

Review of Sustainable Use of Biodiversity (SUB)
Program Initiative's
Use of Local and Indigenous Knowledge in Selected Projects

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January 2002
SUB Intern 2001

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Review of Sustainable Use of Biodiversity (SUB) Program Initiative's Use of Local and Indigenous Knowledge in Selected Projects

1.0 Review of SUB Projects: an Overview of the Related Concepts

The purpose of this report is to present the findings of a review that was conducted on selected SUB-funded projects. The review was conducted in order to examine how effectively local or indigenous ecological knowledge was incorporated in SUB programming and project implementation. From the review process, there also emerged the recognition of the need for methodology that could be usefully incorporated into project design. This methodology, a brief outline of which is provided in section 7.0, is a means to ensure that the level of enquiry into the nature of local and indigenous knowledge is broad and pluralistic enough so that local knowledge is regarded systemically and not in a piecemeal fashion.

The report is structured so that an overview of the concepts related to biodiversity and local/indigenous knowledge is first presented as an introduction to the issue. The introductory section is followed by the methods used to conduct the review. The review findings are then presented in a summary format. Points for discussion and further inquiry are provided a conclusion to the review and are meant to facilitate further development of the process of incorporating local and traditional knowledge in development projects. An introduction to a complex systems approach/methodology for understanding local and indigenous knowledge is presented in the final section of the report. Finally, the guidelines that were developed for the review are in Appendix II and the details of the findings for each of the six projects reviewed are presented in Appendices III-VIII.

1.1 The Use of Local and Indigenous Knowledge for Sustainable Biodiversity Use: Implications for Development Projects

There are a number of issues that arise in discussions of biodiversity and local/indigenous knowledge. The first is the realization that cultural diversity and biological diversity are inter-related: indigenous and traditional peoples inhabit many of the areas of highest biological diversity (Posey and Overall, 1990). The World Wide Fund for Nature (WWF) commissioned a study that cross-mapped indigenous peoples to global ecoregions and found that of the 900 ecoregions of the world, 225 were identified as critical for biodiversity conservation. Within these regions, 67 percent of the world's ethnolinguistic groups occur (Oviedo and Maffi, 2000).

Understanding the essence of local and indigenous knowledge (L/IK) and how to fully integrate knowledge systems for contemporary resource management issues still remains an elusive ideal, although the current interest and intent to use L/IK is unprecedented. Heightened interest in local and indigenous ecological knowledge is evident in academic literature, government conventions, declarations, and countless conferences dedicated to IK, and is now also seen regularly in global and international resource conservation policy and methodology. Most significant is Article 8j of the 1992 Convention on Biological Diversity (CBD - of which 152 countries are signatories) that relates specifically to the preservation and maintenance of indigenous and local knowledge and practices. The burgeoning interest in indigenous knowledge (IK) by western-trained scholars and development practitioners is also reflected at the local level.

In one community in southern Ontario alone, the number of non-indigenous researchers going to study the local knowledge was reported to be as high as 50-60 per year (Lucky, 1995, cited by Simpson, 2001).

The issue then, is one of how effectively this increased interest in L/IK is translated into full understanding and effective use of local knowledge systems in projects related to the use and conservation of biodiversity. If the use of L/IK is to fuel the ultimate objective of self determination of indigenous peoples (Burgess, 1999), then the issue remains as to how L/IK can be used to ensure ecological integrity, food security and sustainable livelihoods as well. The use of IEK, while often regarded as a political issue, is very much an 'ecological' issue and concerns the sustainable use and interaction with the biophysical components of our ecosystems.

Efforts to ask what local and indigenous knowledge is today, how it can be understood in all of its complexity and how it can contribute to resource management should be made instead of extracting piecemeal factual knowledge that suits the particular needs of the development issue. This concern was raised by many participants, who were largely First Nations, at a conference, called 'Honouring Indigenous Knowledge' (Saskatchewan, May 2001). Some people expressed the belief that IK could never be fully incorporated into resource management because it is simply not understood and compatibility with western science is questionable. Simpson (2001) stated that documenting and integrating IK over the last ten years has done little to protect the land from environmental destruction. The factual aspects of indigenous knowledge is generally emphasized over the spiritual foundations, worldviews and values of indigenous peoples, and this has not served indigenous peoples nor the environment well. In the absence of traditional ways of sharing knowledge, many First Nations fear the traditional context for IK will be lost and, in the end, the knowledge will be misused (Lambrou, 1998).

These two dimensions of context and time, are considered here to be important to understanding the complexity inherent in the use of local and indigenous knowledge in research and development interventions. Dealing with complexity in local and indigenous communities calls for a conceptual framework or approach that is able to order various sources of and kinds of information. This approach should enable development practitioners and researchers to better understand the complexity inherent in the often stated objective of incorporating local and indigenous ecological knowledge systems in programming and projects.

1.2 The use of Local and Indigenous Knowledge within SUB Programming

SUB's emphasis on the use of local and indigenous knowledge for biodiversity conservation is a complex initiative. Biodiversity is considered a 'whole systems science', in that species-specific requirements depend on the functioning of the broader ecosystem, which includes biophysical as well as social elements. Given this view, local and indigenous knowledge can provide critical insight into general ecosystem functioning due to the daily, practical and long-term nature of human-ecosystem interactions in many non-industrialized/subsistence societies. Issues of biodiversity loss should not be dealt with without equal consideration of the issues related to loss of local and indigenous knowledge, since the two are inter-related trends occurring on a global scale.

The premise for much of SUB's programming is that local and indigenous knowledge is to inform and be incorporated into institutional research and development. Thus, knowledge commensurability is assumed. This may not always be the case, however, since local knowledge may differ epistemologically. It is also socially and spiritually connected and embedded in local context of use. The spiritual dimension of knowledge or the institutional dimension of resource use are often overlooked, even though they may be fundamental to how local and indigenous peoples conceptualize and utilize their resources (Gray, 1999). Once extracted and used within another conceptual framework, such as a model for resource management, the very nature of the knowledge changes. It is often the case that only some elements of local and indigenous knowledge are used, those that fit within and are validated by the western models of development and resource use. Therefore, it is useful to examine what assumptions are being made about local and indigenous knowledge at both the programming and project level. How much do the researchers involved in the project address the framework that local and indigenous knowledge has operated within, in terms of social institutions, religious beliefs, and the specific biophysical characteristics of the ecosystem and how much all of this has changed over time? The examination of the potential for the incorporation of local and indigenous knowledge in research and development projects is driven by the fundamental question: 'Does the use of local and indigenous knowledge for biodiversity conservation separate indigenous knowledge from the context from which meaning is derived and is this context operative in contemporary society?'

1.3 Local and Indigenous Knowledge and Use of Biodiversity

The origins of the abstract concepts of biodiversity and conservation are non-indigenous, largely western-oriented concepts. The term biodiversity originated relatively recently in the late 1980s. The concept is often associated with 'wild diversity' and ecosystems unimpacted by humans. This is a misleading conception of biodiversity, since most ecosystems have historically, been subjected to human influence.

Conceptions of biodiversity vary according to scale, perspective and values (Figure 1). Biodiversity can be understood and integrated across different scales, which includes the landscape, ecosystem, population and genetic scales. Cross-scale integration ensures that the emphasis on one scale is not done without examining the influence on other scales. For example, if crop genetic diversity, is emphasized, the larger agroecosystem that it is embedded within should be examined for interrelationships in terms of impacts of change at one scale on another.

The concept of biodiversity also varies according to perspective, or worldview. Often, the view of nature as something to be conserved depends on the perspective of nature as separate from culture and that it must be managed. This dualistic view of culture and nature is often at odds with a more integrated view of nature and human activity within it, which takes a more unified perspective, in that nature/biodiversity are not objectified and able to be managed by people (Berkes, 1999). Some even go so far as to suggest that indigenous and local communities are hostile to the tenets of biodiversity and conservation (Langton, 1996, cited in Posey, 1999). The concept of *use of*

biodiversity requires import and modification in order to make sense. The daily interaction within forests to harvest medicines or the planting of several crop varieties to ensure harvest, may not be considered by the community or farmer as the *use* of biodiversity. Instead, conceptions of livelihood practices are constructed according to need and are not described or viewed in the same way as a trained researcher who objectifies the system and describes daily practice as *use* of biodiversity.

There are also different and often divergent values attached to biodiversity, which include aesthetic, economic, ecocentric, anthropocentric values. It is often difficult to reconcile different values and sometimes the basis for biodiversity conservation is ecocentric, recognizing the intrinsic value of species or landscape diversity. This value may be at odds with the local economic value attribution to biodiversity. Often the values underpinning the concept are not explicit but instead guide policy and research. Biodiversity is seen, in one view, the landscape, ecosystem or habitat that contains multiple species and structural diversity, in a unified pattern of high stability and resilience. Conservation motives range from preserving diversity as global heritage, to putting aside areas for carbon sequestration. Other views may relate to preservation to ensure a future source of medicine. Biodiversity also represents economic advantage - there is more opportunity to serve a local market by a higher number of products.

Therefore, biodiversity use and conservation occurs under different guises and is interpreted in many ways, with different values attached. It is therefore important to be mindful of the different scales, perspectives and values attached to biodiversity if common goals and the means to achieve those goals are to be reached.

Biological diversity is assumed by many local and indigenous communities to be a part of every day life. Choices to nurture wild or cultivated diversity are based on livelihood concerns. Conservation of biodiversity has often been used in reference to daily practices for subsistence livelihoods, where communities and farmers' groups maintain the ecosystem in a diverse state for utilitarian purposes to maintain food security, or to provide a source of medicine. Agrobiodiversity is the term extended to the farmer who experiments with plant genetics to develop new local varieties, or who maintains diversity by creating habitat by burning, maintaining fallow areas, etc. In the case of medicinal plants, the maintenance of diversity in fallows, home gardens, or in primary or secondary forest is to maintain the local health care system. Both examples represent maintenance of a system of diversity for utilitarian purposes, supported by the prevailing socio-cultural, economic and ecological features of the local ecosystem. It is this supportive structure that is subject to change over time, with changing values, economics and ecological change, thus the support framework for the maintenance of diversity can be eroded. This is the fundamental argument for the greater depth of understanding of local and indigenous knowledge that is required if this knowledge system is to provide the basis for sustainable use and conservation of biodiversity.

Another important aspect to biodiversity is the continuum of *wild* and *cultivated* biodiversity. Agrobiodiversity, largely concerned with cultivated diversity, is based on the premise that maintaining crop genetic diversity ensures food security. Medicinal plant diversity ensures that sources of medicines are widely available through the development of home gardens and/or accessibility to specific habitats, encompassing both wild and cultivated biodiversity ideals.

Biodiversity conservation is motivated by different values, ranging from landscape conservation incentives for global heritage to economic incentives, to primary health care or for food security. The values and social structures and institutions that provide the framework supporting biodiversity conservation are just as variable as the values that underpin conservation efforts.

This is the justification for the premise taken in this report, that program/projects based on the concept of conservation of biodiversity should ensure a common understanding of what biodiversity means to research partners and the participating communities and farmers. In addition, the values, perspectives and different scales in which biodiversity is understood, underpin efforts for sustainable use and conservation of biodiversity and should be made transparent. At the very minimum, the concept of biodiversity needs to be discussed with community members, farmers and all other project participants in the project design stage, if just to obtain the '*peoples' perspective*' of biodiversity that SUB policy outlines as one of their aims (Sustainable Use of Biodiversity Program Plan 1998-2000). Local/indigenous subsistence practices that appear to conserve biodiversity, are ways of life based on prevailing social and ecological conditions, and may not be considered in more abstract terms as a 'sustainable use of biodiversity'. With social and ecological change, it might be difficult to preserve a way of life, but easier to reconcile the *function* of a specific practice if there is a common basis for understanding by all participants. There is then more likelihood that the practice can continue within a new context.

The objective of supporting indigenous knowledge of biodiversity may also be understood and valued as support for 'multiple resource use by community members' or as a 'means of value added to resource use' by community members. Biodiversity is a concept that has been reified to some extent - it is not a concrete 'thing', it is relative and represents one particular construction of a reality - ecosystems have been human-modified for centuries, and to understand the history of land use and what motivates land use practices is critical. Why is biodiversity important and for whom - this may be implicit and obvious, but should be made clear in project documents, especially since the term biodiversity can carry with it western constructions and different incentives for conservation than the community or farmer's group might have.

The SUB program plan's consistent reference to the '*peoples' perspective*' ('As indigenous peoples and local communities have typically been excluded from the research process, particular attention will be given to supporting the development of research tools and skills within communities that can effectively contribute to the documentation of biodiversity from a *local perspective*' [SUB Program Plan 1998-2000]). The nature of this objective prompted the author of the report to send out questions to the regional offices and staff in Ottawa in an attempt to hear their views on biodiversity and if possible, the views of the research partners. In addition, views of local and indigenous knowledge within a project context were questioned in order to make links with biodiversity issues. The questions sent to various team members are listed in Appendix I. There was only one response to these questions, so there are no data provided here, however, it is still considered to be a very interesting area of discussion, especially if SUB's commitment to understanding biodiversity from a local perspective is to be realized.

SUB's commitment to local and indigenous knowledge issues emphasizes a

number of critical areas of research. It includes research on guidelines and protocols for indigenous and local peoples to negotiate their relationship with outside groups. The SUB PI is also committed to supporting indigenous and local peoples to document their knowledge of biodiversity and to better understand their own systems of innovation and knowledge production (Whyte and Spendjian, 1999). The main challenge to SUB in using local and indigenous knowledge is to be able to articulate a different world view (SUB documents).

In summary, SUB is the only program initiative (PI) to explicitly focus on the needs of indigenous peoples in the context of biodiversity conservation. An external review of the SUB PI concluded that SUB's work was very important in this regard: 'The reviewers have nothing but praise for SUB's achievements in this area.' (Whyte and Spendjian, 1999). The positive evaluation indicates that SUB is working in the right direction. However, the position taken in this report is that there is a need to incorporate SUB's current political perspective on indigenous peoples with a greater examination of how to effectively incorporate local and indigenous knowledge while maintaining or enhancing ecological integrity. More effective integration of local knowledge works towards the creation of a research environment that examines the complex nature of local knowledge in terms of its dynamic and place-based qualities.

1.3.1 Categories for the Review of Local and Indigenous Knowledge

For the purposes of this review, four broad categories were chosen to order the discussion of local and indigenous knowledge in projects related to the sustainable use of biodiversity. The categories are:

- i) Participation
- ii) Property Rights Policy and Land Tenure
- iii) Temporality of Knowledge
- iv) Context for Knowledge.

The results from the more detailed set of guidelines used in the review have been summarized (in section 4.0) under these categories. They also represent the aspects of local and indigenous knowledge that should be considered in programming and project development and form the basis of an approach or methodology to understanding L/IK in research and development initiatives. An in-depth discussion of each of these categories is beyond the scope of this review, but a brief introduction to each is outlined here.

Participation by local/indigenous peoples is a fundamental criterion in any research project. Participation ensures local ownership and a plurality of perspectives, essential to sustainable resource use. Full and collaborative participation includes: 1) the commitment to involve community members and local institutions in research and development issues; 2) the intent to devolve power and authority from central/state to more local and often indigenous institutions; 3) the desire to link and reconcile the objectives of socioeconomic development with environmental conservation and protection; 4) the legitimization of local and/or indigenous resource and property rights; and 5) a belief in the desirability of including traditional values and ecological knowledge in the research/development issue (after Kellert, et al., 2000). If the research process is to be truly collaborative, then local and indigenous peoples should have control over the identification of areas and issues where research is needed as well as the design and delivery of the methodology. Indigenous peoples should participate in the collection and

analysis of data and have equal control of the dissemination of information and research findings. If the role of local and indigenous peoples is one of advisor or informant, then the research can be disempowering. Anything less than a full decision-making participation by indigenous peoples is not truly participatory (Lambrou, 1997).

Intellectual property rights, informed consent and resource tenure are also key to regulating how people act within their environment. Respect and equity cannot be achieved without recognition of the basic rights of indigenous peoples, traditional societies and local communities, including full disclosure about all activities that affect them. Basic rights include the right to self determination for indigenous peoples, right of local determination for traditional and local communities, guarantees of territorial and land rights, right to development, equitable benefit sharing, collective rights for communities, and religious and customary rights. 'It is these rights that underlie the shifts in power necessary to enhance and support local, in situ biodiversity conservation.' (Slikkerveer, 1999). The political context to L/IK is critical as a point of identity for local and indigenous communities. Prior informed consent (PIC) (or even better, voluntary participation) is another means of ensuring awareness and greater local participation in projects. PIC is a method of formulating strategies, policies and projects through negotiation with the affected communities as equal parties in the process (IUCN, 1997; Posey and Dutfield, 1996). Project implementation only occurs when these communities have given their informed consent. This is increasingly called upon as a pre-condition for projects in indigenous communities, especially when intellectual property rights are threatened, which usually occurs when documenting and using indigenous knowledge. Procedures for acquiring and sharing knowledge, including innovations and practices as well as procedures for rights and responsibilities are also best defined within the community. Reference to resource tenure refers to the social and kin relationships that often regulate land and resource use. According to Clay et al. (2000), indigenous peoples identify resource tenure as the most important issue for their survival and well being.

The last two categories for the review and discussion of L/IK in programming and projects are the *spatial* and *temporal* dimensions of local or indigenous knowledge systems. Understanding local and indigenous ecological knowledge occurs at the interface of the two dimensions of *space* and *time*. This perspective considers the nature of knowledge as *embedded* in place and context and *dynamic* in that it is constantly changing and evolving. The changing or dynamic nature of the local knowledge base is a result of the evolving reciprocal relationship of human communities to their local ecosystem within which they manage their livelihoods. The dynamic or 'temporal dimension' of knowledge refers to changes in context that occur over time and the impacts that change have on the transfer, retention and use of local and indigenous knowledge. The changing nature of societies, as they become integrated globally, can impact a range of social and ecological variables that define the structure and context for knowledge. The end result of change is usually the erosion of traditional local and indigenous knowledge and loss of specific practices that were relied upon in the past for survival and maintenance. Local and indigenous knowledge is also considered a dynamic and evolving process. Traditional resource management systems should not be viewed as static traditions, but instead as 'adaptive responses' (Berkes, 1999) to prevailing conditions. However, it is clear that when past knowledge that functioned under a

specific set of social and ecological conditions is replaced by knowledge operative under a new set of conditions, useful and functional knowledge that maintained communities for thousands of years is forgotten.

The context, or 'spatial dimension' is the embedded, highly localized nature of local and indigenous knowledge - how local knowledge is situated in the context of use, within prevailing social structures and institutions in the community, the education system, biophysical features, population demographics, religious practices, etc. and the relationships between them. Thus understanding local context and epistemology is the basis for creating and articulating new knowledge through collaboration with other worldviews and perspectives.

1.4 Project Review Objectives

The objectives of the project review are to:

1. To work in collaboration with members of the SUB PI team who are currently reviewing SUB-funded activities in agrobiodiversity and medicinal plants, in an attempt to bring forward issues of local/indigenous knowledge to these reviews, in terms of how projects are incorporating local/indigenous knowledge;
2. To make specific recommendations on areas where the incorporation of local/indigenous knowledge for use in conservation/sustainable use of biodiversity could be more effective, in order to assist (where needed) the SUB PI team in incorporating issues, methodologies and perspectives related to local and indigenous knowledge into its program

1.5 Sources of Information

IDRIS

PCRs

Project Appraisal Documents

Evaluations (if available)

TRIPs Reports

Discussions with the POs and others associated with projects being reviewed:

Ronnie Vernooij, Sheri Arnott, Erin Omanique, Danna Leaman, Carolyn Switzer, Kirit Patel, Paul Voroney, Tony Winson. Email response from Dr. Anil Gupta

2.0 Project Review Methods: Approach and Analysis

The review is based on a mode of inquiry that integrates objectives of SUB and assumptions made at the programming level with actual field data from several projects that depend on local and indigenous knowledge in the project cycle. The SUB focus areas (increasing agrobiodiversity and medicinal plant diversity) are specific entry points to understanding the role of local and indigenous knowledge, but an attempt will be made to review the research issue in broader systemic terms. This means that the review will use, as a unit of analysis, the local ecosystem and consider projects in terms of how the issues fit with the local social, biophysical, economic and cultural framework. Within

this conceptual framework, how context and change may influence the use of local and indigenous knowledge in that particular project setting will be considered.

The review guidelines were developed by first examining IDRC's foci and SUB's objectives and suggested assumptions made in those objectives. A list of questions was generated from this exercise which provided the basis for the review guidelines.

If the premise is that if local and indigenous knowledge is to be used in projects, then there are certain conditions that need to be in place to ensure this. Participation, policy and the contextual and temporal nature of local and indigenous knowledge are categories to be considered in project design and implementation so that multiple perspectives and an understanding of the complexity of local/indigenous knowledge are used to guide projects to effectively use local and indigenous knowledge.

Six SUB supported projects, approved between 1992-1998 were selected for review. Each project is briefly discussed in terms of its strengths and weaknesses, then the projects are discussed under the categories: Participation, Policy, Context of L/IK and Temporality of L/IK.

2.1 Local/Indigenous Knowledge in SUB Programming: IDRC and SUB Objectives

Deconstructing IDRC's statement of support to biodiversity conservation and the objectives of SUB as an exercise to develop review guidelines involved consideration of the objectives in terms of their local and indigenous knowledge component. In other words, how the objectives expressly rely on the use and incorporation of local and indigenous knowledge in projects was considered in light of the inherent complexity in using local/indigenous knowledge.

2.1.1 IDRC Support for Biodiversity Use and Conservation

In general, IDRC's support is directed to the work of scientists and researchers in the South. IDRC favours multidisciplinary, participatory research where researchers from different disciplines work with local people to devise solutions to local problems. Involving beneficiaries in the research process at the outset increases the likelihood that communities will use research results.

IDRC will support research that concentrates on:

1. Indigenous knowledge of biodiversity and the institutions needed to protect and use this knowledge;
2. The sustainable use of biodiversity to conserve plants and animals;
3. The involvement of communities in the development and conservation of agricultural and aquatic biodiversity; and
4. Models for intellectual property and traditional resource rights to ensure equitable sharing of the benefits of biodiversity.

2.1.2 SUB PI Objectives:

The research challenge is to identify the physical, socio-economic and cultural conditions under which the use of biological resources enhances the conservation of biological diversity (SUB Program Plan 1998-2000)

The specific objectives of SUB that involve L/IK are listed in this section along with comments on the objectives as they relate to the use of local and traditional knowledge.

Objective 1: to promote the use, maintenance and enhancement of the knowledge, innovations and practices of indigenous and local communities that conserve and sustainably use biodiversity

Comments:

This objective implies a significant reliance on local and indigenous knowledge (local and indigenous knowledge) for conservation and use of biodiversity. The complexity of local knowledge because it is embedded in local context of use and because it is subject to change or gradual erosion, is critical. Therefore, it is important to gain a broad based understanding of what informs local and indigenous knowledge and what social structures are in place that support the continued use of local and indigenous knowledge for conservation and use of biodiversity and what is threatening loss of local and indigenous knowledge.

Objective 2: to support the creation of models for policy and legislation that recognize the rights of indigenous and local communities to genetic resources and the equitable sharing of the benefits of the use of these resources in the context of intellectual property regimes

Comments:

This objective is interpreted to refer to both intellectual property rights (IPR) and resource access rights, primarily land tenure. For local rights to be recognized, the first consideration is that the project beneficiaries are aware of the research, in terms of context, motives, risks and benefits, and give their consent before it begins, in accordance with Prior Informed Consent (PIC) guidelines. In addition, when local and indigenous knowledge is to be used in a broader context and is applicable outside the local setting, there must be mechanisms in place so it is not appropriated. Awareness of these rights are critical when conducting research in local and indigenous communities and the development of appropriate models to confer protection are needed to ensure equity in the benefits of the research to all knowledge holders.

Objective 3: to develop incentives, methods and policies that facilitate strategies for conservation and enhancement of *in situ* agricultural and aquatic biodiversity; and the participation of communities in their design and implementation.

Comments:

The facilitation of conservation strategies for agricultural biodiversity requires the use of local and indigenous knowledge to improve the cultivated diversity and production of useful crops as well as the associated habitats. This objective suggests that the local and indigenous knowledge that is most useful is that which confers strategies for conservation of certain useful species.

Objective 4: Participation of communities in the design and implementation of strategies for the conservation and enhancement of agricultural and aquatic biodiversity.

Comments:

Full collaborative participation is ensured when beneficiary groups/communities are involved in all stages of project development, from issue identification to analysis of results. Frequently, the issue is determined outside the community and the structure of the project is an imposed framework that local and indigenous communities/groups must

conform to. In many instances, the scientific paradigm provides the axioms and standards that local and indigenous knowledge is compared to.

Objective 5: to support the development of options for sustainable livelihoods and incentives for sustainable use of natural products from biodiversity resources, especially medicinal plants.

Comments:

Factors contributing to habitat destruction have been addressed and how habitat destruction may influence loss of local and indigenous knowledge. In addition, the contribution of local and indigenous knowledge to local strategies for the restoration and conservation of declining habitat is important to consider under this objective.

2.1.3 Assumptions and Research Questions

Most policy carries with it certain assumptions. Questioning assumptions challenges the very basis of action. It is suggested that the above objectives that inform SUB programming and projects contain some assumptions. These are stated below and represent the author's interpretation only. These assumptions assisted with developing a set of research questions, which were the basis for the development of the guidelines used for the review.

Assumption 1. *There exists knowledge of biodiversity within local/indigenous communities*

Research Questions

- What does 'knowledge of biodiversity' mean? Are different perspectives of biodiversity considered?
- What is threatening this local/indigenous knowledge of biodiversity and are these factors addressed in the project?
- How often does a project identify local and indigenous knowledge as (implicitly or explicitly) conserving and sustainably using biodiversity?
- Are there efforts within SUB programming/projects to examine the impacts of social-ecological change on local and indigenous knowledge and subsequent loss of knowledge? (could there be a specific objective to address this issue, since there is a link between loss of biodiversity and loss of local knowledge).

Assumption 2: *Social institutions play a role in biodiversity conservation*

Research Questions

- What social institutions play a role in biodiversity conservation and are they threatened by social change?
- Are they traditional institutions or have they been evolving to meet changing needs?

Assumption 3. *By using local/indigenous knowledge of biodiversity (for health, agriculture or sustainable livelihoods), there is incentive to maintain and conserve biodiversity (therefore, 'conservation through use')*

Research Questions

- Does use ensure conservation? Is local and indigenous knowledge the key to understanding use and is that what local and indigenous knowledge is (knowledge that is required to use something)?
- Why is conservation of biodiversity important - is it for maintenance of ecosystems for global homeostasis or is it for local utilitarian purposes through sustainable livelihoods? Are the different values discussed among participants and the implications of these values for sustainable use?

Assumption 4. *That local/indigenous knowledge can be articulated as conservation strategies through participation*

Research Questions

- How are existing conservation strategies elicited - what methods are used?
- What methods are used for community participation
- Participation is the main idea in this objective - How participatory and what do the methods set out to do - elicit existing local strategies and/or to have local participants' input into developing new ones?
- Are stakeholder issues addressed?
- If there are supposedly conservation strategies in place; are they explicitly so or are they embedded in the socio-cultural elements of the community?
- Do the participatory methodologies/methods draw out the 'embedded' nature of local and indigenous knowledge - do they consider religious practices, social structures, ecological conditions, etc., as providing the context for local and indigenous knowledge?
- Do the research projects incorporate multiple perspectives on the problem and the methods to deal with it the problem, so that local/indigenous knowledge is brought in to the project cycle initially?

Assumption 5. *That beneficiaries will have the awareness and means to contribute to strategies for intellectual rights protection*

Research Questions

- Are communities aware of the issues around IPRs?
- do farmers/communities have the resources for knowledge protection?
- are researchers, program officers and donors aware of the rang of tools and options available for knowledge protection?

Assumption 6: *Western scientific knowledge (WSK) and indigenous knowledge are compatible and can be integrated for decision-making¹ (SUB Prospectus)*

Research Questions

¹ SUB's programming strategy (Prospectus 2000), states that the strategy is to bring 'scientific understanding of local perspectives and management of biodiversity into appropriate decision making and policy debates'. SUB promotes participatory and interdisciplinary research processes that support the integration of social science, natural science, and traditional methodologies and perspectives

- Is the scientific paradigm too restrictive - is there an understanding of keeping local and indigenous knowledge in its context of use or of the consequences of taking it out of context?
- Can IK be integrated with WSK within a new context of use?

Assumption 7: Using/documenting local and indigenous knowledge serves to maintain/preserve it

Research Question

(note: this is an implicit assumption in the use of local and indigenous knowledge - if it is depended upon for use, then the knowledge has to be documented)

- Is the use and documentation of IK enough* to maintain a sustainable knowledge base from which to incorporate into biodiversity conservation?

(*how does documentation and use deal with the evolving nature of IK - is re-articulation or formalization a necessary requirement?)

2.2 Indigenous Knowledge in Subthemes: Medicinal and Aromatic plants and Agrobiodiversity

It is acknowledged within this report that the subthemes identified as agrobiodiversity and medicinal plants are no longer functional as distinct themes, but are now merging as an integrated whole, defining a larger area of study within SUB programming. However, since the themes were in existence during the review, and the projects were implemented according to specific aims, these are elaborated here solely for the purpose of the review and do not suggest that the distinct themes should continue to divide projects within SUB.

2.2.1 Agrobiodiversity

The Agrobiodiversity theme within SUB aims to:

1. generate new insights and knowledge, be responsive to user needs,
2. decrease the erosion of crop diversity,
3. develop methodology, build capacity and empower local communities; and
4. change perceptions and attitudes. (Vernooy and Goertzen, 2000)

All of these aims incorporate the use of IK to some extent and these have informed the criteria used here

2.2.2 Medicinal and Aromatic Plants (MAPS)

The Medicinal and Aromatic Plants (MAPS) theme identifies the key issues as: (those related to the use of local and indigenous knowledge are listed)

1. Biodiversity conservation and management - the need to encourage sustainable management practices in policy and action to conserve and protect medicinally useful species and genetic diversity from habitat destruction².

² e.g. non sustainable levels of harvest from wild populations

2. Social and Cultural - the need to document local and traditional knowledge of medicinal plants which are threatened by cultural change and diminishing access to particular natural environments; and the need to recognize the relationship between increasing poverty and the diminishing ability of local communities to control and manage natural resources sustainably. (www.idrc.ca/biodiversity/projects/proj)

The specific research focus on the use of indigenous knowledge is by supporting collaborative research between local communities and scientific institutions using participatory research methodologies. Documentation and development of medicinal plants based on traditional knowledge must ensure that local communities have control of, access to, and benefits from research through IPR legislation, protocols and other mechanisms.

Local and indigenous knowledge will also play a large role in the biodiversity conservation focus, where uses of medicinal plants and their taxonomy will be documented, as well as relative abundance, those endangered species, and for establishing community-based conservation practices.

2.2.3 Research Questions Relating to Subthemes

Most of the assumptions in the above aims, issues and foci for the two subthemes have already mentioned for the IDRC support statement and SUB objectives. Further research questions generated by the Agrobio and MAPS subthemes are as follows:

- What existing conservation/management practices have been identified - are they traditional/local/indigenous and has their context of practice been identified and is that context for management in place today? Or do the management practices necessitate a merging of 'western scientific' with local?
- Does the use of the term 'establishing' with regard to community based conservation practices, presuppose that conservation practices do not already exist or that if they do, they are not working?
- Is the issue of habitat destruction only in reference to over-harvesting of useful plants, or does it include forces outside the community/beneficiary group, and if so, how is this dealt with?

3.0 Review Guidelines: Rationale

The review guidelines (Appendix II) are divided into the following categories, as outlined below. These categories roughly correspond to the categories that the medicinal plants review has adopted.

3.1 Project Profile Information

Its geographic focus, year of approval, funding received and the project summary identify each project.

3.2 Specific Project Objectives

Each project will have a certain level of commitment to use local and indigenous knowledge, according to the specific objectives of the research project. Each of the project objectives are assessed for how local and indigenous knowledge might contribute

and this is later compared to an assessment as to how effectively local and indigenous knowledge was used to meet the objectives.

3.3 Research Approach

This includes:

1. Participation - which is a crosscutting objective of all research projects. The use of local and indigenous knowledge presupposes full participation, so that the totality of project related information embedded in local knowledge is contributed. Full participation often implies that 'beneficiaries' (usually farmers groups, community groups) are part of the issue identification process, or at least their perspective on the issue forms the basis of project development. In doing so, local participants can express their traditional and contemporary knowledge that contributes to project objectives.

Control over the research design ensures that indigenous knowledge is not taken out of context or misrepresented; a relationship of equals is established; local systems of management will be strengthened; and information and data bases established will be for the benefit of the local community and culture (Stevenson, 1996).

Participation includes issues of issue identification and who's perspective is used. Also, continuous two way dialogue between community 'beneficiaries' and other stakeholders is key to full participation.

2. Linkages between Biodiversity and Local/Indigenous Knowledge

This section is based on the first SUB programming objective and refers to how project participants perceive the inter-related issues of biodiversity loss and loss of traditional knowledge.

3. Biophysical Context for Project - Limits to the biophysical aspect of local ecosystems often constrains what can be achieved. These limiting features may be anthropogenic or naturally occurring or a combination of both. Usually local knowledge provides a sound basis for understanding and assessing these constraints, so perspective is important here.

4. Policy Environment - The project environment should provide opportunities for beneficiaries to understand their rights concerning intellectual property and to assist in the development of models to protect those rights. Also, local and indigenous knowledge can assist in understanding of resource rights and access based on local land tenure systems and, conversely, treatment of land/resource tenure assists with better understanding motives or disincentives to conservation strategies.

5. Project Assumptions - Most development initiatives carry with them implicit or explicit assumptions about the environment they are working within. Questioning assumptions regarding different values attached to biodiversity helps to clarify different perspectives. There are also differing views of what local and indigenous knowledge is and how it can fit into the project cycle.

3.4 Project Focus: Project Information Collected that Uses Local and Indigenous Knowledge

Project focus is further divided into:

Inputs - The kinds of information a project requires that relies on local knowledge are varied and numerous, and range from using local taxonomies, local innovations to complex management strategies.

Methods Used - How particular elements of local knowledge are used in the project cycle is largely determined by the methods used. For local and indigenous knowledge to be used effectively and not appropriated, methods should be mindful of context, and the dynamic nature of local knowledge and appreciate it for how it is useful in that particular setting and circumstance. Therefore, the guidelines for the review of methods consider if the project participants consider regulatory elements of prevailing social structures, the impact of current population levels, the modern education system, and current religious beliefs. The methods should also be designed to explore the historical and change-related nature of local knowledge to determine if past traditions are of use today, if they are being transferred to new generations and the impacts of social change on the erosion and loss of local and indigenous knowledge.

Outputs - the intended outputs of SUB projects in general are assessed for how local knowledge has assisted in their realization and if local beneficiaries have benefited from the use of their knowledge in the project.

3.5 Limitations of the Review

There are very clear limitations to conducting a review of this nature. Compiling information from diverse sources of written material and interviews with project leaders and then categorizing the information into structured criteria does not provide a complete picture of the project. What is missing is closer involvement with the project, which provides the detailed contextual information that written materials do not capture.

A disjuncture occurs between theory/ideology and practice. This gap can be large, since what is stated in project objectives, may not be the same as what was encountered and done in practice, and the latter is often difficult to glean from project completion reports, when they are available.

Another important consideration is that the author reviewed some projects that specifically target local and indigenous knowledge, such as SRISTI and the Kuna-Embera, and for that reason may have a more in-depth review because the information was more specific. Others projects such as slash/mulch, where the approach to IK is more implicit, the review turns out differently. Thus, each project review should be viewed in context. Finally, mistakes and mis-interpretations were anticipated so all comments, criticisms and necessary changes were invited, so that the review would be as complete and as accurate as possible. Feedback was solicited on several occasions:

- 1) when the review guidelines were sent out to various team members for comments;
- 2) when a project review was drafted, it was sent to the programme officer most closely involved in the project;
- 3) at the Montreal SUB team meeting in November 2001, the report was presented and discussed and comments were invited at that time.

4.0 Summary of the Analysis of the Results of the SUB review

The review was based on six SUB supported projects, which were recommended for review by five SUB team members. The projects were chosen on the basis of their

geographical representation, and the high degree of dependence on local and traditional knowledge.

1. Traditional Medicine of the Islands (TRAMIL - Central America Phase III);
2. Community Biodiversity Conservation and Development Project (CBDC);
3. Spatio-Temporal Dynamics of Sorghum Genetic Diversity and Farmer Selection in situ (Ethiopia);
4. Improvement of Slash/Mulch Systems and Frijol Tapado Systems (Guelph/Costa Rica) II;
5. Indigenous Knowledge and Innovation Network (SRISTI); and
6. Conservation of Embera and Kuna Medicinal Plants and Associated Traditional Knowledge (Phase II).

A brief description of each project is provided before each summary in order to orient the reader to the nature of the project itself and how it involves the incorporation of local or indigenous ecological knowledge. The guidelines for the review that were developed to structure the review process are found in Appendix II. The detailed reviews for each project, based on these guidelines, are provided in Appendices III-VIII.

4.1 Overall strengths and weaknesses in each project

In this section each project is summarized from the **point of view of how local and indigenous knowledge is incorporated** into the project. The discussion is centred on identified ‘strengths’, ‘weaknesses’ and ‘gaps’ inherent in each project.

4.1.1 TRAMIL

TRAMIL - Centroamérica is a network linking public and private research organizations, nongovernmental organizations (NGOs), public health agencies and local communities in an interdisciplinary program of research on ethnopharmacology and traditional health practices of communities in the Caribbean. The three main goals of the program are to re-evaluate cultural traditions using medicinal plants; to provide a scientific basis for the rational application of traditional medicines; and to identify significant interactions between the biodiversity of medicinal plants, local people and their tropical environment, as a basis for conserving sites deemed a global priority in terms of biological and cultural diversity.

The **strength** of the TRAMIL program lies in the objective of tying into large-scale landscape conservation initiatives. In particular, the goal is to identify ‘significant interactions between biodiversity of medicinal plants, local people and their tropical rainforest environment as a basis for conservation management in sites identified as global priority in terms of the existing biological and cultural diversity.’ (PAD, 1999). It is also stressed that research must focus equally on conservation and management as it does on safety and efficacy.

The GEF proposal states, ‘the goal is to support the *conservation of forest ecosystems* in Central America and the Caribbean through the rational and sustainable use of medicinal plant resources.... to support the conservation and sustainable use of forest ecosystems in the region by identifying conservation and management needs of medicinal plants within key forest ecosystems, and integrating these issues into the broader management of selected forest ecosystems.’ This concerted effort to prioritize sites for

forest conservation indicates that a more holistic approach to plant conservation is taken, and conservation occurs at the scale of the ecosystem, rather than the species. The use of indigenous and ecological knowledge is often suitable at this scale. The ecosystem is largely viewed, by traditional societies (often local and indigenous) as an extension of society, and not broken down into its constituent parts, for study in isolation of the other inter-related parts. The holistic approach to conservation integrates well with the holistic nature of local and indigenous knowledge.

The high level of participation in key areas such as conservation are reflected in statements such as: ‘priorities for management and conservation actions agreed among communities, resource managers, and other stakeholders.’ (expected project outcomes, GEF report), and ‘conservation and management strategies for species and habitats.....emphasizing community involvement and incorporating local knowledge...’ (Terminal Report, Phase II). Another strength is in the outputs: the booklets produced (1991, 1993) are in a very user- friendly style and designed for local people, not academics.

There is some **weakness** in the project, due to the emphasis on the scientific validation of safety and efficacy of traditional medicines. While considered a definite strength in terms of enabling the use of traditional remedies to be taken seriously by mainstream health programs in many Central American countries, the emphasis may sideline the promotion of the holistic or belief-based aspects of traditional medicine. There does not appear to be enough consideration given to the nature of traditional medical practices which involve a strong spiritual belief system, although relatively few remedies are strongly spiritual in nature and when they are, TRAMIL does not take an active interest in them (Leaman, pers com). Since it is acknowledged that L/IK is eroding due to ‘modernization’ (GEF proposal), it may be relevant to include a broader spectrum of plants in order to encourage the traditional local and indigenous knowledge that underpins traditional medicine.

The methods, while based on strongly stated conservation objectives, appear to be slightly underdeveloped and could potentially follow more closely the implied ecosystem approach. This is however, a function of the participatory nature of the program and the methods are to be developed with stakeholders. A possible gap is seen in the outputs, listed in the terminal report, Phase II. They do not emphasize local community involvement in biodiversity conservation on a broader scale, but instead emphasize the safety and efficacy aspect of medicinal plant research. However, in Phase III, biodiversity conservation was emphasized. Phase III is designed to ‘support the domestication and planting of scientifically validated medicinal plants according to the priorities of the country.’ If domestication is encouraged, so should the conservation of forest habitats be similarly emphasized in order to maintain the balance between safety & efficacy and habitat conservation that the project strived for at the outset.

4.1.2 CBDC

The **Community Biodiversity Development and Conservation (CBDC)** Network is a partnership of international and national institutions whose activities promote the role of farmers as community innovators in development, conservation and utilization of plant genetic resources. It was created in 1994 following the Keystone Dialogue, which focused attention on the issue of on-farm conservation and the use of

genetic resources. The first phase of the program aimed to document and validate farmers' knowledge and systems of innovation. Phase II continues Phase I, while putting greater emphasis on the ecosystem approach and gender analysis. The program is based on a model that includes a reduced and refined administrative system, a revised communication network, a more precisely defined technical component, and a more participatory planning and operating agenda.

The **strengths** of the CBDC project are in the specific programming objectives of 'understanding and strengthening the farmers' system of PGR conservation and development in particular, and in biodiversity management in general.' This shows the reliance on farmers' knowledge for both approaches to biodiversity conservation.

Methodologically, the ecosystem approach, which incorporates the socio-cultural, ecological and economic elements of sustainability is a strong point of the **CBDC's** approach. Another innovative approach is RAAKS (rapid appraisal of agricultural knowledge systems), although this also has its limitations (in that it is rapid).

The t-lines used in the program appear to be an effective means to streamline the coalition of 17 different projects in 12 different countries. The t-lines appear to be an attempt to provide consistency and a basis for comparison over such a diverse and large number of projects and countries. The use of the t-lines may, however, be more difficult in practice than in theory (Leppan; Vernooy, pers com)

In reference to the seed supply system (SSS) t-line, it is stated that 'there have been few studies and activities which look at the local seed supply system in a more integrated way and also systematically analyzes the causes behind the weaknesses of local systems.' Examining issues in an integrated way means that many facets of local knowledge are considered, along with the relationships, which is a more comprehensive approach as best use of local and indigenous knowledge. This is further emphasized by the reference to: 'local norms and values as reasons to conserve are strengthened; traditional uses are restored and new sustainable forms of utilization are adopted' (NDSDB t-line).

CBDC's approach appears to be highly participatory. It is clearly stated that local knowledge was incorporated into the research design: '..the first years of the **CBDC** programme were planned and implemented starting from very specific needs and priorities identified at the *local* or national level...' (Phase II proposal) (although this should better read 'local *and* national level'). This emphasizes links between local communities and formal institutions, as indicated by **CBDC's** attempt to 'link community knowledge to global understanding' and 'linking community seed improvement and conservation to formal research institutions.' There is consistent reference to the value of local knowledge systems. Farmers' intellectual innovation dominates the management of local and indigenous plants that provide for much of the food requirements of farming communities' and the importance of NDSDB for local communities is reflected by 'complex indigenous knowledge systems in which women play a strategic role' (NDSDB t-line).

Another strength in the program is the extent to which IPR is addressed (it is also pertinent that RAFI is involved in **CBDC**), in that a Protocol to address these issues has been developed, which 'establishes relationships with participating communities to ensure a bottom up approach'.

A possible **weakness** in the program is that the NDS t-line is only adopted in 5 out of 13 projects (refer to table in Phase II proposal) and it is this t-line that stresses the evolutionary biodiversity of the system as well as its importance for long term food security. Questions also arise as to how much emphasis is placed on traditional crops vs the aim to make accessible a wide range of cultivars: ‘...farmers continue to select from the introduced varieties, thereby creating new lines blending local and exotic cultivars. The combination widens the genetic base of crops and improves local food security (Phase II proposal), but at the same time may have the effect of weakening the knowledge of native or endemic crops. The erosion of traditional knowledge of PGR has not been identified as an issue. An example is the SSS strategy adopted in Zimbabwe, where the emphasis is on storage and distribution of seed stores, with no emphasis on the cause of the issue: why seed supply has become a problem in rural areas (Sheri Arnott, pers com).

Another issue brought up in the evaluation report (Universalia, 1999), is that some respondents expressed the view that the **CBDC** had become too top down when it was trying to be bottom up, and that there should be mechanisms in place to facilitate bottom up planning. This, of course, has implications for the effective use of local and indigenous knowledge. This observation, made during the Phase I evaluation, was to be addressed into in Phase II.

The **gap** identified in the CBDC program is that land and resource tenure are not clearly identified issues. Tenure underpins local conservation mechanisms, so it is apparent that it is something that should be addressed clearly at the programming level.

4.1.3 Spatio-Temporal Dynamics of Sorghum Genetic Diversity and Farmer Selection in situ (Ethiopia)

This project involves the conservation of plant genetic resources that ensures locally adapted and dynamic crop genetic resources are controlled by and directly available to farmers. The project aims to contribute to the food security and well-being of Ethiopian farmers and communities by ensuring that adapted and dynamic crop genetic resources are readily available to them. Researchers will measure the spatio-temporal changes in sorghum landrace diversity on the North Shewa and South Welo study sites over the last 8 years.

The **strength** in the **sorghum diversity project** lies in the approach, which is to develop and implement a model that situates the socio-economic information with the spatio-temporal selection criteria of the farmers. This approach allows a broad range of factors to be considered that are behind decision making. Specifically, the selection criteria, such as distance from living place, soil fertility, last harvest and location in landscape are influenced by socio-economic factors, such as agricultural and economic policies, ‘gender, biological, biotic, abiotic, market, cultural, ethnic and farmer-based selections...’. This approach underpins the approach to understanding local and indigenous knowledge by understanding the context and temporality of knowledge.

Land tenure is well addressed in the project documents, and this is stated as key to food security, as individual landholding is becoming smaller and fragmented - farmers lack security and do not possess a certificate of ownership of the land they are working on. Farmers say they do not have the landholding security to maintain its productivity on a long-term basis.

The main **weakness** in the project is the reliance on expert farmers, and not a cross section of farmers. A cross section might reveal more information of the nature of change and why certain land races are or are not being used and developed.

While elderly informants were interviewed, there is no mention of knowledge transfer (inter or intra-generationally), which, again, is a means to understand why certain land races are chosen for use. This raises the question if there is the opportunity for the intermediate and 'non-expert' farmer to benefit from the knowledge shared during the research. The project also appears to be more consultative than collaborative and as a result, may lose some of the implicit local and indigenous knowledge that is found when participants take more ownership.

An apparent **gap** in the research project is in the dissemination of results. Outputs may not include farmers as much as it targets scientific journals. Project files state: '...results will be shared with other scientists at international conferences and scientific gatherings.' Only 'meetings with participant farmers' are mentioned as including the farmers themselves.

4.1.4 Improvement of Slash/Mulch Systems and Frijol Tapado Systems (Guelph/Costa Rica) II

Phase I of the **Slash/Mulch Systems and Frijol Tapado Systems** project studied a traditional low-input hillside system of bean production in Costa Rica, which uses thick mulch of chopped secondary vegetation to prevent erosion. The project resulted in the agro-ecological and socioeconomic characterization of the slash/mulch or frijol tapado system and two representative case studies. Phase II project focused on the ecological and economic value of the frijol tapado system in terms of its biodiversity richness, in particular concerning the composition and functions of the fallow vegetation, the conservation and transfer of indigenous knowledge and management practices by men and women farmers, and the role of biodiversity in maintaining sustainability. The goal of the project is to improve productivity (per unit of land), increase farmers' income and thus reduce rural poverty, and guarantee the long-term conservation of the natural resource base.

The **strengths** of the frijol tapado project lie in various areas, one of them being the commitment in Phase II to be more highly participatory, with farmers identifying the issues for this phase. It states on pg.i of the appraisal document, that Phase II topics were 'brought forward by the participating farmers...' ('based on Phase I results and shortcomings' -Vernooy, pers com). The PCR states that a lot of attention was paid to the 'meaningful participation of farmers, and they played a role in fieldwork, exchanges and evaluations' and that the 'ultimate beneficiaries' were involved in the stages of design, implementation, review of results and utilization, but not in idea identification. (The P.C.R.III. Project Design and Implementation). The very active involvement of farmers, both men and women, is one of the outstanding features of the project.' (Project Appraisal, pg.i). The farmers themselves also evaluate the project, so there is a significant element of valuing local input into the project evaluation system. The project represents one of the first efforts to move frijol tapado research from academia to the field (Vernooy, pers com). Two universities and NGOs work directly with community groups.

To encourage the continued use of frijol tapado, it is placed and understood within the economic, social and ecological framework (in a socio-economic study) , so the

system is understood within the local context of use, which is an important entry point for understanding local and indigenous knowledge that guides behaviour towards resource use. The extent to which local and indigenous knowledge is depended upon is extensive as it is the implicit basis of the project. The project attempts to introduce value added to an already existing traditional system in a marginal environment.

The primary area of local and indigenous knowledge use is of course, in the agricultural sector, with experiments with seed handling (treatment and storage), soil fertility, slope aspect, timing of planting, and fallow species and evaluation of bean quality, done using ideas and criteria developed in collaboration with farmers (Melendez).

Another issue in the project, which is not identified as either a strength or weakness, is the inequitable land tenure system. It is recognized that it is the marginalized farmers, with no land, who practice frijol tapado. This raises the question of whether there is a place in the project for the issue of land/resource tenure to be addressed. This is a project that helps poor farmers to secure a livelihood, but it cannot tackle the larger issues of why the farmers are there in the first place. The issue was addressed, and they received a request to fund a land purchase initiative (Vernooy, pers com). In addition, in the Melendez paper, she states that land tenure is an issue and can affect frijol tapado. It is recognized as an issue, but there appears to be no means, within the scope of the project to deal with it. This situation may undermine the traditional knowledge associated with frijol tapado, in the long term.

A possible **weakness** in the project is that it does not deal with the issue of biodiversity as directly as some other projects and as the SUB objectives would suggest (Voroney, pers com). The frijol tapado system is one of 'cultivated biodiversity' developed *in situ*, since it is maintained on the farm site. A low number of bean varieties were in use - possibly 5-10 varieties only of bean (Voroney, pers com) were used. The project is about poor farmers working in marginal environments and the strength lies in the assistance given to poor traditional farmers and attempts to add value to their work through an organic bean product.

The implicit assumption made in the project is that farmers' knowledge of the frijol tapado system will be expanded upon by other, University-based knowledge, which will enhance the existing system and increase the economic benefits. The tapado system is an evolving system (Vernooy, pers com) and the dynamic nature of local and indigenous knowledge is acknowledged, however, there are no formal mechanisms in place to transfer the traditional knowledge of the frijol system to the next generations. Also, IPR is 'not addressed explicitly' (Vernooy, pers com). This may be a shortcoming of the project, especially since the same bean varieties are being produced en masse in the United States (Voroney, pers com), which may out-compete any initiative taken by small farmers in Costa Rica.

A possible **gap** in the project is the unrealized potential for increased use of local and indigenous knowledge. IK could be relied on even more extensively to compliment the scientific studies: for example, IK can assess the value of some fallow species for their ability to accumulate phosphorus (it appears that this is based on University research, not local consultation). Also the relationship between biodiversity and productivity is estimated by quantitative research methods. The participant farmers, who use other indicators, are likely aware of this relationship.

Traditional institutions and religious practices are not examined for the context of IK and its contribution to the expanded frijol tapado system. For example, considerations of traditional cultivation practices associated with ritual could be done to determine if there were traditions (no longer widely practiced) that could contribute to more effective seed storage, provide indicators of fertile sites, poor soils, etc. in the fallows.

4.1.5 Indigenous Knowledge and Innovation Network (SRISTI)

The Society for Research and Initiatives for Sustainable Technologies (SRISTI) and the Indian Institute of Management, Ahmedabad (IIMA) have established a network to enhance global and local opportunities for conserving biological diversity and associated knowledge systems by augmenting creativity and innovation at the grassroots. The Indigenous Knowledge Network (IKN) was established during a phase I project and has undertaken research involving social and natural science aspects of local innovations. This work is based on the premise that the linkage between formal and informal (indigenous) knowledge systems must be forged in such a way that the gains from value addition accrue to the innovators and originators of ideas; and that intellectual property rights of local communities must be respected to encourage innovative approaches to problem-solving. The general objective of the second phase of IKN will be to add value to local ecological and technological knowledge by documenting, characterizing, and validating this knowledge and generating products and services that provide incentives and income for grassroots innovators.

The **strengths** in the SRISTI project is that is very locally based, with strong involvement by local innovators within communities. It is considered a 'community driven approach to natural resources management' (Appraisal). 'We insist in our work that two principles be followed without fail: 1) whatever we learn from people must be shared with them in their language; and 2) the source of every innovation must be identified, in order to protect IPR. SRISTI's focus is in the production of written materials that are locally accessible. The newsletter, Honeybee, is published in 6 Asian languages besides English. Most of the project is oriented to information delivery: databases of innovations, institutions and documents pertaining to IK and innovation; articles, reports, as well as many references to educational materials, fellowships to school children, biodiversity contests, etc. (SRISTI report).

The strength of the program also lies in the broad-based framework within which **SRISTI** views and uses local and indigenous knowledge: '...institutions for natural resource management are a part of evolutionary cultural, religious and social experience of any community.' (CPR, 1992). This shows that local and indigenous knowledge is viewed in context (institutions, culture and religion) and the temporality of knowledge (evolution) is made explicit. SRISTI also attempts to merge the western worldview with the local, without the obvious dominance of the former over the latter.

SRISTI also works hard to raise the issue of biodiversity and to generate awareness of biodiversity within communities - biodiversity contests are geared to raise awareness and the contests are considered the first step towards the valorization of IK (Footprints, 1995). A statement from Prof. Gupta serves to illustrate how committed to the goals of conservation the project is: 'But it will be a very limited understanding of Honey Bee approach is one were to relate innovation with conservation under only an utilitarian logic and ethic'. '...the conservation agenda is also pursued through an

evolutionary ethic in which human existence is seen not just through anthropomorphic prism...it is also seen through ecocentric view blended with utilitarian logic.’ As commented by Kirit Patel (email), the ethics of experimentation and innovation is crucial to develop technologies and institutions for sustainable use and conservation.

The **weakness** apparent in SRISTI is the approach taken to implement the goals of biodiversity conservation. This is done through developing ‘a network that will seek to conserve biodiversity through documentation, experimentation and value addition in local innovations of development and diffusion of sustainable technologies and institutions’ (Appraisal). This approach does not link with SRISTI’s broader objectives. Thus, it is possible that the emphasis on innovation may detract from conservation and management, especially within such an expansive program with only two people at the ‘top’. Prof. Gupta and Kirit Patel gave some clarification of this (via email). It was made clear that innovation is closely linked to conservation, through the use of certain tools, such as the ‘gum scraper’, used to assist women in the process of scraping the gum from the *Prosopis* tree. Gupta says, ‘we will submit that without this innovation, the chances for conservation would have been lesser. It is a different matter that this species of tree otherwise grows abundantly and may not need to be conserved in most places. But at places where it provides gum to poor women, it needed to be conserved.’ While there is no doubt that these innovations are indispensable to rural people and in some cases conserve local species, there could be a stronger link to *biodiversity* (multiple species conservation).

There is not a strong link made between biodiversity and the goals of **SRISTI**. One objective is to ‘enrich their cultural and institutional basis of dealing with nature’, but this is not seen as a thread through the project documents, except as ‘germplasm conservation’, and this does not link well to the overall objective. In fact, the 9 objectives are not well linked to biodiversity use.

A **gap** identified in the SRISTI approach is lack of attention given to issues of land/resource tenure. Tenure is not mentioned, which is surprising, given the scope of the above objective (‘enrich their cultural and institutional basis of dealing with nature’). While this may not seem relevant when dealing with indigenous innovation, which is a large part of SRISTI activities, it is important when dealing with some of their stated aims, such as the ‘basis of dealing with nature’.

4.1.6 Conservation of Embera and Kuna Medicinal Plants and Associated Traditional Knowledge (Phase II)

The **Kuna-Embera Project**, Phase II, is based on Phase I which was a successful promotion of traditional knowledge on non-medicinal plant usage, which identified locally endangered plant species and analyzed gender-based differences in knowledge. In the second phase, the work will be divided into three components. The first will attempt to identify just compensatory mechanisms for traditional knowledge on medicinal plants as viewed by indigenous people themselves. The second component will develop plans for in-situ or ex-situ conservation of medicinal plants based on basic knowledge of their biology. The third component will promote the conservation of traditional knowledge of medicinal plants through the development of brochures, the participation of students from the local college and the formal apprenticeship of young people to traditional healers.

The **strength** of the Kuna-Embera project is the strong and explicit link between local and indigenous knowledge and biodiversity conservation. It is stated: ‘we contend that, if conservation action focuses solely on the plants without preserving the traditional knowledge, an important component of cultural diversity would be lost’ and ‘...cultural erosion...is the most severe problem for Kuna people.’ In addition, ‘as the forests of Darien are being cleared for lumber and cash crops, more than biodiversity is being lost; TK [traditional knowledge] evolved over hundreds of years is being eroded. Forest destruction threatens the unique lifestyle of indigenous people.’ Statements such as these illustrate the clear linkages between IK loss and biodiversity loss, issues that have to be addressed if there is to be any resolution.

The project is also participatory-collaborative: ‘The solutions detailed in this proposal have been developed with local people of Embera and Kuna villages’. The Kuna and Embera are the ones who defined issues, and the methodology depends on community-based decisions (Phase II proposal). In addition, the project results are scrutinized by communities: the *Congresos* (reunion of villagers called by the authorities) will cross check research results to ‘identify incorrect information. This kind of collaborative process ensures that local and indigenous knowledge is integrated into the project early in the process.

The project is allied with a very suitable NGO, in that the Fundacion Dobbo Yala’s mission is to: ‘ally indigenous and rural development with environmental conservation.’ The NGO has a ‘clear environmental mission’ which aims to ‘promote, encourage and support initiatives of indigenous and rural communities pertaining to sustainable development or conservation.’

Understanding knowledge transmission is very important in this study: it is part of the formal questionnaire. The issue is very carefully addressed in phase II, objective 3, which specifically deals with transmission: ‘...conservation of traditional knowledge on medicinal plants depends on the interest that the young generation holds for such knowledge.’

A **weakness** in the project may be too little emphasis on *in situ* conservation: ‘we hope to work with 10-20 different species in each village to gather basic biological information and decide on which *in situ* or *ex situ* conservation actions should be undertaken. The reason for this appears to be related to land tenure. In phase II, it states that ‘Land is common property so no villagers hold title to land: it could be possible for almost any villager to engage in *ex situ* conservation. In the case of the Kuna villages, where it is hierarchical, it could be decided to put land aside as a reserve’ (*in situ*). In the case of the Embera village, the question is asked here if there could possibly be more emphasis placed on resolving issues of land tenure so that *in situ* conservation becomes a possibility.

A potential **gap** in the Kuna-Embera project is that the information gained may be western biased- there is no mention of a spiritual or historical component to the study. For example, it is stated that in Phase I: ‘we also carried out intensive ecological inventories...thorough characterization of ecological contexts, densities, and age-class distributions of useful plant species in a wide range of land use types combined with information on use patterns and harvest intensity provides a multi-dimensional framework for constructing endangerment status and management plans of the target species’. ‘The ecological data will be compared with traditional ecological knowledge

using the card game developed in phase I.' If this is the extent of merging different world views, then it appears that the western scientific world view is the dominant paradigm.

4.2 Overview of Four Key Areas of IK incorporation

The four key categories that the guidelines used for the review are: Participation, Policy and Land tenure, Context of Local and indigenous knowledge, and Temporality of Local and indigenous knowledge. The categories were summarized from all sections of the guidelines, and included project methods, project objectives, and outputs. Notes are made in the last section on results delivery. This is briefly discussed because results dissemination is the mechanism for feedback to the use of local and indigenous knowledge by the larger community.

4.2.1 Level of Participation/Collaboration

Most projects had a high level of local participation: in most cases, the project beneficiaries were involved in the development of the project at some point, not always in the issue identification stages, but in implementation and sometimes, evaluation.

The stakeholders involved in **TRAMIL** projects are varied and largely identified at the government and university level. For example, **TRAMIL** Centroamerica is significantly contributing to the capacity building of all those national and regional institutions involved in medicinal plants work through the exchange of scientific research and the practical utilization of the research results (PAD for **TRAMIL** Centroamerica). In addition, **TRAMIL** collaboration with health officers in each country culminated in a meeting hosted by the Health Minister of Panama, and the meeting was attended by representatives of Health Ministers and the main universities from Panama, Nicaragua, Costa Rica, Honduras, Guatemala, El Salvador, Cuba, Venezuela, and Dominican Republic. Stakeholders were involved in the design of the proposed project and the preliminary identification of project sites through national consultation workshops where approximately 100 people participated. The proposal for the third phase was prepared by the Network Coordinator and Project Leader in consultation with all network members for Central America. The common objectives and conceptual framework were developed during a meeting of the network main focal points and further discussions took place with **TRAMIL** members.

Instead, project beneficiaries are listed as rural communities, primary health care workers, NGO's working on health programs for women and children, local initiatives for biodiversity conservation and environment education programs, local scientists and Central American Universities. It is not clear how much influence the rural communities had in forums such as the national workshops and consultations with network members. However, it is clear that the conservation and management strategies will be developed and implemented in collaboration with local communities.

The **CBDC** objectives, as outlined in project files, suggest that projects are very participatory collaborative, as indicated by the aim to strengthen community biodiversity development and conservation systems and techniques by *depending on community-based* activities and by inclusion IK into the research design. The Phase II proposal aims to make field activities farmer-led.

The **Frijol tapado** project was largely collaborative, especially in the second phase. Entry points existed to allow for high participation (Vernooy, pers com). The

issue was developed by the Universidad de Costa Rica and University of Guelph, R. Vernooy, and researchers from NARS and NGOs. In Phase II, topics were ‘brought forward by the participating farmers...’ based on Phase I results and shortcomings’ (Vernooy, pers com).

The **SRISTI** project is very community oriented and highly participatory. **SRISTI** adopts a novel concept of knowledge transfer: not simply transfer of technology but stimulation of learning, experimentation: sharing of the scientific principles behind technologies; concepts of ‘knowing why’ and not simply ‘knowing how’ which evolves from the practitioners and inventors themselves and its returned to them’ (Project Appraisal).

The **Kuna-Embera** project is very participatory-collaborative (as indicated above in section x as one of the project’s strengths), and it is explicitly stated that local communities are involved in design, implementation and analysis.

The **Sorghum diversity** project in Ethiopia states as the beneficiaries: M.Sc. students, field scientists, and farmer experts (from farming communities). It is difficult to determine from the project files how consultative or collaborative the project was, beyond the project’s dependence on expert farmers to identify land races and field characteristics, suggesting a more consultative than collaborative approach, restricted to expert farmers participating in pre-designed methods and analysis. It is not readily obvious, from the project files, that the contribution of enhanced knowledge to the scientific community is really going to have a tangible effect on small farmers.

4.2.2 Policy Orientation: PIC and IPR

The **SRISTI** project is very committed to this area of research: ‘We insist in our work that two principles be followed without fail: 1) whatever we learn from people must be shared with them in their language; and 2) the source of every innovation must be identified, in order to protect IPR.

The **TRAMIL** project addresses these issues thoroughly as well. The discussion on the regulation of the use of phytopharmaceuticals and the impact of bioprospecting and IPR on biodiversity will continue through stakeholders consultations and the elaboration of national policy positions on IPR issues` (PAD).

In the **CBDC** program, the main ethical consideration is stated to be the issue of control of information, and germplasm; and it is stated that it is important to ensure that the rights that go with this information are respected. A Protocol to address these issues has been developed.

In the **Kuna Embera** project, Phase II, it states that ‘...it has repeatedly been made clear that at each step of the project the authorities and the botanicos would be asked permission to proceed and that the research strategies would be defined jointly by the researchers and the community.’ The Appraisal states that ‘...this will be the first study to be carried out with the full collaboration of all traditional authorities and a full respect of their intellectual property rights.’

The **Frijol tapado** project addressed the issue of prior informed consent, and sought agreement from farmers to work with the research team from the university. However, the IPR issue was not addressed, in which case, farmers who may have developed bean varieties would not have received support by the project. The **Sorghum diversity** research project did not address PIC or IPR in the project documentation.

4.2.2.1 Land/Resource Tenure

Land and resource tenure is highlighted in the **Sorghum diversity** project, where it is acknowledged that lack of security of tenure influences genetic diversity on each field. Since individual landholding is becoming smaller and fragmented, farmers lack security and when there is no security, productivity on a long term basis cannot be maintained. Phase II was designed to address the land tenure issue.

The **Kuna-Embera** also explicitly address land tenure as an issue for biodiversity conservation: The Kuna have been successful in obtaining control over their traditional lands. But there is significant violence on indigenous peoples from drug trafficking cartels. 'The Embera have not progressed as much in their process of negotiation, and are already collaborating with the Kuna to follow a similar route toward claiming their lands.' (Appraisal). In Phase II, a questionnaire on property rights will be given to every household.

The **Frijol Tapado** also address the land tenure issue, although it appears to be beyond the scope of the project to do anything about. The project leaders received a request to fund a land purchase initiative (Vernooy, pers com), which indicates that land tenure was recognized as an issue.

However, the other four projects do not address the land/resource tenure issue thoroughly. This is viewed as a gap in the **TRAMIL** program, since the link is not well made between collaboration with local communities on management and conservation of plants and the need for land and resource security. Even if the focus is on widely distributed species rather than specific habitats, a pro-active approach is based on the concept that conservation of species relies on habitat conservation and the latter is largely dependent on land and resource tenure. The **CBDC** also does not explicitly address land tenure issues, an approach which may later conflict with the 'ecosystem' approach taken to conservation, which considers the social aspects of human-resource use conflicts. Finally, the **SRISTI** project also does not address issues of land tenure.

4.2.3 Context for Use of Local and Indigenous Knowledge

SRISTI's strength, viewed through the lens of incorporation of local and indigenous knowledge, is in the development of the concept of understanding IK in context of use. For example, the 'cultural and institutional basis of dealing with nature' underpins their work. The project examines heuristics, values, semiotics, cultural, spiritual and historical aspects, and the depth of inquiry, which is not seen in other projects. **SRISTI** also has a very innovative methodology, in that the 'process of innovation is classified into 5 categories: a) conceptual transformation; b) improvisation; c) accidental or serendipity; d) collective or individual; e) triggering new metaphors; f) funny processors, and institutions for humour. These processes can manifest in 4 ways: religious, cultural, socio-economic and political' (Gupta, 1992). This realization of the complexity of indigenous thought and innovation means that the methods are wide ranging to capture that complexity. For example, they explore unconventional sources for information, such as songs, riddles and jokes. What has been identified, as lacking in the **SRISTI** approach is women's IK, although the program remains ideologically committed to address these issues. Women farmers do not necessarily talk to men researchers. There is what seems as an accepted bias of researchers accepting the male point of view

as universal. The women's point of view is not sought specifically and separately (Lambrou evaluation, 1998).

The **Kuna-Embera** project also emphasizes the cultural aspect of local knowledge. In phase I, workshops on the legends and practices of traditionally used plants resulted in body painting and traditional music which had disappeared from Ipeti to be present again in village festivities.

The **Sorghum diversity** project is also strong in this regard, since it evaluates a range of socio-economic variables that influence IK, mentioned as 'gender, biological, socio-economic, biotic, market, cultural, ethnic and farmer based selections.' The project methodology includes some 300 household interviews, key informant interviews and focus groups. This can be an effective way to learn about factors influencing IK.

Similarly, the **CBDC** program is concerned with IK in context, by the very nature of the 'ecosystem approach' and the methodologies used to address the 'complexities of the field situations'.

In the **TRAMIL** program, men and women, mothers and women's groups, as well as ethnic minorities were consulted. A possible weakness in **TRAMIL** is that the scientific aspects of medicinal plants are emphasized through the safety and efficacy objective possibly at the expense of understanding the holistic belief system (which would include understanding religious beliefs and local cosmologies in general) within which the plants are used. The collaboration with local communities on management and conservation strategies makes no mention of the context of IK - how local and indigenous knowledge depends on the social institutions and religious framework that support it, especially in the context of traditional medicines which are often spiritually based practices.

The **Frijol tapado** project identified socio-economic factors at play in the maintenance of the system, while the role of ritual practices in the system were not examined. It is possible that particular traditions, often no longer widely practiced, could contribute information on seed storage, soil fertility indicators, etc.

4.2.4 Dynamics of IK

The **SRISTI** program places emphasis on 'support for networks and research activities that examine mechanisms which reduce the accelerating erosion of indigenous knowledge through both the strengthening and adaptation of social and cultural institutions and the development of information systems that capture and systematize knowledge before it is irreversibly lost.' (Project Appraisal) and factors that affect the processes of knowledge transfer are addressed up front and clearly.

The **Sorghum diversity** project is also concerned with change in IK over time. During the project, key informant interviews were held with the elderly, as the stability of knowledge over time was considered important to crop genetic diversity. This is also regarded here as a gap in the Ethiopia project, as there is not much sharing of information through inter-generational transfer, which can result in loss of knowledge over time.

The NDSDB t-line in the **CBDC** project emphasizes cultural re-valorization – the promotion of local pride and customs, re-establishment of trans-generational links of knowledge and circulation of info on the value of local resources and knowledge. The Zimbabwe project's 1999 Technical review of the Zimbabwe project asks the question why farmers have not been able to keep varieties as they used to and if this is due to

cultural erosion. It also is concerned with finding a strategy for counteracting possible sources of erosion. These questions that deal with the cause of the issue of biodiversity and IK loss are not commonly asked in project documents. It is key to the issue of biodiversity conservation and should be asked and examined more frequently.

The **Kuna-Embera** project makes explicit mention of age differences in IK. Knowledge associated with different age groups is also integrated into project methods - teams of younger and older women were investigators in phase I to examine gender and age-specific knowledge and practices. The **Frijol tapado** project also addresses issues of change, specifically the issue of migration of young people to the city, who were not staying in the rural communities to learn the skills of their parents.

In the **TRAMIL** program it is stated that, 'All ...ethnic groups have been exposed to the 'modernization' of the outside world that has influenced their attitude to their environment and natural resource management. As a result, traditional knowledge of plants is disappearing.' (Project rationale, GEF report). Nevertheless, in Central America and the Caribbean, local knowledge and practices have remained an important component of primary health care even though the public health policy has opposed traditional health systems using medicinal plants. In the TRAMIL program, the change of knowledge over time and inter-generational transfer of knowledge was explicitly addressed in the leaflets, plays and was mostly from grandmothers and healers. This knowledge was transferred to younger adults, children with the added benefit of documented safety and efficacy (Leaman, pers com).

4.2.4.1 Links between Biodiversity and L/IK

SRISTI is an example of a program with a heightened concern with erosion of IK and biodiversity. It is made explicit that conservation of biological diversity is impossible without conserving associated knowledge systems. '... the process of modernization, rising expectations of a particular life style, weakening of intergenerational dialogue and indifference towards indigenous knowledge system in formal education system as well as by policy makers has adversely affected the process of transfer of knowledge from one generation to another. Once the knowledge about sustainable use and conservation of various natural resources becomes defunct in the communities, the erosion of natural resources also becomes inevitable.' 'Biodiversity expresses the natural endowment of flora, fauna and micro-organisms in any ecosystem. People inhabiting these ecosystems imbibe knowledge about biodiversity through informal processes. This wealth of knowledge is, however, very often unrecognized and unacknowledged. While erosion of biodiversity has been a major issue of concern, it is only of late that the erosion of knowledge associated with such biodiversity has attracted attention.' (Footprints, 1995).

In spite of this commitment to stem the erosion of local and indigenous knowledge of biodiversity, it is difficult to discern, from project documents, the link between the practice of searching for indigenous innovation and the concept of biodiversity conservation. This link is well developed theoretically in a series of papers and other project related documents, but is not evident in project implementation documents.

The **Kuna-Embera** project also makes strong links between loss of biodiversity and loss of indigenous knowledge. The explicit assumption is that traditional knowledge

must be the cornerstone of all management strategies of biodiversity in order for the strategies to be biologically and culturally sustainable.

The **CBDC** program, in general, makes the link between genetic diversity and the replacement with mono crops and subsequent loss of associated local traditional knowledge. In agricultural systems, knowledge of crop genetic resources is constantly evolving, as farmers experiment with new cultivars. However, there are instances where knowledge of traditional crops is diminishing, threatening food security. It is recognized that 'local cultivars are better adapted to the natural environment and cropping system' as well as to household needs and preferences. 'The inherent heterogeneity of the cultivars ensures a degree of adaptability and resilience under shifting conditions with respect to changing climate, new races of diseases and pests' (Appraisal, p. 3). Although, in the Phase II proposal (executive summary) it states 'although under favourable conditions, varieties from research institutions may replace local cultivars, even in these situations, farmers continue to select from the introduced varieties, thereby creating new lines blending local and exotic cultivars. The combination widens the genetic base of crops and improves local food security.' This advocates cultivated biodiversity, but does not emphasize traditional knowledge associated with traditional varieties.

The **TRAMIL** program also makes clear links between biodiversity and L/IK. One objective is to 'support the conservation and sustainable use of forest ecosystems in the region by identifying conservation and management needs of medicinal plants within key forest ecosystems, and integrating these issues into the broader management of selected forest ecosystems'. However, in the **TRAMIL** program, a possible gap here is the link between causes of biodiversity loss (expansion of agriculture, rural poverty, deforestation and uncontrolled resource use) and L/IK loss. Ideologically, the link is not clear between the above social processes and the use and retention of IK by local populations.

The **Sorghum diversity** project also presents a convincing case for the link between expert farmers knowledge and biodiversity, in that 60 landraces are used in the area of study and farmers' knowledge of them must be maintained for long term food security. The **Frijol tapado** project has a strong focus on the use of local knowledge for the maintenance of a traditional agro-ecological system that maintains local biodiversity.

4.2.5 Information Sharing and Dissemination

In general, project files showed a high level of appropriate results dissemination, in that the material was designed to reach the rural farmers/communities ('beneficiaries'). In the **TRAMIL** project, there were a number of publications, designed to reach the rural public who may not have had any formal education. Dissemination activities are an integral part of the network's activities (**TRAMIL-DIFUSION**). A Travelling Kit for dissemination workshops has been produced, as have five videos on different aspects of the program, puppet shows, plays and a variety of pamphlets and monographs giving detailed information on the status, safe use, and preparation of specific plants have also been produced. **TRAMIL** has also been involved in helping establish "home gardens" for medicinal plants as well as demonstration gardens such as the Agro-ecological Garden in Limon, Costa Rica (Whyte and Spendjian, external review).

In the **Kuna-Embera** project, the outputs were geared to the local community in the form of training based on a booklet and brochures to all Kuna schools (phase II).

In the **Frijol tapado** project, the farmer to farmer exchanges were highly rated as was the training seminar (farmers as participants); the workshops, video, farmers involved in experimentation are all designed to reach users effectively. The **CBDC** lists some 60 publications, ranging from books to interim reports. More specifically, however, is the t-line that deals with mainstreaming the CBDC approach: a set of information materials aimed at different audiences emphasizes the importance of development and conservation of biodiversity at the community level. There are also short courses aimed at farmers and farmers' organizations.

SRISTI's strength lies in its widely disseminated publication, the newsletter, 'Honey bee' along with other methods of reaching rural communities through workshops and biodiversity contests in schools.

The **Sorghum diversity** project is weak in this area, as the emphasis appears to be on material directed to the scientific community: Scientific articles for referenced Journals as well as results shared with other scientists at international conferences and scientific gatherings.

5.0 Review of IDRC Initiatives on the Use of Local/Indigenous Knowledge

Identified in the Second Annual Report to the Board of Governors (June 11, 1999), the research challenge for SUB is to determine the physical, socio-economic and cultural conditions under which the use of biological resources enhances the conservation of biological diversity. This is a vast undertaking, but in the attempts to do so, SUB has undertaken numerous initiatives that specifically target indigenous and local knowledge holders. This includes support for participation of the Indigenous Peoples' Biodiversity Network (IPBN) and support for the IBIN *Library of Traditional Knowledge and Biodiversity*, published on CD-ROM with support from IDRC and NORAD (03247/96-4032 Indigenous Biodiversity Information Network (IBIN)).

IDRC (largely through the SUB PI) has supported numerous projects involving indigenous peoples and biodiversity. In the IDRC publication by Dionne-Stout and Langill (1999), IDRC-Funded Research on Indigenous Knowledge, it recognizes that IDRC has supported 87 projects (since 1981) that focus on indigenous knowledge and the environment. The areas of inquiry include knowledge associated with farming and pastoral systems (29 projects), natural resource management (34), and biodiversity of food species (11).

5.1 Handbook: Working with Indigenous Knowledge

SUB supported the publication of a handbook 'Working with Indigenous Knowledge', by Louise Grenier, 1998, which was designed to guide researchers, development professionals, extensionists and project managers on using IK in projects (Grenier, 1998). This comprehensive handbook outlines the practical application of traditional ecological knowledge (TEK) and emphasizes the importance of self-determination or full participation for successful indigenous ecological knowledge (IEK) projects. The handbook specifically subscribes to the WCED sustainable development paradigm, but emphasizes sustainable development at the local level (Grenier, 1998: 9).

Social and cultural constraints are recognized as critical for understanding IK, with mention of numerous pressures related to globalization ('modernization and cultural homogenization') (Grenier, 1998: 4). The author takes the position that local

organizations have to be enabled to have more power in decision-making processes that affect them. It is an approach that seems unhampered by potential pitfalls of over-idealizing IEK. The author also acknowledges the realities of state authority over local power in the development process. The strong point of the handbook is the list of methodologies that can be used to document IK in a community setting. The book is an excellent springboard from which to apply the broader approach to understanding local and indigenous knowledge, which looks at human-ecosystem interaction and what influences these interactions, in terms of context and temporality.

5.2 IKP

Through the Indigenous Knowledge Programme (IKP), SUB has supported indigenous peoples' efforts to be recognized and compensated for their innovations and intellectual contributions to the sustainable use of biodiversity. Highlights of some of the projects in the IKP program are outlined here. The aspects highlighted reflect what the project can share with respect to effective use and incorporation of indigenous knowledge. In general, many projects incorporate indigenous knowledge in the context of culture and religion, a view that is usually not emphasized to the same extent in other SUB supported projects.

In the *Indigenous Health System and Practices in Nepal* (SGRSA97.001), ritual is regarded as the key concept to understand the human relation with nature. The project emphasizes IK in context, as very much interconnected and interdependent with the spiritual ideology, production base (livelihood, ecosystem), socio-cultural and rituals practices and traditional community institutions.

The *Project for the Recuperation and Development of Indigenous Knowledge for the Conservation of Ecosystems and Biodiversity in the Amazon Forest of Yana Yacu Sacha* (IKP File: SGD97.001), is based on the ancestral indigenous knowledge and technologies of ecological management, which includes a combination of social, economic and cultural development of the indigenous communities with the objective of conserving the ecosystems and biodiversity of the Amazon. The vision of nature, the ancestral system of understanding the land (the traditional system of relating to the environment and the beings of nature), and the sustainable management of forest resources are key elements that have been included in a model of a community settlement which is 'culturally identified' with its habitat. This project reinforces the approach to IK incorporation based on context (traditional system of relating to the environment) and temporality (the kind of local/ IK that is more traditional and associated with past practices, not current practices).

In the project (IKP File SGRAS98.001), the relationship of indigenous knowledge and learning with each of the elements in the ecosystem were the main criteria for the development of the project. The project proposed to examine the different dimensions of learning and indigenous knowledge acquisition. Peoples' survival strategy is worked out with the integration and interaction of the multiple components of the social life into a unique whole: the economic and ecological lives do not function as two separate realms. Instead, they are part of daily life and they are inter-related with the indigenous peoples' social, political, cultural and spiritual lives. The methodology does not make the separation between the study of the productive alternatives from the study of the indigenous culture that sustains it. Therefore, the alternative production systems,

the complexity of the learning, the individual and collective knowledge and its relation to the various cultural norms, social roles or natural conditions of the men and women that manage it will be simultaneously analyzed in the project. What can be learned from this project is the integrated approach taken to understand IK, one that examines a range of variables in the ecosystem that support the learning process. The project also emphasizes the temporality of IK, in stressing the importance of the dissemination and propagation of the elders' wisdom to the new generations.

The The En'owkin Centre The Indigenous Keepers Program (IKP File SGRNA97.001) also emphasizes innovative methodology. The Okanagan Nation has their own system of traditional conservation, which has been rebuked in the past by modern science. 'Indigenous scientists are the keepers of knowledge...' Our IK keepers have developed whole system approaches to conservation and protection of biodiversity'. Lessons learned from this project are the complex systems approach that emphasizes relationships, and non-linearity, two important features to consider when incorporating indigenous knowledge for biodiversity conservation.

5.3 Networking with other Program Initiatives

SUB regularly collaborates with other program initiatives within IDRC that focus on natural resources management. There has been an exchange of ideas on resource management processes with MINGA and there has been a sharing of methodologies and approaches with CBNRM. PLAW has also developed methodological guidelines for the use of local and indigenous knowledge.

5.3.1 CBNRM guides

The CBNRM program initiative has researched local and indigenous knowledge issues. (source: Indigenous Knowledge. Readings and Resources for Community-based Natural Resource Management Researchers. Vol 4 Langill, S. and Landon, S. 1998).

CBNRM has made an effort to promote approaches to research that are grounded in local experience and local knowledge. IK is considered to be *cultural* knowledge in its broadest sense, including all of the social, political, economic and spiritual aspects of a local way of life (p.b-1).

One assumption made in the CBNRM document is that 'Scientists now recognize that indigenous people have managed the environments in which they have lived for generations, often without significantly damaging local ecologies. Many feel that indigenous knowledge can thus provide a powerful basis from which alternative ways of managing resources can be developed.' These statements are qualified, however, with the view that IK has its limitations and should not be accepted uncritically because of naive notions that whatever indigenous people do is naturally in harmony with the environment. There is historical and contemporary evidence that indigenous peoples have also caused environmental destruction through over-fishing, over-hunting or over-cultivation of the land.

Specifically, the authors of the CBNRM report on local and indigenous knowledge find particular categories of IK to be of interest: empirical knowledge, classification systems, and resource management knowledge ('tools, techniques, practices and rules related to fishing, gathering of wild food, agriculture and agroforestry') and the worldview or way the local group perceives its relationship to the natural world. It is this

latter category that is at times addressed in programming but goes largely un-addressed in the technical aspects of project implementation.

The CBNRM toolkit refers to two dimensions in using indigenous ecological knowledge (IEK): 1) valuable input about the local environment and how to effectively manage its natural resources, use local technology and materials, etc. and 2) empowerment, and self sufficiency. The ethical and methodological issues mentioned include PRA, where local people are assisted to record their own knowledge, using techniques that involve a minimum of outside involvement.

Lessons learned from the CBNRM document is the mention of IK as holistic (drawing in the systems perspective) in that 'local people face a set of interrelated problems and they often attempt to solve them by applying their knowledge in a holistic way - decisions about one enterprise may be affected by knowledge and perceptions of other parts of the environment. These relationships may not be easily discernible to the outsider.' Also, it says 'IK systems integrate culture and religion'. Both of these statements lend themselves to the approach that is advocated in this review - that local and indigenous knowledge be considered in context, which requires integrating information on local worldviews and perceptions of the environment, and on culture and religious practices. The CBNRM manual provides much valuable and practical information of the use of local and indigenous ecological knowledge.

5.3.2 PLAW

IDRC's People, Land and Water Program Initiative has also developed guidelines for the collection and documentation of Indigenous Knowledge. Chapter 3 in the PLAW publication [PLAW website] deals exclusively with methods for collecting IK. In general, the participatory approach is outlined, ways to improve PRA skills, and an extensive list of effective tools for PRA. It is an excellent resource, as is the CBNRM manual and Grenier's manual, for specific methodologies.

The resources summarized above for their utility in integrating local and indigenous knowledge in the development process are not fully adequate for SUB's specific purposes. What is advocated in this report is the application of a conceptual approach to using local and indigenous knowledge. The conceptual approach, which precedes methodology, is to provide the basis for methods in the field. CBNRM, PLAW and Grenier's methodological guides become more useful *after* that point, as specific participatory methods to invite local and indigenous peoples to share their knowledge.

6.0 Moving ahead: Discussion Points for the Incorporation of Local and Indigenous Knowledge into Programming and Projects

It is not an easy task to make recommendations within a program with a long and successful history of project work. However, an attempt is made here to provide some points for discussion on some possible gaps found during the course of the brief review of a small and select sample of SUB supported projects. SUB has a successful track record in dealing with issues of incorporating local and indigenous knowledge. The comments made here are an extension of that positive acknowledgement. It is hoped that the suggestions below are seen more as identified opportunities that can serve as a basis of discussion around SUB's assumed role in the field of local and indigenous knowledge research.

1. Issues of scale can be addressed in greater depth.

Conservation of biodiversity occurs at different scales, ranging for example from the diversity of sorghum varieties at the field level to in Ethiopia to the maintenance of tropical forest habitat in the Darien, Panama. Both approaches use local and indigenous knowledge, but in different ways, because the scale of use is different. One is at a genetic/field scale and one is at a landscape scale. If both are to occur under the umbrella of biodiversity conservation, the issue of scale can be presented to clarify the links between project activities and biodiversity conservation objectives.

2. Adopt a new mode of inquiry.

It is suggested that a new mode of inquiry for the incorporation of IK be adopted, based on a conceptual framework that precedes participatory methodology and is based on considerations of context and temporality. This would allow projects to start from a common approach to understanding and incorporating IK and would ensure that critical elements of local and indigenous knowledge are not missed during project implementation. This particular issue area is dealt with in more depth in the next section (7.0).

3. Biodiversity should be clearly defined with the participating communities and farmers groups.

Defining biodiversity ensures three things: i) that SUB's objective of obtaining a 'peoples' perspective' is obtained; ii) so that the various motives and incentives for conservation are transparent and applicable in the long term; and iii) to serve as a means of awareness raising of the number of issues around biodiversity conservation.

4. More explicit links made between theory and practice.

Goals and objectives relating to sustainable use of biodiversity goals and incorporating local and indigenous knowledge as a means to this end are often not well linked with the field research. More emphasis on making these links will provide indicators of how well programming/project objectives are being met in the field.

5. Analysis of the underlying issues of biodiversity loss.

Approaches to the underlying causes of loss of biodiversity could be developed so that methods to deal with the causes can be determined

6. Analysis of the underlying issues of erosion and loss of local and indigenous knowledge.

Approaches taken to increase general understanding of what contributes to the loss of knowledge will help determine what measures must be taken to revive, or re-articulate knowledge that is useful in the present day context of biodiversity conservation

7. Knowledge transmission processes should be given more attention.

Encouragement of the inter and intra generational process of information exchange will help to ensure that the knowledge that is depended on for research today will be available in the future.

8. Partner institutions should ensure participation.

It should be ensured that SUB's partner research institutions and NGOs have a clear and transparent mandate to use IK in the context of full collaborative participation of farmers and community members.

9. Land and resource tenure needs more emphasis.

This issue was addressed in some projects, but not consistently or not enough. Land and resource tenure underpins local conservation strategies and so it is difficult to promote the latter without knowledge of the security of the former.

10. Attempts to work with different age and gender groups should be ensured.

Since local and indigenous knowledge is not evenly distributed within a community and is often tied to local power structures, there should be strategies in place to disaggregate the data according to the differentials or age, status and gender, or whatever differences the community/farmers define. It follows that action in project implementation recognizes gender differences and adjusts methods to accommodate these differences.

11. Issues of empowerment through the use of local and indigenous knowledge should be addressed. Empowerment of individuals or communities through the use and incorporation of their knowledge should be observed and given mention in project reports. This is a difficult element of IK research to quantify. However, some indicators of empowerment could be investigated to indicate progress in this area.

12. Learn from other projects.

There are 'best practices' in SUB supported projects (such as the IK projects), and the work of other PIs, such as PLAW and CBNRM that can be consolidated and used in subsequent SUB projects. As it stands, the research that SUB has done pertaining to the incorporation of local and indigenous knowledge needs to be pulled together if SUB is to learn from it and apply it.

7.0 An Approach to the Integration of Local and Indigenous Knowledge in SUB Programming and Projects

The theory underlying the proposed approach to the use and incorporation of local and indigenous knowledge is based on ethnosystems methodology and complex systems approach, which includes the ecosystems/adaptive management approach.

Ethnosystems methodology, as proposed by Slikkerveer (1999) facilitates the assessment of the cognitive and behavioural characteristics of particular groups or communities as systems in a holistic mode. The methodology is based on the elaboration of the concept of culture as the result of historical processes of acculturation and transculturation in a more dynamic way and includes a combination of three methodological principles: i) participants view, ii) field of ethnoecological study, and iii) historical perspective. These principles emphasize the *in situ* (context based) nature of L/IK. Included is the assessment and incorporation of symbolic representations, world-views, specific philosophies of nature, and the environment, perceptions, attitudes, opinions as part of the underlying structure of values, norms, and belief systems which characterized specific cultures. 'Particularly in transcultural research settings, strict contemporary-oriented approaches have failed to unravel the dynamics of the origins and development of processes that have led to present day complexes (Slikkerveer, 1999: 173). Methods that derive from this methodology include the well-known techniques of participant observation, semi-structured interviews, transects, community cartography.

7.1 The Complex Systems/Ecosystems Approach

The ecosystem as a complex system provides a framework that serves to delimit a problem for study and indicates ways in which problems might be approached. The

ecosystems approach focuses on a complex nature of reciprocal causality. It is the logical conclusion to the idea of constant interplay between culture, biology and environment.

The study of ecosystems as complex systems does not have a long history (Kay, 1994). In order to understand more thoroughly the human-environment relationship, Jorgensen (1997) argues for a new holistic science that cannot be reduced to component mechanisms without losing the essence of their holism. Western science has traditionally regarded the world as distinct systems, where environmental relations are distinguished from social relations and are studied in isolation. There is a renewed interest in the 'systems' nature of ecosystems, as they are re-conceptualized to embody the larger metaphysical and epistemological contexts from which those living and interacting within that ecosystem attribute value and significance (Kay, 1994; Rappaport, 1979). Complex systems science shifts the focus on ecosystems from static entities with one path of progression to dynamic and unpredictable relationships within the whole. An example of how data can be ordered within a systems framework is shown in Figure 2.

Ecosystems are self-organizing, in that they are defined by systems of processes, by exchanges of matter, energy and information within their immediate environments. Development or evolution of the system also occurs, which is largely unpredictable but which generates information and pattern (Lemke, 1997). Ecosystems are not only material flows, but also involve communication flows and are contingent on the 'plurality of subjective, species-specific perspectives', where meaning is not outside nature, but is integral to its constitution (Hornborg, 2001: 89). Complex systems analysis is concerned with how parts of a system give rise to the collective behaviours (for example, culture as collective behaviour) of the system and how the system interacts with its environment³. By understanding the whole, properties emerge that are not evident in the component parts. This is exemplified by indigenous knowledge itself, which is considered here as a 'property' that emerges from the interaction of multiple component parts.

The inter-relationships between humans and biophysical components within ecosystems are a useful concept from which to consider the possibility that human social or cultural behaviour might regulate material relations within an ecosystem through homeostasis. If this was so, the maintenance of crucial variables ensures the survival or adequate functioning of the system. Wynne-Edwards (1962, cited in Ellen, 1982) noted that some forms of social behaviour acted as a form of homeostatic control and there have been attempts to demonstrate that cultural practices previously regarded as irrational do indeed have significant ecological functions. Such is the position taken by Rappaport (1979) in his extensive treatise on the function of ritual to maintain ecosystem homeostasis.

Jodha (1998) identifies three, very pragmatic elements that strengthen links between the ecosystem and the social system, which contribute to traditional management systems. These include: a) a total dependence-driven stake in the protection of natural resources; b) close proximity and a functional knowledge driven approach to resource use

³ The 'environment' is all that is 'outside' the system but still interacts and influences the open system

and c) local control determined sanctions and facilities governing resource use. Also, the smaller populations and the greater social cohesiveness of *traditional* societies were the major facilitators of the above responses. These elements of community, or social capital are considered system features that work to maintain system *resilience*⁴ as suggested above by Wynne-Edwards. The concept of resilience links conventional ecological principles with IEK and integrates the social and ecological.

Both biophysical and cultural perspectives must be brought to bear as part of ecosystem analysis (Kay, 1994). Understanding ecosystem dynamics requires investigating the spatial, temporal, thermodynamic, information and cultural aspects of living systems and on knowledge of interconnections and past history. Decisions must be made about what to include and what to leave out of the system to be studied and the scale and extent and the hierarchical units of study must be selected. These decisions, while done in a systematic and consistent way, are necessarily subjective, reflecting the viewpoint of the analyst about which connections are important to the research and those which can be ignored (Kay, 1994). The selection process has implications for resource management in terms of who determines how to look at the system and what components to study. Features of social or cultural capital may be considered, in the context of the systems approach, as ‘attractors’, which act to maintain an internal homeostasis in the system. For example, strong kinship ties and social cohesiveness may act to maintain the resilience of the system by being a form of social control that maintains specific behaviour under adverse conditions.

The ecosystem approach draws on the theory and methods of adaptive management (see section 7.2). In the application of the ecosystem approach in India, Bunch (2000) uses soft systems methodology, which provides cognitive and methodological tools to deal with ‘human activity systems’. Due to high levels of uncertainty, conflicting values and interests within a complex system, the role of science in intervention is not as likely to succeed as well as an approach that integrates issues into a holistic means of inquiry. The ecosystem approach draws on systems-based approaches and collaborative processes to qualitatively analyze the situation within its cultural and political context (Bunch, 2000). Moran (1990: 16) criticizes the ecosystem approach for its tendency to endow the ecosystem with the properties of a biological organism, a tendency for models to ignore time, and structural change, a tendency to neglect the role of individuals and a tendency to overemphasize stability in ecosystems.

The systems perspective suggests that the relations between human and biophysical elements in ecosystems are based on synergistic feedbacks. The physical and biological (other than human) systems put constraints on the human system (for example carrying capacity is a measure of biophysical limitations to population growth), so that the human subsystem modifies the physical and biological environment to increase the carrying capacity (through using human-made capital, i.e. technology). Therefore from this perspective, changes to L/IK (which is a change in cultural capital) are based partly on changes required by the physical and biological system. Co-evolution is a local process that is specific to local cultural knowledge, technology and social organization. Therefore the systems approach incorporates the interrelationships between social and cultural capital and the biophysical components of the ecosystem.

⁴ resilience in ecosystems is considered the ‘ability’ of an ecosystem to maintain or regain its original structure and function after perturbation

A set of principles of organization are identified as the basic principles of ecology and are used as guidelines to build sustainable human communities (Capra, 1996). These include 'interdependence', which is understanding relationships and represents a shift in perception from the parts to the whole, from objects to relationships, and from contents to patterns; and cyclical vs. linearity in terms of causal relationships. Capra (1996) also includes the qualities of cooperation and partnership (not competition, expansion and domination), flexibility, and diversity as guidelines for sustainable communities. Gallopin, et al. (in press) also include the idea of diversity through complementary pluralism, not hegemonic fragmentation in their list of attributes of complex systems.

With complementarity, each stakeholder is aware that his or her projection is partial, and there is diversity. This relates to different epistemologies of knowledge systems involved in management, and the need for pluralism and diversity instead of hegemony and fragmentation, in which case awareness of legitimacy of the other's perception is either discounted or denied.

7.1.1 Soft systems methodology

In soft systems methodology (SSM) (Checkland, 1990), the focus is on an organized set of principles (methodology) which guide action in trying to manage real world problem situations; it is systems-thinking based and is applicable to taking purposeful action to change real situations constructively.

If complex systems thinking is taken as the basis for how we structure reality, then methodologies are developed in that way. Soft systems thinking works from the position that the methodology, or the process of enquiry, can itself be created as a system. SSM is an epistemology, which can be used to try to understand and intervene usefully in the rich and flux of everyday situations. Systems are a tool to structure enquiry into a problem situation. Models are used, which are based on a range of worldviews to question perceptions of the situation.

7.2 Adaptive Management

Adaptive management (AM) is another methodology that is oriented to the incorporation of L/IK and it is also oriented to complex systems. Adaptive management is based on the premise that our knowledge of the complex and evolving systems we intervene in is incomplete, and that management of these systems is an ongoing process of learning, of which we will probably never achieve complete understanding (Holling, 1995). Notably, this is also the premise of post normal science, of which complex systems is a significant component.

Adaptive management views resource management problems as the result of the interaction between ecological and socioeconomic systems and the tendency for managers to ignore the holistic view of system interactions (Walters, 1986, as cited by McDonald, 1988). Adaptive management attempts to understand large systems over the long term (diachronic) which is often a feature attributed to indigenous ecological knowledge. Adaptive management is clearly supportive of management that incorporates other ways of knowing and perceiving and is open to exploring alternatives to positivist methods of inquiry (Hilborn, 1987, cited by Pinkerton, 1994) and may bridge the gap between the need for both synchronic data sets and diachronic data sets. It is an approach that does have some drawbacks, however. Despite the commitment by practitioners to

have wide stakeholder participation, the analytical approach taken in conventional AM, may put up barriers to prevent full community involvement. The scientific methods employed favour information and knowledge that can be quantified, which tends to exclude other kinds of knowledge (McLean and Lee, 1996: 444, as cited by Bunch, 2000).

As Descola and Pálsson (1996) argue, an ecological approach has been relegated to the margin of anthropological discussions, as post modernism and culturalist perspectives have dominated the social sciences. E.O. Wilson (1998) proposes the concept of ‘consilience’ which is the unity of knowledge and the integration of the social and the natural sciences. Treating human-environmental issues in a truly ecological sense, means treating person and environment as an ‘irreducible system’ (Descola and Pálsson, 1996:18), which is best approximated by the ecosystems approach that views human-ecosystem interactions as a complex system of inter-relationships that from whole greater than the sum of its parts.

7.3 Methods used for the Incorporation of Local and Traditional Ecological Knowledge

Specific methods to incorporate IEK have largely been participatory-consultative, designed to consult local and indigenous people on their knowledge of local species and, at times, their management practices. There have been some attempts to design participatory-collaborative projects, where local stakeholders are involved in issue identification and the framing of research questions (IDRC, 1998). Kay *et al.* (1999) propose a complex systems approach as a framework for participatory methods and have developed a model called an adaptive Self Organizing Holarchic Open (SOHO) approach to ecosystem sustainability. The model incorporates culture and values into an issues framework which is integrated with ‘science and other knowledge’, that feeds into an adaptive management system.

The WorldWide Fund for Nature (WWF) advocates a ‘biocultural’ approach to ecological issues, based on the premise that the conservation of biodiversity is interrelated with the maintenance of cultural diversity. This relationship is a result of the recognition that human-environment relationships are highly complex and represent a diverse interaction of social, cultural, economic, political and ecological variables (Oviedo and Maffi, 2000).

Community natural resource management (CNRM) provides methods which underpin a ‘modern attempt to revive often quite established and traditional local and indigenous cultural and institutional mechanisms for managing and conserving the natural environment’ (Croll and Parkin, 1992, cited by Kellert et al., 2000:706).

Participatory research (PR) methods, in general, commonly used to elicit L/IEK are based on a constructivist methodology, insofar as it is assumed that there is no neutral or objective science, nor a universal truth. Constructivist methodology is intended to validate popular knowledge. PR, if done well, asserts that knowledge is power, is collaborative, endogenous, heuristic and experiential (Colorado 1988). Validity or truth in PR derives from the trustworthiness of data. In this sense, PR methods, used within a resource management framework, attempts knowledge integration, by the *validation* of local and specific realities. There are a number of PR techniques advocated that appear appropriate for documenting IEK. They are designed to facilitate communication and

bridge the gap between different ways of knowing and understanding ecological and management issues. These techniques, which have been described at length by Mascarenhas et al. (1991, as cited by Grenier, 1998), are based on 'ethnoscience', where the primary principle is to understand the emic, or insider (in this case, indigenous) frame of reference. The techniques are also important in reflecting the variability within any given knowledge system due to roles, such as gender, occupational, educational experiences and personal (idiosyncratic) differences. However, as Hviding (1996) argues, the ethnoscience approach imposes the epistemology of western science on the indigenous way of constructing knowledge. Local resource management strategies based on PR are considered problematic because they incorporate multiple epistemologies, possessed by different groups of people. However, complex socio-ecological systems can only be understood only from multiple, perspectives, and no one world view is a better construction of reality than another.

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⁵ note: the internal IDRC related documents that were obtained from the files are not listed here – only external references are listed

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Appendix I: Questions for IDRC Project Staff

I Biodiversity:

Since this is a relatively recent concept, I am interested to know how IDRC's research partners and the communities involved perceive the concept. It is given value for different reasons and I see merit in articulating those, to examine motives for biodiversity conservation.

1. What is your general conception of biodiversity? Do you have a sense that your partner research organization's conception is different than the community's conception of biodiversity? Do you feel that there is a need to come to some agreement between all project participants about what biodiversity is, its function, why it should be conserved?

II Local/ Indigenous Knowledge:

One of IDRC's objectives states (paraphrased here) that conservation of the local knowledge of biodiversity is key and local/indigenous knowledge must be used to this means.

1. What does 'local knowledge of biodiversity' mean to you and how is it used in the project?
2. In the projects that rely on local and indigenous knowledge, what are the most effective methods used to elicit local and indigenous knowledge?
3. What is local and indigenous knowledge specifically used for in projects you are involved in? (For example, for plant identification, crop cultivars, endangered species, medicinal plant lists, etc.)
4. Is local and indigenous knowledge being lost/eroded and, if so, what is the cause of the loss?
5. If local and indigenous knowledge is being eroded, what, within the context of the project, is being done to address that?
6. Is past local and indigenous knowledge different than today's local and indigenous knowledge and how is it different?
7. Are there explicit or implicit resource conservation strategies in the participating communities - have they always been there and are they operating in the same way today?
8. Do you think context determines what local and indigenous knowledge is and can local and indigenous knowledge work in today's context? (By context, I mean social institutions, rituals/ceremonies, religion, population structure, local ecology, etc.).

Appendix II: Guidelines for the Review of the Use of Local and indigenous knowledge in SUB Programming and Medplants and Agrobio Projects

Draft 3

1.0 Project Profile Information

Project Title
File ID
Radius ID
Reference to Medplants
Reference to Agrobio
Reference to local and indigenous knowledge (describe)
Type of Activity
Year of Approval
Country Focus
Beneficiary Type
Ecosystem Type
Funding Unit
Recipient Type
Project Abstract (IDRIS)
Keywords (IDRIS)

2.0 Specific Project Objectives: Role of local and indigenous knowledge

1. Specific project objectives that depend on the incorporation of local and indigenous knowledge
2. How local and indigenous knowledge contributes to meeting the above objectives
3. Effectiveness of project in using local and indigenous knowledge to meet the objective
4. Do project objectives conform to sub objectives in terms of use of local and indigenous knowledge

3.0 Research Approach

I. Participation of Beneficiaries

This category of inquiry is based on the overall, crosscutting objective of maximum participation of project beneficiaries. For local and indigenous knowledge to be used effectively, local participants should be involved at the beginning of the project and have input into all subsequent phases, and in doing so, given the opportunity to express their traditional and contemporary knowledge that contributes to the project objectives.

Control over the research design would ensure that indigenous knowledge is not taken out of context or misrepresented; a relationship of equals is established; local systems of management will be strengthened; and information and data bases established will be for the benefit of the local community and culture (Stevenson, 1996).

Issue identification perspective

1. Who identifies the issue that the project is based on
(Local community perspective on the issue is obtained through early collaboration with community OR an Outside perspective is used - early stages of project are developed outside community (University, government agency) - consultative)
2. Dialogue – consultation and collaboration with the community as participants
(Inclusive of community throughout project: two way dialogue and continuous collaboration or exclusive of community: one way transfer of info/technology)
- b. Stakeholders: List who the stakeholders are and if they include the local community members. Comment, where possible, on who decides who the stakeholders are.
- c. Community-based organizations (CBOs) are recognized as important participants in the project

Issue Statement:

This section follows from Objective 1 and refers to how project participants perceive the issue in terms of how biodiversity loss. This perspective helps explain how the project might link loss of local and indigenous knowledge and loss of biodiversity and how loss of local and indigenous knowledge threatens biodiversity conservation.

1. Describe the *causes* of biodiversity loss and the perceived role for local and indigenous knowledge in dealing with the loss: does the project make this connection - if not, make it
2. Describe the relationship made between the loss of biodiversity and the loss of local and indigenous knowledge: if it is not clear in the project documents, make the link here
3. Limits of Biophysical Elements of the Ecosystem: the causes of marginalization
 - a. List anthropogenic features (forestry, fires, urbanization, etc)
 - b. List any natural features (poor soils, prone to natural disasters)

II. Policy Environment

This category of inquiry is based on Objective 2.

1. Is Prior Informed Consent (PIC) obtained and who gives consent
2. Does awareness raising of IPR issues take place and are people given the opportunity to suggest and develop a means of rights protection where it is an issue.
3. . Key policies on rights of access (land and resource tenure): List the policies if they have been identified. How does land tenure affect conservation efforts and what are the

key policies affecting the capacity of local stakeholders to sustainably manage their natural resources.

4. Describe the links between institutions/groups participating in project with beneficiaries
 - a. National or regional government to community
 - b. NGO to community
 - c. Other

III. Project Assumptions

Understanding the assumptions surrounding the concepts of biodiversity and local and indigenous knowledge assist in understanding where local and indigenous knowledge fits into the overall project cycle, how sustainable the base of knowledge is for future use and how and motivations for conservation of biodiversity.

1. Concept of biodiversity conservation: *In situ or ex situ*
2. View of Biodiversity
 - a. That conservation occurs through use
 - b. Is the concept clarified with all participants and is there any awareness raising around the issue
3. View of Local and indigenous knowledge
 - a. that continued use of local and indigenous knowledge will maintain the knowledge base for future use
 - b. that the current use of local and indigenous knowledge can be used independently of its historical social and ecological context
4. Does the project adopt a 'rationalist' approach - Western scientific paradigm is dominant and local and indigenous knowledge fits within this framework.

4.0 Project Focus: Project Information Collected that Uses Local and Indigenous Knowledge

Local and indigenous knowledge has many facets and can be expressed and used in multiple ways. The express ways that local and indigenous knowledge is used in the project cycle indicates what the research needs are and if they are being met by the kinds of local and indigenous knowledge sought after.

I. Inputs (Data type)

1. Kinds of local and indigenous knowledge collected
 - a. Classification systems/names and use of plants
 - b. Resource scarcity (med, agri plants, other)

- c. Agricultural practices (breeding, planting/harvesting, etc)
- d. Conservation management practices
- e. Indigenous Technology

2. Additional potential for local and indigenous knowledge to be used

II. Methods Used

1. Impact of social/ecological change on local and indigenous knowledge considered

a. Comment on methods that tend to consider the **embeddedness** of local and indigenous knowledge in the prevailing social and ecological context. How prevailing social structures, education system, religion, local biophysical conditions influence local and indigenous knowledge, etc.

b. Knowledge transmission issues considered wrt intergenerational transfer of knowledge and if these mechanisms are still in place.

c. Project methods consider the traditional or adaptive and **dynamic** aspects of local and indigenous knowledge. Elder community members are consulted on past practices and a cross-section of community members is consulted on current practices: past and present beliefs/practice and context are compared. Do methods consider the impact of change on the functionality of and loss of local and indigenous knowledge and the impact that this may have on biodiversity use? Change in ecology, demographics, social values and institutions, etc., may all be considered.

2. Traditional Methodologies addressed

a. Has the project relied on traditional methodologies (an approach outlined in the SUB Prospectus 2000) and what are they?

3. Data on local and indigenous knowledge disaggregated - local and indigenous knowledge used from relevant sectors of the community: gender, age, economic status, knowledge status, other

4. List specific methods that are used to incorporate local and indigenous knowledge

5. Are there other methods that could be used more effectively: what methods could be strengthened

III. Outputs

1. Increased Participation

(Local community involvement in project in all stages; (community/local ownership of project: Community participants design conservation strategies based on local and indigenous knowledge)

2. New Knowledge Generated

(New information from local and indigenous knowledge emerging from project: project has integrated local and indigenous knowledge and ‘western science’)

3. Traditional Knowledge Re-articulated

(Describe any traditions that are applied to present day issues in new format)

4. Two-way Learning

(local and indigenous knowledge adds to project through iterative process: project builds on local and indigenous knowledge)

5. Results Delivery Reaches/Includes Community

(Dissemination materials accessible to local community: Lists, reports etc available in local language, workshops include community members, etc.)

Appendix III Review of SRISTI (Indigenous Knowledge and Innovation Network)

1.0 Project Profile Information

Project Title **Indigenous Knowledge and Innovation Network**
File ID 93-0013, 96-0023
Radius ID 003267
Reference to Medplants: not particularly
Reference to Agrobio: not particularly
Reference to L/IK (describe): direct reference to IK, especially indigenous innovations.
Type of Activity
Year of Approval (Phase I: 30 months (1993-1995): Ph II???)
Country Focus India
Beneficiary Type - local farmers, artisans, small inventors, and entrepreneurs. Also the Organizations that are part of the network, students and researchers.
Ecosystem Type
Funding Unit
Recipient Type: through the Indian Institute of Management, Ahmedabad (IIMA), est. 1961 (gov't of India)

Project Abstract (IDRIS)

Generating Incentives for Sustainable Natural Resource Management (Phase II)

IDRC Contact: Buckles, Daniel

Type of Activity: Research Project

The Society for Research and Initiatives for Sustainable Technologies (SRISTI) and the Indian Institute of Management, Ahmedabad (IIMA) have established a network to enhance global and local opportunities for conserving biological diversity and associated knowledge systems by augmenting creativity and innovation at the grassroots. The Indigenous Knowledge Network (IKN) was established during a phase I project and has undertaken research involving social and natural science aspects of local innovations. This work is based on the premise that the linkage between formal and informal (indigenous) knowledge systems must be forged in such a way that the gains from value addition accrue to the innovators and originators of ideas; and that intellectual property rights of local communities must be respected to encourage innovative approaches to problem-solving. The general objective of the second phase of IKN will be to add value to local ecological and technological knowledge by documenting, characterizing, and validating this knowledge and generating products and services that provide incentives and income for grassroots innovators. The researchers will organize surveys, contests, fairs, workshops, and reviews of historical literature to identify and document innovations. On-farm and on-station research will be undertaken in collaboration with farmers and university and government-based researchers to develop commercial products from local innovations. Various approaches to rewarding local innovation at the individual and community scales will be tested. A global registry system for the innovations of farmers, tribals, artisans, and pastoralists will be established.

Information Sources: publications (93-0013 proposal,), discussion with Kirit Patel, emails from Gupta and Patel; ‘Generating Incentives for Sustainable Natural Resources Management: A Report 1993-99, 1996 Preliminary Draft for ‘IK and Innovations Network: A Report’; Gupta, 1992: Survey of Innovations for Sustainable Development: Do methods Matter. (IIMA); Footprints: Bi-annual report of the activities of SRISTI, 1995; Building upon peoples’ ecological knowledge: Framework for studying culturally embedded CPR institutions. Gupta, 1992; evaluation by Lambrou.

2.0 Specific Project Objectives: Role of Local and Indigenous Knowledge

1. Specific Project Objectives that Depend on the Incorporation of L/IK

An overview of the project rationale (proposal 93-0013), states that ‘a global voluntary initiative was launched five years ago to link together communities and activists engaged in eco-restoration and reconstruction of knowledge about precious ecological, technological and institutional knowledge systems. The overall objectives of the program are to strengthen the capacity of grassroots level innovators and inventors engaged in conserving biodiversity to a) protect their intellectual property rights; b) experiment to add value to their knowledge; c) evolve entrepreneurial ability to generate returns from this knowledge; and d) enrich their cultural and institutional basis of dealing with nature.

- a) to study the taxonomic basis of indigenous ecological knowledge systems and derive comparative understanding of local and global categories of sense making;
- b) to survey, document and disseminate local innovations throughout India and in other collaborating countries;
- c) to produce training materials supporting the incorporation of insights from indigenous knowledge systems into educational curricula. (Proposal 93-0013)
- d) on farm and on station of farmers innovations
- e) bioefficacy of and value addition to indigenous veterinary medicines
- f) preliminary screening of indigenous plant extracts for bacteriostatic and bactericidal activity
- g) indigenous germplasm conservation
- h) agricultural implements: documentation, promotion and entrepreneurship
- i) soil and water conservation practices: documentation and dissemination
(note: d) to i) is from the 1996 report)

2. How L/IK contributes to meeting the above objectives

- ‘The ecological, technological, institutional and cultural knowledge of the nature conserving communities is the basic building block of our work’ (appraisal).

3. Effectiveness of Project in using L/IK to meet the objective

Very thoroughly and efficiently - IK forms the cornerstone of SRISTI work

4. Do project objectives conform to SUB objectives in terms of use of L/IK

- ‘ the proposal is directly relevant to several key centre objectives. First, it provides program, rather than project support, thus allowing the recipient a greater share of decision-making as activities are developed to meet evolving needs of the network membership. Secondly, it encourages the creation, dissemination and utilization of local knowledge of widespread utility.’ (Appraisal)

3.0 Research Approach

I. Participation of Beneficiaries

1. Who identifies the issue that the project is based on

(Local community perspective on the issue is obtained through early collaboration with community or Outside perspective is used - early stages of project are developed outside community (University, government agency) - consultative)

- it is considered a ‘community driven approach to natural resources management’ (Appraisal)

2. Dialogue – consultation and collaboration with the community as participants

(Inclusive of community throughout project: two way dialogue and continuous collaboration or exclusive of community: one way transfer of info/technology)

- in the 1996 report, it suggests that ‘farmers were allowed to chose the crop and innovations on which they wished to carry out trials.’ this begs the question ‘whose innovations and how were they identified?’

- process of ‘peer group dialogue’

a. Stakeholders: List who the stakeholders are and if they include the local community members. Comment, where possible, on who decides who the stakeholders are.

- all local and indigenous innovators and those who benefit from the innovation

b. Community-based organizations (CBOs) are recognized as important participants in the project

Yes, CBOs and farmers

Issue Statement:

This section follows from Objective 1 and refers to how project participants perceive the issue in terms of how biodiversity loss. This perspective helps explain how the project might link loss of L/IK and loss of biodiversity and how loss of L/IK threatens biodiversity conservation.

1. Describe the *causes* of biodiversity loss and the perceived role for L/IK in dealing with the loss (does the project make this connection - if not, make it)

- I am sure that the connection is made many times over: for example in Annexure 21 (Getting Creative Individuals and Communities Their Due: Framework for Operationalizing Article 8j and 10C): talks about the rate of erosion of the knowledge of biodiversity and you can't conserve biological diversity without conserving associated knowledge systems.

2. Describe the relationship made between the loss of biodiversity and the loss of L/IK (if it is not clear in the project documents, make the link here)

- 'emphasis will be placed on support for networks and research activities that examine mechanisms which reduce the accelerating erosion of indigenous knowledge through both the strengthening and adaptation of social and cultural institutions and the development of information systems that capture and systematize knowledge before it is irreversibly lost.' (Appraisal)

- 'the process of modernization, rising expectation of a particular life style, weakening of intergenerational dialogue and indifference towards indigenous knowledge system in formal education system as well as by policy makers has adversely affected the process of transfer of knowledge from one generation to another. Once the knowledge about sustainable use and conservation of various natural resources becomes defunct in the communities, the erosion of natural resources also becomes inevitable.

- 'biodiversity expresses the natural endowment of flora, fauna and micro-organisms in any ecosystem. People inhabiting these ecosystems imbibe knowledge about biodiversity through informal processes. This wealth of knowledge is, however, very often unrecognized and unacknowledged. While erosion of biodiversity has been a major issue of concern, it is only of late that the erosion of knowledge associated with such biodiversity has attracted attention.' (Footprints, 1995)

3. Limits of Biophysical Elements of the Ecosystem: the causes of marginalization

a. List anthropogenic features (forestry, fires, urbanization, etc)

-poverty in general,

b. List any natural features (poor soils, prone to natural disasters)

II. Policy Environment

This category of inquiry is based on Objective 2.

1. Is Prior Informed Consent (PIC) obtained and who gives consent

I assume that this is built in (see 2.)

2. Does awareness raising of IPR issues take place and are people given the opportunity to suggest and develop a means of rights protection where it is an issue.

‘We insist in our work that two principles be followed without fail: 1) whatever we learn from people must be shared with them in their language; and 2) the source of every innovation must be identified, in order to protect IPR.

- emphasized in the proposal: ‘SRISTI will work to support the intellectual property rights of rural innovatorsby lobbying for their property rights wrt to genetic information, and formulae for herbal medicines, vegetable dyes, anti-oxidants, etc.

- ‘research on IPR and legal registration support to the innovators; mobilization of local and international expertise to strengthen and protect IPR of grassroots organizations.’

3. Key policies on rights of access (resource and/or land tenure): (List the policies if they have been identified. How does land tenure affect conservation efforts and what are the key policies affecting the capacity of local stakeholders to sustainably manage their natural resources).

Land distribution is not a big issue in their main area of work (western India). However, the issues has been partly resolved by voluntary movements like ‘Bhudan’ and also stringent legislation against consolidation of land or conversion of agricultural land (however, recent amendments allow outsiders to purchase agricultural land easily). ‘...land tenure is an important issue especially in forest land where the state has jurisdiction. Many organizations are already involved in protecting rights of tribal people who live on the periphery of protected or forest land. SRISTI has not addressed this issue directly’ (Patel, email).

4. Describe the links between institutions/groups participating in project with beneficiaries

- a. National or regional government to community
 - b. NGO to community
 - c. Other
- generally directly to small farmer

III. Project Assumptions

Understanding the assumptions surrounding the concepts of biodiversity and local and indigenous knowledge assist in understanding where L/IK fits into the overall project cycle, how sustainable the base of knowledge is for future use and how and motivations for conservation of biodiversity.

1. Concept of biodiversity conservation: In situ or ex situ

- this is not really made explicit
- Annexure-22 is titled ‘a Report for in-situ conservation of local biodiversity’

2. View of Biodiversity

- a. That conservation occurs through use

- the project aims to develop a network that will seek to conserve biodiversity through documentation experimentation and value addition in local innovations of development and diffusion of sustainable technologies and institutions (appraisal)
- Consolidate IDRC's role in providing information and strengthening the capacity of indigenous groups and local institutions to influence the agenda of biodiversity utilization and conservation
- my question was that I find it difficult to see the link between the practical nature of the project related to innovation and the theoretical ramblings on biodiversity. Prof Gupta responded to this question: innovations, such as the gum scraper for gum extraction from thorny *Prosopis* trees), herbal pesticides and veterinary herbal pesticides contribute to conservation (Gupta, email). However, in my view, this is conservation, not necessarily biodiversity conservation.
- 'the overall objective of the Phase II research project is to ...to generate and evaluate various approaches to providing incentives for grassroots innovators conserving natural resources...'
- the link to biodiversity seems to be through this and through PPB
- 'Generation of markets for organically grown agricultural products can provide powerful incentives for conserving agricultural biodiversity.' (Footprints, 1995).

b. Is the concept clarified with all participants and is there any awareness raising around the issue

- most definitely: the biodiversity contests are geared to raise awareness – the contests are considered the first step towards the valorization of IK (Footprints, 1995).

3. View of Local and Indigenous Knowledge

a. that continued use of L/IK will maintain the knowledge base for future use

- in general, they make the important distinction between formal and informal knowledge and the latter is not necessarily traditional – it can also be recent, such as the use of *Ipomoea* as a pesticide, which was a recent innovation during a time of crisis.(report)
- documentation of grassroots innovations
- the rapid erosion of ecological knowledge can be partly explained by the lack of premium put by society on this knowledge.

b. that the current use of L/IK can be used independently of its historical social and ecological context

- No, the link is well made: '...reduce the erosion of IK through both the strengthening and adaptation of social and cultural institutions and the development of information systems that capture and systematize knowledge before it is irreversibly lost'.
- the 'heuristics of local knowledge are different – therefore these heuristics should be looked at. (report)
- 'the issue of local knowledge system has to be seen not merely from the utilitarian perspective but from the semiotic, value building or analytical perspective also.' (Gupta, 1992).

- 'We have to look at cultural, spiritual and historical aspect of the technology development and diffusion both at individual as well as collective level. There is no way by which knowledge systems can grow if the traditional anchors are not properly located.' (Gupta, 1992).
- '...institutions for natural resource management are a part of evolutionary cultural, religious and social experience of any community.' (CPR, 1992).

4. Does the project adopt a 'rationalist' approach - Western scientific paradigm is dominant and L/IK fits within this framework.

- the emphasis is on merging the two – there is no dominance of a western paradigm
- there is an annex in the Report (p. 43) devoted to the heuristics of innovation: 'natural' refers to heuristics developed out of experiential knowledge of the innovator; artificial refers to techniques developed by experts to facilitate creative thinking.
- on farm and on station trials of farmers innovations specifies the 'linking between informal and formal science' (1996 report). The view seems to be that the 'value added' to local innovations is accomplished by bringing into the formal science regime and acknowledging benefits from IPR.
- the principles of innovation may not be analyzable in the context of modern rationality – rationality may be inherent but no utilitarian in nature. (Gupta, 1992).
- '...scientists should accept a role for indigenous science for modifying the agenda and framework of formal research. One major barrier to this transformation will be the CG centres.' (Gupta, 1992).

4.0 Project Focus: Project Information Collected that Uses L/IK

Local and indigenous knowledge has many facets and can be expressed and used in multiple ways. The express ways that L/IK is used in the project cycle indicates what the research needs are and if they are being met by the kinds of L/IK sought after.

I. Inputs (Data type)

1. Kinds of L/IK collected

a. Classification systems/names and use of plants

- underlying principles of indigenous classification of soil, climate, plants, insects, etc.

b. Resource scarcity (med, agri plants, other)

c. Agricultural practices (breeding, planting/harvesting, etc)

- 'support for experiments in farmers' fields...'

d. Conservation management practices

- 'study of indigenous folkloric nature conserving traditions (riddles, proverbs, songs and stories); sponsorship of postgraduate research on indigenous ecological knowledge'
- '...document and disseminate environmental management knowledge and sustainable practices.' '...documentation of traditional resource management practices have recently been developed.' (appraisal).

e. Indigenous Technology

- indigenous innovations are the main thrust of SRISTI
- agricultural implements: documentation, promotion and entrepreneurship (see objectives)

2. Additional potential for L/IK to be used

II. Methods Used

1. Impact of social/ecological change on L/IK considered

a. Comment on methods that tend to consider the embeddedness of L/IK in the prevailing social and ecological context. How L/IK is influenced by prevailing social structures, education system, religion, local biophysical conditions, etc.

- yes, definitely: '...it is believed that interdisciplinary research should emphasize local solutions for maintaining biodiversity that are compatible with the economic and social development of the country...'
- SRISTI will '...conceptualize the ecological knowledge systems in their utilitarian, spiritual and institutional dimensions'.
- very evident in the Annexure 21
- 'the process of innovation is classified into 5 categories: a) conceptual transformation; b) improvisation; c) accidental or serendipity; d) collective or individual; e) triggering new metaphors; f) funny processors, and institutions for humour. These processes can manifest in 4 ways: religious, cultural, socio-economic and political' (Gupta, 1992).

b. Knowledge transmission issues considered wrt intergenerational transfer of knowledge and if these mechanisms are still in place.

- One of the objectives is to 'produce training materials supporting the incorporation of insights from indigenous knowledge systems into educational curricula'.
- has adversely affected the process of transfer of knowledge from one generation to another. (report)

c. Project methods consider the traditional or adaptive and dynamic aspects of L/IK. Elder community members are consulted on past practices and a cross-section of community members are consulted on current practices: past and present beliefs/practice and context are compared. Do methods consider the impact of change on the functionality of and loss of L/IK and the impact that this may have on biodiversity use. Change in ecology, demographics, social values and institutions, etc., may all be considered.

- no indication. It only makes the distinction between communal and individual and traditional and contemporary (I asked Kirit, but reply was ambiguous)

d. Socio-religious context of L/IK considered - Validity is given to the social context of L/IK: Ritual, daily practice, traditional social institutions are included as valid contributions as context for knowledge

- 'Cultural knowledge is embedded in rituals, folklore, art and other cultural and social artifacts and processes, etc.' (report)
- Definitely: the religious function of a disease controlling practice was examined (Gupta, 1992) and it is realized that 'revival of religious identities sometimes indicates weakness of other social assurances'.
- 'Folk literature including riddles, songs, proverbs, adages, stories, theatre and jokes provide mechanisms for internalizing certain values which in their explicit form are either difficult to imbibe or to sustain.' (CPR, 1992).

2. Traditional Methodologies addressed

(Has the project relied on traditional methodologies (an approach outlined in the SUB Prospectus 2000) and what are they)

3. Data on L/IK disaggregated - L/IK used from relevant sectors of the community: gender, age, economic status, knowledge status, other

- 'We also made an intensive effort for documentation of women's ecological knowledge system' (report)
- 'Not all traditional or contemporary knowledge is held by communities, it is also held by the individuals.' (report: 36).
- at the specific request of Liz Fajber, Gupta was asked to provide in the outputs "publications on aspects of women's indigenous knowledge systems"; 'a report and evaluation of methods and approaches for the documentation and dissemination of women's knowledge and innovations of biodiversity in India'; etc. (email).
- SRISTI is ideologically committed to being gender sensitive but in practice a lot more remains to be done; Women farmers do not necessarily talk to men researchers. There is, what seems as an accepted bias of researchers accepting the male point of view as universal. The women's point of view is not sought specifically and separately. (Lambrou evaluation, 1998)

4. List specific methods that are used to incorporate L/IK

- 'anthropological and participatory methods will be used to document 'folk knowledge' of nature and use of botanical resources (I asked Kirit about this and he referred me to careful participatory methods, not PRA or RRA) and referred me to two papers).
- the method used by SRISTI helps create conditions favourable to reciprocity: '...two way communication and two way power.'

5. Are there other methods that could be used more effectively: what methods could be strengthened

III. Outputs

1. Increased Participation

(Local community involvement in project in all stages: community/local ownership of project: Community participants design conservation strategies based on L/IK)

- 'models/protocols to assist farmers in conducting their own research'

2. New Knowledge Generated

(New information from L/IK emerging from project: project has integrated L/IK and 'western science')

all innovation that has been 'discovered', and shared.

3. Traditional Knowledge Re-articulated

(Describe any traditions that are applied to present day issues in new format)

- 'guidelines for the introduction in the Gandhian Institutes' teaching curricula of insights from indigenous ecological knowledge systems.

4. Two-way Learning

(L/IK adds to Project through iterative process: project builds on L/IK)

- SRISTI adopts a novel concept of knowledge transfer: not simply transfer of technology but stimulation of learning, experimentation: sharing of the scientific principles behind technologies ; 'know why' and not simply 'know how' which evolves from the practitioners and inventors themselves and its returned to them'. (appraisal)

5. Results Delivery Reaches/Includes Community

(Dissemination materials accessible to local community: Lists, reports etc available in local language, workshops include community members, etc.)

'We insist in our work that two principles be followed without fail: 1) whatever we learn from people must be shared with them in their language; and 2) the source of every innovation must be identified, in order to protect IPR.' The newsletter, Honeybee, is published in 6 Asian languages besides English.

- (most of the project is oriented to delivery): databases of innovations, institutions and documents pertaining to IK and innovation; articles, reports,
- lots of references to educational materials, fellowships to school children, biodiversity contests, etc. (report).

Appendix IV: Frijol Tapado: Improvement of Slash/Mulch Systems and Frijol Tapado Systems (Guelph/CostaRica) II

1.0 Project Profile Information

Project Title: Improvement of Slash/Mulch Systems and Frijol Tapado Systems (Guelph/CostaRica) II

File ID: 96-1005

Radius ID: 002839

Reference to Medplants: No

Reference to Agrobio: Yes

Reference to L/IK (describe): The phase II project will focus upon the frijol tapado system in terms

of its 'biodiversity richness, in particular concerning the '...conservation and transfer of

indigenous knowledge and management practices by men and women farmers...'

(Crystal report)

Type of Activity: Research Project

Year of Approval: 1996

Country Focus: Costa Rica

Beneficiary Type

Ecosystem Type: Rainforest-Mountain

Funding Unit: SUB 96/97 \$234,548

Recipient Type University: University de Costa Rica & University of Guelph

Project Abstract (IDRIS)

Phase I of this project studied a traditional low-input hillside system of bean production in Costa Rica, which uses thick mulch of chopped secondary vegetation to prevent erosion. The project resulted in the agro-ecological and socioeconomic characterization of the slash/mulch or frijol tapado system and two representative case studies. This phase II project will focus on the ecological and economic value of the frijol tapado system in terms of its biodiversity richness, in particular concerning the composition and functions of the fallow vegetation, the conservation and transfer of indigenous knowledge and management practices by men and women farmers, and the role of biodiversity in maintaining sustainability. Phase II will also deal with the diversity, on-farm conservation, storage, and exchange of traditional bean seeds. Researchers will enhance the economic performance of frijol tapado by developing organic methods for bean production. The goal of the project is to improve productivity (per unit of land), increase farmers' income and thus reduce rural poverty, and guarantee the long-term conservation of the natural resource base. The methodological approach will be participatory and interdisciplinary in which farmers, NGO staff, and university staff complement each other.

Keywords (IDRIS)

Subsistence Farming/ Hills/Beans/Traditional Technology/Shifting Cultivation/On-Farm Research/Cultivation Techniques/Postharvest Systems/Sustainable Agriculture/Biodiversity

Notes: frijol tapado means ‘covered beans’

Additional Information Sources: All files, Tony Winson, Ronnie Vernooy, Paul Voroney

2.0 Specific Project Objectives: Role of L/IK

1. Specific Project Objectives that Depend on the Incorporation of L/IK

Objective 02: to identify *new management practices* of the cover vegetation in order to increase frijol tapado’s productive capacity and/or maintain its production at a stable level

Objective 03: to *compare the performance* of other types of cover crops (e.g. mucuna, canavalia, etc.) with the secondary vegetation traditionally managed by farmers

Objective 04: to *improve the production and storage* of traditional bean seeds and *reduce the diseases* that affect them

(source: PCR pg 42-45)

2. How L/IK contributes to meeting the above objectives

Objective 02: traditional management practices from the past (that may no longer be practiced) may provide the foundation for the new management practices

Objective 03: local farmers are likely aware of how productive the other cover crops are before any experimental trials are conducted

Objective 04: L/IK of diseases and traditional storage practices may be important contributions

3. Effectiveness of Project in using L/IK to meet the objective

01: There is reference to the intention to ‘recover local knowledge related to frijol tapado’ (project appraisal).

03: ‘Studies are built on farmers’ knowledge but also brought in academic insights’ (research/experiment-based) (Vernooy, pers com)

04: ‘Our evaluation of the handling and storage of traditional bean varieties by frijol tapado farmers will permit us to make recommendations on how these processes might be improved’ (P.A.D). The evaluation is done by researchers in collaboration with farmers, who bring insights from their studies about storage (Vernooy, pers com).

4. Do project objectives conform to SUB objectives in terms of use of L/IK

They clearly conform to the SUB objectives; it remains unclear, however, if IPR is an issue and there has been awareness raising around it. ‘Not addressed explicitly (Vernooy, pers com).

3.0 Research Approach

I. Participation of Beneficiaries

This category of inquiry is based on the overall, cross-cutting objective of maximum participation of project beneficiaries. For L/IK to be used effectively, local participants should be involved at the beginning of the project and have input into all subsequent phases, and in doing so, given the opportunity to express their traditional and contemporary knowledge that contributes to the project objectives.

Control over the research design would ensure that indigenous knowledge is not taken out of context or misrepresented; a relationship of equals is established; local systems of management will be strengthened; and information and data bases established will be for the benefit of the local community and culture (Stevenson, 1996).

Issue identification perspective

1. Is there involvement by community members/farmers in identification of the issue that the project is based on

a. Local community perspective on the issue is obtained through early collaboration with community (endogenous) or an outside perspective is used if the early stages of project are developed outside community (University, government agency), which is more consultative (exogenous)

As the PCR states, the issue is not identified by the community (referred to as 'ultimate beneficiaries'). 'There are entry points' (Vernooy, pers com). The issue was developed by the Universidad de Costa Rica and University of Guelph, R. Vernooy, and researchers from NARS and NGOs. Although it states on pg.i of the appraisal document, that Phase II topics were 'brought forward by the participating farmers...' ('based on Phase I results and shortcomings' -Vernooy, pers com).

In this case, the question is difficult to answer, since the project was ongoing with partner institutions who recognize a chronic problem with marginalized farmers.

2. Project Dialogue – consultation and collaboration in the implementation, monitoring and evaluation stages with the farmers' groups/community as participants

a. Inclusive of community throughout project: two way dialogue and continuous collaboration or exclusive of community: one way transfer of info/technology

The PCR states that a lot of attention was paid to the 'meaningful participation of farmers, and they played a role in fieldwork, exchanges and evaluations.', and that the 'ultimate beneficiaries' were involved in the stages of design, implementation, review of results and utilization, but not in idea identification. (The P.C.R.III. Project Design and Implementation)

There is an 'Established working relationship between organized farmers groups, NGOs and university researchers, based on mutual respect for each others' knowledge, skills, expertise and interests. The very active involvement of farmers, both men and women, is one of the outstanding features of the project.' (project appraisal, pg.i).

'Farmer training will be horizontal in that it will encourage research and analysis by farmers and the diffusion of results among them.' (P.A.D.) In section V. Capacity

Building, the notes say that the project served to get researchers to the field regularly to work closely with farmers addressing farmers' interests.

In Phase I, there was active farmer participation in the diagnosis of constraints, identification of feasible solutions as well as the planning, execution and analysis of trials. There was 'direct participation of 32 farmers in three farmers associations. Phase II encourages research and analysis by farmers.

- Voroney corroborated that the counterpart, Jorge, was very sensitive to the farmers. Also the farmers themselves were very forthcoming and confident in expressing what they wanted from the project.

b. Stakeholders: List who the stakeholders are and if they include the local community members. Comment, where possible, on who decides who the stakeholders are.

The stakeholders appear to be 12 farmer groups, Universidad de Costa Rica, University of Guelph, 3 NGOs and government agencies. Who decides is not clear from the project documents, but it appears that there may be involvement from the communities, NGO and the Universities as to who the stakeholders are. 'Phase II activities were decided about together' (Vernooy, pers com).

c. Community-based organizations (CBOs) are recognized as important participants in the project

Farmers associations are important in this project – in Phase II there are links with twelve farmers groups.

Issue Statement:

This section follows from Objective 1 and refers to how project participants perceive the issue in terms of how biodiversity loss. This perspective also helps to explain how links are made between loss of L/IK and loss of biodiversity and how loss of L/IK threatens biodiversity conservation.

1. Describe the *causes* of biodiversity loss and the perceived role for L/IK in dealing with the loss: does the project make this connection - if not, make it

Monocrops are replacing the diverse tapado system. By reviving the traditional tapado system, the more biodiverse system will be maintained. Another issue is an inequitable land tenure system - how this influences IK is indirect, in that people have little control over their land and so cannot make decisions about land use, therefore traditional IK may not be used. If L/IK is used effectively, then the context for maintaining tapado will be understood and revival of a traditional system more effective and sustainable.

Therefore, there must be an equal economic incentive in the tapado production system as there is for mono crop production.

- all of the above paragraph is a series of question marks by Vernooy, but he does add 'several forces are at play at once, frijol tapado is but one element of livelihood security'

2. Describe the relationship made between the loss of biodiversity and the loss of L/IK: if it is not clear in the project documents, make the link here

There is no explicit link made between loss of biodiversity and loss of IK. The link is that if the diverse tapado system is no longer practiced, then the associated knowledge that is the basis for this system will eventually be lost. Therefore, this is the kind of IK that supports local and ‘anthropogenic’^{iv} biodiversity.

3. Limits of Biophysical Elements of the Ecosystem: the causes of marginalization

a. List anthropogenic features (forestry, fires, urbanization, etc)

over exploitation of land and encroachment on marginal land, resulting in overall land shortage. The main question (according to Voroney) is how long should the land lay fallow. Frijol tapado farmers are the ‘poorest of the poor’ and farming on marginal lands. No body would farm this way by choice.

Cash crops and animal grazing are encouraged and are pushing farmers to marginal lands. Fallow periods are short to non-existent.

b. List any natural features (poor soils, prone to natural disasters)

soil infertility - these are unproductive lands unsuitable for other uses. Mostly phosphorus limited soils.

II. Policy Environment

This category of inquiry is based on Objective 2.

1. Is Prior Informed Consent (PIC) obtained and who gives consent

PIC is obtained - ‘Farmers, NGOs agreed to work with the research team from the university (Vernooy, pers com)

2. Does awareness raising of IPR issues take place and are people given the opportunity to suggest and develop a means of rights protection where it is an issue.

There is no indication that this is done (‘good point’ Vernooy, pers com). Although, according to Vernooy, this as an ‘issue’ has not been identified as such.

3. . Key policies on rights of access (land tenure): List the policies if they have been identified. How does land tenure affect conservation efforts and what are the key policies affecting the capacity of local stakeholders to sustainably manage their natural resources.

^{iv} the term anthropogenic biodiversity refers to human made; that which is cultivated by humans and is distinct from ‘natural biodiversity’, that which characterizes primary ecosystems, for example, even though they are subject to human modification as well

Land tenure policies are identified, and it is mentioned as an issue in project documents. The issue was addressed, and they received a request to fund a land purchase initiative (Vernooy, pers com).

- in the Melendez paper, she states that land tenure is an issue and can affect f.t. management - farmers may have insufficient land to maintain a fallow-based system.

4. Describe the links between institutions/groups participating in project with beneficiaries

a. National or regional government to community

Two universities and NGOs work directly with community groups. The context is important here because the project represents one of the first efforts to move slash/mulch research from academia to the field (Vernooy, pers com).

b. NGO to community

Direct link

c. Other

III. Project Assumptions

Understanding the assumptions surrounding the concepts of biodiversity and local and indigenous knowledge assist in understanding where L/IK fits into the overall project cycle, how sustainable the base of knowledge is for future use and what the motivations for conservation of biodiversity are.

1. Concept of biodiversity conservation: In situ or ex situ

This is really a situation of ‘cultivated biodiversity’ but is regarded as *in situ* since it is maintained on site. However, it is regarded as anthropogenic biodiversity, since it is cultivated biodiversity and not ‘wild’ biodiversity. Voroney suggested that 5-10 varieties of bean seed were used.

2. View of Biodiversity

a. That conservation occurs through use

This is definitely so, as the local frijol tapado is recognized both as a means to conserve biodiversity on secondary fallow lands, and as potential to generate income locally. Therefore, by generating increased interest in the frijol tapado systems through economic incentive, there will be continued use and maintenance of a more biodiverse system. However, there is a real link to ecological conservation through the use of frijol tapado, which is not described at length in the documents but is an implicit part of the project.

b. The project incorporates an indigenous/local perspective of biodiversity as the basis of the project and/or tries to come to a common understanding of implications of biodiversity conservation

The concept was discussed and diversity is key to the system (Vernooy, pers com). It is implicit that maintaining biodiversity is an economic advantage for communities involved. There is an economic value attached to biodiversity in this project, and the express aim is to add value to the existing system.

The tapado system, however, is biodiverse because of conservative measures taken by farmers to ensure that their subsistence livelihood remains intact by maintaining a diversity of crops. The economic advantages of the tapado system is a new dimension to a traditional agroecological system. There is explicit reference to how the tapado contributes to local biodiversity, but it is in scientific terms: based on 'previous studies' and that it can affect nutrient release, soil conservation, etc. The social dimensions of frijol tapado were recognized (Vernooy, pers com).

3. View of Local and Indigenous Knowledge

a. that continued use of L/IK will maintain the knowledge base for future use

This appears to be implicit - 'the whole project is about this' (Vernooy, pers com).

b. that the current use of L/IK can be used independently of its historical social and ecological context

The loss of L/IK is not addressed in the project documents. It is implicitly assumed that farmers' knowledge of the frijol tapado system will be expanded upon by other knowledge (based in the University) to enhance the existing system for increased economic benefits. The tapado system is an evolving system (Vernooy, pers com) and that is recognized in terms of knowledge in the community.

There is explicit recognition of the impact of social change on communities, such as the demand for income and change in social roles and patterns. However, there is no explicit link to how these social changes impact IK and how that, in turn, impacts biodiversity conservation. Those linkages are not made up front. However, Vernooy (pers com) counters that there are several forces at play. The difference in views here are related to implicit subjective nature of involvement and the objective nature of the review. Even if something is evident to one person, it may not be for others.

4. Does the project adopt a 'rationalist' approach - Western scientific paradigm is dominant and L/IK fits within this framework.

The tapado system is appreciated for what it is, as a traditional system. To encourage its continued use, it is placed within an economic, social and ecological framework, so it within a local context and not an imposed one. The project is evaluated by farmers, so there is a significant element of valuing local input into the western framework.

5.0 Project Focus: Project Information Collected that Uses L/IK

Local and indigenous knowledge has many facets and can be expressed and used in multiple ways. The express ways that L/IK is used in the project cycle indicates what the research needs are and if they are being met by the kinds of L/IK sought after.

I. Inputs (Data type)

1. Kinds of L/IK collected

a. Classification systems/names, use of plants and role of plants in the system

- use of local bean varieties; selection of areas with more diverse vegetation; plants as indicators of soil fertility; land use history (Melendez)

b. Resource scarcity (med, agri plants, other)

none

c. Agricultural practices (breeding, planting/harvesting, etc)

This is the primary area of IK use: experiments with seed handling (treatment and storage) and evaluation of bean quality to be done using ideas and criteria developed by collaboration with farmers. Soil fertility, slope aspect, timing of planting, fallow species identified as 'good', 'bad' or 'neutral'. (Melendez)

d. Conservation management practices

This is the core of the maintenance of the system (Vernooy, pers com)

e. Indigenous Technology

Not explicit - it is assumed that any technology used in the tapado system is encouraged - that traditional seed storage systems will be evaluated and improved upon, etc. Also, slashing techniques, drying processes, etc (Vernooy, pers com).

2. Additional potential for L/IK to be used

An existing system by its social, ecological and economic context, encourages plant diversity.

The value of some fallow species for their ability to accumulate phosphorus (it appears that this is based on University research, not local consultation). Also the relationship between biodiversity and productivity was to be estimated by quantitative research methods.

II. Methods Used

1. Impact of social/ecological change on L/IK considered

a. Comment on methods that tend to consider the ‘embeddedness’ of L/IK in the prevailing social and ecological context. How L/IK is influenced by prevailing social structures, education system, religion, local biophysical conditions, demographics, ritual, etc.

The context for the tapado system has been considered in the socio-economic study. I am unaware of the details of the study, but it should include documentation on the influence of the education system on the adoption of new farming methods, and high birth rates and need for more income, etc which would lend insight into the trends that move people away from frijol tapado system to a mono cropping system

Traditional institutions and religious practices are not examined for the context of IK and its contribution to the expanded frijol tapado system

- objectives of the proposed project are to ‘understand the ecological and socioeconomic factors of the slash mulch system that makes it sustainable.

b. Project methods consider the traditional or adaptive and dynamic aspects of L/IK. Elder community members are consulted on past practices and a cross-section of community members are consulted on current practices: past and present beliefs/practice and context are compared. Do methods consider the impact of change on the functionality of and loss of L/IK and the impact that this may have on biodiversity use. Change in ecology, demographics, social values and institutions, etc., may all be considered.

Changing social values are mentioned, the influence of other changes are addressed in the socio economic study. The main premise is that there is change in local needs and an increased need for income, which has led people to plant mono crops. Since IK is implicit in the system, there is no mention of how L/IK as a system in itself is affected by change and how that will affect the frijol tapado system in either the short or long term.

b. Knowledge transmission issues considered wrt intergenerational transfer of knowledge and if these mechanisms are still in place.

- this was addressed and considered very important, in terms of how young people are drawn to cities and city life (Vernooy, pers com).

2. Traditional Methodologies addressed

a. Has the project relied on traditional methodologies (an approach outlined in the SUB Prospectus 2000) and what are they

For example, traditional methods of evaluating bean quality, soil quality or how to obtain local knowledge on a subject would incorporate local methodologies/methods. This may have been the approach, but was not found in project documents.

3. Data on L/IK disaggregated - L/IK used from relevant sectors of the community: gender, age, economic status, knowledge status, other

Women are mentioned specifically as important contributors, however, the role of women is not dealt with in any depth (Vernooy, pers com). Three types of tapado farmers were identified (what are they?).

4. List specific methods that are used to incorporate L/IK

In addition to general knowledge of frijol tapado, farmers developed criteria for on farm evaluation of plots.

5. Are there other methods that could be used more effectively: what methods could be strengthened

Considerations of traditional cultivation practices associated with ritual could be done to determine if there were traditions (no longer widely practiced) that could contribute to more effective seed storage, provide indicators of fertile sites, poor soils, etc. in the fallows.

III. Outputs

1. Increased Participation:

(Local community involvement in project in all stages; [community/local ownership of project: Community participants design conservation strategies based on L/IK])

Phase II farmer evaluation and experimentation, and the conducting of workshops are very important areas of participation. It appears that the project was highly participatory in all stages, except the issue identification stage.

2. New Knowledge Generated:

New information from L/IK emerging from project: project has integrated L/IK and 'western science'

Alternative methods for seed storage & treatment; there is a better understanding of the role of plant diversity in the frijol tapado system. Also, the 'new or improved resource management system' for the frijol tapado system was developed together with farmers.

3. Traditional Knowledge Re-articulated:

(Describe any traditions that are applied to present day issues in new format)

Traditional tapado integrated to new economic, ecological and social values system (Vernooy, pers com). However, Voroney commented that if people had the choice, they would not be farming frijol tapado.

4. Two-way Learning: L/IK adds to Project through iterative process: project builds on L/IK

Farmer to farmer interchange; farmer experimentation. 'The project also served to get researchers to the field regularly and work closely with farmers addressing farmers' interests and not only the researchers' interests.' (PCR pg 52).

- according to Voroney, busloads of farmers and their families would attend the workshops and only the poorest of the poor are there, not elite farmers (since elite farmers do not do f.t.).

5. Results Delivery Reaches/Includes Community:

(Dissemination materials accessible to local community: Lists, reports etc available in local language, workshops include community members, etc.)

Book, Final Project Report, Scientific Articles - all of these are not accessible to farmers groups and participating communities. However, the farmer to farmer exchanges were highly rated as was the training seminar (farmers as participants); the workshops, video, farmers involved in experimentation are all designed to reach users effectively.

Appendix V. Guidelines for the Review of the Use of Local and Indigenous Knowledge in SUB Programming and Medplants and Agrobio Projects

1.0 Project Profile Information

Project Title Community Biodiversity Development Conservation Programme, PhII

File ID

Radius ID 100356

Reference to Medplants: That it is a model of multi donor support that could be used by medplants

Reference to Agrobio Yes: promote the role of farmers as community innovators in the development, conservation and utilization of plant genetic resources. The CBDC is the flagship project of the agrobiodiversity component of the SUB PI.

Reference to L/IK (describe): Ph I: the documentation and validation of farmers' knowledge and systems of innovation.

Type of Activity:

Year of Approval Phase II: 1999 (Phase I was 4 years: 1994-99; phase II is until 2003)

Country Focus: global: 12 countries; 17 projects

Ecosystem Type: agroecosystems

Funding Unit (Ph I, IDRC contributed CAD\$1,251,112 and Ph II, IDRC funded \$800,000)

- also supported by DGIS and SIDA

Project Abstract (IDRIS)

IDRC Contact: Gines, Maria-Jesus

Type of Activity: Research Project

The Community Biodiversity Development and Conservation (CBDC) Network is a partnership of international and national institutions whose activities promote the role of farmers as community innovators in development, conservation and utilization of plant genetic resources. It was created in 1994 following the Keystone Dialogue, which focused attention on the issue of on-farm conservation and the use of genetic resources. It has been supported by the Netherlands Directorate-General for International Cooperation (DGIS), the Swedish International Development Authority (SIDA) and IDRC. The first phase of the program aimed to document and validate farmers' knowledge and systems of innovation. Its activities focused on participatory research, improving farmers' livelihoods and maintaining diversity. A recent evaluation of the program revealed that the highly innovative CBDC approach is being mainstreamed, and that individuals participating in the CBDE program have been influential internationally. The evaluation also pointed out a number of areas for special consideration or adjustment in the future. These will be incorporated into the second phase of the program, which will continue to pursue the general objective of Phase I while putting greater emphasis on the ecosystem

approach and gender analysis. The proposal outlines a program model that includes a reduced and refined administrative system, a revised communication network, a more precisely defined technical component, and a more participatory planning and operating agenda.

Information sources: Appraisal, PIM, trip reports (for LA), project summary, project evaluation (Universalia report), PAD (project approval document), all written material overviewing regional loci, phase II proposal, etc, discussion with Sheri Arnott

Special Notes: Since this is a `coalition` project and involves 12 different projects in Latin America, Africa and Southeast Asia, the review is done at a programme level.

2.0 Specific Project Objectives: Role of L/IK

1. Specific Project Objectives that Depend on the Incorporation of L/IK

Note: the project aims to take the ecosystem approach

`The CBDC Programme is aimed at understanding and strengthening the farmers` system of PGR conservation and development in particular, and in biodiversity management in general. The CBDC Programme is about strengthening farmers` control of the science and technology of agro-biodiversity research and development, in general and of the science of the PGR research and development in particular.` (Phase II proposal)

Development Objectives

1. `To support and give priority to the implementation of actions promoting the socio-cultural, ecological and economic sustainability of local communities.
2. `To provide direct support to the strengthening of approaches and practices of farmers and local communities to develop, conserve and utilize biodiversity
3. To investigate and assess selected community innovation systems related to the development and conservation of biodiversity, in order to improve direct support
4. To promote recognition, understanding, and awareness of community-based activities on biodiversity and to convert elements of community innovation systems related to the development and conservation of biodiversity into core components of education, policy making and public opinion.

Specific Objectives:

1. `To develop and implement...methodologies ...to strengthen community biodiversity development and conservation systems and techniques`
- 2.`...that support community systems for the use, development and conservation of biodiversity
3. `To assess and propose institutional and legal mechanisms to recognize and implement the rights of farmers and local communities with respect to their biodiversity resources and activities

Objectives as stated in Phase II proposal executive summary:

- to conserve and increase plant genetic diversity and to reverse the trend towards genetic erosion;
 - to empower and promote the self-reliance of farmers by strengthening the capacity of farming communities and promoting their awareness as agricultural innovators, hence decentralizing crop improvement and biodiversity management;
 - to target user needs, recognising status and gender based power relations within communities;
 - to strengthen linkages with external organizations by creating the conditions for partnership opportunities between farmers, NGOs and formal research institutions that will benefit the functioning of both systems;
 - to contribute to the wider endeavour to achieve food security through the sustainable use of ecologically balanced agricultural systems.
- Note: there is a greater emphasis on the ecosystem approach in phase II.

2. How L/IK contributes to meeting the above objectives

strengthening the approaches and practices of farmers utilize and conserve biodiversity; support of community innovation systems; recognition and understanding of community based activities on biodiversity; farmers rights with respect to resources

3. Effectiveness of Project in using L/IK to meet the objective

- cannot assess this, since review is at programming level

4. Do project objectives conform to SUB objectives in terms of use of L/IK

The project contributes to SUB`s mandate as expressed in two objectives: i) to promote use, maintenance and enhancement of the knowledge, innovations and practices of indigenous and local communities that conserve and sustainably use biodiversity; and ii) to develop incentives, methods and policy options that facilitate community participation in the design and implementation of in-situ agricultural and aquatic biodiversity conservation and development strategies.

3.0 Research Approach

I. Participation of Beneficiaries

This category of inquiry is based on the overall, cross-cutting objective of maximum participation of project beneficiaries. For L/IK to be used effectively, local participants should be involved at the beginning of the project and have input into all subsequent phases, and in doing so, given the opportunity to express their traditional and contemporary knowledge that contributes to the project objectives.

Control over the research design would ensure that indigenous knowledge is not taken out of context or misrepresented; a relationship of equals is established; local systems of management will be strengthened; and information and data bases established will be for the benefit of the local community and culture (Stevenson, 1996).

Issue identification perspective

1. Is there involvement by community members/farmers in identification of the issue that the project is based on

(a. Local community perspective on the issue is obtained through early collaboration with community) OR Outside perspective is used - early stages of project are developed outside community (University, government agency) - consultative

The program was first discussed after the PGR Keystone meeting in 1994. The first meeting with partners didn't begin until 1997, so it was somewhere between 2-3 years in the discussion phase without the partners. There is also mention of 'conflicting views on issues' and eventually lateral exchange of information and approaches - could the partners have been involved earlier (Universalia Report, 1999). Since the network was already ongoing before IDRC got involved, it is difficult to assess. This really depends on the partners and is probably variable.

- the RCU (regional coordinating unit) is to be the one identifying the research questions and research design.

- it is difficult to say, and I need input on this: in the 'approach' as an example of a t-line (PVS and PPB) it says that selection of communities is based on 'location, ecosystem, crop diversity, farming system, local organizations, power structures' but who selects on this basis

- '...the first years of the CBDC programme were planned and implemented starting from very specific needs and priorities identified at the local or national level...' (Phase II proposal)

- research design: 'incorporation of local knowledge to research design'.

Many projects are very locally based, but some may not be (Sheri Arnott, pers com).

2. Dialogue consultation and collaboration with the community as participants

a. Inclusive of community throughout project: two way dialogue and continuous collaboration or exclusive of community: one way transfer of info/technology

b. **Stakeholders:** List who the stakeholders are and if they include the local community members. Comment, where possible, on who decides who the stakeholders are.

- the main beneficiaries of CBDC have been small farmers, especially women and indigenous peoples living in fragile and less favourable agroecosystems.

- the criteria for farmer partners are 'socio-economic status, capacity and interest, level of knowledge, gender representation' but as to who selects on this basis is unclear.

- 'the CBDC programme is committed to make the field activities farmer-led.' (second phase proposal, executive summary).

- 'farmers will be involved in as many project phases as appropriate.'

- there is a very nice stakeholder 'map' provided in the Universalia report, that includes the stakeholders in the inner circle are those with the strongest influence on the

organization (participating farmers, RAFI, GCU, IPP, RCU, ITP, DLO-CGN, NHL, CET. The middle circle includes farmers, NGO partners, IDRC, local politicians, SIDA, CGIS. The outer circle are those that medium or low levels of influence.

c. **Community-based organizations (CBOs)** are recognized as important participants in the project

- this was an issue brought up in the evaluation report (Universalia, 1999), some respondents expressed the view that the CBDC had become too top down when it was trying to be bottom up, and that there should be mechanisms in place to facilitate bottom up planning.

Issue Statement:

This section follows from Objective 1 and refers to how project participants perceive the issue in terms of how biodiversity loss. This perspective helps explain how the project might link loss of L/IK and loss of biodiversity and how loss of L/IK threatens biodiversity conservation.

1. Describe the *causes* of biodiversity loss and the perceived role for L/IK in dealing with the loss: does the project make this connection - if not, make it

- Lack of adequate policies to protect or enhance genetic diversity and local knowledge.
- genetic erosion - crop genetic diversity has declined 75% (FAO) due to the replacement of traditional varieties with commercial varieties. Threatens food security
- in the case of SSS, the cause of the issue is being addressed - it is very good to read `there have been few studies and activities which look at the local seed supply system in a more integrated way and also systematically analyzes the causes behind the weaknesses of local systems.`(t-line: seed supply systems).
- globalized markets have threatened informal seed supply systems

2. Describe the relationship made between the loss of biodiversity and the loss of L/IK: if it is not clear in the project documents, make the link here

- loss of knowledge of traditional crops and replacement by commercial crops suggests that IK associated with the traditional crops is lost. My question remains - how much hybridization is done with the old and the introduced - and if this is done, is there something that should be done to retain the old gene pool (I really don't know).
- `today, a great number of the species involved is threatened by habitat destruction, mono cropping and other agricultural practices, introduction of exotic species, erosion of local cultures (including food habits, medical systems, traditional farming systems and indigenous knowledge) and market pressures.`(NDSDB t-line) (this has been looked at in the Latin American case, but not in the African case, necessarily – Sheri Arnott, pers com).

3. Limits of Biophysical Elements of the Ecosystem: the causes of marginalization

(can be anthropogenic features (forestry, fires, urbanization, etc) OR natural features (poor soils, prone to natural disasters)

- Since this is a global project, and there are 17 different projects, this varies. Although if I use the indigenous vegetables as an example:

II. Policy Environment

This category of inquiry is based on Objective 2.

1. Is Prior Informed Consent (PIC) obtained and who gives consent

- difficult to assess at the program level and depends on the partner research institutions.

2. Does awareness raising of IPR issues take place and are people given the opportunity to suggest and develop a means of rights protection where it is an issue.

- the main ethical consideration is stated to be the issue of control of information, and germplasm; it is important to ensure that the rights that go with this information will be respected. A Protocol to address these issues has been developed. It establishes relationships with participating communities to ensure a bottom up approach.

3. . Key policies on rights of access (land tenure): List the policies if they have been identified. How does land tenure affect conservation efforts and what are the key policies affecting the capacity of local stakeholders to sustainably manage their natural resources.

- this has not necessarily been addressed as an issue in projects

4. Describe the links between institutions/groups participating in project with beneficiaries

a. National or regional government to community

- links are made from the recommendations by the NGOs and farmers groups to the National governments in deciding how to respond to biodiversity.

- `CBDC`s ability to link community knowledge to global understanding remains an important part of CBDC`s work, but the institutional and organizational arrangements to make this happen remain elusive (Universalia)

b. NGO to community

CBDC encourages coordinated and collaborative efforts by farmers` groups, NGOs and formal research institutions. Specifically states that `the basic approach...is towards revitalizing and strengthening community innovation systems by linking community seed improvement and conservation to formal research institutions with grass roots NGOs as intermediaries.

c. Other

III. Project Assumptions

Understanding the assumptions surrounding the concepts of biodiversity and local and indigenous knowledge assist in understanding where L/IK fits into the overall project cycle, how sustainable the base of knowledge is for future use and how and motivations for conservation of biodiversity.

1. Concept of biodiversity conservation: In situ or ex situ

- the concept of biodiversity is that it can mean `domesticated`, semi domesticated` or `wild`, as indicated in the T-lines: of the three community based t-line, the sss (seed supply systems) is adopted by 11 of the 13 partners; the PVS-PPB t-line is selected by 12 of the 13, and the NDSDB (non-domesticated, semi domesticated biodiversity) is adopted by 5 of the 13 (see table in Phase II proposal).
- the objective of the PVS-PPB activities is to widen farmers options for utilization and to contribute to the on-farm maintenance of plant genetic resources. To do this, CBDC will support efforts to develop varieties that are adapted to local circumstances and preferences (does this include ecological adaptation).
- in the Sierra Leone Project Report: a thought just occurred to me when I read that in order to `provide a wide genetic base for PPB and PVS, 60 elite lines of local materials in addition to 60 progenies from interspecific crosses made in Cote d'Ivoire (foreign materials). This increases crop diversity, to be sure, but not with native species....so is it artificial biodiversity?

2. View of Biodiversity

a. That conservation occurs through use

- note that the focus of the work is on the development and conservation of locally available genetic resources, promoting exchange between farmer communities and the institutional system. - it is established (Appraisal, p. 3) that `local cultivars are better adapted to the natural environment and cropping system` as well as to household needs and preferences. `The inherent heterogeneity of the cultivars ensures a degree of adaptability and resilience under shifting conditions with respect to changing climate, new races of diseases and pests`
- the Universalia report puts an economic spin on biodiversity, and I am not sure if this reflects project ideology: to make CBDC`s activities economically sustainable, there is a need to make biodiversity valued and appreciated by the markets. It is necessary ...to get the public to regard the diversity of these products as a sign of good quality` (Universalia Report, p. 6)
- an important concept to be considered here is that of mixing traditional cultivars with introduced ones: in the Phase II proposal - executive summary, it states `although under favourable conditions, varieties from research institutions may replace local cultivars, even in these situations, farmers continue to select from the introduced varieties, thereby creating new lines blending local and exotic cultivars. The combination widens the genetic base of crops and improves local food security.`
- `the role of PVS and PPB in a broader strategy of biodiversity conservation will have to be adjusted to the specific situation of the agro-ecosystems in which the work is developed.` (Phase II proposal).

b. Is the concept clarified with all participants and is there any **awareness** raising around the issue

- this is the purpose of the t-line : Mainstreaming the CBDC approach: the aim is to make `community biodiversity` a well known issue among farmers...the idea is to raise awareness among the general public of the value of biodiversity and of the fundamental contribution that farming communities make to its conservation and development; to include development and conservation of biodiversity and related issues into the core concerns and activities of community and farmers`organization.

3. View of Local and Indigenous Knowledge

(i.e that continued use of L/IK will **maintain the knowledge** base for future use or that the current use of L/IK can be **used independently of its historical social and ecological context**)

- preservation of knowledge through use is apparent, and CBDC was said to be `...innovative in arguing for the strengthening and integration of farmers`indigenous knowledge on plant genetic resources and biodiversity into the larger, more institutionalized forum of research in this scientific domain.`(Universalia report, p. 5)
`Farmers`continuing intellectual innovation in agriculture, in PGR management and their system of protecting and using biodiversity in general, has largely been unrecognized by modern scientific institutions. This non-recognition also influenced policies and development strategies that concentrated resources into centralized research institutions that attempt to supplant rather than build on and cooperate with local knowledge system. Farmers`intellectual innovation dominates the management of local and indigenous plants that provide for much of the food requirements of farming communities.
- one of the hypotheses in the phase II proposal states `farmers conserve and develop biodiversity` which means to me that the new varieties developed between the new introduced and the traditional is considered the development of biodiversity.
- the importance of NDSDB for local communities is reflected by complex indigenous knowledge systems in which women play a strategic role (NDSDB t-line)

4. Does the project adopt a 'rationalist' approach - Western scientific paradigm is dominant and L/IK fits within this framework.

There are two conflicting indications in this regard - one is that `farm crop improvement should be recognized as an alternative to institutional plant breeding with a comparative advantage under a range of environmental and social conditions`(CBDC Proposal, 2000-2003, p.1)

Then the Universalia report says that CBDC attempts to fill the information gap on the use and management of genetic diversity at the level of the farmers, and to assess its effectiveness in comparisons with the institutional system and generally tries to validate the role of farmers in this area (p.8)

- In the **Zimbabwe** Project, community systems of conservation practices are seen to be complimentary to formal systems. `Allow for the recognition of community based

biodiversity conservation and utilization practices by the formal sector and systemic support in terms of training, financial resource allocation, collaborative research and dissemination of information by other rural development organizations.’ (CBDC Ph II proposal).

5.0 Project Focus: Project Information Collected that Uses L/IK

Local and indigenous knowledge has many facets and can be expressed and used in multiple ways. The express ways that L/IK is used in the project cycle indicates what the research needs are and if they are being met by the kinds of L/IK sought after.

I. Inputs (Data type)

1. Kinds of L/IK collected

a. Classification systems/names and use of plants

- wild and semi- domesticated species (T-line)

b. Resource scarcity (med, agri plants, other)

c. Agricultural practices (breeding, planting/harvesting, etc)

- participatory plant breeding (PPB) and participatory varietal selection (PVS), PGR diversity status (who knows this), `Local knowledge on PGR conservation and development and IK on selection & breeding objectives.

- farmers` participation in on farm trials - research design, field layout, monitoring system, selection breeding techniques, evaluation and analysis tools, seed production

d. Conservation management practices

- this theme runs through the entire CBDC approach

- one of the objectives of the SEARICE in the Philippines, is to `mainstream support for farmer-led conservation and development of PGR among farming communities, universities and formal research institutions.

e. Indigenous Technology

- informal seed supply systems

2. Additional potential for L/IK to be used

in conducting the PVS & PPB, it states that `they need to identify appropriate genetic materials` and it is not immediately obvious that IK is to be used here

II. Methods Used

1. Impact of social/ecological change on L/IK considered

a. Comment on methods that tend to consider the embeddedness of L/IK in the prevailing social and ecological context. How L/IK is influenced by prevailing social structures, education system, religion, local biophysical conditions, etc.

- I think an excellent example of this is addressed in questions asked by the 1999 Technical review of the Zimbabwe project: `why have farmers not been able to keep varieties as they used to and is it due to cultural erosion` and `what could be a strategy for counteracting possible sources of erosion` These are good questions to ask and very refreshing - it would be nice to see more questions asked along these lines when appropriate.

- another excellent example is in the sss t-line: the approach is to systematize information and definition of a framework for analysis of local seed systems and to do this the CBDC will serve as a conceptual framework with the aim to allow a `comprehensive analysis of the performance of local seed systems, biologically and socio economically and its relations with the institutional and policy environment.

- methodologies will have to address the complexities of the field situations

- the `ecosystem approach is used, but - nowhere in the `methodology of the research` (p.3 appraisal) did I see any more mention of the `ecosystem approach`. - `...since all projects have an ecosystem orientation...` (p.3)

b. Knowledge **transmission issues** considered wrt intergenerational transfer of knowledge and if these mechanisms are still in place.

- the NDSDB t line emphasizes cultural re-valorization – promotion of local pride and customs, re-establishment of trans-generational links of knowledge and circulation of info on the value of local resources and knowledge (note: this was a 10 year programme in itself in Western Province, and resulted in very little and very local effect. These issues are addressed – see d). Also, in the Chile project, traditional foods are introduced into the schools, which also has the benefit of creating a market for the local farmers(Sheri Arnott, pers com).

c. Project methods consider the traditional or adaptive and **dynamic aspects of L/IK**.

Elder community members are consulted on past practices and a cross-section of community members are consulted on current practices: past and present beliefs/practice and context are compared. Do methods consider the impact of change on the functionality of and loss of L/IK and the impact that this may have on biodiversity use. Change in ecology, demographics, social values and institutions, etc., may all be considered.

d. **Socio-religious context** of L/IK considered - Validity is given to the social context of L/IK: Ritual, daily practice, traditional social institutions are included as valid contributions as context for knowledge

- the sustainable use strongly based upon local cosmovisions, needs, skills, crafts, tastes and celebrations (NDSDB t-line chart)
- the NDSDB t-line stresses the importance of `cultural (re)-valorization at the local level, though actions like the promotion of local pride and customs, the re-establishment of trans-generational links of knowledge sharing, the circulation of information on the value of local resources and knowledge sharing, etc.
- the project will explore solutions under complex and diverse social and cultural situations

2. Traditional Methodologies addressed

a. Has the project relied on traditional methodologies (an approach outlined in the SUB Prospectus 2000) and what are they

- this is implicit in indigenous innovation used in PGR.

3. Data on L/IK disaggregated - L/IK used from relevant sectors of the community: gender, age, economic status, knowledge status, other

- gender is a t-line and so is specifically addressed throughout
- the role of NDSDB – ‘their importance for local communities is reflected by complex indigenous knowledge systems in which women play a strategic role.’ (p. 9)

4. List specific methods that are used to incorporate L/IK

- the project lists `Environmental Impact Assessment` as a `Methodology`, (Appraisal, p. 3)
- CIKSAP was involved in the Kenya project and they have a clear commitment to a holistic treatment of IK.
- the RAAKs (Rapid appraisal of Agricultural Knowledge Systems) was proposed for Phase II.
- participatory methods are used - in detail:
 - `one of the expected outcomes of the first phase of the CBDC programme was to `develop common approaches to the understanding of on-farm conservation and development of diversity by farmers.` (Universalia, 1999). This was done by `...a decentralized, locally-oriented conservation and development system by farming communities.`
 - the Universalia report also found that some people felt that methodological tools need to be developed.
 - participatory evaluation
 - are local participants involved in the baseline study (in the sss t-line)

5. Are there other methods that could be used more effectively: what methods could be strengthened

III. Outputs

For CBDC, t-line has a different output. (Consider SSS, PVS-PPB and NDSDP)

1. Increased Participation

a. Local community involvement in project in all stages; (community/local ownership of project: Community participants design conservation strategies based on L/IK)
- one output is control of farmers over their genetic resources, and to develop options for farmers interactions with formal systems (PVS-PPB t-line)

2. New Knowledge Generated

a. New information from L/IK emerging from project: project has integrated L/IK and western science

CBDC has great potential to fundamentally change the approach to agricultural research and development internationally.

- the outputs linked to local biodiversity and local seed systems is immense: beans, corn, quinoa, potato `reactivated` or `recuperated`
- in the Philippines and Veitnam, there is mention of rice, yam, sweet potato, corn varieties `adopted`. Does this mean that they were not there before
- increased understanding of the role of gender aspects and indigenous knowledge in seed supply systems and the implications for the strengthening of these systems (SSS t-line)
- selection and breeding methodologies and protocols by crop type designed and tested with farmers, selection of varieties based on farmers varieties, breeding options, (PVS-PPB)

3. Traditional Knowledge Re-articulated

a. Describe any traditions that are applied to present day issues in new format

- local norms and values as reasons to conserve are strengthened; traditional uses are restored and new sustainable forms of utilization are adopted (NDSDB t-line)

4. Two-way Learning

a. L/IK adds to Project through iterative process: project builds on L/IK

- `the constant interactions between scientists at the Rice research station (RRS), project staff and farmers generated vital learning experiences for all players (national project: Sierra Leone)
- `Recognizing farmers`PGR management as a distinct, parallel management system to formal research and breeding, and establishing complementary roles for both (Phase II proposal).

5. Results Delivery Reaches/Includes Community

a. Dissemination materials accessible to local community: Lists, reports etc available in local language, workshops include community members, etc.

- there will be over 60 publications ranging from books to Interim reports - how accessible these are to local people is not known
 - workshop proceedings for policy and advocacy at local, national, regional and international levels in support of local sss (sss t-line).
 - the t-line that deals with mainstreaming the CBDC approach is very good: a set of information materials aimed at presenting to different audiences the importance of development and conservation of biodiversity at the community level; short courses aimed at farmers and farmers' organizations
 - 'farmers' field schools' (SEARICE t-line)
 - there was no specific reference made to NDSDB materials available to farmers and communities
-

Further Questions:

1. What is CIKSAP's involvement in the project - were they responsible for the Kenya project (in phase I in Kenya only)
2. What exactly is meant by 'to explore animal biodiversity as a source of high quality protein (Report on the workshop on the Technical Results of the CBDC program, 1999). This was mentioned as an interesting area to consider.

Notes:

Universalia (based in Ottawa) conducted an external evaluation of the CBDC in 1999.

Appendix VI. TRAMIL - Central America Phase III

1.0 Project Profile Information

Project Title **TRAMIL - Central America Phase III**

(Previous phases: Ph I (01930) \$238 960; Ph II (03233) \$502 649)

File ID

Radius ID 100367

Reference to Medplants: Entirely

Reference to Agrobio: No

Reference to L/IK (describe): `revaluation of cultural traditions using medicinal plants

Type of Activity: BIO

Year of Approval Phase III: Dec 1999-Nov 2001; (Ph I Nov 94-Nov 96; Ph II Dec 96-Nov 99)

Country Focus: Inter-regional: Carribean and Central America: Honduras, Nicaragua, Panama, Dominican Republic

Amount of Funding: 371,300 (SUB): GEF implementing agency: UNEP

Project Abstract (IDRIS)

TRAMIL - Centroamérica is a network linking public and private research organizations, nongovernmental organizations (NGOs), public health agencies and local communities in an interdisciplinary program of research on ethnopharmacology and traditional health practices of communities in the Caribbean. The TRAMIL program has three main goals: to reevaluate cultural traditions using medicinal plants; to provide a scientific basis for the rational application of traditional medicines; and to identify significant interactions between the biodiversity of medicinal plants, local people and their tropical environment, as a basis for conserving sites deemed a global priority in terms of biological and cultural diversity. This project will enable TRAMIL to continue its work and to promote the results of previous work to the ministries of health of the countries involved for use in primary health care applications

Keywords (IDRIS)

Information sources: Memorandum of Grant Conditions (MGC), PAD, Appraisal, GEF Project Brief, Terminal Report, Ph I (PIM) and all Ph I files, Ph II files (briefly skimmed).

Possible contacts to follow up with: Simon Carter, Danna Leaman (external reviewer)

2.0 Specific Project Objectives: Role of L/IK

1. Specific Project Objectives that Depend on the Incorporation of L/IK

1. To determine the conservation status of TRAMIL medicinal plants and to develop management plans for improving access, use and conservation of these plants by local communities.

2. To validate the use of medicinal plants through a systematic follow up process to further enhance an understanding of their safety and efficacy
3. To develop sustainability strategies for the national networks and the TRAMIL program`
(depends what is meant by `sustainability`)

- the overall goals are stated as: `revaluation of cultural traditions using medicinal plants, provision of a scientific basis for the rational application of traditional health practices using medicinal plants based on criteria for safety and efficacy; and identification of significant interactions between biodiversity of medicinal plants, local people and their tropical rainforest environment as a basis for conservation management in sites identified of global priority in terms of the existing biological and cultural diversity.` (PAD, 1999)

2. How L/IK contributes to meeting the above objectives

- the project objectives are in accordance with SUB Objectives 1 and 5 above (Appraisal). Now, considering what those objectives say about IK, I need to assess if the TRAMIL project follows through.

3. Effectiveness of Project in using L/IK to meet the objective

4. Do project objectives conform to SUB objectives in terms of use of L/IK

- `within the biodiversity conservation theme, this project will support the protection and use of indigenous and local knowledge of medicinal plant biodiversity, as well as local and national measures for sustainable use and conservation of this resource. It directly advances the objective of the SUB PI No. 1 above. (PAD)

3.0 Research Approach

I. Participation of Beneficiaries

This category of inquiry is based on the overall, cross-cutting objective of maximum participation of project beneficiaries. For L/IK to be used effectively, local participants should be involved at the beginning of the project and have input into all subsequent phases, and in doing so, given the opportunity to express their traditional and contemporary knowledge that contributes to the project objectives.

Control over the research design would ensure that indigenous knowledge is not taken out of context or misrepresented; a relationship of equals is established; local systems of management will be strengthened; and information and data bases established will be for the benefit of the local community and culture (Stevenson, 1996).

Issue identification perspective

1. Who identifies the issue that the project is based on

(a. Local community perspective on the issue is obtained through early collaboration with community) OR Outside perspective is used - early stages of project are developed outside community (University, government agency) - consultative)

- the proposal for the third phase was prepared by the Network Coordinator and Project Leader in consultation with all network members for Central Africa. The common objectives and conceptual framework were developed during a meeting of the network main focal points and further discussions took place with TRAMIL members.

- the proposal clearly responds to national and regional priorities to provide affordable primary health care to rural communities. This is considered a 'cost effective alternative' to imported medicines which are expensive.

-

2. **Dialogue** consultation and collaboration with the community as participants

a. Inclusive of community throughout project: two way dialogue and continuous collaboration or exclusive of community: one way transfer of info/technology

- one of the indicators of the main objective (GEF report) is 'conservation and management strategies for medicinal plants developed and implemented in collaboration with local communities, resource managers and other stakeholders.

b. **Stakeholders:** List who the stakeholders are and if they include the local community members. Comment, where possible, on who decides who the stakeholders are.

- 'TRAMIL Centroamerica is significantly contributing to the capacity building of all those national and regional institutions involved in medicinal plants work through the exchange of scientific research and the practical utilization of the research results (PAD)

- 'TRAMIL collaboration with health officers in each country culminated in a meeting hosted by the Health Minister of Panama, and the meeting was attended by representatives of Health Ministers and the main universities from Panama, Nicaragua, Costa Rica, Honduras, Guatemala, El Salvador, Cuba, Venezuela, and Dominican Republic.

- stakeholders were involved in the design of the proposed project and the preliminary identification of project sites through 'national consultation workshops' where approx 100 people participated.

- beneficiaries listed as rural communities, primary health care workers, NGO's working on health programs for women and children, local initiatives for biodiversity conservation and environment education programs, local scientists and Central American Universities.

c. **Community-based organizations (CBOs)** are recognized as important participants in the project

Issue Statement:

This section follows from Objective 1 and refers to how project participants perceive the issue in terms of how biodiversity loss. This perspective helps explain how the project might link loss of L/IK and loss of biodiversity and how loss of L/IK threatens biodiversity conservation.

1. Describe the *causes* of biodiversity loss and the perceived role for L/IK in dealing with the loss: does the project make this connection - if not, make it

- the causes of biodiversity loss are: rural poverty, deforestation and uncontrolled resource use, have contributed to the increasing scarcity of plant resources (GEF). The case is well made here for the link - when the project rationale
- advance of the agricultural frontier and the deterioration of biodiversity

2. Describe the relationship made between the loss of biodiversity and the loss of L/IK: if it is not clear in the project documents, make the link here

- the following statement in the PAD is not clear: `Similarly important is the research to be done on the environmental influences on the medicinal effectiveness of specific plants. Therefore, the work on agro-ecological conditions for the conservation and cultivation of medicinal plants will be expanded.`

- I need help to interpret the following statements in the GEF Project Brief (2000:7) `Forests have been targeted in Central America and the Caribbean as priority eco-regions for conservation. However, little is known about the conservation status of the medicinal flora in these priority eco-regions or in the region generally, notwithstanding the increasing recognition of their importance to sustainable development..` `Unless research focuses equally on conservation and management of medicinal plants as an important component of biological diversity, much of this diversity will be lost through over-exploitation, degradation and destruction of forest habitat.

- countries participating in the project were selected on the basis `interest shown by governments....regarding the promotion of validated med plants for use in primary health care...under an overall concept of ecosystem management (diversified forest management), stressing the importance of the intimate relationship between people and the surrounding forest.`(GEF). Also based on `...interest shown by local communities in recovering traditional and popular knowledge...`(GEF)

3. Limits of Biophysical Elements of the Ecosystem: the causes of marginalization

(can be anthropogenic features (forestry, fires, urbanization, etc) OR natural features (poor soils, prone to natural disasters)

II. Policy Environment

This category of inquiry is based on Objective 2.

1. Is Prior Informed Consent (PIC) obtained and who gives consent

Definitely: in the Memorandum of grant conditions, it states (ethics) `before an individual becomes a subject of research, they shall be notified of: the aims, methods, anticipated benefits and potential hazards of the research activities; his her right to refuse to participate in the research activities; his her right to terminate such participation at any time; and the confidential nature of his her replies.`

2. Does awareness raising of IPR issues take place and are people given the opportunity to suggest and develop a means of rights protection where it is an issue.

- `Where the use and dissemination of such knowledge is envisioned, ENDA-CARIBE will ensure that the moral and or legal rights of any potential claimants are respected, through consultation with them and compensation to them where available` (MGC)
- `network members have, in several instances, organized national and regional meetings on issues relating to regulation of the use of phytopharmaceuticals and the impact of bioprospecting and IPR on biodiversity. The discussion will continue through stakeholders consultations and the elaboration of national policy positions on IPR issues` (PAD) (so, does this mean local people are consulted as well).

- the Appraisal states `IP and access to information are issues suggested by the nature of this research. As in previous phases, intellectual property is unlikely to be a concern where the focus of research is on validation of local knoweldge and enhanced local access to widely known, effective herbal remedies...due to the increasing interest in commercial development of herbal remedies, project staff and network members are aware of the need to develop legal mechanisms for equitable sharing of benefits if opportunities for commercial production of herbal remedies are identified...network members have organized national and regional meetings on issues relating to regulation of the use of phytopharmaceuticals and the impact of bioprospecting and intellectual property rights on biodiversity. The discussion will continue through stakeholders consultations and the elaboration of national policy positions on IPR issues. (Appraisal).

3. . Key policies on rights of access (land tenure): List the policies if they have been identified. How does land tenure affect conservation efforts and what are the key policies affecting the capacity of local stakeholders to sustainably manage their natural resources.

4. Describe the links between institutions/groups participating in project with beneficiaries

- a. National or regional government to community
- b. NGO to community
- c. Other

III. Project Assumptions

Understanding the assumptions surrounding the concepts of biodiversity and local and indigenous knowledge assist in understanding where L/IK fits into the overall project cycle, how sustainable the base of knowledge is for future use and how and motivations for conservation of biodiversity.

1. Concept of biodiversity conservation: *In situ or ex situ*

- In objective b), it states that to initiate activities for the domestication, cultivation and quality control of TRAMIL medicinal plants of interest to diverse user groups. Whose idea of biodiversity is this - this is ex situ and it is not in accordance with SUB objectives.
- the potential for increased harvest of medicinal plant species in the recommended category was addressed in the second phase through support for ex situ conservation in demonstration gardens and homegardens, development of in situ and ex situ conservation measures for vulnerable, threatened or endangered species, and research on sustainable harvest of medicinal plants. (what about SUB's commitment to in situ).
- appears that both in situ and ex situ approaches are used for medplant conservation (GEF report)

- there are 2 management strategies outlined in the GEF report: the ex situ outlines collaboration with communities and other to identify priority species for domestication and cultivation (e.g. species that cannot be harvested sustainably in situ in the selected project areas, and that are recommended or validated for medicinal use; create community, family and health centre medplant gardens for research and education with links to in situ management and conservation of species and habitats.
- In the Utilization of research results, it says that threatened medicinal plants are domesticated for cultivation in households and community gardens or re-introduced into the forest and as part of conservation strategies. My question here is: why are these plants threatened and if they are re-introduced into the forest, were they over-harvested and if so, why.

2. View of Biodiversity

a. That conservation occurs through **use**

- note that one objective stated in the GEF report says the goal is to support the conservation of forest ecosystems in Central America and the Caribbean through the rational and sustainable use of medicinal plant resources. And the objective following this goal, is to support the conservation and sustainable use of forest ecosystems in the region by identifying conservation and mgmt needs of medicinal plants within key forest ecosystems, and integrating these issues into the broader management of selected forest ecosystems.
- the effort to include TRAMIL to priority sites for forest conservation is excellent and shows that a more holistic approach to conservation is taken.
- ...the proposed research activities should result in positive environmental impact and biodiversity conservation (Appraisal)

- prioritize a list of TRAMIL medicinal plants originally from Central America for cultivation and domestication (Ph III proposal)

b. Is the concept clarified with all participants and is there any **awareness** raising around the issue

3. View of Local and Indigenous Knowledge

(i.e that continued use of L/IK will **maintain the knowledge** base for future use or that the current use of L/IK can be **used independently of its historical social and ecological context**)

- `within this environment, African, European, and indigenous cultures have created a diverse mosaic of knowledge and use of medicinal plants.

4. Does the project adopt a 'rationalist' approach - Western scientific paradigm is dominant and L/IK fits within this framework.

- the approach can't help being rationalist - the safety and efficacy of medplants is done via scientific research. Once plants are scientifically `validated` then they are incorporated into national health policy for public health care.

- a general objective stated in the Phase III proposal is stated as: `to determine the boundaries between simple belief and effective use

5.0 Project Focus: Project Information Collected that Uses L/IK

Local and indigenous knowledge has many facets and can be expressed and used in multiple ways. The express ways that L/IK is used in the project cycle indicates what the research needs are and if they are being met by the kinds of L/IK sought after.

I. Inputs (Data type)

1. Kinds of L/IK collected

a. Classification systems/names and use of plants

- `medicinal plant inventories for priority sites are made in collaboration with indigenous and local communities and site resource managers` (GEF)

b. Resource scarcity (med, agri plants, other)

- current threats to med plants in 8 regions will be done with indigenous and local communities; also mentioned in Ph I documents: to identify threatened and endangered species;

c. Agricultural practices (breeding, planting/harvesting, etc)

d. Conservation management practices

- `in situ management plans for priority species that involve collaboration between communities and resource managers` (GEF report).
- at least one community in each priority eco-regional study site is developing and implementing a sustainable use and management strategy for medicinal plants in collaboration with the protected areas managers.
- management of med plants is carried out with indigenous and local communities (GEF)
- `collaborative monitoring and management agreements for medicinal plants designed (and implemented in collaboration with partner organizations) between communities and resource managers in selected priority sites.` (GEF).
- one specific objective is to `work with indigenous and local communities to develop appropriate management strategies (terminal report)

e. Indigenous Technology

2. **Additional potential for L/IK to be used**

II. Methods Used

1. Impact of social/ecological change on L/IK considered

a. Comment on methods that tend to consider the embeddedness of L/IK in the prevailing social and ecological context. How L/IK is influenced by prevailing social structures, education system, religion, local biophysical conditions, etc.

- in the project rationale section of the GEF report, it says `All these ethnic groups have been exposed to the `modernization` of the outside world that has influenced their attitude to their environment and natural resource management. As a result, traditional knowledge of plants is disappearing. Nevertheless, in CA and the Carib., local knowledge and practices have remained an important component of primary health care even tho the public health policy has opposed traditional health systems using med plants.

b. Knowledge **transmission issues** considered wrt intergenerational transfer of knowledge and if these mechanisms are still in place.

- school and community gardens might be one way

c. Project methods consider the traditional or adaptive and **dynamic aspects of L/IK**. Elder community members are consulted on past practices and a cross-section of community members are consulted on current practices: past and present beliefs/practice and context are compared. Do methods consider the impact of change on the functionality of and loss of L/IK and the impact that this may have on biodiversity use. Change in ecology, demographics, social values and institutions, etc., may all be considered.

d. **Socio-religious context** of L/IK considered - Validity is given to the social context of L/IK: Ritual, daily practice, traditional social institutions are included as valid contributions as context for knowledge

- I think this is an important question to ask for this project: is the project promoting the holistic aspect of traditional medicine, or just the plants aspect: trad med involves spiritual beliefs as well and is not a secular practice as it is in the west.

2. Traditional Methodologies addressed

a. Has the project relied on traditional methodologies (an approach outlined in the SUB Prospectus 2000) and what are they

3. Data on L/IK disaggregated - L/IK used from relevant sectors of the community: gender, age, economic status, knowledge status, other

- yes, differentiation is made between knowledge and priorities for use of medicinal plants of men and women (PAD). `As in Ph I and II, the focus of community-based activities is on mothers and women`s groups as the primary source of community knowledge of commonly used traditional remedies, and as the primary harvesters and caretakers of plants used in traditional remedies. (PAD). `This project fully integrates a gender and socially sensitive approach, differentiating between knowledge and priorities for use of medicinal plants of men and women. The program prioritizes the research work on ethnic minorities in the region and targets the dissemination and development activities to those same communities.(Appraisal)

4. List specific methods that are used to incorporate L/IK

-both Phase II and III appraisals mention Phase I as detailing the methodology for `identification and application of criteria for evaluating the safety and efficacy of traditional remedies for the purpose of recommending their use. This is the primary concern of project reviewers. The appraisal of Phase I dealt with this concern in detail and provided specific examples in appendices of the types of toxicological and clinical data` (PAD)

- it is unclear if the activity `conduct investigations that will contribute to determine the population of priority plants` (Ph III proposal) includes IK or not
- ethnobotanical surveys in target communities (Ph I)
- consultations with med plant users and healers on threatened and endangered species;
- promotion of conservation seems to be more through information and policy - and through home gardens; etc.

5. Are there other methods that could be used more effectively: what methods could be strengthened

III. Outputs

1. Increased Participation

a. Local community involvement in project in all stages: (community/local ownership of project: Community participants design conservation strategies based on L/IK)

- in the expected project outcomes (GEF report) it states that `priorities for management and conservation actions agreed among communities, resource managers, and other stakeholders.`

- outcome 2: conservation and management strategies for species and habitats.....emphasizing community involvement and incorporating local knowledge...` (Terminal Report).

- increased participation by women in the process of dissemination (Ph III proposal).

2. New Knowledge Generated

a. New information from L/IK emerging from project: project has integrated L/IK and western science

- not sure if this applies: `by the end of the third year, there are 40 community leaders and staff of protected areas offices trained in conservation plans. Also 400 persons from communities in priority eco regions trained.

- `form a multi-disciplinary team of specialists and community leaders in each country to coordinate and develop actions for the rational and sustainable use of med plants.`(GEF)

- `priorities for management and conservation actions agreed among communities, resource managers and other stakeholders. (Terminal Report).

- general comments re: the impacts of Phase II: (country by county): In Panama, Honduras (^ the education of medicinal plants scientifically validated has permitted that the people use them with trust - who does this refer to, as I thought local people already trusted them; In all, the impacts are very `use oriented` and do not emphasize in situ conservation or biodiversity management across a broader scale, like some objectives state. When they refer to `validation of the popular knowledge of medicinal plants`, is this in the interests of the communities. Also, why does access increase for local people when there are medicinal gardens (as stated in the Guatemala project). THIS SEEMS TO BE VERY IMPORTANT - in that the results are not tied to objectives (instead of being critical, tho, I need to provide the observations in a constructive format).

3. Traditional Knowledge Re-articulated

a. Describe any traditions that are applied to present day issues in new format

Phase III is designed to support the domestication and planting of scientifically validated medicinal plants according to the priorities of the country. If domestication is encouraged, does this not negate the objective stated somewhere else, for the use of med plants to be tied into the conservation of forest habitats. There is a balance of the two and much emphasis on in situ, which also depends to some extent on ex situ – they are complimentary (Danna Leaman, pers com).

4. Two-way Learning

a. L/IK adds to Project through iterative process: project builds on L/IK

5. Results Delivery Reaches/Includes Community

a. Dissemination materials accessible to local community: Lists, reports etc available in local language, workshops include community members, etc.

- `local and intermediate-level public health programmes receive and disseminate information about validated uses of priority species of medicinal plants used by local communities and in the region generally.`
- `lessons learned and model strategies for rational and sustainable use of medicinal plants are disseminated within the region through workshops, curricula and public health information (e.g illustrated brochures in Spanish and local languages).
- `the workshop methodology will be the principle means for involving many disciplines and types of expertise (including especially protected areas managers and communities)` (GEF)
- saw some great 1991, 1993 publications done in `where there is no doctor style`

Notes: It would be really nice to see some evidence of outcome 3 realized: `Scientific validation of safety and efficacy of traditional remedies from locally important medicinal plants, including: **extending the TRAMIL programme to priority sites for forestry conservation`**

Appendix VII: Conservation of Embera and Kuna Medicinal Plants and Associated Traditional Knowledge

Project Title **Plant Biodiversity of the Embera and Kuna People of Darien** (Panama) (Phase I);

Conservation of Embera and Kuna Medicinal Plants and Associated Traditional Knowledge (Phase II)

File ID 98-0008 (Phase I);

Radius ID 04195 (Ph I); 100568 (Ph II).

Reference to Medplants Yes, Phase II is very specifically medplants

Reference to Agrobio Yes

Reference to L/IK (describe) The project aims to maintain, enhance and promote traditional knowledge concerning plant diversity

Type of Activity

Year of Approval Ph I: 1998; Ph II: 2001-04-19

Country Focus Panama

Beneficiary Type

Ecosystem Type Darien hosts one of the two remaining frontier forests of Central America.

Funding Unit SUB (CAD 231 800)

Project Abstract (IDRIS)

IDRC Contact: Zaya, Pierre

Type of Activity: Research Project

In 1998, McGill University and Fundación Dobbo Yala initiated a research project to help the indigenous people of Darién preserve their traditional knowledge while protecting the biodiversity of the region (98-0008/004195). The project involved developing sustainable management strategies for culturally important plant species in Emberá and Kuna villages. It promoted traditional knowledge on non-medicinal plant usage, identified locally endangered plant species and analyzed gender-based differences in knowledge. The project was highly successful and a second phase of support was approved. During the second phase, the work will be divided into three components. The first, supervised by two law students (one Kuna and one Emberá), will attempt to identify just compensatory mechanisms for traditional knowledge on medicinal plants as viewed by indigenous people themselves. The study of medicinal plants will begin only after a consensus has been reached. The second component will develop plans for in-situ or ex-situ conservation of medicinal plants based on basic knowledge of their biology. The third component will promote the conservation of traditional knowledge of medicinal plants through the development of brochures, the participation of students from the local college in data collection and the formal apprenticeship of three or four young people to traditional healers. Given its participatory nature, it is expected that the research results will be adopted immediately, generating an increase in the availability of key medicinal plants. In the long term, the project is expected to help local communities better protect their rights and use their resources in a sustainable manner.

2.0 Specific Project Objectives: Role of L/IK

1. Specific Project Objectives that Depend on the Incorporation of L/IK

Phase II: the project will investigate and promote the TK systems for plant biodiversity of the Embera and Kuna peoples of Panama. It will help in the conservation and re-introduction of endangered plants in their natural territory and to establish the basis for a long term sustainable mgmt plan of natural resources for the area.

Phase II specific objectives:

1. To suggest mechanisms based on local traditions, for transmission and fair compensation of knowledge on medicinal plants;
2. To design conservation strategies for medicinal plants based on basic biological information. (we contend that, if conservation action focuses solely on the plants without preserving the traditional knowledge, an important component of cultural diversity would be lost).
3. To promote training of Kuna and Embera traditional knowledge of medicinal plants species and, in agreement with local experts, record knowledge on medicinal plants and their preparation.

2. How L/IK contributes to meeting the above objectives

3. Effectiveness of Project in using L/IK to meet the objective

4. Do project objectives conform to SUB objectives in terms of use of L/IK

The project clearly contributes to the centre objectives and SUB objectives: especially objectives 1 and 4 (?) Also compliments TRAMIL.

- degree of fit between IDRC, SUB and Project Objectives

‘clearly contributes’ - SUB’s initiative to ‘promote use, maintenance and enhancement of the knowledge, innovations and practices, of indigenous and local communitiesand to support the devel of options for sustainable livelihoods and incentives for the sustainable use of natural products from biodiversity resources...’

Reintroduction of endangered plants in their natural territory

To increase the key plant species that are integral to the cultural practices and livelihood options of indigenous peoples in the area.

3.0 Research Approach

I. Participation of Beneficiaries

This category of inquiry is based on the overall, cross-cutting objective of maximum participation of project beneficiaries. For L/IK to be used effectively, local participants should be involved at the beginning of the project and have input into all subsequent phases, and in doing so, given the opportunity to express their traditional and contemporary knowledge that contributes to the project objectives.

Control over the research design would ensure that indigenous knowledge is not taken out of context or misrepresented; a relationship of equals is established; local systems of management will be strengthened; and information and data bases established will be for the benefit of the local community and culture (Stevenson, 1996).

Issue identification perspective

1. Who identifies the issue that the project is based on

Local community perspective on the issue is obtained through early collaboration with community or Outside perspective is used - early stages of project are developed outside community (University, government agency) - consultative)

- Explicitly states: 'The solutions detailed in this proposal have been developed with local people of Embera and Kuna villages' ...and with 2 NGOs. One of the McGill researchers is an

Embera himself...as well, 2 other researchers from the Universidad de Panama will participate in the research. The Kuna and Embera people identify the issue and have shown 'massive support for the project and methodology.'

'This component (the re-introduction of 4 palm species near villages and sust. Mgmt of these species) articulated the basic needs expressed by local people'.

- The Kuna and Embera are the ones who defined issues
- methodology depends on community-based decisions (phase II proposal)
- in 1998, phase I was initiated by McGill and Fundacion Dobbo Yala

2. Dialogue – consultation and collaboration with the community as participants

a. Inclusive of community throughout project: two way dialogue and continuous collaboration or exclusive of community: one way transfer of info/technology

- Yes: project results are scrutinized by communities, for example. The Congresos (reunion of villagers called by the authorities) will cross check research results to 'identify incorrect information.'

b. Stakeholders: List who the stakeholders are and if they include the local community members. Comment, where possible, on who decides who the stakeholders are.

- Darien is homeland of 2 important indigenous nations: the Kuna and Embera-Wounaan. They rely on many native plant species for medicine, building material, food or raw material for crafts.

- Appears to be very good in this regard

c. Community-based organizations (CBOs) are recognized as important participants in the project

Phase I: McGill University and Fundacion Dobbo Yala;

Phase II: ‘...trust existing relationships between the recipient institutions and the communities. It would not be possible for us to propose this project without the relationships that have been built during the last 3 years between the target communities, the Fundacion Dobbo Yala, and McGill U.

Issue Statement:

This section follows from Objective 1 and refers to how project participants perceive the issue in terms of how biodiversity loss. This perspective helps explain how the project might link loss of L/IK and loss of biodiversity and how loss of L/IK threatens biodiversity conservation.

1. Describe the *causes* of biodiversity loss and the perceived role for L/IK in dealing with the loss: (does the project make this connection - if not, make it)

- Cause of declining biodiversity is identified as over-exploitation of certain species and deforestation for cash crops; cause of knowledge loss is desire for salaries and migration to cities.
- the forests of Darien are being cleared for lumber and cash crops

2. Describe the relationship made between the loss of biodiversity and the loss of L/IK: (if it is not clear in the project documents, make the link here)

- Loss of biodiversity and life style of indigenous peoples, and associated knowledge: ‘...cultural erosion...the most severe problem for Kuna people.’
- ‘as the forests of Darien are being cleared for lumber and cash crops, more than biodiversity is being lost; TK evolved over hundreds of years is being eroded. Forest destruction threatens the unique lifestyle of indigenous people.’

3. Limits of Biophysical Elements of the Ecosystem: the causes of marginalization

a. List anthropogenic features (forestry, fires, urbanization, etc)

- deforestation

b. List any natural features (poor soils, prone to natural disasters)

II. Policy Environment

This category of inquiry is based on Objective 2.

1. Is Prior Informed Consent (PIC) obtained and who gives consent

- Protection of rights insured; Not stated explicitly - only mention of avoiding med plants inventory because of IPR issues

- in Phase II: ‘...it has repeatedly been made clear that at each step of the project the authorities and the botanicos would be asked permission to proceed and that the research strategies would be defined jointly by the researchers and the community.

2. Does awareness raising of IPR issues take place and are people given the opportunity to suggest and develop a means of rights protection where it is an issue.

‘...this will be the first study to be carried out with the full collaboration of all traditional authorities and a full respect of their intellectual property rights.’ (appraisal)

- this is a big issue in Phase II and esp. objective 1 and issues of compensation are to be explored with a local think-tank in a series of workshops.

3. Key policies on rights of access (land tenure): List the policies if they have been identified. How does land tenure affect conservation efforts and what are the key policies affecting the capacity of local stakeholders to sustainably manage their natural resources.

- The Kuna have been successful in obtaining control over their traditional lands. But there is significant violence on indigenous peoples from drug trafficking cartels. ‘The Embera have not progressed as much in their process of negotiation, and are already collaborating with the Kuna to follow a similar route toward claiming their lands.’ (appraisal)

- in Phase II, a questionnaire on property rights will be given to every household.

4. Describe the links between institutions/groups participating in project with beneficiaries

a. National or regional government to community

- The links are the University and field assistants who are both indigenous and Canadian

b. NGO to community

- the Fundacion Dobbo Yala’s mission is to: ‘ally indigenous and rural development with environmental conservation.’ Has a ‘clear environmental mission’. It aims to ‘promote, encourage and support initiatives of indigenous and rural communities pertaining to sustainable development or conservation.’

c. Other

III. Project Assumptions

Understanding the assumptions surrounding the concepts of biodiversity and local and indigenous knowledge assist in understanding where L/IK fits into the overall project cycle, how sustainable the base of knowledge is for future use and how and motivations for conservation of biodiversity.

1. Concept of biodiversity conservation: In situ or ex situ

- The first component of the project is to domesticate and sustainably harvest 4 species of palm (used in thatch). The assumption seems to be that in Phase I, domesticating 4 palm species will ‘...show people that alternative practices can be successfully developed to protect biological diversity and cultural knowledge.
- in phase II, ‘we hope to work with 10-20 different species in each village to gather basic biological information and decide on which in situ or ex situ conservation actions should be undertaken.
- there is a link made to land tenure here: in phase II, it states that ‘Decision making regarding conservation strategies will be made. Land is common property so no villagers hold title to land: it could be possible for almost any villager to engage in ex situ conservation: but in the case of the Kuna villages, where it is hierarchical, it could be decided to put land aside as a reserve.

2. View of Biodiversity

a. That conservation occurs through use

b. Is the concept clarified with all participants and is there any awareness raising around the issue

- Due to the level of collaboration with local communities, it appears that there is a common understanding of ‘biodiversity’

3. View of Local and Indigenous Knowledge

a. that continued use of L/IK will maintain the knowledge base for future use

- The explicit assumption is that TK must be the cornerstone of all management strategies of biodiversity in order for the strategies to be biologically and culturally sustainable.
- Yes, I think the assumption that using IK is a means of conserving biodiversity: that by growing these 4 species in Phase I, it introduces economic uses and provides alternatives to cash based agriculture
- To strengthen traditional knowledge thro preservation and also results in the empowerment of women
- ‘The postulate on which we base this research is that knowledge of medicinal properties of plants, as well as the plants themselves, will be less threatened if traditional medicine is promoted.’

4. Does the project adopt a 'rationalist' approach - Western scientific paradigm is dominant and L/IK fits within this framework.

- ‘A strong correlation exists between scientific assessment and local people’s perception of endangerment status.’ The information gained is very western based - there is no spiritual or historical component to the study.

The questionnaire is being reviewed by an anthropologist from McGill, but no mention of community review.

- in Phase II: 'the collaboration between McGill university, the Universidad de Panama and Fundacion Dobba Yala, will allow 'cultural translation' of traditional and ecological knowledge across Kuna, Embera and scientific cultures.

In Phase I: 'we also carried out intensive ecological inventories...thorough characterization of ecological contexts, densities, and age-class distributions of useful plant species in a wide range of land use types combined with information on use patterns and harvest intensity provides a multi-dimensional framework for constructing endangerment status and management plans of the target species'

- in phase II, 'The ecological data will be compared with traditional ecological knowledge using the card game developed in phase I.'

4.0 Project Focus: Project Information Collected that Uses L/IK

Local and indigenous knowledge has many facets and can be expressed and used in multiple ways. The express ways that L/IK is used in the project cycle indicates what the research needs are and if they are being met by the kinds of L/IK sought after.

I. Inputs (Data type)

1. Kinds of L/IK collected

a. Classification systems/names and use of plants role of plants in the system

- Plant use from a cultural perspective (20 species) for example the palm used for thatch, one used for basket weaving, etc. (I predict more functional uses than anything else). In Phase I: non-medicinal plant usage

- phase II - phenological data (field assistants are trained in standardized data collection)

b. Resource scarcity (med, agri plants, other)

- people will identify locally endangered species (Phase I); TEK associated with species at risk;

c. Agricultural practices (breeding, planting/harvesting, etc)

d. Conservation management practices

-Traditional knowledge of plants other than medicines will alert people to the components of biodiversity and will provide the traditional knowledge base on which sustainable management strategies (identified by whom?) could be developed. Field assistance will be provided by one Kuna, four Embera and one Canadian. The participatory maps will be used to develop and implement sustainable mgmt. Phase I: protection of unique biological diversity; developing of sustainable management strategies for culturally important plant species in Kuna and Embera villages.

e. Indigenous Technology

2. Additional potential for L/IK to be used

- do the local people know the germination and other ecological requirements of the 4 species under investigation -this might be studied in addition to all the experimentation proposed.

II. Methods Used

1. Impact of social/ecological change on L/IK considered

a. Comment on methods that tend to consider the *embeddedness* of L/IK in the prevailing social and ecological context. How L/IK is influenced by prevailing social structures, education system, religion, local biophysical conditions. Is the assumption made that the current use of L/IK can be used independently of its historical social and ecological context (note a. and d. should go together)

- 'Traditional knowledge evolved over hundreds of years ...in their effort to preserve their traditional knowledge and livelihoods while helping to protect the unique biological diversity of Darien.'

- To some extent, given that an ecological inventory is coupled with an ethnobotanical inventory, but the economics are left out in phase I

- the issue for Phase II is that the market economy is putting the transmission of medicinal plant knowledge in jeopardy. Local botanicos who need money for a living are not willing to transmit their knowledge for free. Also, wider access to western health care is eroding traditional medicine.

- weakening of traditional lifestyles

b. Knowledge transmission issues considered wrt intergenerational transfer of knowledge and if these mechanisms are still in place.

- Local people define the research questions and see the project through, so that might be embedded in the concern for knowledge transmission. Investigation of culturally important plants. Understanding knowledge transmission is very important in this study: it is part of the formal questionnaire.

- workshops on plant use provided forums for inter-generational exchange of knowledge on the legends and practices of ...'

- very carefully addressed in phase II: objective 3 specifically deals with transmission.

- phase II: '...conservation of traditional knowledge on medicinal plants depends on the interest that the young generation holds for such knowledge.'

c. Project methods consider the traditional or adaptive and dynamic aspects of L/IK. Elder community members are consulted on past practices and a cross-section of community members are consulted on current practices: past and present beliefs/practice and context are compared. Do methods consider the impact of change on the functionality

of and loss of L/IK and the impact that this may have on biodiversity use. Change in ecology, demographics, social values and institutions, etc., may all be considered.

- No means to stem out migration, but keeping economic options local is a means, altho not mentioned outright
- they state explicitly that change is the result of out-migration
- yes, the project attempts to single out the elder healers: 'The general feeling is that specialized knowledge is more threatened than general knowledge because the healers are aging and do no have students.'
- population growth as an issue is identified in objective 1 of Phase II, as a threat to biodiversity.

d. Socio-religious context of L/IK considered - Validity is given to the social context of L/IK: Ritual, daily practice, traditional social institutions are included as valid contributions as context for knowledge

- Participatory mapping is done; ethnobotanical surveys. The biophysical is satisfied by an ecological inventory (but they are done by different people: one by a gringo researcher in Nurra and the other by an local researcher in Embera). The cultural is done by having participants identify the 20 most important plants culturally.
- This is not elaborated upon, but the cultural significance of the 20 plant species is emphasized. The objective is economic it appears
- in phase I, workshops on the legends and practices of traditionally used plants resulted in body painting and traditional music which had disappeared from Ipeti to be present again in village festivities.

2. Traditional Methodologies addressed

a. Has the project relied on traditional methodologies (an approach outlined in the SUB Prospectus 2000) and what are they

3. Data on L/IK disaggregated - L/IK used from relevant sectors of the community: gender, age, economic status, knowledge status, other

- Gender sensitive methodologies adopted as well as age-specific differences; their hypothesis is that women and men have complimentary knowledge of biodiversity.
- in Phase II: 'gender differences are critical; age difference and the knowledge associated with it are also integrated into methods - teams of younger and older women were constituted in phase I to investigate gender and age-specific knowledge and practices.

4. List specific methods that are used to incorporate L/IK

- Participatory mapping is relied upon to determine which species are endangered and then NRM strategies are developed: there is a very scientific basis to the project and no mention of determining traditional NRM
- 'Highly participatory', 'consult and involve'; 'new methods will be developed to allow the Embera people, who are not used to quantify, to develop and adopt appropriate means of assessing harvest intensity.' '...slow, highly participatory process.' The reference to

‘participatory observation’ is probably reference to participant observation. Other methods are formal interviews (why not unstructured?) Women will be collaborators and field assistants

5. Are there other methods that could be used more effectively: what methods could be strengthened

- A scientific bias that could have incorporated more IEK
- Good, perhaps not enough time and why the use of formal interviews, instead of unstructured

6. Degree of Fit between Project Objectives and Project Implementation:

It appears that the methods fit the objectives and there is a good fit as to who is doing the collaborating and implementing; only that there could be more reliance on IEK

III. Outputs

1. Increased Participation

(Local community involvement in project in all stages; community/local ownership of project: Community participants design conservation strategies based on L/IK)

2. New Knowledge Generated

- a. New information from L/IK emerging from project: project has integrated L/IK and ‘western science’

3. Traditional Knowledge Re-articulated

- a. Describe any traditions that are applied to present day issues in new format

Phase I: successful at re-introducing 4 palm species near Embera villages; and at developing sustainable management strategies for culturally important plant species in both Embera and Kuna villages.

4. Two-way Learning

- a. L/IK adds to Project through iterative process: project builds on L/IK

- It is definitely not a one way dialogue, but the scientific basis could be based more on prelim results of the IEK

5. Results Delivery Reaches/Includes Community

- a. Dissemination materials accessible to local community: Lists, reports etc available in local language, workshops include community members, etc.

- Posters, booklets, a herbarium will be done (the herbaria in each village is very questionable, since it requires controlled environment). ‘The beneficiaries of the project will be first and foremost Kuna and Embera people themselves.

- Results will be returned to the communities by means of small workshops.

Will also be published in national and international scientific journals and conferences.

- in phase II, it is suggested that the Embera botanicos would prefer to transmit their knowledge to a few students rather than diffused at large.
- training is based on a booklet
- brochures to all Kuna schools (phase II).

Appendix VIII: Spatio-Temporal Dynamics of Sorghum Genetic Diversity and Farmer Selection in situ (Ethiopia)

1.0 Project Profile Information

Project Title **Spatio-Temporal Dynamics of Sorghum Genetic Diversity and Farmer Selection in situ (Ethiopia)**

File ID

Radius ID 100555

Reference to Medplants no

Reference to Agrobio yes: conservation of PGR; sorghum landrace diversity

Reference to L/IK (describe) knowledge and activities that relate to selection, conservation and use of sorghum land races.

Type of Activity Research Project (RP)

Year of Approval 2000-08-28 (18 months)

Country Focus Ethiopia

Beneficiary Type Sub Saharan Africa

Ecosystem Type central highlands agroecosystem

Funding Unit 149 900 CAD SUB

Recipient Type University of Ottawa (Awegechew Teshome)

Project Abstract (IDRIS)

IDRC Contact: Leppan, Wardie

Type of Activity: Research Project

In Situ (on-farm) conservation of plant genetic resources ensures that locally adapted and dynamic crop genetic resources are controlled by and directly available to farmers. There are, however, substantial gaps in knowledge that prevent full realization of the goal and objectives of in situ conservation. Building on baseline data gathered under project, "91-1056 Traditional Farming (Carleton/Ethiopia)," this project aims to contribute to the food security and well-being of Ethiopian farmers and communities by ensuring that adapted and dynamic crop genetic resources are readily available to them. Researchers will measure the spatio-temporal changes in sorghum landrace diversity on the North Shewa and South Welo study sites over the last 8 years; examine the structure and pattern of crop production where sorghum landraces dominate; identify women's and men's knowledge and activities that relate to the selection, conservation and use of sorghum landraces; note differences in the use of sorghum landraces by women and men farmers; identify the impact of agricultural and economic policies on the enhancement, use and conservation of landraces; train Ethiopian graduate students and field scientists in sampling and analysis of agro-biodiversity field data; and use the project methodology as a model to strengthen the scientific basis of other on-going in situ projects in Ethiopia, Africa and other parts of the world.

Information Sources: P.A.D., P.I.M. Proposal, interim report

2.0 Specific Project Objectives: Role of L/IK

1. Specific Project Objectives that Depend on the Incorporation of L/IK

- overall goal is to contribute to the food security and well being of farmers and communities by ensuring that adapted and dynamic crop genetic resources are readily available to them.

- 1) to measure the spatio-temporal changes of sorghum landrace diversity in 2 sites over the last 8 years;
- 2) to gather gender dis-aggregated base line socio-economic information to look into the structure and pattern of crop production where the landraces are dominant in the study sites;
- 3) to identify women and men's knowledge and activities that relate to the selection, conservation and uses of sorghum landraces;
- 4) to take stock of the differential access to and the decision making process in the utilization of sorghum landraces by women and men farmers'
- 5) to identify the influences of agricultural and economic policies on the enhancement, use and conservation of landraces in the study area as seen from the perspective of the farmers;
- 6) to use the spatio-temporal information as a model to strengthen the scientific basis of other on-going *in situ* on-farm projects in Ethiopia, Africa and other parts of the world; and
- 7) to train Ethiopian graduate students and field scientists in sampling and analysis of agrobiodiversity field data.

2. How L/IK contributes to meeting the above objectives

- farmers' selection practices (based on up to six criteria, such as distance from living place, soil fertility, last harvest and location in landscape) are 'integral to generating and maintaining and thereby reducing the risk of homogenization that can result from the continual replacement of a highly diverse set of landraces by single dominant crop genotypes.' (PAD)

3. Effectiveness of Project in using L/IK to meet the objective

4. Do project objectives conform to SUB objectives in terms of use of L/IK

- consistent with SUB's objectives and their desire to increase funding to Africa.

3.0 Research Approach

I. Participation of Beneficiaries

This category of inquiry is based on the overall, cross-cutting objective of maximum participation of project beneficiaries. For L/IK to be used effectively, local participants should be involved at the beginning of the project and have input into all subsequent

phases, and in doing so, given the opportunity to express their traditional and contemporary knowledge that contributes to the project objectives.

Control over the research design would ensure that indigenous knowledge is not taken out of context or misrepresented; a relationship of equals is established; local systems of management will be strengthened; and information and data bases established will be for the benefit of the local community and culture (Stevenson, 1996).

Issue identification perspective

1. Who identifies the issue that the project is based on

(Local community perspective on the issue is obtained through early collaboration with community or outside perspective is used - early stages of project are developed outside community [University, government agency] - consultative)

2. Dialogue – consultation and collaboration with the community as participants

a. Inclusive of community throughout project: two way dialogue and continuous collaboration or exclusive of community: one way transfer of info/technology

b. Stakeholders: List who the stakeholders are and if they include the local community members. Comment, where possible, on who decides who the stakeholders are (list the Community-based organizations (CBOs), farmers orgs, and others as participants in the project)

- the main beneficiaries are identified as: M.Sc. students, field scientists and farmer experts (from targeted farming communities)

Issue Statement:

This section follows from Objective 1 and refers to how project participants perceive the issue in terms of how biodiversity loss. This perspective helps explain how the project might link loss of L/IK and loss of biodiversity and how loss of L/IK threatens biodiversity conservation.

1. Describe the *causes* of biodiversity loss and the perceived role for L/IK in dealing with the loss: does the project make this connection - if not, make it

- the link is made in terms of farmers' 'storability' knowledge, which is knowledge of which landraces are resistant and storable or susceptible and non-storable, and do not take the necessary storage measures to prevent losses, there may be serious loss of germplasm and a lesser diversity returned to the fields in the next season.

2. Describe the relationship made between the loss of biodiversity and the loss of L/IK: if it is not clear in the project documents, make the link here

3. Limits of Biophysical Elements of the Ecosystem: the causes of marginalization

a. List anthropogenic features (forestry, fires, urbanization, etc)

- 'marginal, less favoured agricultural environments'

b. List any natural features (poor soils, prone to natural disasters)

-farmers are forced to move onto fragile ecosystems and cultivate slopes over 40%

II. Policy Environment

This category of inquiry is based on Objective 2.

1. Is Prior Informed Consent (PIC) obtained and who gives consent

2. Does awareness raising of IPR issues take place and are people given the opportunity to suggest and develop a means of rights protection where it is an issue.

3. . Key policies on rights of access (land tenure): List the policies if they have been identified. How does land/resource tenure affect conservation efforts and what are the key policies affecting the capacity of local stakeholders to sustainably manage their natural resources.

- 'to identify the influences of agricultural and economic policies on the enhancement, use and conservation of landraces in the study area.'

- individual landholding is becoming smaller and fragmented - farmers lack security and do not possess a certificate of ownership of the land they are working on. 'They say they do not have the landholding security to maintain its productivity on a long-term basis.'

- in the planned second phase (March to August, 2001) research is proposed on government policy related to conservation and uses of farmers' varieties.

4. Describe the links between institutions/groups participating in project with beneficiaries

a. National or regional government to community

- MOA (extension agents), IBCR (institute of biodiversity conservation & research - field scientists and technicians); Universities (gender and socio-economic specialist, grad students and project leader)

b. NGO to community

- 'collaboration will be forged between this project and NGOs such as Institute for Sustainable Development, World Vision, Ethio-forest, Future-forest and others. The linkage will be mainly in providing technical support and scientific information to these NGOs...' (but there is not much mention of these NGOs elsewhere in the documents)

c. Other

III. Project Assumptions

Understanding the assumptions surrounding the concepts of biodiversity and local and indigenous knowledge assist in understanding where L/IK fits into the overall project cycle, how sustainable the base of knowledge is for future use and how and motivations for conservation of biodiversity.

1. Concept of biodiversity conservation: *In situ* or *ex situ*; natural or domesticated

- *in situ* refers to 'on farm'. 'locally adapted and dynamic' genetic resources.
- there is reference to 'specialist' (endemic) and 'generalist' landraces in the research area
- (Q:re these endemic or introduced land races?? Have they been cultivated over the years from what genetic stock?)

2. View of Biodiversity

a. Conservation occurs through use

b. The concept is clarified with participants and/or there is awareness raising around the issue

3. View of Local and Indigenous Knowledge

a. Through the *use* of L/IK, knowledge is maintained and preserved for future use

- 'using time tested experiential knowledge and through keen observations, farmers husband this crop diversity to meet their varied economic and cultural needs.'

b. The current use of L/IK is dependent on its historical, social and ecological context

4. **Commensurability:** does the project adopt a 'rationalist' approach, where the Western scientific paradigm is dominant and L/IK fits within this framework or is IK used in its own right - explain.

- '...their folk taxonomy is consistent with modern numerical taxonomy. Their knowledge adds to the knowledge of the scientific community, particularly as to how farmers generate, select and maintain diversity in their fields.
- '...scientists and policy makers should recognize farmers as key partners in agricultural development efforts and build upon and sustain scientific expertise using the traditional practices and knowledge of the farmers.' '...link and collaboration between the formal and informal systems...'

4.0 Project Focus: Project Information Collected that Uses L/IK

Local and indigenous knowledge has many facets and can be expressed and used in multiple ways. The express ways that L/IK is used in the project cycle indicates what research needs are and if they are being met by the kinds of L/IK sought after.

I. Inputs (Data type)

1. Kinds of L/IK collected

a. Classification systems/names, use of plants and role of plants in the system

- crop classification system - there are 60 agromorphologically distinct landraces that represent the intraspecific sorghum landrace richness in north Shewa and south Welo regions of Ethiopia. The land races belong to four of the five cultivated global sorghum races.

b. Resource scarcity (med, agri plants, other)

c. Agricultural practices (breeding, planting/harvesting, etc)

- selection criteria for sorghum landraces, storability knowledge

d. Conservation management practices

- soil and water conservation measures practiced by each participating farmer to reduce land degradation risk

e. Indigenous Technology

2. Additional potential for L/IK to be used

II. Methods Used

1. The methods incorporate ways to examine the impact of social/ecological *change* and *context* on L/IK

a. Project methods are used to examine the traditional or adaptive and *dynamic* aspects of L/IK. Elder community members are consulted on past practices and other community members are consulted on current practices. Methods consider the impact of change on the function of and loss of L/IK and the impact that this may have on biodiversity use. Change in ecology, demographics, social values and institutions, etc., may all be considered.

- the project really emphasizes the time dimension: ‘The specific goal is to measure the dynamics of temporal and spatial variations of sorghum landraces and ...the stability over time of factors supporting the maintenance of crop genetic diversity on-farm in Ethiopia. This is really related to c) below, where the range of factors are listed.

- key informant interviews were conducted with elderly men and women.

b. Knowledge transmission issues considered with respect to intergenerational transfer of knowledge and if these mechanisms are still in place.

c. Comment on methods that examine the *embeddedness* of L/IK in the prevailing social and ecological context: How L/IK is influenced by prevailing social structures, education system, religion, local biophysical conditions, etc. Validity is given to the social context of L/IK: Ritual, daily practice, traditional social institutions are included as valid contributions as context for knowledge.

- the projects seeks to address the effect that a range of factors have on the spatio-temporal nature of the ecosystem. - these factors include ‘...in situ conservation of agrobiodiversity, requires research on gender, biological, socioeconomic, biotic, abiotic, market, cultural, ethnic and farmer-based selections...’

2. Traditional Methodologies addressed

a. Has the project relied on traditional methodologies (an approach outlined in the SUB Prospectus 2000) and what are they

3. Data on L/IK disaggregated - L/IK used from relevant sectors of the community: gender, age, economic status, knowledge status, other

- gender is listed as one of the factors that needs to be studied for its influence on the spatio-temporal aspects of the ecosystem.
- ‘gender dis-aggregated base line socioeconomic information to look into the structure and pattern of crop production...’
- also, to ‘identify women’s and men’s knowledge and activities that relate to the selection, conservation and uses of sorghum landraces ...’
- ‘what are the gender-based division of labour and the indigenous knowledge with respect to the selection, conservation and uses of sorghum landraces?’
-

4. List specific methods that are used to incorporate L/IK

- scientific methods used to understand the agroecosystem, such as af
- farmers interviewed and 300 farmers’ fields re-sampled using the same methods that were employed in the 1992-93 cropping season by Teshome.
- full participation of farmers-experts, graduate students and selected scientific staff from the Biodiversity Institute.
- up to 300 households sampled and interviewed; focus group discussions and key informant interviews.
- in the budget for the pilot project (one year: June 2000-June 2001) it states that payments to farmer experts is \$6/person, and that includes 5 persons for 60 days (not much during one year!)

5. Are there other methods that could be used more effectively: what methods could be strengthened

- vegetation analysis done using transects, but with farmers naming plants. Observations made on field size, fragmentation, connectivity, etc, all done in partnership with the respective farmers.

III. Outputs

1. Increased Participation

(Local community involvement in project in all stages; community/local ownership of project: Community participants design conservation strategies based on L/IK)

- of note is that farmer experts are hired (see above #4).
- (it is a very consultative project, not collaborative it appears overall)

2. New Knowledge Generated

(New information from L/IK emerging from project: project has integrated L/IK and 'western science')

- development of a spatio-temporal model that can be used other *in situ* farm projects
- (I can't figure out how the data mesh: the year long budget proposal asks for money for 5 expert farmers, but the results for sept/00 - feb/01 show that 323 fields were surveyed and 8 expert farmers were trained - need some explanation)

3. Traditional Knowledge Re-articulated

(Describe any traditions that are applied to present day issues in new format)

- the information generated will contribute to the recognition of farmers' knowledge and to the empowerment of farmers in relation to their genetic resources through community genebanks and by establishing partnership with the formal system.

4. Two-way Learning

(L/IK adds to Project through iterative process: project builds on L/IK)

5. Results Delivery Reaches/Includes Community

(Dissemination materials accessible to local community: Lists, reports etc available in local language, workshops include community members, etc.)

- '...results will be compiled and technical and financial reports will be prepared for IDRC and all participating institutions. Scientific articles will be written for submission to referenced Journals for publication...' '...results will be shared with other scientists at international conferences and scientific gatherings.'
- 'meetings will be held in Ethiopia with participating farmers...'

Appendix IX: Results Of The Discussion Of L/IK In Sub Programming/Projects At The Montreal Team Meeting: November 12-15, 2001

New Directions/ Opportunities

1. more support for and better understanding of IK research by indigenous peoples themselves
2. adding value to IK
3. support research that tries to identify and make available principles from cultural practices
4. South-Canadian linkages and awareness building at home
5. biodiversity and (local and indigenous) language dynamics and revitalization
6. adaptiveness of IK in face of major changes; and assessment of these changes; processes to strengthen adaptiveness (tools, ecological footprint)

Gaps, Missed Issues and Opportunities

1. research methodology influencing policy and vice versa
2. understanding the driving forces of biodiversity and IK/cultural practices loss and future usefulness...what research methodologies to learn more about 'future usefulness'
3. need more collaborative research methods used in practice and to better understand why not
4. indigenous peoples' involvement in evaluations
5. 'peoples perspective' of biodiversity requires more research in terms of supportive frameworks
6. evaluation using more participatory and integrative approaches

Achievements and Strengths

1. research on IK by indigenous peoples and putting indigenous rights on the agenda (CBD).
2. IDRC's work on local/community indicators and measures of environmental change (evaluation unit [ENR], IUCN and CIDA)

	Gaps	Achievements	New Directions
Documenting	<p>1. methodological issues(don't really understand); other research frameworks (i.e used by indigenous peoples and how they can be used with western model -are participatory approaches enough? -participatory evaluation -who is doing the research? (from within or outside the framework?)</p> <p>2. lack of understanding/analysis of causes of biodiversity loss (assumptions made) and relation to loss of knowledge, role of knowledge in 'conservation' and sustainable use.</p>	<p>Research on IK by Indigenous peoples (IKP, Kuna-Embera) GRINS (see list above)</p>	<p>1. communications: south-Canadian linkages and awareness building at home 2. explore relationships between biodiversity and language 3. explore adaptiveness of IK in face of major changes (when/how?) 4. explore use of ecological footprints as tool</p>
Adding Value	<p>Lack of understanding issues related to the 'transmission' of knowledge</p>	<p>Innovative ways of re-incorporating IK (school lunch, research teams in Kuna-Embera)</p>	<p>1. does adding value to IK and its supporting structures create and incentive to maintain it and therefore maintain diversity 2. support research that identifies principles from (not specific knowledge of) cultural practices and scale up.</p>
Policy Incentives		<p>facilitating indigenous peoples assertion on CBD policy agenda</p>	<p>more support for research/agenda setting by indigenous peoples</p>