



## **Report**

# **Evaluation of Ecohealth Projects. Development outcomes and changes related to human health, well-being promotion and environmental sustainability**

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## 1. Executive Summary

An evaluation process was established by IDRC aimed to expand the knowledge on the application of Ecohealth approach for improving population health and well-being through sustainable environmental change. For that two consultants were asked to select four Ecohealth projects, out of 12 projects previously chosen among the ones considered representative of that approach, in order to perform an in-depth evaluation. Projects in Ecuador, India (Goa), Cuba and Malawi were included in the study because were beyond phase II and presented a great deal of outcomes related to scientific information and intervention.

This work assessed and described situational changes and achievements within the socio-environmental context and living conditions of targeted population groups as an effect of project's action. Documental review and suitable instruments for key-informant interviews and focus group meetings were applied; furthermore, qualitative and quantitative data collected during field visits were analyzed. The support of the Evaluation Unit at IDRC and collaboration of projects' teams were essential to conduct the evaluation tasks.

It was observed that all four projects thoroughly applied the Ecohealth principles (transdisciplinarity, community participation, equity and gender). Their main objectives were accomplished, regardless of different balances between scientific production, intervention and policy making actions, due to variation in the way funds, time and workforce effort were combined at every phase. Moreover, projects with few partners were more flexible and adaptable, although presenting some limitations in the outscaling of their interventions and less impact in policy making. In contrast, multi-stakeholder projects showed a higher potential to achieve sustainable changes in the environmental situation related to positive impacts on health and well-being, while facing the complexity of institutional divergence and bureaucracy.

A good amount of relevant information, qualitative and quantitative in nature, was produced by all four projects, working under diverse circumstances and dealing with a variety of specific research questions. As a result, it effectively guided intervention, community participation and empowerment and therefore enlightened the subject of socio-environmental determinants of health and well-being. More than applying high-tech approaches it was the existence of properly skilled teams, their affirmative attitudes and excellent level of commitment that made it possible to arrive at some outstanding results described in its annual reports. Nevertheless, production of scientific papers and diffusion of more recent outcomes are still being carried on.

The evaluation revealed the need for research teams' specific training on strategic thinking, planning and negotiation. It would increase their capability to deal with political conflicts of interests and to influence the development of proper legal basis and regulatory actions, whenever the decision-making process can be carried by responsible institutions and key actors. In addition, economic evaluation of environmental changes and cost-

benefit analysis of advocated solutions are often lacking and these should be emphasized in future research & intervention proposals.

The continuous evaluation of Ecohealth approach and the application of methods such as outcome mapping to improve project's proceedings and management are desirable. In addition, keeping track of all key investigators involved with the projects, by establishing a world-web for knowledge exchange and human resource bank, are some initiatives that can assist in consolidating the benefits of applying this approach.

Based on the findings of this evaluation we conclude that, in comparison to the traditional approaches, Ecohealth is a more cost-effective tool to promote the changes in attitudes and actions that are needed to improve health, well-being and environmental sustainability. However, factors such as the complexity of the addressed issues, the numerous and variable confounding factors involved (market forces, climate, etc) and the time and budget constraints did not allow the evaluated Ecohealth projects – with the notable exception of the SFHC-Malawi project - to produce sufficient hard data to prove that their interventions effectively resulted in improved health and environmental sustainability. In three out of four of the projects, a proper post-intervention evaluation of these important factors was neither performed, nor complete, or not conclusive. However, all projects present qualitative data that do indicate significant improvements in well-being and knowledge empowerment.

IDRC could build on the maturity of the Ecohealth approach and on the critical mass of investigators it has nurtured worldwide to proactively identify research/intervention issues and teams that can be assembled in such a way as to maximize the production of the hard evidence basis required for further demonstration of its efficiency and cost effectiveness.

## 2. Evaluation Report

### 2.1. Background

A long time application of Ecohealth principles and practices in supporting several research and intervention projects in many countries and about different subjects and settings, motivated IDRC to begin an evaluative process aimed at “better understand and define what is meant by *improving health and well-being through the use of an ecohealth approach*”. For that it was decided to call external consultants to perform an in-depth study of selected projects.

The evaluation began by establishing an external consultancy in July 2005. From that, during consultants’ visit to the IDRC Head Office in Ottawa, Canada, during August 1<sup>st</sup> to 5<sup>th</sup>, 2005, 12 projects previously selected by the Evaluation Unit were examined. Out of those, four<sup>1</sup> were considered to be representative of the approach linking environment and health/well-being and were chosen for an in-depth evaluation. Requisites for selection were based on some key elements of Ecohealth conceptual framework, specifically related to transdisciplinarity, participation, equity, social and economic practices, information, communication and education, people’s perception of health and development problems, gender and ethnicity. In addition, the projects chosen were all beyond phase II, and well advanced, as to present outcomes and research outputs, and included those that had developed intervention to promote changes. Different geographic regions and diversity of research subjects were also considered.

#### **Objectives**

The established working objectives were: 1) Carry out the evaluation process of the Ecohealth approach by performing an in-depth study of four projects, previously selected; 2) Outline methods, practices and instruments of data collection and information production to support the evaluation process; 3) Present strategies of information assembly and analysis for evaluation of Ecohealth projects. These tasks were accomplished and the methods and findings are described below.

This evaluation did not aim to describe technical or administrative singularities of every project’s performance and did not look at their end results. In contrast, by using qualitative data and reports the task was to describe situational changes and achievements within the socio-environmental context and living conditions of the target populations.

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<sup>1</sup> Projects included in the evaluation were: I. Human Health and Changes in Potato Production Technology in the Highland Ecuadorian (Andean) Agro-Ecosystem (Phase II). Scaling Up and Out of Research-Intervention Approach (101810); II. Environmental and Social Performance Indicators and Sustainability Markers in Minerals Development: Indicators of Health and Well-Being (Phase III), Goa (101276); III. Ecosystem Approach to Sustainable Prevention & Control of Dengue (Phase II), Centro Habana (101545); IV. Soils, Food and Healthy Communities: A Participatory Agro-Ecosystem Approach to Monitoring Change in Northern Malawi (101829).

A presentation of this report was made to IDRC Evaluation Unit Team at the Head Office in Ottawa, in a meeting held on September 20<sup>th</sup>, 2006.

## **2.2. Methodology**

The main objective of the study is described as: “evaluation of the impact of the Ecohealth approach research on health and well-being outputs and outcomes and environmental sustainability” (TOR, July 2005). From that, the central evaluative question, derived from Ecohealth theoretical framework was stated as “whether Ecohealth approaches contribute to improve health situations and reduce well-being problems through a better understanding of their socio-ecological determinants and the adoption of transdisciplinary interventions that support environmental sustainability”. Some other relevant aspects examined were related with changes in attitudes of social actors associated with project’s activities, whether these changes contributed to better health and environment sustainability through participation and knowledge empowerment of community members and other key stakeholders, and whether decision and/or policy making processes were affected by the projects’ actions.

In order to carry out the case-study of the four projects two types of data and information sources were used: documental review and field visits to perform collection of primary qualitative information from key actors correlated with the projects. Documental review and analysis included proposals and reports of all phases, publications and presentations made by the research teams. Those documents were made available by IDRC. Indicators and quantitative data described in the reports were analyzed to reveal progress of the environmental and health status, modifications of perception and attitudes of project’s beneficiaries and stakeholders, policy development and implementation of qualified community participation. Prior to perform this evaluation, an introduction letter was sent to project leaders presenting the process and rationale and asking for collaboration and participation.

### ***Instruments and procedures***

Field visits to selected projects located in Goa (India), Ecuador and Malawi were made from February to May 2006. Researchers of the Centro Habana Project (Cuba) were met in Antigua, Guatemala, because a field trip to this project’s area was not possible. From Antigua, both evaluators traveled to Ecuador, which was chosen as a first test for the evaluation methods because of the absence of any language or cultural barrier between the evaluators and the project teams, project beneficiaries and other stakeholders.

The field visits were accomplished as part of the information gathering procedures, observing during these opportunities some specific local aspects of projects’ development and their context, and to make contact with all individuals listed among researchers, beneficiaries, stakeholders’ representatives and organizations of interest. A member of the research team assisted evaluators during field activities. In addition,

interviews and focus group meetings were completed by applying instruments previously designed.

Evaluative instruments containing a list of topics and questions were used to guide key-informant interviews and focus group meetings, and were applied during the field visits. All instruments were reviewed for refining and adjusting to every situation and were validated beforehand by IDRC and project's principal investigators. These instruments were formulated to characterize the view of beneficiaries, project team members and stakeholders about the Ecohealth project's objectives, activities and outcomes. In addition, it intended to address the mechanisms by which the project's outcomes could affect or influence community participation and changes in knowledge, perception and attitude towards the relevant issues relating environmental conditions and health/well-being. Issues concerning the role of government, of non-governmental organizations (NGO) and decision-makers, research practices and socio-economic and political contexts in relation to environment, health and well-being were also included.

The questions and topics proposed for semi-structured interviews and or focus group discussions (in which case the questions were restated as discussion topics) were arranged into two types of instruments: 1) A core of similar questions applied to all four case studies, to project beneficiaries, the research team and local decision makers, to evaluate the views or conception that members of these groups would have or share on a set of common issues; 2) A project-specific evaluation instrument directed to: samples of beneficiaries (individual residents, workers, family members), members of the Ecohealth project team, decision-makers and stakeholders representatives, aimed at describing conditions, strengths, weaknesses and relational aspects of the project and partners. During the field visits, presentations of work in progress and discussions with researchers changed some parts of the instruments, adapting them to the dynamics of project's development and circumstantial changes of institutions involved.

### **Analysis**

For the analysis, information gathered from documental review, reports of evaluators' field visits and transcription of interviews and group meeting records were classified and consolidated.

All relevant information and data obtained during the interviews were validated by checking them within the contents of projects' documents like the annual reports, publications and presentations made available by both the IDRC and the research members. When appropriate, further correspondence between evaluators and project leaders was used for confirming some of the specific information gathered or to clarify aspects that were not well explained or presented.

The interpretation of evaluation findings was made by contrasting attributes and outcomes of every project to expectations of achievements according to Ecohealth framework and the evaluative questions. A set of parameters were drawn and applied to verify the level of accomplishment by the projects for every relevant aspect of their



development and potential for changes, inter-comparing them qualitatively, and including: Control over budget, team & timeline, potential negative impact of external factors, potential impact on policy-making, intervention success and reach, adaptability, capacity building (meant as training and knowledge empowerment), participatory, potential for continuity & out scaling, scientific output (publications and communications), transdisciplinarity. These information and projects' achievements related to each evaluative question (see Annex, Instruments) are summarized in tables shown in the section below.

A preliminary report was sent to every project leader for validation and further adjustments and information completion was provided by helpful comments subsequently received. Observations made by professionals of the IDRC Evaluation Unit were also invaluable to improve this report.

## 2.3. Evaluation Findings

All projects applied the Ecohealth principles (transdisciplinarity, participatory nature, consideration of equity and gender issues) and reached their main objectives, though with very different balances between scientific outputs, intervention and impacts on policy making, resulting from dissimilar choices regarding the allocation of funds, time and effort. For that it can be generally stated that Ecohealth approach contribute to promote positive changes in health situation and to reduce well-being problems by applying information to action through advancing knowledge on socio-ecological determinants and carrying out— interventions that helped support sustainable environmental changes.

It was observed that by covering a wide range of subjects and geographical areas the projects presented also different socio-economic and environmental settings. The extremes of this range were a project in a purely urban, densely populated area, one in a totally rural, agricultural area, with very little infra-structure, and in the mid-range two projects in mixed urban/rural sites where the impact of environmental changes was still more complex. Besides all that, the potential for measurable outcomes and results of interventions was quite different among the projects. In a place like Centro Habana where governmental and political forces were put together at local level to fight dengue, a context that opened the prospect for success and sustainability, these same forces and some not counted extraneous factor like resource constraints represented a limit to future developments. In the other end of the spectrum, in a place like SFHC-Malawi, where several constraints could impair the project development, project's adaptability and strong community participation yielded a fairly good amount of information and promoted visible positive changes.

Some projects have declared "enemies" such as a mining or pesticide company, or a jealous institution that felt excluded, other has only drought or themselves to fear. The successful few-stakeholder and far-away projects have the challenge to find the authorities before thinking of lobbying them, and the laborious multi-stakeholder projects conquer effective opportunities to change perceptions, attitudes and regulations. However, the translation of these opportunities into practical changes is under constant menace due to the inherent instability of the political and administrative structures, the low motivation of their members - often occupying volatile functions and positions dictated by political conveniences - the unfavorable inclination of their institutional cultures and traditions towards transdisciplinarity and gender/equity issues, and often towards participatory approaches. Such structures are slow in moving and changing. This is well illustrated by CIP-Ecuador project where central authority levels resisted setting up programs to control pesticide exposure, despite the eloquent scientific and practical evidence, while other health problems like goiter, already controlled long ago, still deserves an elaborated notification system.

The projects with few partners are more flexible and adaptable. In contrast, the beneficiaries of multi-stakeholder (including official institutions) projects clearly

perceived the difference in speed and efficiency between these projects and their “enemies”: the industries moved fast to impair or overcome any positive change that was promoted by applying Ecohealth principles and practices. In the CIP-Ecuador project, the pesticide industry local agents quickly realized the potential of the tools used by the project and adopted them, but of course solely in benefit of their own agenda. By the same token, at TERI-Goa area, mining companies and truck contractors used poverty and job seeking pressure to prevent the population to complain about water shortage and dust pollution which seemed to the research team an almost unbearable challenge. Table 1 summarizes the performance of the four projects in relation to the parameters adopted for this evaluation and Table 2 brings, for each of the four projects, more specific answers and comments related to the central evaluation questions described in Annex (Instruments).

Table 1: Comparative performance of the evaluated projects in relation to a set of parameters.

<b>Parameters</b>	<b><i>Few-stakeholders project (SFHC- Malawi)</i></b>	<b><i>Many stakeholders project (TERI-Goa &amp; CIP-Ecuador)</i></b>	<b><i>Government-run project (Centro Habana)</i></b>
<b>Control over budget, team and timeline</b>	More	Less (conflicts, different views, bureaucracy)	More
<b>Adaptability</b>	More	Less	Less (limited by resources)
<b>Capacity building</b>	High, local	High, regional	High, local
<b>Participatory</b>	More	Less	More
<b>Transdisciplinarity</b>	More	More	Less
<b>Potential negative impact of external factors</b>	Less (little damage by policy changes)	More	Interference by other hierarchy levels
<b>Potential impact on policy-making</b>	Less	More	More
<b>Intervention success and reach</b>	More, but local	Less, but high potential	More, but local
<b>Potential for continuity, out scaling</b>	Less	More	Less (dependent on higher govt. levels)
<b>Scientific output</b>	More	Less	Less

Obs.: “more” and “less” for a project category in comparison to the other categories.

Table 2: Overall assessment of project outcomes as related to central evaluation questions

Questions	Central Habana	CIP-Ecuador	Malawi	TERI-Goa
<i>Did Ecohealth approach contribute to improve health situations and well-being?</i>	To a certain extent, yes. Dengue epidemic of January 2002 in Centro Habana was successfully fought by applying the approach and methods developed during Cayo Hueso's Ecohealth project. Incidence and major epidemics are kept under control in the study area since then. However the new integrated surveillance system was not adequately followed yet by permanent improvements in housing and urban environment.	Yes, the project lead to improvements in the handling of intoxication cases and of intoxication data. Farmers are more cautious and by using IPM techniques reduced by approx. half the frequency and amount of applied pesticides and experienced a return of their mental capacities to normal. However, only a fraction of the families in project communities adopted all or most project-inspired practices.	Definitely yes. The improvement of soil fertility and nutrition education had both perceived and measured positive effects on child health and growth. The increased household prosperity had a suite of positive side-effects such as less dependence on piecework labor more harmony, more access to education, reduced hostility, more togetherness at household level and within and between communities.	Yes, although in Phase III the project remained with strong "research" component due to expected difficulties in intervening and promoting more effective changes. However, pressure for governmental regulation has increased. Community awareness about health impact of mining was achieved and groups' organization (notably women's' groups) became actively involved in seeking changes. Remediation and compensation measures were installed, as were the cases of household water tanks, reduction of dust pollution of road corridors and implementing fruit crops on dumping sites.

Table 2: Overall assessment of project outcomes as related to central evaluation questions (cont.)

<i>Did the project make it through a better understanding of socio-ecological determinants of health-environment links?</i>	Yes. Presented an extensive contribution to knowledge on socio-ecological determinants of environmental situation that can help to control dengue transmission in urban areas.	Yes, but many of these determinants are beyond the sphere of influence of the project, such as the market forces and the attitude of the pesticide industry itself.	Yes, and these determinants were clearly perceived by the project beneficiaries. The use of visible indicators such as corn color and height, soil color, child growth, contributed to that.	Yes. Produced a good body of knowledge on socio-ecological determinants of water, air pollution and respiratory problems, including the economics of those problems. Explanatory models of environmental impact were drawn.
<i>Did the project adopt transdisciplinary interventions that support environmental sustainability?</i>	Yes and this helped producing integrated knowledge and addressed community and other actors' participation, although economic assessment was lacking.	Yes, though the complexity of the institutional setting limited the pace and depth of the interventions and external factors hampered the measurement of their efficiency.	Yes, the interventions acted simultaneously on a large palette of aspects (agriculture practices, nutrition, household and community dynamics and practices) that resulted in increased sustainability.	Yes. Integration of different knowledge sources and expertise in producing data and directing it to provide diffusion through community participation and organization were specially noted.

Table 2: Overall assessment of project outcomes as related to central evaluation questions (cont.)

<i>Were there changes in attitudes and behavior of different actors associated with projects' activities?</i>	Post-intervention data are lacking. Changes in population attitudes towards prevention and increased community participation were noted. Local health personnel learned and applied new surveillance practices to control dengue transmission.	Yes, the institutional partners changed attitudes, agriculture institutions incorporated the health dimension and the health sector became aware of the socio-ecologic factors behind intoxications, though only at local and regional levels. For farmers it is difficult to define how much of the changes were brought by the project or by market factors.	At community and project team and partners level, the changes were striking and clearly project-related. At other levels no significant actors were available or did not show significant changes.	Certainly yes for community members and women's groups. Local government and mining organizations are discussing the issues together for the first time. More effective regulatory actions and related legal basis development are still missing.
<i>Were decision and/or policy making processes at different levels affected by Ecohealth projects?</i>	At municipal level, yes. Local government adopted the new surveillance system. Higher levels of governmental sectors were less involved as to assure policy making processes.	Yes, but at community, municipal and provincial levels only, though the passing of a provincial bill by the local legislators to restrict pesticide use was an important precedent. The project contributed to pinpoint the conflict of interests behind planned alliance between public institutions and the industry. These were discontinued.	The project brought significant changes in decision making at household and community level, but had no effect on policy-making at central decision levels. At regional level, no significant other stakeholders existed.	Involvement of key local actors in discussing the main issues of mining and environmental/health impacts was recently seen; community organization has pushed for decisions on resolving the problems.

Table 2: Overall assessment of project outcomes as related to central evaluation questions (cont.)

<p><i>Did these changes improve health and environment sustainability through the participation and knowledge empowerment of community members and other key stakeholders?</i></p>	<p>Information diffusion to communities and promoting participation of local residents and groups were performed. It may have contributed to reduce risk of disease transmission, so preventing epidemics. Social organizations were thoroughly involved. Sustainability is fragile on dependency of further environmental and socio-economic changes.</p>	<p>. The industry adopted Ecohealth strategies, but for the sake of its own agenda. The communities, the teachers, health and agriculture technicians now have a demand for more training and integrated activities by health and agriculture services.</p>	<p>Yes, participation was high and knowledge empowerment of community members was very successful. New legume varieties were presented by the project but chosen by farmers after testing them. They are today enthusiastic diffusers of the techniques introduced by the project. ICRISAT was also encouraged and stimulated by the project achievements for which it was partly responsible.</p>	<p>Evaluation of intervention results was not specifically performed by the project. Changes in water availability through remediation measures and discussion about truck loads and pollution were noted. The recent involvement of state government in reviewing legislation concerning mining impact and the meetings between companies' representatives, local officers and legislators and local civil organizations can be attributed to the project's activities that among other actions have provided qualified information that supported informed decisions.</p>
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***Understanding the socio-ecological determinants of health and well-being***

Research and scientific information production component was a strong part of the projects. This component presented a balanced mix of quantitative and qualitative methodologies with a great deal of diversity in types of studies and instruments. Overall, data collection and analysis were directed to increase understanding of role of risk factors, socio-economic determinants and population perception of events linking environmental situation to health and well-being. The results of these investigations can certainly help other projects and will contribute to direct intervention in other settings where environmental factors affect health and well-being, if publications are completed.

Generally speaking, the capacity for analyzing the data and to produce information were satisfactory, although it was not always easy and fast to translate scientific evidences into simple and qualified information that could feed essential processes of changes. It was the case of producing information for population groups and NGOs that was very successful in Centro Habana and to a less extent in CIP-Ecuador, and to produce qualified information to companies and government in TERI-Goa. In this last case, for example, the research into water availability problems as a result of mining activities lead to an explanatory model that supported participatory approach to community organization. In this regard, making all these outputs available to decision-makers in such way they can easily understand is a challenge faced by all projects.

It was also noted that a great deal of time and project's resources were spent on developing conceptual frameworks and the theoretical basis of intervention that were registered in reports and in some instances also in scientific literature. These frameworks incorporated in an integrated vision related socio-economic-cultural determinants of links between environmental situation and health and well-being problems and possible solutions, and to some extent this effort gave a stronger support to research and action, mostly by guiding the data gathering designs and methods.

***Ecohealth approach contributed to improve health and well-being situation***

The intervention component was based on some baseline data not always simple and direct enough to make this part of the project move fast in the beginning. The balance between information gathering activities to support intervention, mostly participatory in nature, and scientific information to expand the knowledge of the relationships between environment and health/well-being was generally achieved. Nonetheless, time and resources spent on analyzing more complex quantitative data necessarily reduced the investment on intervention for changes, and this produced some conflicts and anxiety in the team and its allies. The relevance of data collection was not always clear to the intervention communities and project technicians, and the time and effort this required was felt as a burden, reducing their willingness to participate.



However, it can be stated that in some circumstances health and well-being situation changed for better as a result from projects' intervention. Examples of that can be cited: in Habana, Cuba (the municipality where project area is located) the last dengue epidemic was registered in 2001-2002. Although the study area remained classified as of high transmission risk due to a ubiquitous vector, the integrated surveillance system carried out by local health personnel is keeping the disease under control and in-house insecticide concentrations are kept within recommended levels. In Malawi, soil fertility and nutrition were clearly improved, resulting in better child health and growth, and all these changes were adequately documented with sets of hard indicators, and the data are under final analysis and publication stage. This project informed the farmers of five new legume options, supported their testing of the options, leading to more legume production. This, in turn doubled legume consumption among participating households' children, making their height to improve with time while control children's height didn't.

It can also be said that increasing population awareness about effects of environmental problems and helping community groups to make a planned demand to government and industries for compensation and solutions have empowered them to seek better living conditions, which in turn has contributed to positively change well-being perception. Three out of four of the projects did not perform post-intervention surveys up to the conclusion of this evaluation in such way that could give some clear-cut evidence of improvements in health and well-being situation of those affected by socio-environmental problems. In Ecuador, by using IPM techniques farmers reduced by approx. half the frequency and amount of applied pesticides and experienced a return of their mental capacities to normal.

***Transdisciplinary interventions that support environmental sustainability were carried out***

A common feature of all four projects is the fact that they rely on well-known and usually low-tech approaches or methods (intercropping, crop residue burial, IPM, diet diversity, vector control). In contrast, the attitude, commitment and continuity were the factors that made a difference, not technology.

In addition to that, the inter-dependency of environmental situation, socio-economic context, biological aspects and effects on human health was largely recognized. This was in turn translated into applying integrated approaches to intervention through community participation and involvement of key stakeholders. In Malawi, the intervention meant to act simultaneously on a large range of aspects (agriculture practices, nutrition, household and community dynamics and practices) that resulted in increased sustainability. In Goa integration of different knowledge sources and expertise in producing information and directing it to provide diffusion through community participation and organization were specially noted, as happened when working with women's groups, villagers and health services. In this project' area mining activities have depleted water sources with great impact on families' well-being. This made the researchers to gather information on a variety of different fields of knowledge that contributed to design a complete explanatory framework of mining

impact on agricultural land and water availability that helped support intervention at state level regulatory action and companies' compensation or remediation measures, like household water tanks and fruit crops on dumping sites. Further discussions about permanent solutions to those problems are relying on transdisciplinarity to reduce environmental impact of mining activities.

***Promoting changes in attitudes and behaviour of relevant actors***

Projects' activities and their approach of the relationships between health/well-being and environment promoted important changes in attitudes and behaviour of different actors.

Institutional changes were achieved as in Centro Habana Project that implemented a new surveillance system to prevent dengue transmission that became a current practice of local health personnel and services.

In Ecuador, agricultural institutions now include the health dimension within their working rationale and health services are involved in dealing with pesticide intoxications. This included, for example, participating in improving the information system for case notification at local and regional levels and obtaining a provincial bill restricting the use of pesticides. Besides that, farmers and their families became not only aware of risks of pesticide usage but also about ways to protect themselves against its effects. The adoption of IPM techniques resulted in halving the number of pesticide applications as well as the amount of pesticides applied and the mental capacities of farmers using IPM returned to normal ([www.idrc.ca](http://www.idrc.ca), case-ECO-4E).

In Malawi striking changes were noted among community members, project team and partners. Long-established farming and feeding habits were changed and the adoption of new crop varieties, cropping techniques and recipes increased soil fertility, crop yield and hence, household wealth and health. As a result, more harmony and togetherness at household level and among and between communities are repeatedly reported by interviewees.

In Goa the project managed to involve women's groups and community organization on acting towards demanding government and mining industries conversations and actions to find solutions for the effects of air pollution, water shortages and land waste on their health and well-being.

These observed changes were not all thoroughly documented by the projects nor did they carry pre and post-intervention surveys and a more systematic evaluation of perception, in such way that could allow them to clearly show any upward trend or improvement on that matter. Some of the relevant changes were brought to researchers' attention during discussions made with evaluators that were only scattered in their written reports.

It is noteworthy mentioning a great deal of change in attitude and behaviour of research team members, whose demonstrated to have broadened their knowledge and

their sensitivity to health and environment issues, and increased their self-esteem, factors that will influence their professional lives thereon. This was expressed in many statements recorded during the meetings and interviews performed for this evaluation.

### ***Knowledge empowerment of community and key stakeholders***

Two features are highlighted by projects' transdisciplinary approach to community empowerment: community members and key local organizations participated in information production and diffusion and community members got involved in discussing, deciding and implementing solutions.

It was seen in Malawi that information empowerment of community members and their participation in intervention made them enthusiastic diffusers of the agricultural techniques introduced by the project, and many respondents declared they would be able and willing to train farmers from other villages, even without material support for this. In Centro Habana, the involvement of local residents in surveillance may have contributed to reduce risk of dengue transmission and to prevent epidemics, and it may represent a factor of sustainable operation of the implemented surveillance system. In Ecuador, project lobbying performed with support of the intense participation of farmers' leaders and local organizations resulted in an effective response of provincial legislators who improved regulatory legal basis by passing bills that restricted pesticide use.

Methods applied by the projects in working with diffusion of information to community members and key stakeholders that contributed to reduce information asymmetry and to support organized action towards better environmental and health condition were effective. Although these methods were well adapted to cultural characteristics of the population and help passing information generated by research activities this part was not systematically described in the reports.

The issues of capacity building and about influencing decision-making that are also related to knowledge production and transmission were observed in terms of projects' activities on education, communication and diffusion of scientific outputs. Concerning that, working with key stakeholders and delivering information on environmental situation and related health effects helped to find and implement solutions.

In Goa, involvement of key local actors (mining industries, government and community) in public hearings and discussions started only recently to be seen and industries' associations decided to carry out a survey on health impact of mining and ore transportation in the entire area of their influence for the first time, which are clearly the result of the project's activities. This however did not go further to influence yet provincial or national levels of policy making. In Malawi, some significant changes in decision making at community level were achieved although it had limited effect on central decision level and counting on this is the fact that there were not other organizations acting as stakeholders at regional level. The same was observed in Centro Habana where it was not show significant involvement of more central or national level of governmental decision as a result of project's influence.

It is important to mention that using all societal resources currently available in the countries' universities and research institutions as well as NGO's that could help was seen in all projects, although characteristics of the institutional culture of large organizations that were responsible for some of the projects did not favor research teams in finding out partners outside the project area.

All four projects devoted expressive energy on training health and social workers as part of the intervention component. Community leaders were involved in training opportunities and their experience and knowledge were then applied in scaling out the project's impact as happened in Ecuador and Malawi. In the other hand, institutional capacity to address issues on environment and health/well-being interlinked factors were strengthened by both research and intervention components of the projects and researchers and graduate students found adequate ambiance and enough support to increase their capabilities to produce more qualified investigative outputs.

### ***Gender, ethnicity and equity***

Generally speaking, the projects considered from their proposals to reports at all phases important cultural aspects of local social and political contexts, including them within their research questions and methods as well as along with intervention activities.

A special attention was given to women's participation while dealing with community organization and empowerment, as it was observed in projects in Goa and Cuba. Evaluating the impact of those groups' actions on contributing to change environmental condition to improve health and well-being status was unfortunately not directed approached by the projects. What was described though was the process of change that was initiated or improved in families and communities' lives by creating opportunities for equal participation of men and women in discussing their problems and in finding solutions and besides that to voice out some unequal effects by gender of environmental problems, as happened to be shown in Goa where air pollution and water shortage affected more profoundly women than men according to the singularities of their household chore arrangements that are present in their society. In other hand, ethnicity was not mentioned and that seems to be an issue still far from being included by the projects within the framework of social determinants of inequities at all four projects' areas.

Finally, changing project leaders and or principal investigators in the middle of a project's phase seemed to hold back some developments, though momentarily, but at the same time appeared to bring new and refreshing insights that lead to success. Administrative difficulties registered in reports and commented on interviews with team members brought some exasperating times to all but it didn't impair success, which must be credited to a high level of involvement and commitment of the project teams.

***Considerations on methods***

One limitation of key-informant interviews or focus group format is that people do not necessarily do what they say they do. The field visits surely offer the opportunity for direct observation, but these are quite limited in time and space. However, the high-self criticism of the project leaders and teams, and their feedback on the interview transcription and texts suggest that the instruments were adequate. Many questions were answered by respondents before even being asked, and others were dropped. The instruments were designed before the field visits, based on the project documentation, reports, publications and other materials as described, but the direct contact with the project teams and other stakeholders and the observation in the field brought new questions and transformed the existing ones.

One evident aspect of the interviews made during field visits was the concise if not telegraphic answers of most Malawian respondents, contrasting with the prolixity of Ecuadorian respondents. There are a number of reasons for this. Formal education in Malawi is in English, and as in other Anglo-Saxon languages, objectivity and conciseness are the rule. In contrast, Ecuadorians tended to answer much more than one question at a time and were often elliptic and close to contradicting themselves (or maybe should we say closer to the contradictory nature of truth? An open question). An additional reason for the more extended answers in Ecuador is that, in all interviews, both consultants were present, and both are fluent in Spanish. In contrast, in Malawi, interviews with the project team could be done directly in English, while those with the beneficiaries required translation, and the local language (Tumbuka) has concepts that are not easily translated to English and vice-versa. Initially, a member of the team was designated as translator, but due to other engagements he could only translate on the first day. From the second day on, the driver became the translator and the dynamics of the interviews were radically transformed. Each question or answer gave rise to an animated chat between the interviewed person and the translator, and the recorded answers became a bit less telegraphic. When asked about the contrast between the length of the dialog and of the resulting answer, he explained that the chatting was required to make sure that both the questions and the answers were adequately perceived.

**2.4. Conclusions**

All four projects thoroughly applied the Ecohealth principles (transdisciplinarity, community participation, equity and gender). Their main objectives were accomplished, regardless of different balances between scientific production, intervention and policy-making actions, due to variation in the way funds, time and workforce effort were combined at every phase. Moreover, projects with few partners were more flexible and adaptable, although presenting some limitation in the scale of their interventions and less impact in policy making. In contrast, multi-stakeholder projects were able to perform more massive training and/or to act at a regional level. By involving many institutional partners they have a higher potential

to impact policy-making but this is in turn limited by the complexity of the institutional setting, by divergences and bureaucracy.

A good amount of relevant information, qualitative and quantitative in nature, was produced by all four projects, working under diverse circumstances and dealing with a variety of specific research questions. As a result, it effectively guided intervention, community participation and empowerment and therefore shed light on socio-environmental determinants of health and well-being. More than applying high-tech approaches it was the existence of properly skilled transdisciplinary teams, their affirmative attitudes and excellent level of commitment that allowed the projects to arrive at some outstanding results described in their annual reports. Nevertheless, diffusion of more recent outcomes is still being carried on.

Based on the findings of this evaluation of a representative sample of Ecohealth projects we conclude that, in comparison to the traditional approaches, the Ecohealth approach is a more cost-effective tool to promote the changes in attitudes and actions that are needed to improve health, well-being and environmental sustainability. Traditional projects are of diagnostic nature, disciplinary and expert-based, and result either in no intervention or disastrous ones. However, factors such as the complexity of the addressed issues, the numerous and variable confounding factors involved (market forces, climate, etc) and the time and budget constraints did not allow the evaluated Ecohealth projects – with the notable exception of the SFHC-Malawi project - to produce sufficient hard data to prove that their interventions effectively resulted in improved health and environmental sustainability. In three out of four of the projects, a proper post-intervention evaluation of these important factors was neither performed, nor complete, or may be considered not conclusive. However, all projects present qualitative data that do indicate significant improvements in well-being and knowledge empowerment.

## 2.5. Recommendations

### Project incidence on policy-making

The four projects selected for this evaluation cover a broad range of subjects and geographical areas but represent a wide palette in a number of important parameters. Some projects such as the SFHC-Malawi project are carried out in isolated areas with little or no infrastructure and few partners, interacting directly with the project beneficiaries, carrying out very successful and massive interventions but with little or no immediate impact on policy. Others, such as the CIP-Ecuador project and to a lesser degree the TERI-Goa one, are in the hurricane eye, dealing with a constellations of official partners and other stakeholders with high but fragile potential impact on policy-making. Finally, the Centro Habana project is somewhat an outlier in a number of interesting aspects: it has no declared enemies in contrast to the latter two projects and allows for high hopes of influencing policy and governance as it is carried out by members of government itself, although many factors limit its influence on other local governance levels and institutions.

The culture of fragmentation and the *patrimonialism* that prevail in most institutions are obstacles in the attempt to include Ecohealth principles and methods into official, regular programs and policies. These aliases are not likely to change appreciably in the near future. Like in the myth of Sisyphus, constant pressure must be made on the institutions, from all sides. From above, by multilateral and or donor agencies; from the sides, by fellow agencies that obtained success and visibility using Ecohealth tools; from below, by the project beneficiaries that develop higher expectations after witnessing practical examples of their feasibility.

**A political approach to stakeholders' conflicts of interest and government inertia and/or lack of concern for problems faced by vulnerable population groups requires special support to the project team, including specific training of professionals and social workers to deal with strategic thinking and negotiation. In addition, policy making and regulatory action can be enhanced by helping projects to develop or strengthen the appropriate legal basis related to environmental sustainability that could be placed in the right hands and in the right moments.**

### Project economic analysis

One of the most powerful, dynamic and ubiquitous actors in some projects is often not even mentioned in the project proposals: the market. Consumer movements and NGO's campaigns for cleaner and more equitable food production add market value to organic products and seem more efficient in reducing pesticide use in agriculture in wide areas than many years of projects painstakingly developed in specific regions, as seen recently in Ecuador. Though these market forces drive the

overexploitation and degradation of resources and health that we are increasingly witnessing, they can still be positive for many elements of the Ecohealth agenda. The SFHC-Malawi project brings an involuntary illustration of this: the success of the project leads to surplus that can be sold to the market, but these crops happen to be organic, because the farmers cannot afford buying pesticides, and this potentially added market value could contribute to the sustainability of the production and of its organic nature: a virtuous circle. In the Goa mining area it was observed that changes in the demand for iron ore and an increased participation of other economic sectors in overall area's income may turn to be an unexpected political force. This could drive communities, labor market and companies together to seek governmental solutions to very expensive environmental interventions, new investments in ore transportation infrastructure and public services that will be beneficial to employees and villagers alike.

The CIP-Ecuador and the SFHC-Malawi projects offer excellent opportunities for detailed analysis of the economic costs and benefits of current and project-suggested agricultural practices, on individual or demonstration plots. For example, in Ecuador, the potato yields in IPM fields were the same or higher than in conventional plots, but production costs decreased from US\$104 per tonne for conventional plots to \$80 for IPM plots ([www.irdc.ca](http://www.irdc.ca), Case –ECO-4E). In Malawi, for different good reasons such a type of analysis was not done. The TERI-Goa project began introducing micro-economic analysis more recently, but this aspect is still not much emphasized within its main research questions.

**There is a need for more cost-benefit analysis of the solutions advocated by the projects, for demonstration purposes to current and potential beneficiaries, authorities and other stakeholders, and not the least, for better documentation of Ecohealth achievements. We suggest the IDRC to encourage the teams to include the economic evaluation in their projects whenever relevant and feasible, and to give them the support or specific training this subject may require.**

### **IDRC relationship with project teams and other stakeholders**

Some PI's expressed the feeling that the relations with IDRC were marked by administrative and similar issues and that more technical-scientific support or dialogue would be welcome. With the exception of the Centro Habana, the projects were visited by one or both evaluators. In these three cases, the visits and interviews revealed important elements that were far from evident in the available project documentation. This reflects both the limitations of the reporting formats and conventions and the self-demanding nature of the PI's that are often the most severe auto-evaluators.



**A continuous evaluation of the Ecohealth approach as related to projects' outcomes – through the outcome mapping methodology or other specifically designed instrument – is worth applying every year throughout the project development. It is also important to find other report formats or mechanisms that can better reflect qualitative aspects of projects' development. The on-going practices of IDRC applied for project follow-up and evaluation visits; the promotion of north-south and south-south exchanges for filling-in projects gaps and for training, diffusion and promotion of the Ecohealth approach; the support to networks of Ecohealth initiatives are all synergic actions to be intensified as much as possible.**

Individuals that take active roles in Ecohealth projects usually have flexibility, solidarity and humility among their features and tend to attract other similar creatures, forming quite efficient and motivated teams. Many successful projects have been initially proposed and lead by single individuals and more often than not, by women. These projects attract, motivate and train many professionals that are often orphaned when the project eventually phases out and its goals and methods are not assumed by local institutions.

**As the pursuit of the Ecohealth principles is a long-run process so deeply dependent on the quality of human resources, it is important to keep track of all key-actors involved in past, present and future Ecohealth projects, down to the technical level, as they collectively represent a wide and precious human resource bank. We also recommend to extend the participation of project's researchers in workshops and other events beyond PI level.**

### **Visual documentation**

The evaluated projects work in physical and human landscapes that have a very strong visual and conceptual appeal and could, as could so many other Ecohealth projects, yield extraordinary professional documentaries, under IDRC initiative or not.

**The project teams should be explicitly encouraged from the beginning to keep a visual record of their work (both still and movie) that can be building blocks for these documentaries, complemented later with (or replaced by) professional takes.**

### **Intervention versus research**

The documentation of changes in attitudes and actions and the measurement of the effect of these changes in health and environment sustainability is by no means a simple task. The routine activity of the projects may produce many of the data required for this, but often it will be an extra work load. The project teams deal with limited human and material resources and often face strong stakeholders resistance to change, so that obtaining the changes is usually an exhaustive process and many of

its interesting features remain undocumented. IDRC could therefore be more proactive in this process, from the project call stage and throughout the project elaboration and implementation phases, for an early detection of the possible limitations the projects may suffer in this respect, and the kind of support they would require for a better documentation of the pre and post-intervention situations regarding health, well-being and sustainability. This in turn requires time and money and in this aspect the donors faces a similar dilemma as the project teams: should they privilege depth or width? Give less support to a bigger number of projects or the opposite? Should the projects privilege research or intervention? How much effort should be invested on obtaining changes and on measuring them and their effects? These issues are relevant because the projects have finite resources and build on an equally finite initial “community confidence capital” that can be spent too quickly if too much effort is invested in research at the expense of interventions.

However, due to the reasons mentioned in the Conclusions item, a better project design, support and follow-up may not be sufficient to guarantee that the projects will produce the strong evidence basis required to prove, beyond doubt, that the Ecohealth approach is efficient, despite a number of clear success-stories.

**IDRC could build on the maturity of the Ecohealth approach and on the critical mass of investigators it has nurtured worldwide to proactively identify research/intervention issues and teams that can be assembled in such a way as to maximize the production of the hard evidence basis required for further demonstration of its efficiency and cost effectiveness.**

## 2.6. References

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### 3. Annexes

#### 3.1. Project Description and Specific Findings

##### 3.1.1. Centro Habana Project. Applying an Ecosystem Approach to the Sustainable Prevention and Control Dengue in Centro Habana, Cuba II

###### Introduction

The Centro Habana Project began its Phase II in November 2002, aimed at developing an “environmental surveillance to entomological and epidemiological surveillance, coupled with a community-mobilization approach to ecosystem control”. Its principles were based on urban ecosystem and “characteristics at the individual and family level”. The overall objective was “to implement and evaluate a strategy to prevent and control Dengue based on a participatory ecosystem approach to human health in Centro Habana”. Institutions involved included: Cuban research and services organizations represented by *Instituto Nacional de Higiene, Epidemiología y Microbiología* (INHEM), *Instituto de Medicina Tropical Pedro Koury* (IPK) and the University of British Columbia, Canada.

###### Description of Field Work

The evaluation work done in collaboration with the Research Team of the *Centro Habana* Project (Central Havana) was carried out during the Regional Symposium on Ecohealth, Dengue and Chagas’ disease in Central America and Caribbean. This meeting was held in Antigua, Guatemala, from February 5<sup>th</sup> to 8<sup>th</sup> 2006, under the auspices of the Applied Entomology and Parasitological Laboratory (LENAP) of Biology School of *San Carlos* University of Guatemala and of IDRC. The Symposium was an excellent opportunity to meet with the researchers of the Project and that happened in two parts. A first one was held on February 8<sup>th</sup> to present the objectives of the evaluation and instruments and to arrange for next workday for the interviews. A second part happened on a day long meeting on February 9<sup>th</sup>, beginning with a presentation by researchers of the project’s main objectives, methods and relevant outcomes, and was followed by a group discussion when all aspects of the project were dealt, both by spontaneous participation of researchers and by answering some specific questions previously prepared for that occasion. The work conditions for the evaluation activities of consultants were adequate, and the time spent to go over all issues concerning the evaluative objectives was sufficient. A list of participants is shown in Annex.

However, it was not possible to visit the project’s area in Habana, Cuba, which was only of the consultant’s knowledge after the evaluation work had begun. At the time of the meetings with project’s researchers in Antigua it was considered the possibility that focus group meetings could be carried by a research of the Centro Habana team that would approach project’s beneficiaries

and government representatives to collect additional information. Consultants decided not to do this for the following reasons: 1) there was a representative of Ministry of Health among those present in Antigua; 2) different approach to population groups and participation of another researcher could result on validity problems of information gathered. In that sense, the evaluation of this project was based on the results of the meeting described and on documental review. In addition of reviewing the documents made available by IDRC in the beginning of the evaluation process, the final report (March 2006) and other documents sent by researchers in the course of the work were examined.

It is worth mentioning an outstanding level of collaboration of all participants, always willing to talk about the project with no constraints and to overcome eventual difficulties in communication matters between consultants and the research group. We wish to highlight here the attitude of broadening the rationale towards the best possible results of the evaluation process, reflecting over the achievements and weaknesses faced during the development of the project. Participants emphasized the importance of receiving the evaluation instruments well in advance of the meetings, which were shared among all researchers.

#### Notes and Comments on Presentations and Group Discussions

One special aspect of the evaluation process deals with team constitution and members' perception of how they value their work, in the context of Ecohealth approach to knowledge production and practices that may contribute to population health and well-being and sustainable environmental changes. In that sense, positive attitudes and behavior were noted in the research group. In addition, during the meetings, it was established that all questions would be made to the entire group, including the principal investigator, revealing a sense of integration and equal participation of all members.

Project Coordinator placed the view of what would mean to coordinate the project in the context of the work to be done, namely "to perfect the existing health surveillance system" and thus changing the ways families dealt with water collection and storage and to build up an entomological surveillance system to increase the data source and flow on factors that determine dengue incidence. She emphasized the different research approaches adopted in order to gather information, using both a case-control study to establish the importance of household factors on transmission and a prevalence study to know population attitudes in relation to preventive factors. The population empowerment achieved through community participation was another special point raised during her presentation. In this regard, preparing volunteer health promoters for community work was distinctive in this project. These workers lived in the project's area and were supported by the municipal department of health & education, which in turn assured the continuity of action. Additionally, she pointed out the way they used the existing social structures to

get across the issues and information that promoted community participation towards environmental changes for prevention.

A researcher called the attention of the group to the fact that being a veterinary worker could apparently bear no relationship to the project's activities. However, just for that, his view of entomological aspects, mostly mosquito control from a broader epidemiological viewpoint, added much to the objectives and practices as he stated. He described also how the house-to-house inspection during the vector control cycles, performed every two weeks, was integrated as to act properly on promoting community participation and in creating dengue awareness opportunities. These activities were carried by inspectors, chiefs of health brigades and quality control agents (*compañeros*), all of them supported by the vector control department.

Implementation and evaluation of the surveillance system were tasks remarked by another researcher. She recognized that the environmental conditions in the urban study area are deprived but the population is willing to collaborate according to her view as a sanitary engineer. According to her, the slogan "discover, destroy, prevent" was largely applied during the environmental campaigns.

Application of epidemiological knowledge and searching for new information were points emphasized by the epidemiologist. He was in charge of reference data on notified dengue cases in the study area and on quality control of medical information. His work with health statistics and health information system was critical to the data bank formation and data analysis. He is a member of the local health team in the project and for that reason he mixes some academic activities with a continuous field work on epidemiologic surveillance.

A unique feature of the Ecohealth approach within the Centro Habana Project is the central subject of research and intervention, related to sustainable dengue control and prevention in an urban area. Dengue is a complex disease that may affect the entire population and its determinant factors sustain the endemic level as well as periodic epidemic surges. Interactions between the vector species and human population, their dwellings and associated environmental conditions, and some behavioral aspects related to living chores and the overall socioeconomic situation make this public health problem of special interest.

Those aspects are still more important because some solutions presented for surveillance and control that worked well in one place may not be effective in another place, which in turn stresses the need for increasing knowledge on risk factors and on evaluation of intervention. It is also known that epidemiologic surveillance is the strategy of choice to indicate the places and time to intervene in order to reduce the risk of transmission of dengue virus strains. However, in contrast to the general recognition that environmental changes are a key factor

in preventing dengue, conventional surveillance tasks to control the disease are mostly focused on population vector control using insecticides.

Those issues make Ecohealth approach to prevent and control dengue an exceptional challenge. The idea behind the Centro Habana Project was to redefine the surveillance system to achieve sustainable control status. For that the research team emphasized during the presentation the main differences in the surveillance systems before and after the project. They said: *se acercó más a las características del ambiente* (it got closer to the environmental characteristics), meaning that three systems were integrated: environmental, entomological and epidemiological. In fact, the environmental factor was not considered before as a main risk factor, specially related to in-house water collections that are vector breeding sites. In addition, the necessary environmental inspection was not designed before as a full surveillance system and this became an outcome of the Project. They said that the awareness about the environmental factor happened during the 2001-02 dengue epidemic, and it was also motivated by the Cotorro Project, although the characterization of the vector breeding sites was not previously taken in consideration. In that sense, it was not only designing a new and integrated surveillance system. It was necessary to propose a new model, meaning to include new strategies to prevent and control dengue based on the integral understanding of the environmental factors in relation to the socioeconomic and cultural conditions at local level, and on community participation.

In achieving the best level of acceptance possible of the new model researchers said that participation of the decision makers was critical. The responsibility of the project was placed at the municipal level of government but the exchange established between INHEM, IPK, and Municipal Officers was a key factor to implement the new surveillance model.

For that, the political context in which the health system is organized, services are delivered and health personnel are involved in Cuba played a special role. Public health services are strongly settled; responsibilities and hierarchical relations are clearly established. They declared that the environmental and social dimensions of dengue transmission was amply dealt during the *talleres* with auxiliary health personnel professionals (*operarios de la campaña, Jefes de brigada, Supervisores, Jefes de Áreas de salud, Especialistas de Higiene y Epidemiología y estadísticos*), when all of them were trained on how to use the surveillance instruments according to the notion of an integrated Ecohealth approach to control and prevent. The level of adherence to the new model by health personnel was a key factor of success which is at least partially determined by the characteristics of the organization of the Cuban health system. However, it was also recognized that the health system is “paternalist”, that is, the responsibility for the health action is in great part of the health worker. The issues of the individual versus the collective responsibilities and

the role of the governmental institutions in health have been discussed within the project.

In this regard, some passive attitude of the population toward prevention, waiting for the health worker to “solve” all the problems, together with a low level of information on health and preventive issues, presented a special challenge in promoting community participation, which in turn was aggravated by the precarious sanitary and living conditions of study areas. The low level of population’s perception about dengue transmission risk factors was focused by the project activities aimed at changing that by applying strategies to enhance community involvement, described below.

In the other hand, the community participation was promoted to achieve a point where social participation turned to be a decisive element of control program management and to strengthen the capacity for negotiation and change. Strategies of social communication were adopted, such as the slogan “*el peligro es grande pero la prevención es simple*” (the risk is great but the prevention is simple), which was meant to translate the relationships between risk and prevention in a simple language. There are differences between the three study areas: Dragones, Los Sitios and Cayo Hueso. This last one has a different community organization that responded more promptly to the project’s activities. In fact, interventions carried out by another project (“Salud del Ecosistema: el Análisis de la efectividad y eficiencia de las intervenciones en el Consejo Popular de Cayo Hueso, Centro Habana”) for the 1995-1999 period, may have resulted on those differences. In fact, during the 2002 dengue epidemic that affect Centro Habana some learned experiences from that area helped to organize the community in other areas to control disease transmission.

Behavioral aspects of dengue transmission risks were focused from the viewpoint of the research methods and intervention. In fact, it became evident from the new model of surveillance system that environmental factors were interlinked to individual, household and community levels of perceptions about those factors and attitudes towards preventing the disease by adopting protective conducts. In this regard, intervention practices carried out by health promoters were directed to change attitudes, during face-to-face contact with individuals and groups and by applying specific communication strategies that covered the entire community. It was specially mentioned that working with *grupos vecinales* (neighborhood groups) was an effective strategy. However, they recognized that opportunities which potentially induced changes in attitudes needed to be more explored, using existing local social organizations and their activities. In addition, the formation of the team must include social scientists who work with socio-psychological aspects of perception and behavioral changes. The need to perform in-depth studies on the relationships between health information, preventive attitudes and behavioral changes was also mentioned.

Overall assessment of benefits of the approach adopted to control dengue in Centro Habana included the increase in work quality and enhancing information quality as a whole, which are essential to achieve the desired level of effectiveness of the surveillance system. There is variation in the work force to a certain degree (younger workers remain two years in the control program) that did not threaten the quality of the activities. Quality control performed by resident women specially trained in that task was of top importance to accomplish the objectives.

Gender issues were discussed. While there was an even distribution of men and women among health promoters, the majority of *campañistas* (field workers) was male. Among participants of *grupos vecinales* women participated in greater proportion than men. Those different gender distributions within the project's activities were attributed by researchers to the local socio-cultural factors. In this regard, gender related issues were not aimed to be approached by the project.

The Centro Habana Project produced enough information and scientific evidences to guide intervention directed to promote and implement environmental changes that could positively affect health outcomes. Concerning that, three important aspects were raised during the discussions. The first was related to household improvements. A massive intervention was done in Cayo Hueso during the 1995-96 period, and it was evaluated in 2000-01. It was later extended to other *Consejos* (research areas that corresponded to city districts and health service areas). However the combination of poverty, old dwellings and badly maintained urban environment was a key factor that precluded success in applying the new model of an integrated surveillance system. It was said that there is a plan to recuperate all *viviendas* (households). The second one was related to the quality of the water supply system and the sewage disposal system in the study area. Public water tanks were eliminated from all areas. However, flooding was common during the rainy season contributing to maintain mosquito breeding sites. The third of those aspects is related to applying insecticides to control vector population density. The whole idea behind the sustainable environmental changes in this case was to avoid using insecticides while improving health and living conditions. In Centro Habana, dengue control surveillance system included reducing insecticide application and that was achieved. It was commented on the increased level of population consciousness about the risks of exposure to insecticides. The levels of insecticides concentrations were measured and happen to be below the international recommended values.

Closing remarks during the interviews and group discussions were made in relation to the fact that decision makers in Cuba are convinced that the health system alone will not "solve" the problem of endemic dengue. In that sense, the project experienced some difficulties to involve other institutions that dealt



with environmental situation in the country. In addition, resources are scarce and that impaired the implementation of needed environmental improvements identified by the project. Despite all results in improving the surveillance system and to empower the community on the dengue control issues, it was said that given the actual situation Centro Habana will always be considered a high risk area and their expectation was that the accomplishments of the new health surveillance system could prevent this area to be the place where another epidemic would begun.

#### Methodological Aspects

The issue of whether the project applied methods considered capable to generate information and to support action according to the Ecohealth principles and objectives was dealt with the evaluation of the reports and documents presented by the project.

In the Centro Habana Project the research design had three components: “1. pre- and post-intervention surveys to identify the needs, risk perception, knowledge, attitudes and behaviors; 2. a case-control study to identify risk factors and, 3. key informant interviews to assess main areas of needs as well as the success of the intervention”. Those components are soundly related to the general goal of the project which was to produce enough information to contribute for understanding how the environmental factors and individual attitudes combined to sustain dengue transmission status and related morbidity, and thus establishing priorities and evaluating interventions that could improve wellbeing and health conditions. In addition, using quantitative and qualitative approaches to obtain data was proper to accomplish research objectives.

The chosen strategy of designing and implementing a surveillance system based on a new model, where the central issue was integrating epidemiological, environmental data and health services with community participation is a very special case of applying Ecohealth approach to change ways commonly adopted by health services everywhere when dealing with transmissible diseases control and prevention. In fact, carrying what was called environment surveillance, “allowing the identification and stratification of risks... the driving forces, pressures and state indicators” (Final Technical Report, March 2006) is new to surveillance methods applied in disease control. Entomological surveillance and epidemiologic/clinical surveillance are two components of traditional disease control activities that were adopted in an integrated way in the project. What is new here was the manner in which related activities were performed by local health personnel and community members. In this regard the project referred to a truly “community participation ‘surveillance’” (2002 Phase II Proposal), which was translated into the study rationale described in the Final Report as “promoting the role of community participation in implementing the surveillance strategies”.

Regarding the issue of community involvement, in addition to what was mentioned before, the project introduced a model of social participation based on joint management (*co-gestión*) principles, using the available information to empower community members and strengthening the capacity of negotiation and conflict resolution to promote a healthy environment. The utilization of *grupos vecinales* formed by resident health promoters facilitated the data collection process, the identification of local problems and solutions in order to reduce risk of disease transmission and to follow up the interventions implemented.

The original selected study area included five *Consejos Populares* (Popular Councils) but was finally reduced to three sub-areas, namely Los Sitios, Dragones and Cayo Hueso, and the reasons for that were the workload and extensive time related to training personnel on new methods and delay in the execution of the Cotorro Project. It seems that this reduction did not have a greater impact in achieving the project's main objectives. In fact, the area effectively studied was large enough to allow for all types of sampling procedures. Besides that, it presented all features regarding exposure and dengue transmission as well as vector infestation rates and determinant factors of mosquito breeding sites fitted within the surveillance aims, considered for that reasons representative of the densely populated urban area of the municipality (Centro Habana has 3.5 km<sup>2</sup>, 152.534 inhabitants and population density of 43.581 hab/km<sup>2</sup>).

The data analysis used software previously developed and the experience accumulated in the Cotorro Project, which is a good example of applying resources and knowledge generated by an Ecohealth project into another. The usage of thematic maps with geographic representation of health and environmental situation in the study area is exceptional in the way in which the indicators could well be understood by community leaders and decision makers. This information was extensively used in training those who worked in house-to-house surveillance activities.

It is worth mentioning that the project's intervention and research designs, applying different methods of information gathering and analysis related to the three components cited above, were capable to support the implementation of an integrated surveillance system according to Ecohealth principles. Considering that, the study hypotheses represented a good combination of research and intervention relating health and environment. The first hypothesis, stating that "an integrated surveillance system can be implemented, and community mobilization to manage its ecosystem to prevent and control dengue can be achieved" was central to the entire project. It was related to the intervention part of it and was supported by the information gathering and analyzing activities proposed. The second one: "environmental factors, behavioral factors (including social and cultural influences) and economic factors are associated with the presence of foci of *Aedes aegypti* in Centro

Habana” was related to the case-control study carried by the project. The third one, linked to comparing features of the Cotorro and the Centro Habana projects, stating that “in spite of the differences between the ecosystems [of both projects’ areas], the strategy of control and prevention of dengue, based on an ecosystem health approach, is effective in both communities, when local adjustments are made” was connected to the third component of the research design. Comments on the results and outcomes are presented below.

#### Relevant Outcomes

Clinically detected Dengue is an important health problem in Cuba since early 40s. However, after little over one and half decade without it, autochthonous cases were detected in January 1997 in Santiago de Cuba when an epidemic affected 3.012 individuals with 12 deaths. It was from this point that new strategies applying environmental changes to control transmission of this disease begun to take place in the sense that Ecohealth turned later to be a central column. Between 1995 and 1999, when intervening to improve life and health quality in Cayo Hueso, Centro Habana, the municipality called the support of INHEM to produce scientific data that could guide those interventions. The Phase I of Ecohealth project (September, 98-99), developed with professionals of the University of Manitoba, Canada, helped to establish a framework to control dengue-related risk factors, which was of great assistance during the Havana epidemic occurred from January to April of 2002, supposedly the last one in the area. At least equally important was the experience accumulated during the Ecohealth Cotorro Project developed in an urban/rural area close to the municipality of La Habana, which was meant to serve as a comparison reference for the Phase II of Dengue Ecohealth Project.

Researchers described that insufficient sanitary education and inadequate behavior regarding preventive measures of the population played a significant role in maintaining dengue transmission risk, which was worsening by poor housing conditions (it was said that 70% of all houses in Centro Habana were considered of regular or bad condition) and deficiencies in sewage disposal and water public systems. The integrated surveillance system was able to change that at a certain point, where community participation increased the level of awareness about the association between environmental situation and health conditions and involvement of key institutions provided the means to implement the intervention strategies.

This surveillance system was also capable to provide information to identify indicators that can be used in selected areas where interventions have to be implemented, supporting the decision-making process and an active participation of residents in any urban area affected by vector-born transmissible diseases. Those indicators, identified as “environmental indicators” included a combination of household conditions and neighborhood environmental situation that showed high risk vector breeding sites and other risk determinants, entomological indicators, epidemiologic indicators related to

serologic data and case reporting, and a global “disease risk” indicator integrating entomological and epidemiological information. In addition, depicting all that data in local maps by city blocks (*Mapa de Manzanas*) by sub area (*Consejos Populares*) and for the entire study area at the municipality was an easily understandable way to show the situation to both community members and governmental officers. Besides all that, follow-up information to track environmental changes and to evaluate the effectiveness of the interventions was provided by the new surveillance system although this was only partially achieved to date.

The case-control study performed by the project to identify the most relevant factors associated to the presence of *Aedes aegypti* resulted in an interesting picture of socio-environmental and behavioral aspects of disease transmission. Most important factors were: “a perceived poor economic situation” (Odds Ratio - OR=2.95) and family members’ low educational level (OR=2.91), followed by crowded houses (5 or more family members) (OR=2.55). The presence of children or older people (OR=1.94 and 1.52, respectively), “a high proportion of economically inactive people” (OR=1.64) and “the use of spiritual flower vases” (OR=1.93) were some other significant factors. It was observed in the Final Report that confidence intervals on estimated OR values were not presented, although it was said that all these values were statistically significant.

This part of the research findings may certainly support designing and implementing intervention applying the Ecohealth framework, relating environmental changes to community participation to reduce risk of dengue transmission and the burden of that and other diseases over living and health conditions. Furthermore, it is relevant to note that these results validated the set of indicators selected by the surveillance system. It is also worth mentioning that the adopted research design using households as “cases” and their control counterparts is unusual for this type of epidemiologic study and by doing so it approximated the application of epidemiologic methods to Ecohealth approach to produce scientific evidences.

Poverty, poor housing conditions and some socio-cultural factors were the overall foremost factors revealed by the study. In this sense, community participation and information diffusion actions, as well as social policies to improve living standards, became particularly important in applying Ecohealth principles to control dengue in urban areas like Centro Habana. In fact, the knowledge-attitude-behavior analysis showed that achieving behavioral changes is possible, favoring community intervention directed to promote what was called “self-efficacy” of individuals at risk. That was also showed to be independent of people’s “risk perception”. In addition, factors related to deficiencies in water supply which lead to water storage in makeshift tanks at home and complaints about the attitude of health workers (*personal de la*

*campaña*), who were said not to be developing proper educational activities during house-to-house inspections were some other important outcomes.

Monitoring environmental and behavioral changes as related to dengue transmission control was fully achieved by applying the instruments and indicators of the integrated surveillance practices already described. In addition, involvement of political/governmental actors on deciding about possible alternatives, priorities and interventions was achieved. At political, healthcare and community levels the key actors participated as source of information and decision-making groups. However, there are no data on post-intervention survey that could help evaluating the impact of strategic actions carried out in the study area.

Achieving the objective of “early detection” of dengue epidemics was felt to be an important issue for governmental representatives, which revealed their views related to diminishing some political impact of disease occurrence trends. It shows the importance of working with decision-makers to make the Ecohealth approach more understandable to them.

The aspect of population exposure to insecticides was examined. Although it has been shown that levels were below international recommended values, researchers concluded that there is a potential harm due to the amount of insecticides commercially acquired by individuals to use at home which was considered difficult to control. In addition, the long term health effects of chronic exposure of the population to insecticides applied by dengue control agents have still to be evaluated. For pesticide application these are mixed with diesel, an additional potential health nuisance that deserves investigation.

The comparison between Cotorro and Centro Habana Projects regarding the results of Ecohealth principles applied to control dengue allowed some interesting conclusions. The fact that these two areas are different in many aspects of great importance to maintain risk of transmission and to facilitate vector breeding sites due to environmental characteristics made this comparison still more important, in view of the potential to apply the same intervention rationale to other affected urban areas. In Centro Habana, a lesser acceptance of the strategies was observed in the beginning, which may be related to socio-economic conditions and cultural aspects that are typical of densely populated urban areas. In both areas, the pre-existence of community groups and organizations was a decisive factor for the success of the projects.

Three other aspects are highlighted. The first was an extensive training of health personnel, researchers and students in both issues of Ecohealth approach to environmental changes that improve health conditions and on integrating surveillance practices to deal with an important public health problem in an urban area. The second one is related to the strengthening of research and operational capabilities of official institutions like IPK and INHEM and its

collaborative activities with WHO, Canadian Universities and other countries' research organizations. Those aspects are part of the capacity building potential of Ecohealth projects that was fully achieved in this case. And finally, the dissemination of project's methods and results through scientific literature is underway, expecting seven articles according to the Final Report, and some manuscripts and presentations at seminars were made, although it may be considered that in the second phase of this project there was less writing to date than in the first phase.

#### Final Remarks

The project demonstrated that achieving innovative dengue surveillance system and effective disease control through environmental changes and community participation was only possible by integrally adopting Ecohealth principles. In that sense, to search for selected information that supports decision-making processes and implementing actions that influenced the adoption of specific policies aimed at improving living and health conditions were elements exemplarily combined in this Project. The level of knowledge relating environmental conditions and health situation was increased by the project's outputs and outcomes.

However, despite the support of governmental representatives at municipal level, constraints of the general economic situation did not permit enough coverage and extension of environmental changes (housing conditions and water supply, for example) with greater impact on eliminating disease transmission. Continuity in applying the surveillance practices is a key factor to sustain or increase the level of modification achieved in dengue situation in the study area. In this regard, the involvement of municipal health services throughout the project's development and the participation of community groups politically empowered by information generated by the study open that possibility in the long run. National policies towards environmental changes that had positive impact over health situation in the context of vector transmissible disease were not made clear in the results presented.

It may be said that applying methods to generate data on economic impact of interventions would have added a new perspective to analysis and evaluation. Moreover, Ecohealth Outcome Mapping methodology was not applied. The adopted internal evaluation procedures promoted desirable changes in the project development, and allowed for adaptation to social and political contexts, but were not sufficiently powerful to provide for a continuous production, analysis and diffusion of data.

### **3.1.2. Ecuador Project. Human Health and Changes in Potato Production Technology in the Highland Ecuadorian (Andean) Agro-Ecosystem. Phase II**

One striking feature of the project history is the evolution of the relationship of the project team and institutional partners with the pesticide industry. The

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latter's economic power and influence are evident in their support of travel expenses of members of the Agriculture and Health Ministries to workshops and conferences, often organized or sponsored by the industry itself, logistic support to field activities of technicians and authorities at the provincial level. It appears that the project has increased the awareness of local authorities and technicians at different levels, and of other institutional partners such as INIAP and CIP itself, of the interest conflict associated to the partnership with the industry.

However, the industry has been very fast and efficient in incorporating the Ecohealth methods in activities directed at their own agenda, such as participatory, multi-stakeholder workshops to promote their products and demonstrate their "adequate use", including workshops aimed at schoolchildren, expected to transmit the message to their parents. The local industry representative, interviewed by telephone, even complained about the lack of interest of the project team to develop joint activities with them. This is ironically the only change introduced by project activities in the attitude of the industry, as the promotion of highly toxic products - such as carbofuran presented as such or under other "new" brand names - continues, and the protection equipments are still unavailable at local stores.

Different interviewed technicians commented on the difference in the pace at which the industry and official or research institutions adapt to changes and would like to see the institutions reacting faster.

The handling of intoxication cases and records by local health services has been improved, bills regulating the use of pesticides are in discussion at provincial level, different partnerships that are important for sustainability of the project objectives have been established, all this suggesting an increased political will at local level to recognize and address the pesticide problem. But the majority of local authorities interviewed mentioned the lack of echo and support to these efforts at central level. The contacts with authorities in Quito indeed revealed their limited concern on pesticide-related issues and their ambiguity concerning the role of the industry. The use of pesticides seems for them a fact of life and their abuse would be caused by ignorance and misuse. Health effects would be minimized by the robustness of the Andean farmers. These stereotyped and unproved assumptions are common in their speech.

This contrasts with the motivation boost the project brought to local partners in different institutions, enthusiastic about the efficiency of the Ecohealth approach and methods, and eloquent about their personal and professional improvement after being involved in activities with communities and professionals of other disciplines and institutions. These same partners express their concern about the continuity of the efforts and the fragility of the political and administrative setting, with its intrinsic discontinuity.

In this context, two important change promoters appear: on one hand the international institutions such as CIP, FAO, international ONGs and other, that have instruments to lobby on executive and legislative levels of member countries, and on the other the growing market pressure for clean and equitably produced food, that is felt both in foreign and local markets.

In the field of project direct beneficiaries the interviewed sample was small but suggests increased awareness, positive practice and attitude changes, such as reducing the amount of applied pesticides, specially the more toxic ones, incorporating IPM practices, being more careful in the storage of pesticides and handling of used containers, and last but not least, being more sceptic about the messages delivered by the industry agents. Technicians that have been in direct contact with different communities mentioned that it is the case of a few families in each village involved in the project. The impact of the project seems to have been limited by the lack of community sense and organization of the involved farmers, a factor mentioned by different actors that point out the difficulty to bring them to meetings and other project activities, their reluctance to share the new information with neighbours - seen as competitors - and even with their spouses. According to the project leader and project team, the farmers in this area see themselves as small entrepreneurs rather than as small farmers belonging to a community. This is expected to be less limiting in the regions where the project is presently working, characterized by the strong community sense and organization that prevails in traditional Andean communities.

However, gender and transdisciplinarity seem to have been the most challenging aspects of the project, due to the fact that the project leader is a woman and a medical doctor, working in an agronomic institution, were none of these categories are seen in key positions. In the field, the presence of women in the team was positive when approaching women farmers and children, but caused some initial resistance from the local technicians. CIP is possibly the institution that changed most as a result of its involvement in the project: it accepts nowadays the leadership of an important project by a woman and it has included the health dimension in its agenda, a first time in its history.

Relevant external factors that were negative to the project were the political and economic crisis, with downward potato price shifts and drastic personnel reductions in some Ministries, which was a limiting factor in the participation of local agronomists and health workers in the project activities. This also led farmers to decide not to plant potatoes, compromising the planned interventions and therefore the evaluation of their effects.

The issue of the balance between research and intervention produced some conflicts and anxiety in the team and in the communities. The relevance of data collection was not always clear to the farmers and to the agronomy and health technicians that considered that the problems were sufficiently evident. The



time and effort this data collection required was felt by these stakeholders as a burden, reducing their willingness to participate. This in turn caused some disappointment in research-oriented institutions such as INIAP.

Though some project members say that the balance between research and intervention favored the former, members of national ministries say that more lobbying should have been made at central decision levels – a task they would themselves possibly be more apt at – considering the budget and time limitations, the project managed very well in introducing and/or improving elements of the Ecohealth agenda in a very wide set of stakeholders and give them visibility in different settings including the local and national media. The scientific output was also good, so the project seems to have reached a good balance between research, intervention, institutional lobbying and diffusion. This diversity of fields of action by the project is clearly not casual but rather a choice that paid off: it required more effort, but it managed to introduce positive changes in all fields and contributed to a better diagnosis of the possibilities and limits behind the introduction of Ecohealth principles in the agenda of different stakeholders.

This project clearly illustrates the challenges in up-scaling the Ecohealth approach. The achieved changes are sustainable only if the approach is incorporated in policy-making and in the routine of local institutions. Many factors conspire against this here, such as the diversity of involved institutions and decision levels, their history of conflicts rather than collaboration and their sexist and top-down culture. Despite this, the project managed to include the health dimension in the agenda of agronomic institutions and vice-versa.

As the project is moving to other study areas, it would be interesting to evaluate, at some point(s) in the future, which impacts of the project are still visible and what is the status of the different local stakeholders that have been positively influenced by their participation in the project.

### **3.1.3. Goa Project. Environmental and Social Performance Indicators and Sustainability Markers in Minerals Development: Indicators of Health and Well-Being, Goa III**

#### **Introduction**

The Goa project begun its Phase III in early 2003 for a 36 month period, after completing two other phases supported by IDRC since 1997, and involving several other institutions along that time. For the present phase, it had as Project Leader Dr. Ligia Noronha during the first year and Ms. Shirin Cooper and Dr. P. V. Sridharan as Project Leaders during the second and third years, and was developed by a research team of The Energy and Resource Institute (TERI), located at Western Regional Centre in Goa (Third-Year Technical Report, April 2006).

The Project shows distinctive features that made it suitable for evaluating the application of Ecohealth principles within a research and intervention contexts, where mining activities affected rural/urban populations in different ways. Its complexity and the diversity of determinant elements of relationships between environmental situation and community's health and wellbeing, in addition to the long term duration of the developments of knowledge and practices in the same area presented some special contribution to the evaluation work. The evaluation of this project was based on the central question whether Ecohealth contributes to improve health and reduce wellbeing problems through a better understanding of their socio-ecological determinants.

#### Description of Field Work

The trip to Goa to visit the Project was carried out from May 22<sup>nd</sup> to May 26<sup>th</sup> 2006 by Consultant Eduardo Mota. Activities for that visit were well coordinated by Ms. Shirin Cooper, Research Associate, Project Leader and Co-principal Investigator. A complete list of Research Team Members is presented in a table at the end of this part. It shows the variety of backgrounds and responsibilities of those working in the project. Some of them were more directly involved with the evaluation work developed during the visit and in that case will be individually cited along the text of the interviews in another part of this Report.

The visit's work schedule was well fitted into the objectives of the evaluative tasks. During the first two days there were a series of presentations when all relevant aspects of the project's activities were reviewed and discussed with team members. It will be commented on the next section of this text. Following that, short trips to the study area were made in order to meet with community members and groups and to make *in loco* observations of mining operations, truck loads and ore transportation in village roads, of agricultural land situation, and of private and public health services. During those trips it was possible to take a fair look of the general socio-economic situation and relevant cultural aspects of settlements and villages, and to talk to people living and working in the study area. Representatives of governmental institutions, non-governmental associations and mining industry were interviewed in their offices. The last day was reserved for comments and feedback to research team about the observations made during the visit and to discuss some relevant issues concerning data analysis and future perspectives for research and interventions.

It is worth mentioning the excellent level of collaboration of research team members who talked openly about all matters related to their work and to this evaluation. All discussions and interviews represented special moments for thinking together about achievements and results already registered and on constraints faced during the course of the project, trying to find solutions and developments for future work. In that sense, the visit was a very rich learning experience, when it was possible to know better about the relationships between environmental conditions and wellbeing in the context of socio-

economic determinants of population's living conditions and the characteristics of their living area, exchanging views and opinions that contributed to this evaluation.

#### Comments on Presentations and Research Group Discussions

Positive attitudes of all research team members towards free discussions and opinions about their work and results of the project were noted throughout the meetings and presentations at TERI. It was observed that they deeply valued in high level every aspect of the project and were committed with the knowledge and principles related to promote population's work and living conditions by improving socio-environmental conditions. They also appreciated working together and demonstrated an integrated view of their efforts. During the meetings all members of the research team participated, including the project leader, which revealed a sense of equal participation within this group. Those aspects can be counted as decisive elements of success in developing the objectives of the Goa Mining Project. Comments on some presentations made on different aspects of the project are registered below according to every one of its central subjects.

The study area is located in the central region of Goa State and extends across three sub-districts (*Talukas*) of Bicholim, Sattari and Sanguem, corresponding respectively to study Clusters I, II<sup>2</sup> and III (divided according to the age of mining). The area represents 18% of total land and 10% of the province's population. Ore mining in this region started in the late 40s and companies are privately owned.

The point that Phase III was built over achievements and results observed in phases I and II was clearly made during the presentations. It gave a sense that despite all characteristics of those phases there was a continuum along their periods of development, according to what was observed in terms of the intensive use of accumulated experience and the application of methods and practices developed earlier. This phase focused on research data analysis, in improving and refining the tools developed in previous phase, in capacity building and dissemination of results. Those themes were developed in relation to some categories of impact on population health and wellbeing: 1) issues that constrained "their ability to do or be", included the increased morbidity associated to poor air quality, reduced opportunities for women and "slow responses to problems that could have much quicker solutions"; 2) issues related to policy choices to improve health systems and environmental quality at mining regions, included the metal uptake in fruits, the systems of compensation for land waste, health situation and governance relationships.

A remarkable aspect was the registered trends of mining participation in the local economy. From 1971 to 1991, the mining sector experienced a decrease in its share of total income, from 54.9% to 14.5%, in the mining belt area. In the

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<sup>2</sup> Cluster II is composed of villages from Bicholim and Sattari Talukas.

same period, other activities related to secondary and tertiary economic sectors had shares varying from 12.9% to nearly 27% and agriculture remained with roughly the same figures (23.6% and 25.9%, respectively). Those changes pointed to different economic perspectives of mining in the future, although local economy and population income are still strongly dependent of that activity.

Environmental impacts of mining are related with land *siltation* (silt deposits on agricultural land and water bodies) and periodic flooding which are aggravated by poor dump management in the circumstance of heavy monsoons. Another impact is the progressive decline in availability of groundwater (wells go dry) by reduction of water table levels and less water for household use. It was noted that the burden of those environmental changes is greater on women and on those families depending on public taps and on other sources for water, which are somewhat irregular, creating also a feeling of dependency and insecurity.

Dumping sites and siltation also provoked a decrease in agricultural land area and on crop yields. This was shown to have an effect on cessation of agricultural activities and loss of livelihoods and other assets, resulting in poverty and higher social tension. Monetary compensation of land owners made by mining companies created a culture of paid inactivity and exposed the community to political manipulations. In addition, transportation of ore by overloaded uncovered trucks creates a continuous ambience of heavy dust pollution in the villages which along with vehicular emissions cause health problems, tensions within community members (in fact, some village residents are truck drivers) and negative environmental impact on fruit and vegetable crops at resident areas. Lack of information and an information asymmetry between mining companies and communities impair social organization to find solutions and to make companies and truck contractors responsible for that situation. Corruption, governmental inaction and lack of effective regulatory and law enforcement actions perpetuate the described situation.

The issue of governance was specially discussed during the presentations, particularly because it was possible to look at some project's action related with influencing decision making processes to mitigate the environmental impact of mining activities.

By applying methods of interviews, focus group discussions and surveys the issue of governance related to air quality, water supply and health care was studied. A survey was carried out for a systematic sample of 442 households (8,326 inhabitants – 5.3% of the total population) of all three clusters and road corridors. Qualitative data obtained through interviews made with stakeholders, public and private, and with community leaders and workers were fed into analysis of survey data.

In that sense, the so called “water case” was studied in depth to examine the issues of governance and possible interventions. This turned to be a good “case” for examining the issue of decision making in the area and the role of all related socio-political actors in order to design and to implement actions. This case involved family wellbeing and was directed related to environmental impact of mining activities. Moreover, it helped to build a framework to approach the determinants relating environment and health/wellbeing, to produce information that made possible to develop qualify interactions with government and companies and to promote community participation and empowerment.

It was shown that availability of tap water provided by the state government varied with season; and that tanker supply made available by companies (in some places the only source of water) is not tested for its quality and is not a sustainable solution. In fact the survey showed that in addition to reducing the possibility of communities to negotiate sustainable solutions for water availability it created dependency of villagers to companies.

The project was able to show however that among those having water problems some 76% reported to have approached companies and or government to complain about it. In addition, the project was called to meetings between population groups and governmental representatives, an opportunity when information generated by the analysis gave support for settling issues in favor of changes and new policies although with some limitations. In fact, it was said that the lack of action of the Water Resources Department that only responded when hard-pressed by community made it difficult to advance in applying information into public policies and new regulations. It is worth mentioning that during interview with an Officer at Goa State Pollution Control Board it was clear that the project has achieved some changes of attention to problems among lower levels sectors of governmental decision processes and that empowering those officers with qualified information became the best strategy to overcome the immobility of the official departments. It can also be said that through group meetings, particularly women’s groups, discussions about issues of water availability and the information produced by the project helped villagers to direct their complaints to mining companies and governmental representatives.

The health effect of environmental pollution caused by dust dispersed by truck loads (trucks transporting ore are counted up to 9000) was specially discussed. Respiratory health data are still being analyzed and in this regard the relatively low frequency of some chronic respiratory diseases and the long term exposure that are necessary to result in a measurable effect represent some difficulties. Health surveys, secondary data analysis and air quality monitoring were performed to generate data and it is outstanding that an economic model was designed to link air pollution, health effects and economic impact. This later one is a subject less studied in the context of environment and health. It is

notable that in the level of analysis already achieved (Third Annual Report, April 2006) describing the effect of exposure to air pollution on the frequency of upper and lower respiratory tract illnesses, it was possible to establish, among other features, that reporting of upper respiratory illnesses was highest among those aged 60 year and older and among children (under 15 years old), that there was a pattern linking distance from the road and health problems and that more exposure to air pollution resulted in more sick days due to respiratory diseases.

The project realized that the degree of political pressure exercised by population groups would be essential to provoke changes and mainly to make regulatory agents to enforce the law that could reduce air pollution. However, it became also clear that poverty in the study area and dependence of villagers from employment in the mining companies represented an enormous limitation to political action. A series of problems were found when working with communities on those aspects: lack of unity among residents, lack of effective political leadership among villagers, limited understanding of information, complaints and protests that had only localized impact (and sometimes resulted in job offers to those who complained), intimidation by mining companies and absence of strong local-level institutions. In fact, it was also demonstrated that while 57.5% of those who did not have mining-related jobs complained about air pollution, only 50.0% of those who had mining jobs complained. Overall data also showed that for those having air quality problems 53.6% made complains, mostly to Panchayats and mining companies. This is not a small proportion considering the complexity of the context and the difficulties to promote people awareness and action on this matter as described.

Studies performed with secondary health data and on characteristics of health care system revealed some other striking figures. The quality of health data is generally poor and that certainly reflects the absence of systematic application of health data into decision-making and intervention by government. The health care system shows little or no recognition (better saying, concern) for linking environmental situation and associated health effects. This is amazing, because during interviews made by the consultant with local physicians in different settings, they amply recognized the relatively high frequency of respiratory problems and the epidemiologic links between poor health conditions and mining activities in the area. In other hand, the researchers noted a lack of state health policies that addressed the issues described, including the considerations about the special situation of the mining area as related to health and well being effects of environmental damage. The project drew a set of recommendations based on all the work done on this issue that was fully presented but, actually, changes in the situation will certainly take time and additional resources.

Some of the planned research components in Phase III were difficult to carry out as a result of serious limitations and in that sense were not fully or successfully completed. An example of that was the study on metal uptake in

fruit crops. It faced a limitation due to few fruit trees found on dump sites, barren dump sites and of restricted access to re-vegetation areas. Despite of that, significant uptake of some metals (cashews in relation to iron, manganese, nickel and chromium) was revealed. These results were presented and discussed and specific recommendations were made.

#### Final Remarks

The amount, diversity and high quality of data produced by Phase III of the Goa Project is remarkable. This alone would meet one of the requisites to evaluate positively the achievements, namely its capacity to generate information about the relationships connecting environment and health/well-being. It also reveals that Ecohealth approach to research questions, such as the ones set for a mining region affecting villages and agricultural area, was effective in pointing to relevant aspects of the problems.

In spite of the fact that some socio-economic determinants of health effects of exposure to air pollution were examined (income, education and migrant status were included in survey analysis), aspects of social inequalities related to cultural/religious aspects of the population were not thoroughly approached yet, possibly due to the complex nature of society in India. In addition, due to the extent and socio-economic-political interlinks of mining activities within the context of state and the country, apart from its local effects in Goa, the project did not show any general environmental changes that had a greater impact on villagers' wellbeing. It indicates that higher expectations for seeking those changes in a relatively limited amount of time could be turned, by contrast, into expecting more localized, restricted, transitory or even partial changes that would accumulate, one at a time, and thus strategically gaining terrain on the way to reach sustainable transformation of reality. For that, the participatory approach adopted by the project and the way it used information to empower community members and leaders may lead to effective interventions in the future.

Interventions and actions to promote changes that would have a positive impact in the situation described may be centered in this case around community participation and organization. The project described this part as capacity building. An intense activity was developed using workshops to publicize information and simple measures that could help improving sanitation, hygiene, nutrition and to prevent exposure to air pollution. Working with local farmers associations made also possible to discuss problems related with land recovering and use and to design plans that were later recognized by mining companies. We emphasize the work done with women's groups, which was observed during the consultant's visit to the area, revealing the effectiveness of the actions implemented by the project. Workshops with elected representatives and Panchayat members are a promising activity directed towards exploring gender issues and strengthening their political action. Besides that, diffusion of

results of the investigations throughout several public presentations and publications helped applying information to change.

Diversity in professional backgrounds and integration among the research team members are exceptional characteristics of the Goa Project. In that sense, involving expertise from TERI and other institutions by bringing together professionals of different fields of knowledge who could help dealing with designing and implementing research and intervention revealed not only leadership abilities of principal investigators but the value placed in Ecohealth principles by the entire project team. One element that was not clear to this evaluation refers to the extent in which TERI as an organization became more deeply involved by providing opportunities at institutional level to induce changes in the area. The organization is national and complex, and has several fields of interest at its central office in Delhi, and for that reason it may have found difficult to act at state level politics, although it was said to be supportive in every instance of the project and researchers' activities. It was also noted that the expertise build up in the project is applied in other TERI's projects. Presentations of project's developments and results were made at the central office and some professionals from there worked during some time at the Goa regional office with the Ecohealth project team.

The potential for scaling up the methods and practices established by this project is excellent. Wherever open mining activities affect land use and resources, and associated dust pollution causes health problems, the rationale and framework developed can be applied to expand knowledge about risk factors, social determinants and associations between environment and health.

#### **3.1.4. Malawi Project. Soils, Food and Healthy Communities: A Participatory Agro-ecosystem Approach to Monitoring Change in Northern Malawi**

This project presents many striking features.

The first is its evident success in achieving its goals of increasing soil fertility and reduce child malnutrition by introducing legume options and new agriculture practices. Both achievements are documented through hard indicators and are the subject of different project publications. Both are also clearly perceived by the numerous interviewed farmers from different villages that express in various ways their gratitude for this hunger relief and its multitude of positive side effects. The very integrated approach and intensive and continued presence in the field, the combined use of agronomic techniques (promotion of new species, intercropping, crop residue burial, seed banks), socio-anthropological work (demonstration and discussion of recipes with the new legumes, discussion of roles in the household) and healthcare, all carried out in a strongly participatory way, were very effective in changing practices, perceptions and attitudes and increasing well being, health and sustainability in tens of villages.



The project triggered a virtuous cycle, as the increase in soil fertility and crop yield had a number of positive consequences, on health, income, and household dynamics. Women spend less time walking to get firewood, men spend more time at home as they no longer migrate to get food, work or money elsewhere during famine, surplus are sold and the income helps paying school fees, and togetherness is the word repeated by many respondents when asked about the positive effects of the project at the family level. “No food, no peace”; “I have no peace if I have food and my neighbour doesn’t”; “No hunger, no quarrel”, “God comes through people, and it did through the project”, are some of the expressions used by the respondents.

The same word togetherness returns when respondents comment on the changes at community level, as most recognize a reduction of hostility within and among communities as a result of the different collective activities – farmer schools, recipe days, field days, workshops - that gather people from different villages that had otherwise had little or no previous contact.

The level of acceptance of the new crops and corresponding new practices and recipes by the project communities is very high. Mucuma is mentioned as an important item, but soya seems to have been a little revolution in the kitchens, due to its multitude of possible products and preparations (soya pieces, soya milk, soya coffee, soya cake) and most respondent are very fond of one or more of them. The same goes for the preparation of sweet potato and cassava leaves that used to be discarded and are now food items. The evaluator had the opportunity to eat at two different village meetings: the meals had a high variety of items, were indeed delicious and in addition, safe, as no digestive trouble ensued.

The sustainability of the mentioned changes seems very high as most respondents say they are able and willing to train other families or communities in the new practices. Many of the respondents say they would do it by their own will, without any payment, others mention that logistics could be an obstacle. They expressed their appreciation and pleasure for the visits and the training done so far and they would like both to continue. They would also maintain the community seed bank, should the project phase out.

An element of this success is the highly motivated and well structured team: everybody has more than one task and responded clearly on and for the project, unpaid overtime is frequent if not routine, the project leader and project coordinator both go to the field with their breast-feeding babies and everybody seems quite happy with that. This is well illustrated by Mr. Zimba, one of the interviewed project team members: The project was very positive for me because it empowers people, I enjoyed chatting with people and I feel I had a clear professional progress, and learned how to facilitate instead of just training. When I was working in the government, I would work only a few hours a week like everybody else in this type of job and now I work a lot

everyday, doing overtime and still enjoying it a lot. I did not know of projects that could change people's lives so much, and that's why it is so motivating.

Another success element is the staff of the Ekwendeni Hospital, the institution where the project is hosted, that seems also highly motivated and disciplined in its different activities.

Ekwendeni being is a small town, far away from the capital, little infrastructure is present and a good share of it including the hospital is supported by the Presbyterian Church. Stakeholders such as agriculture or health ministries, municipality or regional authorities, universities or research centers seem to have little or no presence in the project area. This lead to a simplification of the project institutional setting that has many advantages, such as more stability and control, but at the cost of assuming a burden that would normally be shared (or disputed) by many different actors. Again this was and is possible due to the high output and motivation of the project team.

Many attempts were made by the project leaders to mend this partner scarcity but the experiences with national universities were frustrating as approached researchers saw the project as a profit rather than a collaboration or self-improvement opportunity, or imposed unrealistic conditions to participate.

Officials of agriculture institutions visited the project villages and were enthusiastic about its achievements but their only practical response later on was to design folders.

This project is not very flattering for public authorities in general as these would most probably use big staffs and long timelines to do less than done here by a small hardworking team, using a low-tech approach<sup>3</sup> that was highly efficient because it was promoted with motivation, empathy and continuity.

This is therefore a very good example to be followed elsewhere but also reveals the challenge of turning the Ecohealth approach into public policies, especially when public authorities are not even present. Ironically, some conditions, such as the direct and continued contact of the project team with the communities, were wished by the project team, were very positive to the success of the project interventions, but were also due to the institutional vacuum in the project area and the scarcity of partners. The project had no opportunity to be victimized by the conflicts, delays and other shortfalls that are common when working with different official institutions but on the other hand if the project phases out or moves elsewhere, a regression in its achievements is expected, as its continuation will be in charge of the farmer communities alone. These communities are motivated to continue using the new crops, recipes and practices, but are limited in resources and this would limit the diffusion and expansion of the project message. The seed varieties tailored by ICRISAT are

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<sup>3</sup> Excepting the seed varieties tailored by ICRISAT

bought by the project and were essential to its success. Of course the idea is that farmers get self-sufficient by reserving a share of seeds for the next season but seed multiplication rates, variable from crop to crop, are a limiting factor for the expansion of the project approach to new areas. Therefore, the project is now a kind of prisoner of its own success, as it has no funds to meet the demand of a continuously growing number of farmers that want to enrol in the farmer research teams and obtain seeds, as their initial scepticism was efficiently reversed by the evident improvements in health and wealth they can see in the life of the villages that enrolled in the project activities.

Some external factors helped the project development. The political and economic stability allowed to keep a constant seed price (in U\$ currency) and the strong community structure of the farmer villages was favorable for the development of the research and intervention.

### 3.2. Notes on Interviews

#### **Goa Project – Environmental and Social Performance Indicators and Sustainability Markers in Minerals Development: Indicators of Health and Well-Being, Goa III**

Interviews, group presentations, focus group meetings and discussions were carried out from May 22<sup>nd</sup> to May 26<sup>th</sup>, 2006, in Goa, India. Activities were coordinated by the Project Leader and Co-principal Investigator and counted on the participation of the entire research team at The Energy and Resource Institute (TERI), Western Regional Centre in Goa.

#### **Meeting with Project Leader and Research Team Members**

Are there any new questions/issues that have emerged during the course of the research that may or may not be addressed in the project?

*It is not that some aspects were “not addressed” but there are important issues still being evaluated, such as the pressure for jobs, mostly in the mines and for both young and older people. There is also a strong feeling of remaining in the area, that is, not to move out. Young people are not much committed about agriculture but do not get jobs.*

Are there facts in the recent project development, relevant to this evaluation, that are not reflected in the project documentation (proposal, reports etc.) made available to IDRC?

*No. The annual report was just finished.*

*There are lessons learned in the course of the project, like trying to be unbiased, that is, to be open but with an opinion, compromised. Some other general observations were: To have patience, especially when working with the community because expectations may be high in the beginning. Capacity building takes a lot of time and they feel that they just began. Transdisciplinarity is an issue that can not be approached through one angle; it is viewed both in terms of working together and to count on a mix background.*

*Stability and permanence, meaning to have the same team and to keep memory and a sense of evolution.*

*Participation – there are many different ways to deal with that. It is necessary to have supportive data to help people; health impact is difficult mostly because of the low frequency of respiratory disease.*

*Health data – chronic respiratory diseases are low frequency, chronic conditions presented at different stages. Option of looking into secondary data to direct the health surveys. Measuring the amount of exposure by specific population groups.*

When and how often the Ecohealth outcome mapping methodology was applied?

*Outcome mapping was not applied.*

What factors helped / were negative to the development or success of the project?

*Dissemination of information to people and to stakeholders; meeting/involving people living in the community. Related to IDRC's practices it was signaled: short duration of the project – not enough time to achieve results related to changes; being open to the projects, understanding that the “definitions” should come out of the project; giving more feedback to the reports.*

What positive/negative changes the project has introduced in your own behavior, relationships, activities, actions or attitudes?

*To become open to new ideas; different people working in a team instead of working isolated; a balanced approach to the problems; learning how to handle companies' dialogue in order to change policies; learning how to translate information to society; adding new perspectives to the learning process; getting more conscious about possible changes.*

What, if any, was the biggest unresolved issue in the project?

*The analysis of health data. There are doubts about interpretation, meaning that only now we start to have a clearer picture of the situation.*

If the project was a living creature, which one would it be, and why?

*There were different answers to this question: chameleon - change, adaptation, evolution; elephant – huge project, slow but wise; fox – smart, calm and goes up to what it needs; eagle – looking from above... to a broader level and higher perspective.*

Free comments:

*Health impact - studying health impacts due to high air pollution (high RSPM) for epidemiological analysis requires a very large sample size. For this study the sample was drawn from across the region and not only in the most polluted areas. Yet, secondary data is incomplete and presents only a partial view.*

*Duration of the project - the project duration was fine from a research perspective but a first step in terms of capacity building.*

*Related to get more feedback to the reports. It would be a good idea to clarify what factors helped and what factors were negative.*

### **Consultation to Project's Partners**

**Interview with a medical doctor, from Curchorem**, who has helped the project with some medical aspects of the respiratory diseases in the study area. It happened just after lunch time on May 23<sup>rd</sup> 2006 at TERI.

*The project has focused its attention to the effect of air pollution on respiratory tract. There are cases of pneumoconiosis – occupational lung disease in the*

*study area. In addition, some people migrate to the area, most illiterate, and it also determines the occurrence of tuberculosis (10 new cases per month). He sees in perspective the need for a clinic specialized in respiratory diseases. He feels that contractors (truck owners) do not live in the area and are not aware of the health effects. There is a chain of events and everybody blames the other for the effects.*

**Interview with a medical doctor at Sarvona Hospital, Bicholim, on May 24<sup>th</sup> 2006.** The interview was performed during a visit to the hospital, located in Cluster II, rural area. This is a private 20 bed-hospital, counting on 6 doctors and is open 24 hours and performs all basic types of exams including x-rays and others.

*Most common health problems in the area are related to dust from mining activities – respiratory affections are more common than asthma, tuberculosis labor health problems, drinking, and vehicle accidents. Pneumoconiosis is less common now probably due to medical services of the mining industries. Children are more exposed to environmental problems, suffering allergic diseases, asthma and bronchitis.*

*General comments – Goa has a relatively small population and “good” infrastructure. It was signaled that the higher the educational level, the less the adherence to treatment and medical recommendations. Traditional (Ayuverdic) medicine is deeply rooted and patients combine both regular treatments with religion. He made reference to the poor socioeconomic situation and the interference of local politicians.*

**Comments:**

According to the PI, present at that visit, this is the only private hospital in the Cluster II area and she recognizes that it is good for the people. She referred that private hospitals do not report data on diseases but public health centres do.

Later a Public Health Centre at Bicholim Taluka was visited. It is fairly large, capable of seeing 300 patients per day, counting on four doctors and delivering in-bed, outpatient care and preventive actions. Some 20 different public health programs are offered, the family planning being the biggest one.

**Consultation to Project’s Partners (NGO)**

**Interview with officials of the Goa Mineral Ore Exporters Association, on May 24<sup>th</sup> 2006 at their office and with an Officer of the Mineral Foundation of Goa,** two organizations that congregate mining companies in the study area

*It was stated that project’s activities increased general people’s awareness about the impact of mining activities to health and environmental conditions. Being a third party, like a liberal body, the project is more open to all groups. It also helped to solve problems, talking friendly and helpfulness to mining*

*representatives and villagers. Mining groups are doing their practices for many years but lately the political pressure increased. Silt is building up in the crop fields; compensation was settled but it does not remove the silt... it spoils the farmers. There is illegal land usage that farmers do not want to change but it is now tending to change in the area.*

*It was recognized that there is a problem of water shortage. They said that farmers are more open to discuss that but what are their real intentions? What they want? Jobs? Mining companies want to build confidence and people do not want to change the land and their place. There is a generation gap – there are differences in expectations between young and older people. There is poverty in Goa and needs for jobs are pressing and government is indifferent to that.*

*Politicians do not want to solve the problems – only during election times they show some interest. Important! They know about the problem!*

*Of all partnership we established government is the weaker part in terms of regulatory and other effective action. The project is somewhat neutral on dealing with all parties and it was said that the project should go deeper in order to promote changes. Expectations are high and it is time to know what each party is able to give. “If public perception changes then government will change.”*

*The Associations are expected to run a survey about the problem, including the economic aspects, maybe in June, 2006, with 100% coverage.*

#### Comments:

According to the PI, these Foundations are now turning to TERI for help. She felt they keep a balanced and fair approach to the problems. Trustful and open relationships were built now that they are seriously looking for more information. It is expected that Minerals Foundation will become more proactive in the future. They feel more responsible now for companies' activities and are contributing to disseminate information.

It is noteworthy that Mineral Foundation of Goa's "mission statement" written in a brochure handled during the visit (Annual Report, 2004-2005), reads: "To promote Social Investment programmes through capacity building of the stakeholders, participatory decision making; support efforts underway and to pool together activities to improve the natural environment for Sustainable Development in the mining belt of Goa...". This NGO represents 10 companies, including SESA Goa Ltd.

#### **Meeting with Community Members**

**Focus meeting with 11 women at local village school. The Satteri Self Help Group at Band/Dhat Wada, Village unit of Pissurlem in Sattari Taluka (Cluster II)**

*This is a Women's Group that completed 2 years now. In September 2003 TERI asked people in this area to get together to form a community group. Before that there was not a program to form leadership. The objective was to empower women seen before as shy and turning now to speak out about their needs and concerns.*

*Collectively they can be listened and have force. Although they have different views they can figure out better the situation and solutions.*

*Main problems raised were: they don't have toilets at home; dust pollution causes troubles; in one village there is a crack in the terrain (due to erosion) and the mining company is asking the families to move out.*

*They did not expect any specific thing from the project but wished researchers could teach religious songs to their children. They declared that information made available by the project is supportive of their action, helping them to move forward.*

*There are times when the group went to the mining management to settle positively their needs like obtaining fiber and wood for fire, for example. They said that companies' doctors became more sensitive to their health problems.*

*There are some controversies. Until recently they did not approach the Panchayat (elected village and district government). Some think they do not solve their problems but others believe that Panchayat did not know enough about population problems.*

*About public health services they said that people have to wait long time to be seen. Some times they go to private services which are less time consuming and are closer to their houses. Individual problems are seen in general by a private doctor at a cost of \$1.00 per visit. In public hospital "the cure takes longer time" however, they have the perception that the public service is good: that is the reason that for obtaining exams and for more serious health problem, they prefer the public clinic, although the "low staff" has an angry behavior with villagers.*

*Gender issues were freely discussed. They said that couples are now sharing information related to mining activities and associated problems which did not happen before, talking to each other about the group's activities. Their husbands now say "do what you thing is good to our family, just don't bring disgrace to us." As time goes by their husbands became more understanding about their activities. They are thinking of having a joint meeting – men and women, to discuss the village's problems.*

*In short, when some women came they were not as confident but it changed. They said they don't want monetary help but empowering and support.*

#### Comments:

According to the Researcher, present at that meeting "one can not say it is enough" about what is happening there. She feels there could be more groups but distance and time available for night meetings are factors holding up the formation of more groups. Considering the importance of community participation for this project, time of researchers is short to deal with that. She thinks that someone living in the area only to dedicate to community



participation could do better. She noted that in the beginning there were some expectations from villagers that the project would “give” something like money but it changed with time.

### **Consultation to Government Officers**

#### **Interview with a Deputy Collector, Bicholim Taluka**

*Considered that Mining companies are doing well; contractors otherwise do not follow the rules. There are a lot of complaints from villagers about dust spilled by trucks. Government is responding.*

*Mining activities got more intense in past years but tourism and other industries are growing, diminishing the dependency to mining. Overall economic situation improved lately. Migration and temporary workers are a problem.*

*The companies are taking measures to decrease the impact of mining over agriculture but still there is a lot to be done.*

*The TERI's project is helping a lot. It is bringing everybody together to discuss the issues. He expects the project to produce information on water management for mine pits and to the use of water for drinking and irrigation. In fact, Ms. Cooper informed about work done that resulted in a set of guidelines for pit usage and management.*

#### **Comments:**

It became clear from that visit that local government representatives tried to excuse the mining companies from the impact of their activities over environment and population health condition, blaming the truck loads of ore and the contractors all the damage, mostly because this effect provoked people's complaints. The project has worked to bring together this and other governmental officers to discuss the problems with population groups with a certain degree of success.

According to Researchers, The Collector is more informed now and more cooperative, opened to a lot of ideas brought by the project. He is not, however, pro-active in dealing with the problems.

#### **Interview with an Officer at Goa State Pollution Control Board**

*He emphasized the growth of mining activities over the past 3 to 4 years.*

*For that, producing information on health impact of mining became very important.*

*The Office recently set new standards and a recent meeting held in Deli (it is expected to have another one in Goa) dealt with regulatory measures.*

*Some things can be made in terms of the capacity of government to enforce the law.*

*Since 3 to 4 years ago the community members became more aware of the problems.*

*It was commented that the Project can help on the issue of agriculture, making it economically viable (talking on interventions delivery by the project). Training people, training truck drivers to reduce vehicle accidents and other measures. Talking to children to educate for the future.*

**Comments:**

In discussing the interview with Researchers it seemed that the Officer is free to talk (not defensive) on the subjects that matter. The Pollution Control Board could have taken a proactive role but it is changing. Government officers at lower levels find that when there is support, as it happens with project's action and information is passed by, it empowers them to some extent for intervention. A public hearing held a year before changed the ways government are becoming more effective.

**Consultation to a Mining Company Representative**

Visit to SESA Goa Mining Company which is said to be "the largest private sector exporter of iron ore in the country". **Interview with an Environmental Officer**, at his office, on May 24<sup>th</sup> 2006.

He started the meeting by saying: "Good job, young ladies!" in reference to two Researchers who were present at the moment.

*The company is doing different from other companies ("although it does some erratic").*

*He said that information and suggestions gathered on how to do concrete interaction triggered the company's "time to a joint effort" some five years ago.*

*The project is acted as an independent party.*

*Empowering, technical skills, health improvement and dealing with environmental impact became priorities.*

*Highlights: 1) the land issue is the most difficult part; 2) jobs needed – more money; 3) road transportation of ore – relates to environmental impact that is transferred along the roads to the communities. In that sense, truck overload is the company responsibility and it has to be blamed on that and road conditions are government's responsibility.*

*The company will start a project (thought about 15 years ago) on building a new road (made by SESA) in the next two years that will diminish the impact of ore transportation dust. Another project with conveyor and train is underway and will complement the other one.*

*Farmers and villagers are more aware of the problems. At village level, some residents own trucks and some not and they have different views about the problems and solutions. It is a matter of talking to people and it takes some time to solve.*

*At SESA, company's policies have not changed. Environmental investments are costly as any other but expenditures come along with benefits to the community.*

*The company is influencing other companies' policies through participation at the Foundation (Mineral Foundation of Goa). SESA has its environmental officer since 1991 and now three other companies have it.*

*The economic context is changing. The demand for ore exportation is increasing but its participation in region's economy decreased from 43% in 1973 to 15-16% now.*

Comments:

According to discussion with Researchers, SESA is setting some positive standards. There is the expectation that they will come out with some solutions as far as it is profitable. Despite their involvement in finding solutions they could do better, allowing for more interaction and meeting with community members and other companies representatives.

## **Cuba Project - Applying an Ecosystem Approach to the Sustainable Prevention and Control Dengue in Centro Habana, Cuba II**

Meetings were carried on February 8<sup>th</sup> and 9<sup>th</sup> 2006, in Antigua, Guatemala, with Researchers.

What kind of strategies and tools are used to identify key elements regarding the links between the environment (bio-physical domain) and human health *within* the ecosystem?

*The perception that it was necessary to include the environmental factors in the project.*

How did this lead to the integration of transdisciplinarity in the team?

*The inclusion in the research team of professionals of geography and statistics.*

Do the project's partnerships include the key-individuals and organizations representatives that may influence development-related changes? (List: names and organizations).

*Yes, but representatives do not deal with the related socioeconomic problems.*

Besides the indicators already monitored in your project, would you suggest other suitable indicators of changes in environment and health situation, which could be useful in this evaluation and coherent with its time frame? If positive, how have these indicators been developed or identified? Are these indicators available?

*Data analysis may indicate the need of other indicators, like "integration" (relating entomological and epidemiological information, for example), or the ones related to changes in behavior and attitudes.*

Are there facts in the recent project development, relevant to this evaluation, that are not reflected in the project documentation (proposal, reports, etc.) made available to IDRC?

*Some results observed more recently were shown in the presentations made during the Antigua Seminar and are described elsewhere in this Report.*

How much of the project objectives you think has been attained?

*All objectives were attained except the comparison of some results between Cotorro and Centro Habana areas, in view of the non conclusion of the data analysis.*

What factors helped / were negative to the development or success of the project?

*If the Cotorro Project was developed at a more adequate time it would be better for the Centro Habana Project (the original idea was that there would be one year between the projects). The "time factor" in this case acted as a*

*negative aspect. The political will, both at provincial/local level and at the Ministry of Public Health level, was the most important positive factor. The support of the municipality was especially important.*

What were the actions of the project that were more effective and should be continued?

*The community participation into the surveillance system was the most effective project action.*

What has not been done so well or could be improved or abandoned for requiring too much effort or resources to succeed?

*The task of studying the effect of insecticides is very costly. However, there was transference of technology and there is a potential to monitor it at any time.*

The project involves people of different professions, working together and with the community in developing new tools and solutions. Give some example of how positive/negative this was for the project (option: do you agree? Give an example to illustrate your answer).

*It is not easy to integrate. It depends on the understanding that everyone assumes his/her role. There must be respect between the disciplines. However, "it is not easy to work with physicians" although it does not represent a difficulty. "Everybody needs everybody" was a learned lesson that constituted a project's result. The ethical issue is very important.*

The project takes into account the different roles of men and women in task division and decision making. Give some example of how positive/negative this was for the project.

*Not applicable. There were no tensions between different roles of men and women.*

The project tries to consider the voices of all sectors and groups involved in the project issue and to increase the capacity of local communities and institutions to deal with this issue?

*The project directed its action to empower the population. There is a democratic environment in which all segments have voice.*

What external factors (climatic events, political / economical changes at regional or national level) were positive /negative to the project?

*There were three hurricanes within the time frame of the project. There were flooded areas that made it very difficult to run the project. For that reasons there was the need for adjustments.*

What positive/negative changes the project has introduced in your own behavior, relationships, activities, actions or attitudes and in your partners, project beneficiaries, local and/or regional/national decision makers?

*To work in a research institution and the project made it possible to interact with the population increasing its level of compromise and motivation to work; Being a service worker he feels like a researcher too, advancing his knowledge;*

*Exchanging knowledge and acquiring new knowledge interacting with the population are highlights; to see how those house-to-house workers do their jobs was motivating;*

*Self capacitating was the most important personal gain. He amplified his vision from biological to a more broad view. He feels some perplexity considering the socioeconomic difficulties of the population.*

Do the involved stakeholders have, and use, the appropriate tools, skills and knowledge to monitor the outcomes related to sustainable health and well-being?

*The stakeholders participated in the evolution of the project. The institutions followed it and had a good knowledge of the situation of the project at every phase.*

What, if any, was the biggest unresolved issue in the project?

*The unresolved socioeconomic question, meaning the lack of resources to deal with the environmental improvements. There is a need to include the questions of cost-benefit and cost-effect analysis of the projects' results.*

Was there any noticeable effect of the project on actions and policy at regional/national level?

*There is not a clear impact of the project in terms of national policies, but, there is an impact on changes at local level and in the Ministry of Health.*

If the project was a living creature, which one would it be, and why?

*It would be a octopus: a project that has a single purpose with some "arms" – integration is the key-word.*

Is the project succeeding in integrating information and assuring adequate flow of information and its dissemination among those interested to accomplish appropriate decisions on ecosystem management?

*The information is available to all who needs it. The Department of Hygiene and Epidemiology and the Department of Vectors (at municipal level) are in charge of gathering the information and to perform the analysis. Diffusion is made monthly to Health Council (written reports and maps).*

If any, what are the constraints faced by the project to establish the appropriate flow of information to decision makers regarding ecosystem management to control dengue risk factors?

*The information flow needs improvements, mostly because it was not completely established yet.*

Past or present experience with dengue fever, including dengue hemorrhagic fever (meaning the occurrence of dengue cases among family members), play any role in the way families adhere or participate in activities demanded by the surveillance system?

*In the transversal study this question was included but it is under analysis.*

In assessing the socio-economic burden of dengue fever did the surveillance system include indicators of days of work lost, variation in family income, etc.?  
*In the case-control study these questions were included but not exactly in this way.*

In identifying risks and needs of the population, were the results of interviews of key informants validated by any other means, such as applying these results to focus groups with community members, per example?

*A pilot study was conducted. The quality control group was the women's group. However, both men and women were trained to make quality control.*

**Ecuador Project. Human Health and Changes in Potato Production Technology in the Highland Ecuadorian (Andean) Agro-Ecosystem. Phase II**

**Interview with a Research Project team member, CIP-Quito, February 13<sup>th</sup> 2006 (teacher, involved in a FAO project, got involved in the present project).**

What were the actions of the project that were more effective and should be continued?

*There is a learning period on the issues of health effects of pesticides, which is not bad in itself. But there was a lack of continuity along time, time was lost restarting some activities (capacity building action, involvement with other institutions, etc) from zero. The positive aspects were the experience gained, the bridges with other institutions.*

The project involves people of different professions, working together and with the community in developing new tools and solutions. Give some example of how positive/negative this was for the project. Was any important profession not included in the project? Were there significant conflicts between the different involved professionals?

*When forming and managing a multidisciplinary group there is always conflicts and there were some in the project, but the discussion among all professionals has been productive for all. I think all necessary professionals were present in the project. The agronomists took a long time to get to interact with the other professionals to create new knowledge and finally the project made it possible.*

The project takes into account the different roles of men and women in task division and decision making. Give some example of how positive/negative this was for the project.

*The issue of gender was not addressed in depth in the project. There were different views of the issue, and yes it was managed somehow but maybe not in an adequate way. People in Carchi are essentially machistas.*

What external factors (climatic events, political / economical changes at regional or national level) were positive /negative to the project?

*Carchi is an area of commercial agriculture, the issue of potato price was an important external factor, due to farmers did not want to hear anything. But a good moment was when production costs and management issues were discussed (Phase I). In all, the balance concerning external factors was more negative than positive.*



What positive/negative changes the project has introduced in your own behavior, relationships, activities, actions or attitudes and in your partners, project beneficiaries, local and/or regional/national decision makers?

*My training is in rural development and capacitation. I have increased my knowledge on pesticides and have lived with the community. I see there is more trust between us and the communities and with colleagues too, their attitudes change and they now understand better the populations and the way they live their difficulties.*

Do the involved stakeholders have, and use, the appropriate tools, skills and knowledge to monitor the outcomes related to sustainable health and well-being?

*People in Carchi are very individualistic and even the organizations and groups do not work. A work at base level with organizations is needed but a relatively short project is not sufficient for this.*

Has the project had any impact on the use of individual protection equipment?

*They use only part of the set, and with variations from person to person. The equipment set is too expensive and there is little willingness to buy it (50 to 60 USD). When the project made it available for 30 USD not everyone wanted one and among the few that accepted some did not pay. Because those that work with pesticides are paid by other farmers and landowners the requirement for protection equipment is not effective.*

Where there changes among the farmers?

*There was some impact on the selectiveness in the use of pesticides.*

*The method of the field schools is very good and one of the things the project is trying is to train trainers to amplify the results of the effort. This includes training municipal authorities, farmers associations and NGOs. But maybe these organizations, despite their role in decision making, do not grasp the basic conception of what is and how works a field school. I think that the participation of the community organizations is essential for the continuity and sustainability of the projects, and that the involvement of political organizations such as municipal authorities is a risk of discontinuity due to the frequent management changes.*

Do you perceive any change in the pesticide industry?

*No, what I see is that they keep on releasing "new" products that are the usual ones but with new names. Their economic power has much influence, they distribute gifts and people got used to it, they do capacity building their own way.*

*May be the project could work with the industry on some points of common interest. The project should insist on arguments based on profits at short and long term related to a better management of pesticides, working with the industry and not confronting it.*

What changes do you perceive in the way health services handle intoxications?  
*In Carchi there is only basic medical assistance, none of the professionals are specialized on intoxications. A course was organized locally with toxicologists to increase the knowledge on pesticide effects.*

If the project was a living creature, which one would it be, and why?  
*I would have to think it over.*

Free comment:

*I think that a national institution should take the lead and the action, benefiting from all the accumulated experience, but this is not happening and this experience is being lost.*

**Interview with an Agronomy Economist, Coordinator of CIP Ecuador, February 13<sup>th</sup> 2006 (Participated mainly in phase I)**

Besides the indicators already monitored in your project, would you suggest other suitable indicators of changes in environment and health situation?  
*I would use health indicators, rates of intoxications, mortality and would add the economic indicators such as productivity and efficiency of the work as a result of better pesticide management*

What factors helped / were negative to the development or success of the project?

*On the negative side, the pesticide companies do nothing to help. CropLife has been participating but not in the desired way, despite all the advertisement they make.*

*On the positive side, the possibility to explore the sympathy for organic products, it is a market issue and there is already a strong movement in Brazil and Argentina. The concern that urban people have about the quality of the products and the fact that farmers are exposed can help in increasing the market for organic products.*

*Another positive aspect is the contacts made by the project with municipality authorities to impulse changes in policy.*

Do you think there are aspects of the project that should be discontinued?

*The training activities have not been going so well. It is difficult to keep the interest of people if they do not see benefits or outputs. I think we should make capacitation courses to promote other economic activities, involving women and children due to their receptivity and influence. We thought that by training a group they would share their knowledge with other farmers but we did not see that in Carchi, there is much competition and they act by themselves. In Carchi we struggle against the individualism and the lack of organization by the farmers.*

The project involves people of different professions, working together and with the community in developing new tools and solutions. Give some example of how positive/negative this was for the project. Was any important profession not included in the project? Were there significant conflicts between the different involved professionals?

*At the beginning of Phase I there were conflicts between professionals of different backgrounds but they were solved. We had some trouble with the attitudes of medical doctors and their language that is difficult to understand.*

About the gender issue.

*We considered it from the beginning. When dealing with minorities, indigenous people and the poorest, we tried to prioritize the involvement of women, the problem was how to motivate and involve them. We take the gender issue into account when approaching the families and designing the work in each different project area.*

What positive/negative changes the project has introduced in your own behavior, relationships, activities, actions or attitudes and in your partners, project beneficiaries, local and/or regional/national decision makers?

*I have a better perception of the dimension of the problem. I was surprised by the health issue, I thought that only those directly using the pesticides would be affected, not their families. Starting with a background in economy and agronomy, I learned different methods and I understand that the same happened to the other team members.*

Do the involved stakeholders have, and use, the appropriate tools, skills and knowledge to monitor the outcomes related to sustainable health and well-being?

*Yes, Ecohealth was lucky that the “negotiation platforms” were implanted, were all actors are involved, producers, dealers, consumers, researchers, etc (as a result of project FortiPapa, financed by Switzerland). Ecohealth is in the chain of actors of these platforms.*

What, if any, was the biggest unresolved issue in the project?

*The absence of specific public policies concerning pesticides is an unsolved issue. There is a pesticide committee that does not work yet. The advertisement by the pesticide companies stimulating their use and saying how to do it is present all the time and the capacitation work is not capable of changing this.*

Was there any noticeable effect of the project on actions and policy at regional/national level?

*The support on the political side is made with words only, there are interests on the other side that make that the policies themselves are not in place. The frequent changes in the Ministry management hinder the development of the legal frame. International institutions express their concern on this issue and the project invites them to the discussion on what to do.*

If the project was a living creature, which one would it be, and why?

*An animal that has intelligence, patience, persistency and that is a bit negotiator too.*

**Telephone interview with a pesticide industry representative, Crop Life lawyer, Executive Director of the Commercial Chamber, Guayaquil , February 13<sup>th</sup> 2006**

What is the present trend in pesticide production and sales?

*It depends on the agriculture production, which is not growing.*

What changes, if any, did you notice in the behavior of your clients in the last years?

*A tendency towards the rationalization of pesticide use.*

A number of meetings, workshops and official contacts concerning the appropriate use of pesticides and their health and economic aspects have been organized or supported by this project, many of them with media coverage. What changes did this introduce in your policy or practice?

*We have sponsored publications on integrated pest management and organized farmer workshops and field days, even in the village schools, to teach the correct use of our products.*

Where any changes introduced in the color coding and labelling of the products or in other printed instructions or information about them? If not, are there plans for it?

*We follow the new classification recommended by WHO, and there is the Norma Andina de Registro de Plaguicidas, which is not applied by CESA.*

What are the limitations on the industry side to eliminate the yellow and red tag pesticides from the local market?

*(after a few seconds of silence) They are tools that have no substitute.*

Free comment:

*We are disappointed that INIAP and CIP are not responsive to cooperative proposals from the industry.*

**Interview with farmer school members, San Pedro de Piartal, February 14<sup>th</sup> 2006, 19:00 hs**

How would you describe the main objective(s) of the project to a relative?

*To reduce toxicity and intoxications and pesticide use in potato cultures.*

How much of these objectives you think has been attained so far?

*The handling was well addressed but the aspects of production were not.*

*For the involved farmers yes, for the others not.*

People not involved in the project come to you asking about it?  
*Yes, people ask what should be done and how, they show interest.  
I think I would continue using the new practices.*

What were the actions of the project that were more effective and should be continued?

*The most successful aspects were the learning of protection and IPM techniques and the field schools. The negative aspects were the economic issues, the production decrease, the cost issues.*

What positive/negative changes the project has introduced at the community level?

*The changes I see at community level are that there is more openness and the contact is easier, there is more knowledge and exchange. The farmers changed their mentality and production techniques. I think the project team changed too, with more participation and involvement of all, and better dialogue and trust among the professionals.*

Of these changes, which ones you think would persist when the project finishes?

*I think the mentioned changes will survive the project if it is worked with the farmer association, they are open to it. The community leaders give more attention to the pesticide issue now.*

*The trained farmers use all the protection equipments, but those that were not trained say that the equipments are annoying to use. The main problem is that the masks are uncomfortable to use, it is difficult to breathe, but we got used to it.*

Do you perceive any change in the attitude of the industry and its representatives?

*The industry representatives speak of making capacitation for pesticide handling but along the years its attitude has not changed, they only think of sales. The protection equipments have not become more available than before, they are expensive and hard to get. The farmers cannot afford them, so it is not profitable to sell them. The industry representatives do not visit the farmers frequently and do not consider our demands.*

What is the final destination of the pesticide containers?

*We burn them, to avoid just leaving them around. We know it is not recommended, but it is better than dumping them anywhere.*

Where there any changes in the way the pesticides are labelled or handled?

*Without capacitation one cannot understand the instructions. But if one does a correct handling, he may save money too.*

Where there any changes in the way the health services deal with intoxications?  
*We don't know how the health services manage intoxications, we had no contact with them motivated by intoxication cases.*

What changes do you perceive in health?  
*Yes, people that use no protection are having health problems. We use more protection now than before and also reduced our pesticide use.*

Do you experience any economic effect of making a rational use of pesticides?  
*When the potato market price is good, it is worth, but lowering production costs would be desirable. We would increase the quality of our products at lower costs.*

Was there a reduction in health expenses?  
*No, not due to pesticide-related issues.*

**Interview with a project team member, February 14<sup>th</sup> 2006, Montufar**  
(Nurse, worked in Ecohealth I, in charge of psycho-social surveys. In Ecohealth II is preparing health surveys and to be applied to families).

What did you know about pesticides before joining the project?  
*I learnt about pesticides and agriculture through the project. I exchange a lot with my colleagues and learn a lot this way.*

What were the actions of the project that were more effective and should be continued?

*The positive aspects were that in this project there were many different actors working with different approaches. The intervention was the weakest aspect because most of the time was spent collecting data and it was not possible to encompass all aspects, for example it was possible to work with women only in some communities.*

*The families would like the field schools to continue. I think that women especially recognize the results of the project. As field schools are for men, women expressed the demand of field schools for the women.*

The project involves people of different professions, working together and with the community in developing new tools and solutions. Give some example of how positive/negative this was for the project. Was any important profession not included in the project? Were there significant conflicts between the different involved professionals?

*There were many institutions but some were lacking: the Health Ministry was involved in the intervention but not the Education Ministry. The time was too short, it was not possible to collect all data, nor fulfill all expectations and conclude all intervention themes. The work with children was left unconcluded. The intervention /capacity building had many shortcomings. If there was an*

*other opportunity I would do less data collection and more intervention, articulation with other institutions, work with community councils, farmer associations (such as done in Ecohealth II), work with the municipalities.*

*I recognize that there were conflicts between institutions, there is no agreement, and everything is handled politically, as a “mask”. Different institutions have field schools and capacitation activities but without integration among them. The Health Ministry was not integrated in the project except for obtaining statistical data. The knowledge on the intoxication cases (results, epidemiological data) when obtained can be a strategy to get positive answers from the health authorities.*

*The Provincial Health authority is a political and therefore unstable assignment, there is immediatism and priority for visible outputs, which means that they do not care too much for the communities.*

*I think the project staff has an acute awareness of the possibilities and limits of the project.*

The project takes into account the different roles of men and women in task division and decision making. Give some example of how positive/negative this was for the project.

*The local society is machista. There were conflicts inside the couples and there was not much we could do about that. The gender issue is difficult to address. We worked with the women (that were afraid to express themselves and changes occurred, they were less afraid and talked more. They had the opportunity to become more sociable as a result of project activities, because they were involved in all activities, they were asked about their opinion, exchanged experiences with women from different communities, and the meetings and capacitation activities contributed to that.*

*I consider it is very important to consider the family as a productive unit. I recognize that having professionals of both sexes allowed to work with groups of men and women as well as with children.*

What were the main project achievements?

*The families say they are grateful for the results of the work done and the capacitation, though it was less than scheduled. I recognize there were some cases of health improvement in other cases it was an economic improvement, by cultivating better products, in other cases the improvement was in the personal aspect, more leadership, knowledge, interaction with other people, etc. In all cases doors were opened for contacting other organizations. I think that with technical and financial support these families could train other families.*

What would you say of the project partnerships?

*INIAP was an important partner, it introduced a methodology that is well established and that the project does not have, the platforms. They are a success factor and will be even more in the communities we are working now, that are more organized than in Carchi.*

How did the intoxication record system work?

*Generally the farmers do not recognize having been intoxicated until they fall, but not when having milder symptoms. They medicate themselves with house made remedies and that is why there are little or no recorded cases at the health facilities. The exceptions are the suicide cases; this is not sufficiently recorded and the project is making the records. Most people don't think pesticides are dangerous.*

What do you think of the perception of the problem by the communities?

*In families that have been participating regularly in the project meetings and activities, one can see that the project was important to them, they are better off economically, in health, personality, in wanting to surpass oneself through capacity-building. These families now know that pesticides are dangerous and use the protection equipments, though it is a small number of families, like 3 per community. The protection equipments are expensive and usually not sold locally.*

*I think there were many things undone in phase I that will be done in phase II.*

How about the intoxication and suicide cases?

*There was a case in one community and other cases were heard from neighbours.*

*There is the need for more policy in the project. Ecohealth has interacted with the municipality and there was some improvement, technical support and help in the field schools, but other institutions must participate more (Education Ministry, Rural Schools). More time is needed, and working on intoxications with teachers of rural schools and local nurses and helps, which will be done during Ecohealth II.*

What is needed to give continuity to the project actions?

*They must simply become a public policy, a commitment by the state, such as the vaccination programs, for example, in every place where negative effects of pesticide use are found.*

If the project was a living creature, which one would it be, and why?

*Maybe a tree, that is starting to grow and can give many fruits, but in the future, if conditions help.*

Free comment:

*I think more training would be positive for the project staff, on project management, institutional relationships, and conflict management.*

*I consider that working with international institutions that care about the people of my country was a very important experience for me.*

**Focus group, February 15<sup>th</sup> 2006, Tulcan. Epidemiology group, Provincial Health Direction, Ministry of Health ( represented by a nurse at the "Luis**



**Davila” Hospital; a member of the Epidemiological Vigilance, Provincial Health Direction; a Head of the Health Sector, San Juan de Lachas)**

What did you know about pesticides before joining the project?

*We learned during our studies and later during workshops and professional experience.*

*The health units recognize that intoxications are a priority issue and they are very motivated to look for the cases and feel capable of doing it, some units already record the cases. The nurses are trained and know what to do while the doctor does not come, some training was done when the protocol was handed to the health services. At least now there is a specific diagnosis and record for intoxication cases.*

*The group for environmental protection has joined and is helping in the divulgation of precautions in the handling of pesticides. A massive diffusion is however necessary and will be done in phase II.*

These practices can be extended to the national level?

*There is knowledge of the project at the central level and support at the local level. We expect to demonstrate the positive results and intend to work on a new notification form, we hope that this will facilitate the application of these practices at national level. We think it is an issue that the country needs to intervene in.*

How do you evaluate the relation between health and agriculture?

*In our workshops we involve farmers, teachers, youngsters. People are conscious of the problem they are very open and responsive but they also want to produce and sell their products.*

*The authorities that deal with agriculture in the province ask to be involved in the project. Our experience with them is to coordinate actions and ideas, and there is an exchange of experiences and knowledge among the two groups of health and agriculture and has helped the health personnel to get better knowledge and grow. There are demands for things such as a furnace to burn the pesticides containers but there is no way to solve this for the moment.*

How do you see the role of the industry and its local agents?

*The retailers are not interested in the intoxication issue. They don't know if there is a way to control the use of the pesticides. The products are sold freely everywhere in town. The farmers store these products at home. A massive information diffusion is needed.*

What was the share of the Ecohealth project in the changes you perceive?

*Though the project is in progress, the benefits are evident. The health professionals are better informed, the sub-notification was reduced to allow intervention, and this was done by local people. Of the ten recorded patients none died.*

*We do some epidemiological investigations and visits to risk areas but we know more should be done, but we have logistic limitations such as vehicles.*

*Women are a little less exposed and are more participative. We thought of making integrated workshops because husbands do not transmit data to their wives, but in mixed workshops women do not speak out in the presence of their husbands.*

*The teachers are informed of the investigations and participate. They consider themselves as allies involved in the problem.*

Are you aware of any change in the children?

*There are no specific measurements or visits for this. But when we go to schools we see that children are aware, they are the best messengers.*

Does the health team need more members?

*We lack human resources for vigilance, where people are overloaded, but in the epidemiological work with intoxications the team is responding satisfactorily. We received two new workers since the beginning of the project. The pesticide statistics are done by our team and we intend later to integrate them in the health statistics.*

**Focus group interview, Agriculture technicians, February 16<sup>th</sup> 2006, Montufar – 9:34 h. An agronomist of the Ministry of Agriculture, San Gabriel; a member of the Environmental Department, Montufar Municipality; a member of INIAP/Carchi; a member of Corporación Grupo RandiRandi**

What techniques diffused during field schools were effectively adopted by farmers?

*We think the methodology was very good, it is participatory, many NGOs are perceiving its importance, but it needs continuity. The success depends on who is the facilitator and its adequate choice of the most important points to address. The farmers say that alternative management practices such as IPM are good and can reduce the use of pesticides, but the latter eliminate the pests while the IPM only controls them and they want to spare time. Municipal regulations are needed to help implement the alternatives.*

Was there any change in the way information about pesticides is handled in agriculture schools?

*The field schools have been applied to the students too, but it is necessary to adjust the curriculums of the agriculture schools to alternative practices, the teachers must be trained and some conditions are lacking for teaching these new approaches. They are starting but much more training material is needed in these schools.*

*The field school methodology is applicable to other crops than potato which is an interesting aspect that can increase its impact on health and environmental conditions.*

*The farmers are aware of the risks but due to climate and work conditions they do not use all the protection they should, though they modify their practices to include some protection.*

*However the distribution of other products for biological and/or alternative control is very limited (traps, feromones) and this limits the applicability of IPM. In addition a quality control of these bio-control products is necessary to ensure the success of these alternatives.*

The farmers that take part in the field schools are more conscious about the adequate use of pesticides, what can be done to extend this methodology to more farmers?

*The pesticide vendors are forming a new corporation and have been doing workshops were they emphasize the use of pesticides, therefore there is a competition and the team that defends new strategies and methods has less players.*

The industry is more aggressive when approaching farmers that have participated in the field schools?

*No, they act the same. The farmers participate in the industry workshops because they want to know what is new, but many of them do not change their practices because of that. The retailers start talking about IPM but do not incorporate the practices, they are also enrolling agronomists that do some investigation though with not the same methods. Generally speaking, this can be something good for Ecohealth.*

*The farmers are very dynamic and research institutions can't keep the pace of their demands, they should be more creative and show the new alternatives in a more practical way. Some facilitators have no time to diffuse their knowledge because they have to take care of their own plots to sustain their families.*

How do health services handle the issue of intoxications?

*When Ecohealth phase I started there was no information on pesticides and their effects, but in 2004 there was a presentation to the community and the authorities about pesticide effects, the project has approached the health services and they are more aware, and there seems to be some interest from the authorities to take action, but sometimes they seem to give more importance to those that are in Quito than to those that are in the field. We need to be more active at the national level!*

Do the professionals resist the ecohealth approach?

*Yes there is some resistance from the institutions, they do have enough articulation among them, or get into fields that are not of their competence. They should unite themselves under a regional project.*

*The project has contributed to a better integration among institutions but more consolidation is needed. A plan was established between the municipality and the institutions but only part of it was done.*

Was there any specialty that was needed and not available in the project?

*It started with agriculture and now there is health and environment, but more inputs are needed from anthropology, psychology, sociology and education. There is a need of a sustainable link with the schools. The teachers participate in the field schools but not so much. The children were involved in the project as a result of parents' pressure. In the municipal council there was a proposal to put posters in the local buses on the effects of pesticides and alternative methods but we are still waiting to see it will be possible. Media such as TV and radio should be more used for a more massive diffusion, as farmers don't pay much attention to leaflets.*

*As farmers are very machistas when affected by pesticides they do not recognize it and attribute the symptoms to food or some other factor.*

How do you see the issue of gender in the project?

*Well, agriculture is something that involves all the family. In field schools we try to make women participate, even when the school starts only with men. In the project there are professionals of both sexes, and even more women than men, but the fact is that both views and perceptions are always present and this is a positive aspect.*

Free comment:

*We need more people, funding and political will. But the behavior towards farmers is becoming less paternalistic.*

*The research is important but it must also be practical. The pesticide retailers are very executive, practical and effective, research institutions should try to have the same characteristics.*

*We also remind that it is important to make a library gathering all available data and publications, accessible to students.*

### **Interview with a Provincial Health Director of Carchi. February 15<sup>th</sup> 2006, Tulcan**

Where do people learn about pesticides and their effects?

*At the university level this is taught but in a superficial way, I am not a specialist on this class of problems myself, and learned on the job. The Health Ministry makes some trainings but not specifically, this is a theme that is mentioned among others. It is not a national priority.*

Is there a link between the lack of capacities and the occurrence of intoxications?

*The Health Ministry has too much responsibilities and the issue of intoxications is given no priority in relation to other programs. In addition we lack funds and personnel.*

Are there limitations to local decision-making concerning priorities given to different health problems?

*Yes, this is a limitation.*

Where there changes in the way health services deal with intoxications?

*There is no change, the data are kept in the statistics departments of the hospitals, but the last awareness campaign was done a long time ago, maybe due to that, when revising the statistics, an increase in cases is seen last year in comparison to the year before. What we do is to articulate with institutions and associations that deal with intoxication prevention.*

*I think only a fraction of the cases reaches the public health services, there are maybe more cases going to private health services. Those that come to us are due to carelessness because the farmers know that they must protect themselves.*

How would you describe the relations between your institution and other public institutions?

*In our country there is always an antagonism between authorities, but at the local level we have a good relation, we meet in events and talk about this, but there is no decision of a joint program to prevent intoxications, but it would be a good thing to do. At the national level the Health Ministry says the issue of intoxication cases is under the responsibility of the Agriculture Ministry and vice-versa.*

What is the role of industry in this issue?

*They must make a good prevention campaign. The farmers say that the protection equipments are not available.*

Is there any way the authorities can change this?

*Yes, it should happen. The problem is economic, the farmers have many production costs, the prices of their products is often low and they say that if they invest in protection equipment they will lack money to finance production. The health units send the monthly reports to the provincial level and from then to the central level, but not much more is done. The health services treat the cases and that's it. We do a domiciliary investigation in case of death only. We encourage the nurses to make domiciliary visits.*

*It would be good if Ecohealth worked with the health services, acting more on prevention.*

### **Short interview with the Head of the Municipal Council of Agronomic Development, Carchi, 15/02/06**

The Council gathers different actors such as the Ranchers Association, Development banks, Ministries of health and Agriculture and Universities.

It has issued a ordinance project that proposes the reduction of pesticides in agriculture. This was influenced by the Ecohealth project, which brought more awareness about the problem.

One of the initiatives that had a great visibility was painting blue hearts on the highway roadside at every spot where a pedestrian was hit by a car, this initiative was awarded by an association of Ecuadorian media companies. From Tulcan to the next town, that is an area of great agriculture activity and therefore of pesticide use, the frequency of blue hearts is much higher, due to the number of farmers walking on the roadside and suffering from dizziness due to pesticide use.

Other developments are plans of field schools for the promotion of biological agriculture, and participating in the forthcoming Colombia-Ecuador fair with. CropLife wants to sponsor a joint stand, but it would be good to have an Ecohealth stand alone.

### **Interview with FAO representative in Ecuador, February 17<sup>th</sup> 2006, 08:00**

Had previous knowledge of pesticides effects on health?

*During my academic life I was informed of environmental issues, but it was in professional practice that I had experience with the pesticide-related health issues.*

About the project partnerships.

*I think the project has not approached all the actors I think it should. It is very focused on the farmers, I think it could work with the decision makers for the development of regulatory actions and development of a normative base, and FAO could be a mediator in this process. I think of the Rotterdam Commission, that evaluates chemicals for their health effects. Ecuador could make some important contributions with validated scientific data on the health effects and their relation with pesticide exposure.*

*I think the responsible authorities and services are weak and due to that they do not take decisions concerning the pesticide issue. Our role at FAO is to "strengthen authority" and I think we should proceed. I am conscious of the harm pesticides do. SESA's director is conscious of the difficulties to face in order to follow in this process.*

What is FAO's policy concerning pesticides.

*We publish codes on pesticides; strengthen legislation in member countries; support projects such as this Ecohealth project, putting pressure on local authorities to have them adopt the codes; help in capacitations including analytical quality.*

*The farmer schools were a FAO initiative to allow farmers to appropriate information and achieve changes by technology transfer.*

About the project actors.

*They are OK for the project objectives, but I think it must work more at the Ministry level (Health, Agriculture) and involve more academic institutions and studies to produce scientific data on intoxication cases. I am working on a project to involve the Ministry of Health, to strengthen its role and help in capacity building for vigilance and field actions. OPS (PAHO) is an important partner but does not participate enough.*

Were there any changes in the attitude of the pesticide industry?

*Only a little, the industry interest is to sell their product to local retailers and they don't consider themselves co-responsible. They say they do capacitation work but it has in fact advertisement motivations and they don't even know the effect, if any, of these actions. Apsa, the association of national companies in the pesticide business has a project with the municipalities concerning the final destination of pesticide containers, in Cayambe only (floriculture and potato center), however little is achieved and the industry is little responsive and responsible.*

What were the strong and weak points of the project?

*The most successful aspect was the involvement of local authorities and other local actors, but I do not know the details of the data on effects and what changes the project achieved.*

*The negative aspect was as mentioned before the little interaction with central authorities (Min. of Health and Agriculture).*

*Data are needed and what was obtained had not much scientific rigor in the CIP project. However there were unquestionable results on the effects of the methodology in the reduction of incidence.*

**Interview with leaders of Oficina Vecinos Mundiales, Quito, February 17<sup>th</sup> 2006, 11:00**

Positive and negative aspects of the project?

*I followed more closely Ecosalud Phase 1 (pilot). This was a new experience for CIP, that is, how to blend research and intervention. Social investigation is not so linear and some institutions were not interested in research. It was a challenge to find interventions strategies that were compatible with research. Another issue is that the population got tired of being investigated.*

*The issue of the actors, which ones to include and when was also quite important. At first we thought the industry should be an important partner, not all the time but when presenting study results. But we were a bit naïve in our policy of transparency, allowing data access to the industry before these data were worked out with the other actors and as a result of this precocious participation of the industry, they used the results for calibrating their own strategies.*

*In practice the project did not manage to change attitudes and practices, more political action would have been required.*

Can you comment on the socialization of the project experiences?

*Diffusion and interpretation of results with local actors was a strong aspect of the project, communication was done with different techniques, videos, etc. Quite often the community took conscience of what was happening the year before and started to ask for the interventions. There was a conflict between those who wanted to do the investigations such as baseline studies, and those who wanted to do interventions, and this paradigm conflict was not always negotiable.*

How did IDRC respond to these conflicts?

*There was a quite healthy process of conflict management. However, I feel there was not enough interaction between the professionals that would influence positively the project. The reports mentioned only the activities, there was no continuous learning and the donor was more concerned with administrative issues and there was not enough time for a deeper reflection concerning the difficulties.*

What can be done to improve this in the future?

*More horizontal interaction among the projects must be demanded, to reach more learning, maybe even through administrative mechanisms such as co-participation.*

On the role of CIP.

*This project has transformed CIP, including health and nutrition in its agenda. In addition, the previous vision by CIP was that it should be neutral, and they realized that this way they could not influence policies for agriculture and health. This allowed a more open platform and the inclusion of the gender issue. CIP can play a mediator role between scientific knowledge and the government institutions and the industry.*

*The project obtained scientific evidences that were strong enough to be published in important scientific journals, the industry tried to disqualify the studies but did not succeed. The industry based itself on the "safe use" paradigm, while the project insisted on reduction and/or elimination of pesticide use. The industry made interventions and capacitations in schools and communities on "safe use", using some of the ecohealth characteristic tools. At the same time, they said the problem was not the pesticides but the farmer practices and ended recognizing that it is not realistic to expect a safe use due to a variety of socio-cultural and economic factors, as mentioned in NOVARTIS reports.*

*A striking issue was the speed at which the industry reacted, in contrast with the one by the project and its institutions. Nevertheless, some municipalities have issued regulations forbidding the sale of the most toxic products.*

*INIAP gave a good support to the project, but CropLife also supports some INIAP activities, generating conflicts inside the institution.*



*A new strategy that emerged during the project phase II was to approach the food industry and use the growing market demand for healthier crop products in favor of the project objectives.*

On transdisciplinarity and relations among the institutions.

*The project would have needed more people from the social sciences and anthropology to make a bridge and lobbying between investigation and policy, as scientific studies alone do not result in policy changes. The project timeframe was also too short, considering the complexity of the addressed issues.*

*In contrast, CropLife is very generous with officials, financing trips abroad to attend industry meetings and conferences, paying for walkie-talkies used during farmer workshops, financing CESA projects, and the officials do not perceive the interest conflict.*

*The local personnel has an adequate training but agronomists are afraid to take positions that are contrary to those of the industry, due to the possible consequences of this on their professional future. This stresses the important role of the technicians of international institutions, not submitted to this type of pressure. Local workers would go where the money goes, they could change their views due to their participation in the project but would return to the previous view when the industry would finance them again.*

*The universities had a punctual participation only. Changes in the Ministry structure during the privatization and dollarization lead to a huge personnel reduction, such as going from 1400 to 25 extension workers in the Ministry of Health.*

*The diffusion of information on the project within CIP was more an individual job than a institution policy.*

About the gender issue.

*The project financed women in important positions for intervention and this lead to conflicts when their participation became effective, due to the corporate culture at CIP and INIAP that does not favor women's participation or empowerment. INIAP is especially hierarchic and the hired women simply did not fit in this structure. However, after the initial conflicts, the technicians changed their view.*

*Additional problems at INIAP are the low wages, the institutional fragility and discontinuity.*

### **Interview with Fadya Orozco, Project Leader, Quito, February 17<sup>th</sup> 2006**

What lessons were drawn from phase 1 for the bridge phase and phase II?

*The importance of the diversity of collaborators, of having actors that allow to discuss the approach and, and stressing more the intervention than the research.*

Was the project dynamics appropriate?

*Internally yes, it focused on capacity building, which was good. Externally, people often do not understand what the project and CIP do. In phase II we try to be more participatory than in phase I and to become a program more than a project.*

Was there anything you would have liked IDRC to do and it did not?

*More induction of the project leaders and training on the Ecohealth approach would have been good. The communication with IDRC is good, and I feel more like an IDRC project member than a CIP project member. The fact that CIP/Lima is the institution that signs the project often introduces noise, a direct communication is often needed. Some points that I mentioned were also not included in the reports.*

Do you believe the Ecohealth approach?

*100 % yes. I fell in love with it.*

How did you get in touch with it?

*Through IDRC publications and my own practice once involved with the project.*

What are the main interesting features of the approach for you?

*The diversity of actors, the sustainability, the fact that people not only “eat the food” but also “prepare it”, there is community participation since the beginning.*

How do you see the role of institutions such as FAO and others?

*You can start working with them but will not necessarily continue. FAO was an example of this, as we thought initially they would be key partners and finally they were not.*

What institutions you would like to see participating more?

*The Ministerio de Agricultura: they do not make much inputs but have incorporated some elements of the approach. If I had to choose between CIP and INIAP I would stay with CIP. The INIAP technicians have changed but not the central decision levels.*

What success indicators do you see in the project?

*There are not so much hard indicators, but the platforms were quite successful, at the beginning people did not understand what we were doing there but now they see us as partners and the platform members support ecohealth participation in the platforms and say “if they leave, we will leave too”.*

What personal changes you experienced with this ecohealth project?

*I learned to exercise leadership, to be more tolerant and patient, to negotiate, and learned to work without having a complete control of everything, without getting stressed because of this. I also learned communication skills.*

What features should a good PI have?

*The respect for all, initiative, joy and vital energy, the capacity to value him or herself and sustain points of view, the courage.*

What other questions you would have liked to hear?

*"How do you feel as a medical doctor in an institution like CIP?"*

*In many moments I felt diminished, misunderstood. Implementing the approach is more difficult for a woman than for a man, and it would be important to have an other woman as a contact high in the CIP hierarchy. But all this is a challenge of inter-sectorial training.*

If this project was a living creature which one would it be and why?

*A tree, with its methodological roots and slow growth. If a flower, it would not be a hypocritical red rose but rather the simple countryside flowers.*

Free comments:

*Local IDRC projects do not know each other. There was a meeting of R. Bazzani with local PI's but the other two (Jaime Breil and Oscar Betancourt) did not show much interest.*

*Capacity building of Ecohealth personnel by CIP is too focused on foreign thesis students, there should be more emphasis on local MSc students, not only pre-grade students.*

**Interview with Graham Thiele, anthropologist, works in the Papa Andina project and coordinates the different activities of CIP in Ecuador. Quito, February 17<sup>th</sup> 2006**

The concertation platforms were my main role in the project. I saw a change in the paradigms of the institutional actors. The solution of conflicts by Ecohealth lead to more thinking at INIAP and now their directors agrees on the importance of eliminating Carbofuran and the other red-tag products.

The project also impacted on CIP, giving them more visibility and the new projects have incorporated the issue of the connections between agriculture and health. There was an empowerment of the actors.

Concerning research and policy, there is promiscuity between CESA and Crop Life and pressures from the Agriculture Ministry on INIAP to work with CropLife.

**Malawi Project. Soils, Food and Healthy Communities: A Participatory Agroecosystem Approach to Monitoring Change in Northern Malawi**

**Interviews with project beneficiaries, project staff, decision makers and collaborators, 1<sup>st</sup> to 5<sup>th</sup> May 2006**

**Gidion Ngulube village, a member of the farmer research team**

How would you describe the main objective(s) of the project to a relative?

*To increase soil fertility, to care for the young ones by introducing new methods of preparing good foods for infants.*

How relevant are these objectives to you?

*Very relevant, especially soil fertility.*

How much of these objectives you think has been attained so far?

*Soil fertility increase has been the main achievement, as one can see by the much better maize crops the year after planting soya and groundnut.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?

*No.*

What were the actions of the project that were more effective and should be continued?

*The training and the frequent visits by the project team were the most positive aspects. I hope it continues as it will benefit me and many others.*

What has not been done so well, could be improved or stopped?

*Nothing, just perfect.*

What positive/negative changes the project has brought to your life?

*I only see positive aspects, the main one being that men and women now work together, and people that are not in the project want to get in.*

Of these changes (if any), which ones you think would persist when the project finishes?

*I would continue using the new crop techniques and the new food preparations.*

What positive/negative changes the project has introduced in the life of your community?.

*Most members are better off due to better food brought by new crops.*

Why some villagers do not participate in the project?

*Because it was a pilot project and there was not enough seeds for everyone, but if the participants return seeds this will benefit more people.*

If the project was a living creature, which one would it be, and why?  
*Cattle, because it has so many utilities to man.*

**Gidion Ngulube village, a farmer, May 2<sup>nd</sup> 2006**

How would you describe the main objective(s) of the project to a relative?  
*To improve soil fertility, food security, generating surplus that mean cash for different improvements in the household.*

How relevant are these objectives to you?  
*Very relevant, otherwise there is no cash to buy fertilizer and get further crop improvement.*

How much of these objectives you think has been attained so far?  
*The increase of soil fertility is the more important achievement, especially through the introduction of mucuma.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?  
*No, food is the highest priority. If people are hungry there is no community work and no peace.*

What has not been done so well, could be improved or stopped?  
*Everything was fine, but the project should be extended to surrounding villages that admire our achievements and want to join.*

What positive/negative changes the project has brought to your life and your family life?  
*Togetherness, working together.*

What positive/negative changes the project has introduced in the life of your community?  
*The main change was the extension of the food security period.*

If the project phased out, would you be able to train the other farmers?  
*If well equipped, yes, but we are still learning and we would need the seeds.*

If the project was a living creature, which one would it be, and why?  
*Boose, for its many different utilities to man (transport, help in working the soil, milk, manure, meat).*

**Interview with a Chairman of the Farmer Research Team, May 1<sup>st</sup> 2006**

How would you describe the main objective(s) of the project to a relative?  
*To help substitute scarce and expensive imported fertilizers.*

How relevant are these objectives to you?  
*Very, because I saw the beneficial effect on crops without added fertilizers.*

How much of these objectives you think has been attained so far?  
*Mainly the increase in soil fertility, especially by use of soya and groundnuts, and child growth.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?  
*No, but concerning the project, nutrition training should be more widespread.*

What were the actions of the project that were more effective and should be continued?  
*Training on crops and nutrition, both should be continued.*

What has not been done so well, could be improved or stopped?  
*I see only positive aspects.*

What positive/negative changes the project has brought to your life?  
*Improvement of food security.*

Of these changes (if any), which ones you think would persist when the project finishes?  
*All was so positive that the best aspects of the project will continue, but continued training is necessary for those not involved in the first trainings.*

What positive/negative changes the project has introduced in your life and the life of your family?  
*A better health, the absence of chronic illnesses.*

And at the level of your community?  
*We learned to work together and share ideas, which was not common before.*

If the project was a living creature, which one would it be, and why?  
*A cat, because it is man-friendly.*

**Kaigwazanga village, interview with a female farmer, May 1<sup>st</sup> 2006.  
Member of the FRT for the last 3 years**

How would you describe the main objective(s) of the project to a relative?  
*It tries to eradicate hunger.*

How relevant are these objectives to you?

*Very, because it reduces fertilizer use.*

How much of these objectives you think has been attained so far?

*Crop management and soil fertility really improved and soya given to children reduced malnutrition.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?

*The project should have a center in our village. Having bicycles would be nice too.*

What were the actions of the project that were more effective and should be continued?

*Seed distribution.*

What has not been done so well, could be improved or stopped?

*Nothing.*

What positive/negative changes the project has brought to your life?

*Improvement of food security, sharing and discussing with friends on crops, seeds, etc.*

Of these changes (if any), which ones you think would persist when the project finishes?

*I would continue to plant soya, groundnut and mucuma, because I saw their positive effects.*

What positive/negative changes the project has introduced in your life and the life of your family?

*I now do not need to go to the market to buy food and I can even sell my surplus.*

And at community level?

*Some people are jealous of our benefits.*

Do you think that if the donation of seeds stops, the self-organized exchange of seeds between farmers will be enough to assure good levels of legume consumption?

*Yes, because the village plots will assure seed production.*

If the project was a living creature, which one would it be, and why?

*A hare, because it is fast and can do many things at different places at the same time.*

**Interview with a female farmer, Danien Soko village, May 1<sup>st</sup> 2006.  
Member of FRT since 2004**

How would you describe the main objective(s) of the project to a relative?  
*To improve soil fertility.*

How relevant are these objectives to you?  
*Very, because we had fertility reduction before the project and fertility improvement after it.*

How much of these objectives you think has been attained so far?  
*When planting mucuma and after that maize, you can see a great change in yield.  
Soya and groundnut were the most efficient to reduce malnutrition and increase food security.*

What were the actions of the project that were more effective and should be continued?  
*I see no need for project improvement, it is fine, but nutrition training and diffusion of recipes for the new crops should be continued.*

What has not been done so well, could be improved or stopped?  
*I see only positive changes, and lots of adherents.*

Of these changes (if any), which ones you think would persist when the project finishes?  
*As FRT continues, so will food security increase.*

What positive/negative changes the project has introduced in the life of your community.  
*In the last two years I have surplus that I can sell in the market, the project must continue.*

Why some villagers do not participate in the project?  
*One of the problems is that some people adhered to the project late, due to resistance to change. Since they received the seeds, no nutrition training, which is essential to the success of the project. New species such as soya require bigger fields.*

Free comment:  
*God comes through people, and it did through the project.*

**Interview with a male farmer, May 1<sup>st</sup> 2006. Member of FRT since 2003**

How would you describe the main objective(s) of the project to a relative?

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*To show the goodness of mucuma.*

How relevant are these objectives to you?

*Very, as it increases soil fertility, reducing use of fertilizer, reducing child malnutrition and increasing income by creating surplus that can be sold.*

How much of these objectives you think has been attained so far?

*Soil fertility has increased and stayed high, and positive changes in child health can be seen.*

What were the actions of the project that were more effective and should be continued?

*All aspects of the project are fine and should be continued.*

What has not been done so well, could be improved or stopped?

*The time of seed distribution should be better adjusted, last year some farmers received the seeds too late.*

What positive/negative changes the project has brought to your life?

*There was a positive change in child health.*

Of these changes (if any), which ones you think would persist when the project finishes?

*Residue burial and intercropping are practices that I would continue to use if the project phases out, as they are practices that I can do by myself.*

What positive/negative changes the project has introduced in the life of your community?

*I see only positive changes in the household due to increased food security and extra money due to surplus. At the community level I see positive changes such as many requests by FRT members to extend the project to other villages, and some negative changes such as jealousy and some people saying "you are wasting your time with this".*

Do you think that if the project phases out the seed bank will survive?

*We will manage the seed bank by ourselves using the village plots. OMT increased child health, and I will increase my field this year.*

If the project was a living creature, which one would it be, and why?

*Cat, because it is man-friendly.*

Free comment:

*I like the visits, they should be more frequent as we benefit a lot from them.*

**Interview with a male farmer, Msekeni village**

How would you describe the main objective(s) of the project to a relative?  
*Increase soil fertility, reduce use of fertilizer, increase of food security, production of surplus, generating money to pay school fees.*

How relevant are these objectives to you?  
*Very, as the project assures good yields, provided he rains are sufficient and at the right period.*

How much of these objectives you think has been attained so far?  
*The most visible results are the increase in fertility and crop yields.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?  
*Besides food, the other priorities would be clothing and especially school.*

What were the actions of the project that were more effective and should be continued?  
*Training is the most efficient project action and should continue.*

What has not been done so well, could be improved or stopped?  
*Other techniques of soil improvement and other legumes should be introduced.*

What positive/negative changes the project has brought to your life?  
*The main change is seen in child health, mainly thanks to soya. As a result, there are no visits to the hospital, a better life with my wife, and more time available to spend with my family and community.*

### **Interview with a male farmer**

How would you describe the main objective(s) of the project to a relative?  
*To increase soil fertility and food security in the household, two factors that assure household harmony and togetherness.*

How relevant are these objectives to you?  
*Very relevant, especially due to togetherness.*

How much of these objectives you think has been attained so far?  
*Soil fertility and food security were achieved, especially due to soya that before was heard of but not available and now is handy and can be prepared with many recipes.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?  
*No, as no peace is possible without food.*

What were the actions of the project that were more effective and should be continued?

*The most effective actions were training and soil improvement and the diffusion of recipes for using the new legumes, and all should be continued.*

What has not been done so well, could be improved or stopped?

*The project approach is just fine, but it should try to include more farmers.*

What positive/negative changes the project has brought to your life?

*The main change is that I now stand on my own, and have good relationship in the household and with relatives, thanks to the training.*

Of these changes (if any), which ones you think would persist when the project finishes?

*Soil fertility brought by crop management would be the aspect that would remain, should the project phase out.*

What positive/negative changes the project has introduced in the life of your community?

*At the community level the change is that neighbours or non-participating members see the progresses I made and envy me, which makes them want to join. Another change was that the project brought much togetherness, putting together categories that were hard to put together before.*

Would the seed bank survive project phasing-out?

*I think the seed bank is sustainable and would continue even if the project phases out.*

Participating in the seed bank has some effect on your status in the community?

*Taking part of the seed bank definitely increases my community status, many people say next year they will do as me.*

If the project was a living creature, which one would it be, and why?

*Cattle, because it has so many utilities for us, such as milk, manure, meat, money, that all together means life.*

### **Interview with a female farmer, Maketani village (widow, 33 y. old)**

How would you describe the main objective(s) of the project to a relative?

*To increase soil fertility, food security, crop yields and health.*

How much of these objectives you think has been attained so far?

*All items above were achieved.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?

*No, food is the priority, though in our village water is an important issue too, boreholes are needed.*

What has not been done so well, could be improved or stopped?

*No change is suggested.*

What positive/negative changes the project has brought to your life?

*Food security has improved, though I work only with my 12 and 15 year-old sons.*

Of these changes (if any), which ones you think would persist when the project finishes?

*I would continue to use the new crops (soya, groundnut and pigeon pea) and crop management techniques.*

What positive/negative changes the project has introduced in the life of your community?

*At the community level the changes are that everybody is satisfied with the new crops. The new togetherness makes exchanges possible and when I have a bad yield my friends help me.*

Why some people do not join the project?

*In this area everybody participates at different levels.*

The seed bank would survive the project phasing out?

*The seed bank would survive project phasing out, otherwise hunger would come back.*

Would you be able and willing to train other communities should the project phase out?

*Yes, gladly.*

What is your preferred soya recipe?

*Soya pieces and soya milk.*

If the project was a living creature, which one would it be, and why?

*A hen, because everybody has at least one of these useful animals.*

### **Interview with a male farmer, member of the FRT since 2000**

How would you describe the main objective(s) of the project to a relative?

*To increase soil fertility, crop yields, life quality.*

How much of these objectives you think has been attained so far?

*All these objectives were satisfactorily achieved and we have no more malnutrition and now I can have good yields using no fertilizer or just one bag, while before I would have no or bad yield even using fertilizer, which is a big change.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?

*No, food is the priority. At community level you cannot speak of development issues to hungry people and there is no peace if I have food and my neighbour does not.*

What has not been done so well, could be improved or stopped?

*No change suggested.*

What positive/negative changes the project has brought to your life?

*The changes are better gender relations, more togetherness, and more equal labor division at home and in the field. Mothers in law approve the changes and all categories are touched by the training.*

Of these changes (if any), which ones you think would persist when the project finishes?

*Crop management and togetherness, to avoid the return of hunger.*

Why some people do not join the project?

*Because they resist changes, they want to see first but come to ask for food at harvest time and then request to join.*

The seed bank would survive project phasing out?

*Yes, we have a good structure for this and saw that it works well. The seed bank is safer than having the seeds stored at different homes.*

Would you be able and willing to train other communities should the project phase out?

*I would have no problem to do it, even without any allowance. For others, the logistics could be a problem.*

What is your favorite soya recipe?

*Soya cake, milk and coffee.*

If the project was a living creature, which one would it be, and why?

*Cattle, due to its different valuable uses.*

Free comment:

*I am very grateful to the project and to your visit.*

**Interview with a male farmer, Kalinda Makuni village**

How would you describe the main objective(s) of the project to a relative?

*To retain soil fertility, get good yields and a healthier life.*

How relevant are these objectives to you?

*Very, as I see the benefits, we have no more malnutrition and now have a higher variety of foods.*

How much of these objectives you think has been attained so far?

*Soil improvement was achieved as well as better yields. We now have good maize yields as opposed to before the project.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?

*No, food is essential. Before I would have to work on other fields to get food or some money to buy food and now, no longer.*

What has not been done so well, could be improved or stopped?

*The only suggested change would be to include an even higher variety of nutritious foods.*

What positive/negative changes the project has brought to your life?

*Better food security and baby growth, no more problems and better relations at the household level, more togetherness.*

What positive/negative changes the project has introduced in the life of your community?

*At the community level no more underweight children as before.*

Of these changes (if any), which ones you think would persist when the project finishes?

*Crop management and togetherness.*

Why some do not join the project?

*Because they wait to see what happens to those that join.*

Would the seed bank survive the phasing out of the project?

*The seed bank would survive phasing out because of the increased togetherness that was established.*

Would you be able and willing to train other farmers?

*Yes, only transport would be a possible problem.*

If the project was a living creature, which one would it be, and why?  
*Cattle, due to its many useful uses. If you have it, you are someone, and if you are in the project, you are someone too.*

Free comment:

*I thank the donors, because now we have food even when the rains are not adequate.*

**Interview with a village headman wife, Chimuzi village,**

How would you describe the main objective(s) of the project to a relative?  
*To bury crop residue to increase soil fertility and free the younger ones from malnutrition.*

How much of these objectives you think has been attained so far?  
*These objectives were attained, and in addition we now have surplus and biomass to feed chicken and pigs and poverty levels declined with no more fertilizer use.*

What has not been done so well, could be improved or stopped?  
*No, everything was well addressed, the approach was fine.*

What positive/negative changes the project has brought to your life?  
*Training and introduction of new crops.*

What positive/negative changes the project has introduced in the life of your community?  
*With the introduction of new crops we have less poverty, more togetherness in the family, less quarrels, and all share and solve the problems. I see no negative effects, we now have a smooth life and no more suffering. At the community level I see no negative effect, the positive change is that now people know one another, the field days promote exchange between the communities and this lead to declining hostility.*

Of these changes which ones you think would persist when the project finishes?  
*I would continue to use the new crops and recipes.*

Would the seed bank survive the project phasing out?  
*The seed bank would continue.*

Why some people do not join the project?  
*Because some are born lazy, others resist change and are not aware, and do not come to gatherings.*

What are your favorite soya recipes?  
*Soya milk.*

If the project was a living creature, which one would it be, and why?

*Cattle, because it is so useful.*

Why women are much faster in answering this question?

*Women are majority in the project, men join because of women and because they see the results.*

Free comment:

*I am very impressed by the project, by the many visitors, by the staff, I ask you all to go on coming frequently and am happy to see that people from outside the country are concerned about us.*

### **Interview with a female farmer, Vimba village**

How would you describe the main objective(s) of the project to a relative?

*To increase soil fertility, to obtain good crops without fertilizer in contrast with before the project.*

How much of these objectives you think has been attained so far?

*These objectives were attained and we now have surplus that is good for family income and use plants such as maize for firewood.*

Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?

*No, we just want the training to continue and other farmers to join.*

Why do you think some people do not join the project?

*Because of ignorance and illiteracy.*

Of these changes (if any), which ones you think would persist when the project finishes?

*The introduction of velvet beans, soya, pigeon peas, sweet potatoes and cassava. The facilitating with local communities should continue. We need more training on planting the leguminous crops.*

What positive/negative changes the project has brought to your life?

*The new crops have increased soil fertility and child health, we have no more malnutrition, the surplus bring cash and having firewood is good as it avoids having to walk far away to get it.*

Of these changes (if any), which ones you think would persist when the project finishes?

*New crops and crop management would continue.*



What positive/negative changes the project has introduced in the life of your community?

*At community level the main changes are that we now have no more carency, our diet is more diversified, the surplus allows us to pay school fees, there is more togetherness and friendship. The relations between mothers and mothers in law are better thanks to the training and the new recipes. In the past, mothers in law would stand apart during the meetings.*

Would the seed bank survive the project phasing out?

*The seed bank would survive by forming local associations.*

If the project was a living creature, which one would it be, and why?

*Cow, due to its many uses.*

Free comment:

*I am thankful to the new knowledge, better soil fertility and more harmonious households. The staff is very encouraging and the project should really continue. I am especially thankful for the green bank and even fail to express the extent of my gratitude. As you liked the project so much, if you wish to come to Malawi I will be glad to have my husband give you some land in my village area to plant and make your own crop experiments.*

### **Interview with SFH Director**

How much of the project objectives you think has been attained so far?

*Most of the project objectives were attained.*

What were the factors that were positive/negative to the development of the project?

*The positive factors that helped were the initial key people and community involvement, seeing the results by themselves was very important as well as the appropriation of the project by the beneficiaries. The negative aspect I see was having to buy seeds in Lilongwe.*

What were the actions of the project that were more effective and should be continued?

*More capacity building of the staff of the communities.*

What has not been done so well or could be improved or abandoned for requiring too much effort or resources to succeed?

*Sometimes some people try to drive you away from the project objectives. The attempts to attract university professionals were frustrating, as they would either not come or try to charge abusive fees.*

How successful was the experience of transdisciplinarity in the project?

*Cultural background and tradition did lead to some confusion on the roles and responsibilities.*

The project takes into account the different roles of men and women in task division and decision making. Give some example of how positive/negative this was for the project.

*The region is dominated by warrior tribes originating from S. Africa where women are set apart. The project tries to give voice to women, form women clubs and actively involve them in the project. That is why the time spent in the communities is important as well as practical examples.*

What external factors (climatic events, political / economical changes at regional or national level) were positive /negative to the project?

*Political stability was essential to the project success, and the adequate rains were also important. The exchanges with abroad researchers were positive. Negative aspects were the inflation that made budgeting difficult, seed availability, and the high cost of Malawian consultants.*

What, if any, was the biggest unresolved issue in the project?

*Many farmers want to join and cannot, due to limited funding. Accommodation for visiting partners is also a problem. We would like to build a house for that purpose.*

What positive/negative changes the project has introduced in your own behaviour, relationships, activities, actions or attitudes?

*This project complements the small tentative projects that were started since the 90's and it adds skills.*

Was there any change in actions/policy at regional /national level? If not, what are the chances that may happen in the near future?

*Technicians from the Ministry of Agriculture have visited the project and were enthusiastic about the results, but comparisons between the local and national health indicators must be done to convince authorities.*

Free comment:

*I express my sincere appreciation for the donors, and especially for their flexibility and good relationship. Sustainability requires commitment from both the staff and donors.*

**Interview on May 4<sup>th</sup> 2006 with a member of project staff, assistant coordinator, project agronomist/nutritionist, started 6 month ago.**

How much of the project objectives you think has been attained?

*From what I can see I my 6 month involvement, people are struggling to join the project to obtain soil fertility improvement, improvement in food processing and facilitation of different activities.*

What were the actions of the project that were more effective and should be continued?

*The most positive aspect was involving farmers from the planning phase, leading to empowerment. I also see good relationship among the farmers and among the staff too. The negative aspect is the limited funding and limited amount of seeds that hinders accommodating more farmers that would like to join.*

What has not been done so well or could be improved or abandoned for requiring too much effort or resources to succeed?

*I would suggest no change in the project strategy, and I see a striking difference between this project approach and the one by government officers that sit in front of the communities and tell them to do this and that and walk away.*

The project involves people of different professions, working together and with the community in developing new tools and solutions. Give some example of how positive/negative this was for the project. Was any important profession not included in the project? Were there significant conflicts between the different involved professionals?

*I saw no conflict among disciplines and I think that all necessary disciplines were present and active.*

The project takes into account the different roles of men and women in task division and decision making. Give some example of how positive/negative this was for the project.

*I saw no gender conflict, we have a lady coordinator (Lizzie Shumba) and this not a problem.*

The project tries to consider the voices of all sectors and groups involved in the project issue and to increase the capacity of local communities and institutions to deal with this issue. Give some example of how positive/negative this was for the project. Was any important group or sector not included in the project?

*I see no equity problem, the village headmen have an important role as they address and solve conflicts among the community.*

What external factors (climatic events, political / economical changes at regional or national level ) were positive /negative to the project?

*Consultants and visitors that train us are OK, but funding is not adequate in proportion to the demand.*

What positive/negative changes the project has brought to you?

*The project was very positive for me because it empowers people, I enjoyed chatting with people and I feel I had a clear professional progress, and learned how to facilitate instead of just training. When I was working in the*

*government, I would work only a few hours a week and now I work a lot everyday, doing overtime and still enjoying it a lot. I did not know of projects that could change people's lives so much, and that's why it is so motivating.*

What, if any, was the biggest unresolved issue in the project?

*The difficulty to have support from Malawian institutions.*

Free comment:

*I thank the donors for helping meet the communities' demands. I would love the project to keep on training us, as this is part of the learning process. I really appreciate the interns and visitors, and even the evaluator visit, as these bring new and interesting issues to us.*

**Interview with Mr. Oswin Madzonga, Scientific Officer at ICRISAT (International Crop Research Institute for the Semi-Arid Tropics), May 5<sup>th</sup> 2006.**

What are the changes that the project expect to promote?

*Strategic partnerships to diffuse legume options and increase soil fertility since the 2003-2004 season. Demonstration of improved varieties of groundnuts developed at ICRISAT, such as CG-7 and ICGVSM-90704.*

How much of these objectives you think has been attained?

*Overall success, as demonstrated by improved maize yields after using these varieties.*

What factors helped/were negative to the development or success of the project?

*Despite efforts to distribute the seeds, the project did not reach as many farmers as wished, due to low seed multiplication rates. One should consider that increasing soil fertility is a slow process.*

Why some farmers do not join the project?

*Because of the level of information delivery and of logistic difficulties.*

Was there any change in actions/policy at regional /national level? If not, what are the chances that may happen in the near future?

*Officials exposed to the new strategies during field days were very positive about them. This exposure is still at initial stages due to resource constraints but I feel that the political will is present. One of the effects was the preparation and diffusion of flyers promoting the association of legumes and cereals.*

The project involves people of different professions, working together and with the community in developing new tools and solutions. Give some example of

how positive/negative this was for the project (option: do you agree? Give an example to illustrate your answer).

*I saw that there was more input from social sciences than other disciplines, as agronomists and crop protectionists were not as present as needed, as well as social economists for marketing issues. The use of pesticides is limited by cost and technical knowledge as well as by the cost of equipment, but some integrated pest management is present.*

What external factors (climatic events, political / economical changes at regional or national level ) were positive /negative to the project?

*Relevant external factors where the too dry 2004-2005 season and diseases such as HIV that limited farmers working ability. The relation with ICRISAT was not very formal, restricted to buying seeds.*

If the project was a living creature, which one would it be, and why?

*Living creature: an important one, improving well being and maintaining resources.*

Free comment:

*Donors should consider scaling-up the project to get a major impact from this pilot phase. ICRISAT still has more to offer in a more structured collaboration, and a joint proposal would help scaling-up. New technologies are coming up as well as new constraints, stressing the need for more technical collaboration.*

#### **Interview with project leaders, Rachel B. Kerr and local coordinator Lizzie Shumba.**

**Due to the very tight visit schedule and the very high workload of the project leaders, it was not possible to perform a formal interview with them during the evaluation visit. The evaluator asked the project leaders to send later on their answers to the specific project leaders questionnaire, or free comments of their choice, but until the completion of this report coordinators no input was received.**

#### **Visit to Ms. Stacia Nordin, outskirts of Lilongwe, May 5<sup>th</sup> 2006**

When returning from Ekwendeni, I had the opportunity to witness the visit that the project leader and part of the project team (Rachel B. Kerr, Ms. Lizzie Shumba, Mr. Penjani, Mr. Zimba) made to Ms. Nordin, due to the potential affinities between the activities developed by the two groups. It was not in the schedule of the interviews and contacts related to this project evaluation, but it is relevant in the context of development initiatives and international collaborations, and for this reason I include this description here.

Ms. Nordin, RD, is a US citizen living in Malawi that is, with her husband, in charge of the GTZ German / Malawi Basic Education Programme, MoE

Sustainable School Food & Nutrition Programme, GTZ BEP, Box 31131, Lilongwe, Malawi. They are active in diffusing the work they do with local associations, communities, schools, etc. They would have involved over 4000 students, but it is not clear if this was a work of the couple alone or if other collaborators were involved in this herculean challenge. Ms. Nordin promotes healthy and sustainable agriculture and domestic practices, stressing the recycling of food, waste, water, the use of the peri-domestic environment for food production and soil protection, and good nutrition using local products. She has transformed her house in a product and practice show-room and her garden in a demonstration plot of these different management alternatives.

Despite being informed of the background of the visitors in health, nutrition and environment, she lectured us enthusiastically about the virtues of the different food groups, the cycle of water, the structure of soils and so on, while guiding us through the premises. We could see that she was not so successful in convincing her neighbours to adopt some of the suggested methods and approaches, a fact that she attributed to their stubbornness.

Despite the correctness of the suggested practices, the arrogance with which they are exposed in a top-down fashion and the frequent and less than flattering mentions on the negative aspects of the character of Malawians left us all quite astonished, and still more when we learned that this NGO is supported by prestigious donors such as GTZ and FAO. In other words, “How to have a great time in Malawi with subsidized gardening”, or “Funs and funds of gardening in Malawi”.

The irony here is unavoidable as this visit was made right after returning from the SFHC project area, and the contrast between the approaches used by both groups could hardly be stronger. They represent extremes in the spectrum of international development initiatives and under this point of view this visit was exceedingly instructive and illustrative.

### **3.3. Instruments**

#### **1A. General information**

##### **1A.1. Consultation to the Project leader(s)**

The answers to these questions shall reveal common consent of Project leader about the evaluation processes of the project's activities, interpreted in relation to expected changes and achievements described by the objectives of the Ecohealth project. By "change" it is meant the development outcomes and modifications related to human health, well-being promotion and environmental sustainability and or any other partial and transitory outcome that could lead to Ecohealth development outcomes.

1. What kind of strategies and tools are used to identify key elements regarding the links between the environment (bio-physical domain) and human health *within* the ecosystem?
2. How did this lead to the integration of transdisciplinarity in the team?
3. Do the project's partnerships include the key-individuals and organizations representatives that may influence development-related changes? (List: names and organizations).
4. Besides the indicators already monitored in your project, would you suggest other suitable indicators of changes in environment and health situation, that could be useful in this evaluation and coherent with its time frame? If positive, how have these indicators been developed or identified? Are these indicators available?
5. Are there facts in the recent project development, relevant to this evaluation, that are not reflected in the project documentation (proposal, reports, etc.) made available to IDRC?
6. When and how often the ecohealth outcome mapping methodology is applied to promote transdisciplinarity in designing and implement action?

##### **1A.2. Consultation to the project beneficiaries**

This will be done by semi-structured interviews or focus groups to be applied, as far as possible, jointly by evaluators and project leaders, during the visits to the projects. The questions will be previously negotiated with project leaders and they will be asked to rephrase the questions to adapt them to local cultural and language attributes.

1. How would you describe the main objective(s) of the project to a relative?
2. How relevant are these objectives to you? (rank)?
3. How much of these objectives you think has been attained so far?
4. Are there issues that you consider priority for you, to your family/community or to the region that are not being addressed by this project or any other initiative?
5. What were the actions of the project that were more effective and should be continued?
6. What has not been done so well, could be improved or stopped?

7. What positive/negative changes the project has introduced in your own behavior, relationships, activities, actions or attitudes?
8. Of these changes (if any), which ones you think would persist when the project finishes?
9. What positive/negative changes the project has introduced in the behavior, relationships, activities, actions or attitudes of:
  - your family
  - your community
  - the project team itself
  - the decision makers
10. If the project was a living creature, which one would it be, and why?

### **1A.3. Consultation to the project team**

1. How much of the project objectives you think has been attained?
2. What factors helped / were negative to the development or success of the project?
3. What were the actions of the project that were more effective and should be continued?
4. What has not been done so well or could be improved or abandoned for requiring too much effort or resources to succeed?
5. The project involves people of different professions, working together and with the community in developing new tools and solutions. Give some example of how positive/negative this was for the project. Was any important profession not included in the project? Were there significant conflicts between the different involved professionals?
6. The project takes into account the different roles of men and women in task division and decision making. Give some example of how positive/negative this was for the project.
7. The project tries to consider the voices of all sectors and groups involved in the project issue and to increase the capacity of local communities and institutions to deal with this issue? Give some example of how positive/negative this was for the project. Was any important group or sector not included in the project?
8. What external factors (climatic events, political / economical changes at regional or national level ) were positive /negative to the project?
9. What positive/negative changes the project has introduced in your own behavior, relationships, activities, actions or attitudes and in your partners, project beneficiaries, local and/or regional/national decision makers?
10. Do the involved stakeholders have, and use, the appropriate tools, skills and knowledge to monitor the outcomes related to sustainable health and well-being?
11. What, if any, was the biggest unresolved issue in the project?
12. Was there any noticeable effect of the project on actions and policy at regional/national level?
13. If the project was a living creature, which one would it be, and why?



**1A.4. Consultation to decision-makers and stakeholders representatives**

1. What are the changes that the project expect to promote (it includes socio-economic, political, environmental, behavioural and health positive movements)?
2. How much of these objectives you think has been attained?
3. What factors helped/were negative to the development or success of the project?
4. What were the actions of the project that were more effective and should be continued?
5. What has not been done so well or could be improved or abandoned for requiring too much effort or resources to succeed?
6. The project involves people of different professions, working together and with the community in developing new tools and solutions. Give some example of how positive/negative this was for the project (option: do you agree? Give an example to illustrate your answer).
7. The project takes into account the different roles of men and women in task division and decision making. Give some example of how positive/negative this was for the project.
8. The project tries to consider the voices of all sectors and groups involved in the project issue and to increase the capacity of local communities and institutions to deal with this issue?
9. What external factors (climatic events, political / economical changes at regional or national level ) were positive /negative to the project?
10. What, if any, was the biggest unresolved issue in the project?
11. What positive/negative changes the project has introduced in your own behaviour, relationships, activities, actions or attitudes?
12. Was there any change in actions/policy at regional /national level? If not, what are the chances that may happen in the near future?
13. How compatible are the actions taken by the project, with the mandate of your institution or organization?
14. If the project was a living creature, which one would it be, and why?

**1B. Project-specific information and list of persons, groups and institutions to be interviewed for each project****1B.1- Ecuador project****Project-specific issues and their targeted respondents**

1. Is there a conditioning of banking credit to farmers to the application of a “technological recipe” prescribed by official agronomists, including specific fertilizers and pesticides? (Project leaders and agronomists)
2. What have you been thought about pesticide effects on the environment and on human health during your studies? (research team agronomists, technical and graduate levels, Emerson Bravo, Jovanny Suquillo, Edmundo Carlosama MAG.

**For Farmer field schools farmers and agronomists, Emerson Bravo, Jovanny Suquillo**

1. What IPM techniques have you incorporated in your own practice after the FFS's?
2. Have individual protection materials become more available? More affordable?
3. What kind of individual protection do you use?
4. What changes did you notice in the following:
  - the attitude of pesticide vendors when visiting you
  - your attitude towards them during these visits
  - the color coding of pesticide products
  - the way these products are handled, packaged at local shops
5. What changed in the way pesticide poisonings are handled by local health services?

**To management and ground staff of local health services (Cluster de Epidemiología and Gustavo Delgado, Médico Emergenciólogo del Hospital de Tulcan, Director Provincial de salud de Carchi)**

1. What information did you receive on symptoms and treatment of pesticide poisoning during your basic professional training?
2. Are suicides of obligatory notification in Ecuador? If yes, do you think the data are reliable? If not, why?
3. What were the recent changes, if any, in the way suicides are handled by health services?
4. What protocols were developed, and are they currently applied, to document, diagnose and treat pesticide poisonings?

**To teachers at communities targeted by the project (not so applicable, but may be done at San Pedro).**

- What change, if any, did you notice in children behavior, health or performance during the project? Are these changes related to project activities or actions?

**Pesticide industry representatives, retailers or vendors ( Crop Life) and local expendidores (specially at Montufar)**

- 1- What is the present trend in pesticide production and sales?
- 2- What changes, if any, did you notice in the behavior of your clients in the last years?
- 3- A number of meetings, workshops and official contacts concerning the appropriate use of pesticides and their health and economic aspects have been organized or supported by this project, many of them with media coverage. What changes did this introduce in your policy or practice?
- 4- Where any changes introduced in the color coding and labelling of the products or in other printed instructions or information about them? If not, are there plans for it? (probably by telephone to the headquarters of Crop-Life in Guayaquil).

**To policy-makers (Iván Angulo, FAO, Carlos Navas, Cesa central level, Dr. Alvarez, Cesa Carchi, Director Provincial del MAG en Carchi, Alcalde de Montúfar re-ordenances)**

- 1- Did the project activities and contacts with policy-makers and other stakeholders lead to the development of proposals to regulate pesticides use? What is the present status of this issue?
- 2- What changes, if any, do you perceive in the attitude of the pesticide industry/vendors?

### **1B.2- Malawi Project**

In concertation with the project leaders Rachel Kerr and Peter Berti we agreed to focus on key-informant in depth interviews rather than on focus groups due to language barriers and logistic issues. The project visit is scheduled for early April.

#### **Project-specific stakeholders and questions**

##### **Farmer team members, veterans and more recently enrolled ones**

1. Do you think that if the donation of seeds stops, the self-organized exchange of seeds between farmers will be enough to assure good levels of legume consumption?
2. How did the introduction of OMT in your practice change crop yield/quality? and the health of your children?
3. How did your participation in the seed bank change your status within your community?

##### **Grandmothers and mothers, (separately), project veterans and newcomers.**

1. What, if any, desirable/undesirable change(s) were introduced by the project activities in decision- making and task distribution at household level?
2. Do you perceive any change in the health of your children/grandchildren as a result of increased legume options/nutrition education?.
3. Mothers: did you increase EBF frequency or duration? If no, why. If yes, did you perceive any effect on the health of your baby?

##### **Village chiefs and/or cattle owners**

- What, if any, desirable/undesirable change(s) in decision-making at community level were introduced by the project activities?

### **1B.3- Goa Project**

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**Questions to Project Leader and Research Team Members**

1. What are the indicators and survey data that could be applied to evaluate the impact of work and employment changes on family health and well-being situation?
2. Did the families' perception of the importance of agricultural work to health and well-being changed over time as a result of project's activities?
3. What are the specific procedures to work with farmers groups in order to decrease information asymmetry between them, government officials and mining companies representatives?
4. What is the impact of compensation received on health and well-being of family groups as compared to those community groups not entitled to this?
5. Which indicators are applied to identify of changes in perception of farmers in relation to their role in policy making and negotiation with mining companies and government?
6. In what extent the fruit/edible crops in mine reject dumps have affected family health and well-being, both in terms of nutritional status and income level or socio-economic situation?
7. What changes did occur in the communities' perception on the benefits of dump revegetation and other remediation measures?
8. What are the impact of water shortages on family well-being?
9. Would you describe the changes in the way community representatives address the problems of the public health services systems, coverage and quality of health care?
10. How did the mining companies modify their opinions about health and well-being needs of the communities?
11. In what extent the scientific evidences produced by the project are turned into policy recommendations to reduce impact on environment and health/well-being?
12. How did the transdisciplinary approach in producing information on impact of mining activities on health situation and well-being help strengthening governance structures and their capability to present solutions to the health problems?
13. In what extent the information produced by the project has empowered community members, NGO and local government authorities?
14. What are the data available on economic burden or cost of ill health as a result of air pollution?

**Questions to land owners and tenants of the land, farmers, agricultural workers and community members (leaders and NGO representatives)**

1. Did work and employment changes due to decrease in agriculture activity affect your family/community overall health/well-being situation? How?
2. Do you think compensation received due to decrease in agriculture activity has helped maintaining your family/community health and well-being? How?
3. Do the government institutions respond more promptly to community needs of health services now than in the recent past? Give some example to illustrate your answer.

4. Do you feel that mining companies are modifying their opinions about health needs and the environment situation of communities as a result of the project's action and initiatives? Give some example to illustrate your answer.
5. Do you have more access to information on environmental changes and health and well-being situation as a result of project's activities? Give some example to illustrate your answer.
6. What else you feel that the project could do in lessening the impact of environmental changes on well-being of women and children?

### **Questions to Government officers and official institutions**

1. What are the mechanisms by which the community representatives participate on water availability policies and implementation of remediation measures?
2. How the information available on water shortages and water supply problems being used by governmental institutions to respond to community needs?
3. What are the mechanisms by which the community representatives participate on air quality policies and implementation of specific control measures?
4. There have been changes over time in the way community representatives address the problems of the public health services systems and the coverage and quality of health care? What are the changes and how did they occur?
5. Do the government institutions respond more promptly to community needs of health services now than in the recent past?
6. In what extent the scientific and technical evidences produced by the project are turned into environment and health/well-being policy and services?
7. What else do you feel the project could help to improve organisation and delivery of health care services. What can be done to improve quality of health services?

### **Questions to Mining Companies representatives**

1. What are the mechanisms by which the community representatives participate on water availability policies and implementation of remediation measures?
2. What changed over time in the opinions of mining companies about health/well-being needs of the communities and its relation to policy and program implementation?
3. What are the mechanisms by which the community representatives participate on air quality policies and implementation of specific control measures?
4. What are the mechanisms by which the scientific and technical informations are made available by the project to mining companies on the health and well-being needs of communities?
5. In what extent the scientific and technical evidences produced by the project are turned into policy recommendations and effective solution to environmental changes?
6. What were the changes in health and well-being of families/communities as a result of compensation policy and remediation measures?

### **1B.4- Cuba Project**

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**Questions to Project Leader and Project Researchers**

1. How is the project integrating information and assuring adequate flow of information and its dissemination among those interested to accomplish appropriate decisions on ecosystem management?
2. If any, what are the constraints faced by the project to establish the appropriate flow of information to decision makers regarding ecosystem management to control dengue risk factors?
3. How well the multilevel analysis is serving the purpose of examining the possible relationships between individual and area aggregated data, as related to ecological variables and dengue occurrence within and among different study areas?
4. Past or present experience with dengue fever, including dengue hemorrhagic fever (meaning the occurrence of dengue cases among family members) play any role in the way families adhere or participate in activities demanded by the surveillance system?
5. In assessing the socio-economic burden of dengue fever did the surveillance system include indicators of days of work lost, variation in family income, etc.? What are the indicators of socio-economic burden of the disease?
6. Are education and income levels differences between areas of any importance in determining the effectiveness of community participation in the dengue surveillance system?
7. How would you describe the way the surveillance system deals with different roles, if there is any difference, of participating men and women?
8. Was the level of contamination in water samples by pesticides (larvicide and insecticide) applied to control vector density included in the environment surveillance system? How do they combine?
9. If the level of community mobilization to address ecosystem needs changed since the beginning of the project, what do you think was the project's action that contributed most to that?
10. How campaign operators (campañistas) were identified and involved? Are the campaign operators (campañistas) members of the community of Center Habana?
11. What is the proportion of women among campaign operators? Are there different roles of men and women campaign operators?
12. In identifying risks and needs of the population, how the results of interviews with key informants were validated?
13. Has the transdisciplinary approach to environment and health relationships helped the project to achieve its main objectives so far? Explain how.
14. How would you describe the importance of the involvement of schools and other community social equipment in achieving the project's objectives?

**Questions to Project Team Members and Representatives of participant institutions (Instituto Nacional de Higiene, Epidemiología y Microbiología (INHEM), Instituto de Medicina Tropical Pedro Kouri (IPK)), Health Offices and other Government Authorities, Representatives of Popular Council at the provincial level, health professionals at local level.**

1. What are the main determinants of differences in public participation in implementing the strategy of surveillance to control dengue between areas (five Health Directorates)? How did you identify these differences?
2. How did the action to control and prevent dengue transmission relate to overall improvement of health and well being situation of communities in Center Habana? What are the most important factors that can impel sustainability of the health and environment surveillance system being implemented?
3. Did risk perception of community members related to the presence of in-house vector breeding sites changed over time as a result of surveillance intervention?
4. How would you describe the role of your institution in responding to public demands for decreasing the risk of dengue transmission/occurrence in the study area?
5. What have been the most effective mechanisms by which the scientific and technical information produced by the project reached the different actors interested on changing the environment and health situation of community, as related to dengue prevention and control?
6. Did the transdisciplinary approach in producing information on environment risk factors help strengthening governance structures and their capability to present solutions to the problems?
7. How do you describe the relationships between controlling dengue (either epidemics or endemic cases) and improving the overall health situation of families?
8. How do you think the gender differences in participation have being assessed by the surveillance system? What are the role of men and women in the surveillance system?
9. How is the health service (health professionals) responding to mobilization in order to establish the community surveillance system?
10. What are the main differences between projects in Center Habana and Cotorro that could make comparison more difficult in applying the strategy of community surveillance?

**Questions to Community members, Community leaders, Women organization (Federation of Cuban Women and the Committee for the Defense of the Revolution)**

1. Do you feel that yourself and your family became more involved in the prevention and control practices as a result of the project's activities?
2. Do you think that past or present experience with dengue fever play any role in the way families adhere or participate in the activities demanded by the surveillance system?
3. In your opinion how the prevention and control of dengue will change or improve the socio-economic situation of the families/community?
4. What are the role of men and women in the surveillance system to prevent and control dengue?
5. How did children and elderly benefited from the environmental changes to prevent and control dengue?

6. What kind of recent changes in behaviour/attitudes of community members have you observed to reduce risk of dengue transmission?
7. Were there changes over time in community mobilization to address its ecosystem needs?
8. Do you think that health professionals and those who work in the health system became more involved in working with the community to reduce risk of dengue transmission?
9. How many and where dengue epidemics had occurred during the project time? What was the magnitude of these epidemics?
10. What kind of positive impact did have the II Congreso Internacional de Dengue y Fiebre Amarilla (June 2004) promoted in this current research project? What was the participation of the team and what kind of output did the team obtain?



### 3.4. List of Participants

A list of research team members and participants of all four projects, who were involved in this evaluation is presented below.

#### **Centro Habana Project. Applying an Ecosystem Approach to the Sustainable Prevention and Control Dengue in Centro Habana, Cuba II**

Ana María Ibarra Sala, MsC – Project Coordinator. Environmental Health specialist, Sociologist, Chief Investigator, and Full Professor and Researcher of La Habana University. Institution: *Instituto Nacional de Higiene, Epidemiología y Microbiología* (INHEM).

Mirian Concepción Rojas, MsC, Health specialist, Sanitary Engineer, Chief of the Environmental Health Risk Evaluation Group, Assistant Professor of Graduate Course in Environmental Health and Researcher. Institution: *Instituto Nacional de Higiene, Epidemiología y Microbiología* (INHEM).

Alfredo Pintre Novoa, Veterinary, Entomologist, specialist on vector control, Chief of the Surveillance and Anti-vector Department, works at Municipality of Centro Habana and is a representative of Ministry of Public Health in the Centro Habana Ecohealth Dengue Project.

Angel Manuel Álvarez Valdés, MD, MsC, General Physician, specialist in Hygiene and Epidemiology, Professor of Graduate Course, responsible for the Epidemiologic Surveillance Group. Institution: *Instituto de Medicina Tropical Pedro Koury* (IPK).

#### **Goa Project – Environmental and Social Performance Indicators and Sustainability Markers in Minerals Development: Indicators of Health and Well-Being, Goa III**

Ms. Shirin Cooper. Research Associate. Political Science, Env't. and Dev't.. Co-principal Investigator, Coordination of research component, research on water and agriculture with special focus on gender and governance. Carrying out capacity building programmes for women and local government.

Dr. K. S. Nairy. Fellow Statistics (Biometrics). Survey design and statistical analysis of survey data.

Ms. Melba D'Souza, Research Associate, Nursing, Public health Research on community health status through focus group discussion and interviews with community and health professionals. Research on health care system. Supervisor for health tests (PFT, X-rays) conducted. Carrying out health-related capacity building.

Mr. Anand Murugesan. Research Associate. TERI, New Delhi, Economics, Development of model for economic valuation of cost of ill health related to air pollution. Supervision of health-related survey.

Dr. Sangeeta Sonak. Fellow. Microbiology. Coordination of metal up-take and land remediation component. Designing of experimental study and statistical analysis of data.

Dr. B. Choudri. Fellow. Geology. Research on community preferences with regard to land rehabilitation. Vegetation assessment (for metal up-take component).

Ms. Saltanat Kazi. Research Associate. Political Science. Coordinator for governance component. Research on health-care governance linkages. Capacity building programmes for local government representatives.

Ms. Yogita Mehra. Research Associate. Resource economics. Research on governance-air pollution linkages. Survey design and data analysis of governance survey. Capacity building programmes for farmers groups and local government representatives.

Ms. Anuradha Joshi. Gender, Social work. Research on water, agriculture, gender. Capacity building programmes. Governance.

## **Ecuador Project**

### **Project leaders**

**Fadya Orozco, Quito (personal interview)**

**Donald Cole (telephone interview)**

**Charles Crisman, CIP, Lima (telephone interview)**

### **Project team**

Phase 1: Patricio Espinosa, Steven Sherwood, Miriam Paredes, Luis Escudero, Mariana Perez,

Bridge phase and phase 2: Emerson Bravo, Jovanny Suquillo, Ximena Tapia, Edmundo Carlosama, Melba Narváez, Norma Jácome,

### **Project beneficiaries**

Phase 1: Jovanny Suquillo, and possibly members of the San Pedro community

Bridge phase: Jovanny Suquillo, Ximena Tapia, Emerson Bravo

Phase 2: Cluster de epidemiología, Emerson Bravo, Edmundo Carlosama

### **Decision-makers and stakeholder representatives**

Bridge phase and phase 2:

Emerson Bravo, Municipio de Montúfar, Director de Cesa Carchi, Director MAG Carchi, Director CESA Carchi and/or Director CESA Central, Director Provincial de Salud Carchi, Epidemiología DPS, Ivan Angulo (FAO).