

INTERNALLY COMMISSIONED EXTERNAL REVIEW OF THE NATURAL RESOURCE MANAGEMENT PROGRAM AT CIP.

Program Evaluation Report

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1. EXECUTIVE SUMMARY

The “Internally Commissioned External Review (ICER)” panel found that the CIP Natural Resource Management (NRM)¹ program has made excellent progress over its two years of its existence. It is capable of addressing a considerable range of issues relevant to mountain resource management. The core team of the program has excellent and productive researchers, and they are in the process of developing important and innovative methodological tools that will address issues related to crop and livestock intensification, soil fertility management, system analysis, bio-diversity, trade-off analysis, and impact of pesticides on health. They have been successful in attracting a wide range of funding that enables them to address several of the key agricultural NRM issues that are of concern in the Andean Mountain region.

It is suggested that the team consider conducting a strategic planning exercise to identify the priority areas where the research thrust should be. This priority list should be flexible enough to accommodate moderate shifts in both the external and internal environments, and provide guidelines for their relationships with donors.

The primary clients that will benefit from the research should be the policy decision-makers at the national and provincial level and the research community should be an important but secondary client. A process of consultation with representatives of the intended final user groups should be initiated to assure that the research would provide effective solutions to the problems identified by the users.

Activities should be restricted to those areas where CIP has a competitive advantage, and the geographic focus should be on Andean Mountain agriculture above 2000 meters altitude. The NRM researchers are largely agreed that the subject matter focus of their research should lie at the interface between agriculture and the environment. In the high Andes, most agricultural natural resource problems arise from resource-poor agricultural intensification (soil fertility loss, overgrazing) and extensification (soil erosion and water source endangerment with expansion onto fragile marginal lands). Both of these sources of NRM problems are triggered by rural poverty, making income generation the main issue in need for solutions in the region. The suggested focus on soil-water resources linked to trade-off and policy analysis is most desirable but requires that the expertise in the hydrological sciences and resource economics be added to the NRM team.

Selecting one project where most people in the team have an opportunity to participate and interact would be desirable, since this would strengthen the integration. At present the soil nutrient-trade-off system modelling is of high caliber, as are remote sensing and linear programming efforts. These efforts are appropriately targeted towards the

¹ As used in this report, the CIP NRM program primarily refers to project 14: “Sustainable Land Use in the Andes”. The ICER panel also received information about project 13 (Potato Production in Rice-Wheat Systems), Project 17 (Conservation of Andean Root and Tuber Crops), and CONDESAN (Consortium for Sustainable Development of the Andean Ecoregion).

development of decision support system. If these two areas of research could be combined and linked with GIS, and applied to watersheds then the program will have unique capabilities that would be of value to the scientific communities and a range of decision-makers in the region

Scaling up the models from fields to watershed remains a challenge and more thought needs to be given to determine whether it is possible to do such up-scaling in combination with socio-economic factors and whether this can be made relevant to a range of decision makers (farm-community-region).

A clear distinction needs to be made between CONDESAN and Project 14. It is suggested that the CONDESAN coordination unit be removed from within Project 14, and be placed in a separate position in CIP. Creating a CONDESAN secretariat, which is not part of the research management hierarchy, is desirable.

External relations were found to be very good both at the global, regional, and national level. The contribution to the national educational programs is particularly impressive. Involving community and stakeholder groups and farmers in some of the educational programs is desirable, and CONDESAN could play a greater role in making this linkage.

The project performance could be improved by enhanced internal scientific communication. To make this possible an administrative assistant should be assigned to the project to free up time for the project leader.

2. BACKGROUND

The core group of researchers in the NRM program was consolidated within CONDESAN in 1996 and became the NRM unit within CIP in 1998. The development of a research program in a new area within a commodity based research center, the creation of alliances with new institutions and partners, and seeking research support to external funding agencies were the major challenges faced by the group. The unit in its current form consists of five internationally recruited researchers, four national researchers and three to four associate researchers with external funding sources. The NRM group operates out of the CIP center in Lima and the CIP sub-station in Quito, Ecuador. The CONDESAN benchmark sites in Bolivia, Peru, Ecuador, Colombia and Venezuela serve as the primary areas for the NRM research. The focus of the group is on basic research relating to mountain agriculture in the Andean region with a particular emphasis on system analysis and the development of quantitative methods to assess production impacts on the environment. Poverty alleviation, maintaining sustainable agricultural production, biodiversity, and providing scientific knowledge as a basis for policy decision making are all topics that are central to the program.

The NRM program reviewed by the panel is primarily Project 14, its relationship with CONDESAN and partially project 13, and 17.

3. ACHIEVEMENTS AND IMPACTS

The overall quality of the NRM program is very good. Its achievements and impacts on the Andean region are impressive for a program that has only been formally in existence for four years even though its origins go back several years. Project results have been disseminated through various types of publications, conferences, university teaching, undergraduate and graduate student supervision, and training courses and workshops. The project staff has been successful at obtaining project support from a wide range of donors.

The NRM project staff are to be commended for their impressive record of networking, information dissemination, working with students, and success at project funding.

3.1. Publications

The NRM program has produced a significant number of articles in conference proceedings and book chapters and several books in the last two years. However little has been published in the refereed journals. This may be a reflection of the relatively short life of the program and the lead-time necessary for publication in the refereed literature.

Recommendation: Publication in books and conference proceedings should be continued and at the same time increase the number of refereed publications in order to reach the broader scientific community.

Publication of results should be primarily in media that reach the research clients as well as the broader scientific community.

3.2 University Teaching

NRM-CIP staff is to be commended for their involvement with teaching at a large number of universities in the Andean region. This is an important form of outreach and information transfer on sustainable agricultural practices and natural resource management that should be maintained and strengthened. This is an important capacity building activity in the region.

Recommendation: Encourage continued NRM staff involvement in support of teaching at regional universities, but this should not be the primary focus.

3.3. Undergraduate and Graduate Student Supervision

NRM-CIP staff is to be commended on the large number of undergraduate and graduate students from universities all over the world that is involved with natural resource

management related projects. Approximately 10 local undergraduate thesis are supervised each year. An average of 10 graduate students from Latin American institutions and 5 from the rest of the world are supervised each year. Student involvement in research projects is an important form of training and knowledge transfer.

Recommendation: Encourage continued NRM staff involvement with undergraduate and graduate students in NRM-CIP projects.

3.4. Conference Organization

NRM-CIP staff has been very successful in organizing conferences and publishing the proceedings. Example are the IESA III conference in August 1998 which produced excellent proceedings, and the up-coming SAAD III Conference in November 1999 from which two different books in CD format will be produced. Some 10 papers have been prepared by the NRM group for this conference. Conferences are great vehicles for information exchange, development of new programs, and the enhancement of CIP's scientific reputation. However, consideration should be given to balancing staff time involvement with conference organization with respect to other research activities.

Recommendation: Continue to support the organization of conferences as appropriate to the NRM mission.

3.5. Training Courses

Training courses are an important part of CIP's activity to make research results available to a wider audience. NRM-CIP staff has been very successful in conducting training courses and workshops. Often more than 150 people are in attendance. These help to develop networks of people and aid in data compilation that in turn supports the research efforts. An excellent example is the upcoming PRONAMACHS meeting in Cajamarca, Peru in November 1999.

Recommendation: Encourage continued NRM involvement with training courses and workshops.

3.6. Grant and Project Success

The NRM Program has been successful in obtaining support from donors. The NRM group working with cooperating institutions and CONDESAN form a strong team that should continue to have success at attracting funds from various donor organizations for natural resource management research in the Andean ecoregion. As discussed below the team should avoid letting donors take control of the research agenda.

Recommendation: The NRM should continue to partner with cooperating organizations and CONDESAN to enhance its funding success with donors

3.7. Global Impact

CIP has provided the leadership for the Global Mountain Forum and Global Mountain Project through its Natural Resource Management Project. Roberto Quiroz is the coordinator for the Global Mountain Program. The NRM Project also has global impact through publications, conferences, and student training. This is an excellent avenue for CIP to influence the global agenda and to take a leadership role on NRM within the CGIAR systems

Recommendation: NRM should continue to provide global leadership natural resource management issues, but this should not be the main thrust for the next few years.

3.8. Areas of Strength

The strength of the NRM program is in four basic research areas: Soil nutrient modelling, trade-off analysis, remote sensing, and modelling of livestock systems. Current research activities are in method development addressing the main problems in the region, and the individual researchers have done an excellent job in developing tools and approaches that are innovative and well advanced in addressing key problems in the region. Once the components are integrated and linked to GIS, they will become very powerful sets of tools to diagnose natural resource conditions and provide decision support for policy makers. There is clear evidence that the approaches used are relevant, of high standard and employ computer tools that are novel and effective. The collaboration with outstanding external researchers, in highly qualified institutions, assures that high research standards are maintained within NRM.

Research efforts in the agro-biodiversity area are also well received and international interest in the methods developed at NRM is growing. These more applied research activities are aimed at assisting farmers, communities and NGO's in improving productivity without compromising environmental conditions. This is also stimulating virus and gene research.

The individual researchers have very high standards and there is a good rapport amongst the research team. There is a good age distribution within the team and the members are dynamic, hard working and enthusiastic and this bodes well for the future of the program. However, the NRM program would benefit from a more integrated collaboration. It is suggested that the team consider a joint project in one watershed, where all members participate in the research and where most of the techniques under development are linked. This would allow for a more comprehensive evaluation and would result in the development of very powerful integration tools that can potentially reach a wide

audience. Considering that the program is only two years old it is impressive how much progress has been made and the team should be congratulated for their achievements.

Another strength is the work across national boundaries and the support of CONDESAN allows them to disseminate the research results to different clients.

4. STRATEGY

4.1. Strategic Plan

Research in natural resources management (NRM) can encompass a plethora of potentially important problems. Even when the potential scope is narrowed to geographically limited mountain geographies; a variety of important research foci could be identified. CIP's NRM researchers are currently engaged in activities which include intensification of crop and livestock production systems, nutrient leaching and runoff, pesticide problems, soil erosion, overgrazing, agricultural expansion onto marginal lands, and income-environment trade-offs. CIP researchers suggest that other relevant research areas might include conflicts between agricultural and urban or mining land and water uses. Among the NRM researchers no formal prioritization of these topics has been taken place.

The variety of NRM research clients is as impressive and bewildering as the research topics. The five core NRM researchers cited among their clients: development aid donors, researchers, graduate students, non-governmental organizations, farmers, and national, regional and local governments.

This variety of research topics and clients cited suggests that a clear, shared vision of NRM research is lacking. The lack of a coherent vision causes two problems. First, given its resource constraints, the CIP NRM program is unlikely to achieve as much impact as it might if it were more focused. Second, the program risks losing focus even further in response to changing donor priorities.

Recommendation: The CGIAR mandate to develop a logical framework (log-frame) for center projects creates an opportunity for the NRM program (notably Project 14) to develop a strategic plan for its research. Perhaps the most important benefit of strategic planning is not the final plan itself, but rather the process of communication, visioning, and priority setting. Elements of the plan should include:

- **Assess CIP's strengths and weaknesses in NRM, as well as the opportunities and threats it sees for NRM research as a part of a CGIAR member institution.**
- **CIP should develop a vision statement, goals, and objectives for its NRM work, followed by program activities that support those goals and objectives.**
- **Determine whether the goal(s) and objectives fit into a single CIP project.**
- **Make the plan flexible enough to accommodate moderate shifts in both the external and internal environments.**

- **Indicate the boundaries of relevant NRM activities at CIP (so as to avoid needless dilution of effort into areas that are not complementary to the program focus).**
- **Prioritize research areas and the desired sequencing of activities.**

Subsequent recommendations of this ICER include suggestions about certain of these elements. But useful as an external perspective may be, a strategic plan cannot be imposed successfully from the outside. It can only be effective if developed by the people who will be responsible for executing it.

4.2. Geographic Focus

Virtually all CIP NRM research is currently located in the Andean region. This geographic focus is appropriate. Given the size and strength of the NRM group at CIP, activities should continue to focus on mountain agriculture in the high Andes. CIP's working definition of the high mountain areas as being about 2000 meters altitude is appropriate.

Recommendation: Restrict activities to those areas where CIP has a competitive advantage. The geographic focus should be on NRM linked to Andean Mountain agriculture. The current working definition of highlands as above 2000 meters altitude is suitable.

4.3. Subject Matter Focus

There is a need for greater subject matter focus to CIP's NRM research. The NRM researchers are largely agreed that the subject matter focus of their research should lie at the interface between agriculture and the environment. In the high Andes, most agricultural natural resource problems arise from resource-poor agricultural intensification (soil fertility loss, overgrazing) and extensification (soil erosion and water source endangerment with expansion onto fragile marginal lands). Both of these sources of NRM problems are triggered by rural poverty, making income generation a *sine qua non* for solving many NRM problems in the region.

CIP's subject matter focus in NRM research should encompass not only the positive and negative aspects of agriculture, but also those external factors that interact with agriculture, such as water demands, uses, and pollution related to non-agricultural activities (mining, urban, industrial). Land and water use competition and trade-offs can be addressed as long as they have a direct or indirect impact on agriculture. Given CIP's mandate the focus should not be on forestry, mining, eco-tourism and non-agricultural biodiversity, since these topics are more effectively addressed by other research institutions. Climate change is relevant to the NRM program, but research in this area should be oriented toward water resource management and climate risk at the farm level, rather than CO₂ and methane emissions.

Within the area of Andean Mountain agriculture, the most suitable focus is soil and water management at the watershed scale. There is significant expertise within the NRM program on soil nutrient management, crop and livestock production, trade-off analysis, systems research, and modelling. However, a major gap exists in the areas of hydrology, which includes water resource management, climatology, and soils. Relevant topics for water management research include the basic hydrologic process in mountain watersheds, impacts of climate change on the hydrology of mountain watersheds, impacts of competing water users on availability and quality of water to agriculture, and physical and chemical impacts of agricultural water use on other water users in the watershed. Relevant soil management research topics include impacts of agricultural practices on soil fertility, nutrient and carbon cycling, and soil erosion. Soil erosion processes require understanding both soil properties and hydrologic processes within the watershed. Given that water and soil resources are managed by Andean farmers using complex systems of fertility and pest management, these processes need to be researched in the context of farming systems as they fit into the landscape and regional economy.

Agricultural NRM decisions are taken by people. The vast majority of the people engaged in farming in the Andean mountains do so in conditions of poverty and extreme poverty. Sustainable management of natural resources in the Andes cannot be separated from finding ways to alleviate rural poverty. As is appropriate, economic analysis is already a key component of CIP's NRM research. However, current economic research focuses chiefly on decisions taken by individuals, such as decisions regarding income-environment trade-offs. Given that many water and soil management issues have important off-farm causes and/or consequences, there is a body of relevant research topics in resource economics that includes collective management of water as a public good, externalities of farm water use and soil erosion, and the design of incentives to promote individual behavior that contributes to long-term social welfare.

Recommendation: In subject matter, CIP's NRM research should focus on resources having a direct or indirect effect on highland farming systems. Water and soil resources with related policy analysis should be the primary focus of CIP's NRM research. Andean water and soil resources have been identified as being at risk and also serve as excellent integrators between agricultural production and the environment. Understanding hydrological processes, effects of climate change on water resources, external demands for water and pollution are all key issues affecting the agricultural system. As for scale, research at the field and regional scale are well developed, but the link to the intermediate (watershed) scale needs to be strengthened, if we hope to influence policy decision makers at different levels.

Given the strong linkages between rural poverty and many NRM problems related to Andean agriculture, economic analysis of policy and technology alternatives is also essential, and needs to push beyond the current trade-offs research to look at watershed-level issues of public goods, externalities, and incentive design.

4.4. Clients of CIP's NRM Research

There is definitely a need: (a) to generate a shared definition of who are the intended users or clients of the results of CIP's NRM research, and (b) to put in place more effective mechanisms and platforms for interacting with those clients throughout the research process.

During the presentations and the individual interviews, it became apparent that the members of CIP's NRM research team, had different opinions about who the decision-makers who would make direct or indirect use of the results of their work. The one area of agreement was that one main client was the research community, at CIP, at other ecoregional programs in the CGIAR system, and in the national universities in the Andean countries. Focus on this client group is driven by the fact that much of Project 14's present work is on the development of ecoregional research methods and tools. Yet this group is the only one that has no decision-making authority over natural resources. Equally important, there was a wide divergence of opinion among CIP's NRM researchers about who are perceived clients.

The main focus of CIP's NRM research should be toward clients with decision authority – direct or indirect – over natural resource management. CIP's NRM research cannot afford to target only the research community; instead, the research community should be a secondary beneficiary of activities targeted toward NRM decision-makers. Among the many potential *direct* clients of CIP's NRM research is:

- National institutions, authorities and analysts charged with designing and implementing policies in the areas of agriculture, rural poverty alleviation, environment and natural resources, and land use planning
- NARS and ARI's
- Design and implementation units of major agricultural and rural development projects
- Private firms investing in natural resource-based industries
- NGO's working with rural communities and with local governments

We do not include farmers and municipal governments in this list of potential *direct* clients of CIP's NRM research, despite the fact that some of the researchers that we interviewed were of the opinion that these should be the main users of CIP's results in the area of NRM. We feel that aside from those farmers and local governments, who are direct collaborators in the research projects, these are stakeholders, which are best attended to by national private or public institutions.

It is not enough for CIP to make an internal decision about who should be the principal direct client of its NRM research. We are very concerned about the weak and indirect involvement of priority stakeholders in the definition of the research agenda, in providing feedback during the research process, and in the testing and evaluation of results. In particular, much of CIP's NRM research effort is in the area of methodology for decision support, yet there is scant evidence of participation in design and testing by the very decision makers whose needs are supposedly to be met. Through CONDESAN, CIP's

NRM team has access to a very wide network of very qualified research, policy and development organizations in all the Andean countries. In many of the benchmark sites, solid alliances have been built with local and national institutions. The potential for stakeholder involvement is present.

Recommendations: First, in the process of reviewing its strategic plan, CIP's NRM program should reach a consensus on who are its most important clients. As indicated above, the ICER panel recommends that the research community should be a secondary client, after those groups, which make or directly influence those who make natural resource decisions.

Second, as part of its regular programming process, CIP's NRM research team should organize formal and in-depth consultation workshops with those stakeholders who are identified as its priority direct clients. At less frequent intervals, CIP's NRM program (or CONDESAN, depending on the division of labor between the two) should also plan international meetings to foster interchange among its benchmark site collaborators.

Third, those NRM activities involving the development of decision support tools should incorporate a systematic process of consultation with representatives of the intended final user groups. Such a participatory approach will better ensure that CIP's NRM products and services are relevant to the needs and appropriate within the technical, financial and institutional constraints of its clients.

4.5. Scaling from Plot to Farms to Communities to Watersheds

To make the research most effective, the use of watersheds as an effective management unit should be considered central to NRM initiatives. The current modeling efforts use the plot as the smallest spatial unit under investigation and if the models can be effectively integrated and linked to a geographic information system (GIS) it is then possible to move up in the landscape hierarchy from plot to farms to watersheds. This has the advantage that the research results are more useful to a wider range of clients, such as farmers, community groups, regional planners and national decision-makers. We got the impression that the current trade-off model is aimed at influencing national policy, but this can only be accomplished if the results of the model can be agglomerated (using a GIS) into a watershed or regional context. While there are many limitations of using the watershed approach, there is now a consensus amongst the scientific community that water pollution and soil degradation, which are key issues for the future, are best quantified and addressed in a watershed context. These are dynamic indicators for monitoring environmental quality in agricultural systems. Upstream-downstream effects cannot be addressed effectively when using political and eco-regional units alone.

Recommendation: NRM research to inform policy decisions should be conducted at the watershed level. This requires that related models be able to scale up from the plot to the farm and to the watershed. Scaling up can be done by linking the models

to a GIS, which will facilitate the agglomeration process. A GIS linkage also has the advantage that dynamic processes and upland-lowland interactions can be addressed.

5. PROGRAM MANAGEMENT

5.1. Management, Communication and Team Work

The leaders of Project 14 and its subprojects are so clearly overloaded with work, that they have essentially no time to dedicate to systematic, periodic scientific dialogue. Even the basic bi-weekly information meetings have been discontinued due to lack of time on the part of researchers. It goes without saying that this state of affairs will eventually have a negative impact on the integrity and cohesion of Project 14, in particular if more researchers moved from Lima to Quito.

It has been estimated that the leader of Project 14 spends about 30-40 hours per week managing the Project and the Global Mountain Program. It is also expected that the Project leader spend a significant amount of his time doing research.

Recommendation: It is recommended that CIP allocate resources to hire an Administrative Assistant who can take over many of the current administrative responsibilities of the Project leader, so that the latter can spend more time in providing scientific leadership to the Program, improving internal communications and team building within Project 14, interacting with other CIP scientists and external partners, and identifying new research and funding opportunities.

5.2. Priorities and Integration of Research Activities

The prioritization and integration of research objectives, research methods and research results, should follow from the clear definition of a common vision, which has already been addressed in this document. Even considering only Project 14, the tool box of CIP's NRM program contains a wide array of methods and instruments, from Remote Sensing to GIS to farm surveys, and from linear programming to econometric models.

While it is absolutely legitimate that different approaches be used to deal with different questions, we did not get the sense that, for example, the decision about which models to use was the result of an in-depth exchange between project members, nor that there was a clear and explicit blueprint for integrating the partial processes and results.

We have found that formal, in-depth scientific discussion between Project 14 team members is not receiving sufficient time in the procedure to identify, prepare, screen and approve new research activities. Scientific exchange also needs to be strengthened to address the issue of integrating or coordinating research methods and results.

Recommendation: Project and Subproject Leaders of Project 14 should put in place a procedure to conduct periodic and formal exchange of views and information concerning new research activities, research methodologies and research results.

5.3. Relationship Between CIP's NRM Program and CONDESAN

The Terms of Reference of the ICER explicitly requested that the team review the *relationship* between CIP's NRM program and CONDESAN. It is very important to highlight that the ICER did not review the work or the accomplishments of CONDESAN in itself.

For several years, between 1992 and 1997, CONDESAN in fact was CIP's NRM program, in the sense that CIP did not do anything on NRM, which was outside the CONDESAN umbrella. In 1998, CIP organized itself into projects, and some of the researchers became part of Project 14 while others remained officially as CONDESAN staff. In short, there has been a gradual process of clarification of the relative roles and identities of both organizations. It is important that this process be continued, because there still persists a significant degree of confusion within CIP and between CIP and its external partners, which results in unnecessary tensions.

The ICER team strongly recommends the following measures to clarify the relationship between CIP and CONDESAN:

- **That CIP understands that its position vis a vis CONDESAN is one of being: (a) a member of the Consortium, and (b) the Convener (or Secretariat) of CONDESAN. In other words, it should be understood that CONDESAN does not belong to CIP. That is the reason why CONDESAN has its own Board of Directors.**
- **That the CONDESAN Coordination Unit (or Secretariat) be removed from within Project 14, and be placed in a position in CIP, which is consistent with it not, being a CIP project, sub-project or research activity. Such position should probably not be part of the research management hierarchy. We believe this to be the next essential step in the gradual process of clarification of institutional roles. The inclusion of CONDESAN within Project 14 clearly sends the wrong message.**
- **As a member of CONDESAN, CIP (and not only Project 14) should have a clear position concerning the services or benefits it expects to receive from CONDESAN. There seems to be a broad agreement that these include:**
 - (a) **CONDESAN represents the materialization of the strategy that CIP adopted to deal with research in the area of NRM. CIP's distinctive NRM research strategy is now widely recognized within the CGIAR to have been an innovative and forward looking way to deal with this complex issue, and one which wisely balanced CIP's comparative**

advantages and traditional areas of expertise, with the need to move into new subjects and new topics. While this is an intangible service that CONDESAN provides to CIP, it is a highly important one.

- (b) CONDESAN provides a way for CIP to establish and carry out many of its research activities at the field level in a novel way: (i) in well selected *Benchmark Sites*; (ii) interacting with new kinds of stakeholders which are increasingly important as the institutional context of agricultural research and development changes, and (iii) interacting with them in ways which are much different from the old type of CGIAR-NARs linkages which were often criticized for being utilitarian and top-down.
- (c) CONDESAN should be an outlet for delivering CIP's research results to its national, regional and local partners. Again, the way in which CONDESAN is organized and works, provides far better opportunities for reaching these customers in ways which are far better than the traditional forms of dissemination research results, which are often totally irrelevant and useless when it comes to many national, regional and local users.
- (d) CONDESAN should be an institutional platform for organizing the active participation of many stakeholders in CIP's priority setting and monitoring and evaluation process. CIP as a whole, or any of CIP's Projects, could very well use CONDESAN to reach a significant group of institutions, from national governmental bodies to local farmers' cooperatives, in five or six countries, to consult with them in a systematic what are their ideas, needs and priorities in areas and issues which are of direct relevance to CIP's work.
- (e) CONDESAN should develop and search for funding for cooperative research projects, which involve CIP and other CONDESAN members.

Of course, other members of CONDESAN will also put forward their own interests. It is clear that this will mean that in collaborative NRM activities CIP scientists will have to spend significant time working in adaptive research and providing technical, methodological or organizational backstopping to projects and interventions which are outside the field of research. This is a necessary *quid pro quo* of asking others to work with you.

5.4. The Cropping and Livestock Systems Research Activities

Within Project 14, there are two projects funded by DANIDA, one on improving the productivity of Quinoa with emphasis on resistance to drought and frost, and tolerance to salt, the other on downy mildew in quinoa. These two activities are situated outside of CIP's genetic improvement project because they do not involve roots and tubers. The International Development Research Center, ILRI, the Government of Spain and CIP, jointly support research on animal production systems. Finally, the Swiss Development Corporation supports research on dairy production systems.

In cooperation with CIP and CONDESAN, it is now probable that IRD (Institut de Recherche pour le Développement) will also start new research activities on Andean cropping systems.

Bringing together these research activities on crop and animal production systems, would facilitate: (a) the development of a comprehensive conceptual and methodological framework for this type of research, (b) a sharper strategic focus both within the area of production system and also in the rest of Project 14's research activities.

Recommendation: We recommend that CIP's management consolidate these Andean crop and animal production systems as a Subproject of Project 14, or even as a separate project.

5.5. Benchmark Sites

Most of the NRM research activities of CIP take place at or near to the eight CONDESAN Benchmark Sites:

- Merida, Venezuela
- La Miel, Colombia
- Carchi, Ecuador
- Cajamarca, Peru
- Puno, Peru
- Junín, Peru
- Aroma, Bolivia
- Cochabamba, Bolivia

These sites were chosen only in part for agro-ecological representation. They were also chosen for opportunities to build on partnerships with NARS research stations, NGO's, and other valued local collaborators. Most of the sites have a history of relevant research activities. The territorial units at these sites vary considerably. In most cases, more than one watershed is involved, and it is often the case that research activities take place in different watersheds within one site, leading to a dispersion of research efforts and results.

Recommendation: Research efforts should be concentrated as much as possible in a single watershed within each benchmark site. For each benchmark site, a public inventory of the data, information, methods, tools, results and documentation should be compiled and made available over the Internet and traditional media to any interested national or international party.

5.6. Staffing Needs

The NRM-CIP has an excellent core of staff to address many of the issues of agriculturally related natural resource management in the Andean Ecoregion. The need for new staff positions should be based on the outcomes of the suggested strategic

planning process. First and foremost, an Administrative Assistant should be hired to support the NRM Project 14 leader who wears at least three hats in the CIP organization. The Administrative Assistant should be bilingual with excellent writing skills.

GIS is an important integrating tool for the NRM program and if the demand for GIS services from other CIP projects is increasing, then the NRM group should make sure that they have enough human capacity to cover the GIS needs in their own project activities.

Since soil and water issues are becoming more critical, consideration should be given to adding staff in the areas of water resource management (hydrology), and resource economics. Investment in new staff to strengthen research capability in soil and water management will enhance the NRM's ability to attract new funding to its program and support the project's objectives. Staffing needs could be accomplished through either CIP international recruited staff hires or strategic partnerships with other research organizations and NGOs.

Recommendation: Consideration should be given to adding staff in the areas of administrative assistance, water resource management (hydrology), resource economics, to enhance research capability in soil and water resource management and policy design to attract new research funding.

6. EXTERNAL RELATIONS

The NRM program has good external relations. Its involvement with partners at the global, regional, national, and local level is very good. The main concern is one of balance.

6.1. Global Mountain Forum

The initial involvement in the Global Mountain Forum (GMF) was good because the NRM program needed visibility and members of the NRM team helped set the agenda. However, the CONDESAN coordinator is now looking after the Global Mountain Forum, and this will provide good opportunities for interacting with NGO's. The NRM team can provide research results which CONDESAN can then disseminate. The only other involvement of the NRM group in the GMF, is to help in the restructuring of the Mountain Research and Development Journal, by assisting in reviews, editing, and contributing papers that are of high caliber. This does not preclude InfoAndina and CONDESAN from playing an active role in the Global Mountain Forum. Indeed they might be ideally suited to lead this initiative.

Recommendation: Given the research focus of CIP the involvement should not go beyond its involvement in the Mountain Research and Development Journal.

6.2. Global Mountain Program

The Global Mountain Program is a system wide initiative of the CGIAR, focusing on three mountain areas: the Hindu-Kush Himalayas (represented by ICIMOD), the East African Highland (represented by the African Highland Initiative), and the Andes (represented by CONDESAN). Since 1998 the program leader of project 14 is the convener of the GMP. The aims are to produce a better knowledge base of the key processes and risks facing mountain resources for the 2002 UN designated Year of the Mountains. This is a challenging commitment because the partners in the other mountain regions (ICIMOD and African Highland Initiative) work in a more insular manner and the partner organizations have very different capacity and priorities. The four areas of importance are: characterization of mountain resources, the effects of land use intensification, NRM policies, and biodiversity. The NRM leadership in this program is crucial but requires a large commitment of time for the team leader.

Recommendation: To make this program more effective, administrative assistance is needed in the day to day operations relating to GMP.

6.3. CGIAR Collaboration

The most effective collaboration is with ILRI, and the collaborative project in the livestock management area is a good example of a well-integrated research effort that is of mutual benefit. The collaborative activities with other centers are relatively minor, and apart from the involvement in the Global Mountain Program where CONDESAN is the main partner. It may be beneficial for the NRM research program to partner with certain natural resource-oriented CGIAR centers such as the International Water Management Institute.

Recommendation: CIP's NRM program should continue its present course as a collaborator in the CONDESAN Ecoregional Program. Its Andean research program is a productive component. The positive experience gained in the collaborative project with ILRI should be expanded and experts in other CGIAR centers should be invited to participate in selective project activities.

6.4. National Partners (NARS)

CIP's NRM program has made a consistent and successful effort to involve the national governmental research institutes in Venezuela (FONAIAP), Colombia (CORPOICA), Ecuador (INIAP), Peru (INIA) and Bolivia (IBTA) in many of its research activities.

The main problem confronting CIP is that many of these organizations are now very weak technically, financially and institutionally, to the extent that the Bolivian institute has now been disbanded. However, CIP has persisted in maintaining its working relationship with these organizations, while at the same time opening new alliances with

other national institutions such as universities, NGOs, foundations, and other official institutions and programs.

In addition, project 14 and CONDESAN have accomplished good links with several agricultural and rural development projects through the FIDAMERICA network.

It is recommended that CIP's NRM program persist in their active policy of linking with national agricultural research organizations.

6.5. NRM and NGO's

The three NGO representatives whom we talked to are all very happy with having the CONDESAN connection and highly value the contribution made by the NRM researchers. In fact they are suggesting that more collaboration would be desirable. It appears that with this collaborative the research results can be made more available to NGO and have a direct effect on improving the livelihood of the farmers.

The NGO representative expressed that the most valuable contribution made by NRM is in providing top level scientist input to gain a better understand of the key problems, and the NRM group has made an excellent contribution to the NGO group, the local universities, particularly by directing students to conduct their research at the farm level.

The assistance in bio-diversity and livestock is also an area where major contributions have been made by the NRM group.

The interactions between the Peruvian sites is good but exchanges with activities taking place in other benchmark sites in other countries is not adequately developed. There are benefits by having better collaboration across the Andean region but given the large ecological differences such collaboration will be most effective in sharing ideas in the use of different assessment methodology development.

6.6. Identity of NRM within CIP

There is now a better recognition within CIP that the NRM group is making a valuable contribution to the Center. Good examples of this is the use of GIS in other projects, assistance in the use of statistical and quantitative modelling tools for use in other projects, and pest management and health. In comparison to other commodity based CGIAR centers the CIP-NRM program has clearly been at the forefront of addressing the environmental issues associated with sustainable production.

However, more should be done to inform researcher in other CIP projects about activities and research initiatives within NRM.

Recommendation: A monthly informal lunch presentation by the NRM group to the CIP research community might be an avenue to rectify this deficiency

7. FINANCE

7.1 Core vs. Non-core (minimum for NRM operation)

The increasingly competitive environment for raising research funds has changed the role of financial administration in CGIAR research centers. Back when the great majority of funds came from unrestricted funds, administrators were responsible for allocating those funds as productively as possible. With the advent of competitive fund raising, administrators are called upon to provide insurance against specific, temporary funding droughts as well. The purpose of such “insurance” is to be able to maintain core research activities, including the capacity to raise future competitive funds in a given area.

One of several administrative challenges to successfully playing the role of insurer is that funds tend to get committed to programs that are weak at external fund raising, especially the older programs. CIP’s Project 14 is a case in point. Due to its success at raising external funds, in 1998 it relied on unrestricted core funds for only 1% of its research operations budget. Among the other 16 CIP research projects, the core, unrestricted portion ranged from 4% to 100% of total, averaging 15% overall. In 1999, Project 14’s core funding allocation remained unchanged, despite a drop of 17% (\$400,000) in its external, restricted funding. The ICER panel attempted to determine what share of unrestricted core funds are allocated to NRM research programs at other commodity-oriented CGIAR centers, however such information was unavailable.

We think that allocating modest amounts of unrestricted funds to Project 14 to improve its internal administration and management, as well as to have seed money to develop new research ideas, would almost certainly result in an improvement in the performance of Project 14 and in its capacity to attract new restricted funding.

Recommendation: CIP administration should increase the unrestricted funding to Project 14 to improve its internal administration and management capacity and to be able to invest in the development of new research projects.

8. CONCLUSIONS AND RECOMMENDATIONS

Overall the ICER panel was highly impressed with the accomplishments of CIP’s Natural Resources Management activities. Both as CONDESAN and in the brief period since CIP created subprojects distinct from CONDESAN, CIP’s NRM researchers have demonstrated impressive productivity, innovative research methods, and responsiveness to the poverty alleviation mission of the CGIAR. With that said, even the good can get better.

Among the panel’s recommendations, four areas stand out as deserving special attention. First, CIP’s NRM research would benefit from a strategic planning exercise. To date,

NRM at CIP has not benefited from the priority-setting process that helped to define most of the potato research projects in the Center. Strategic planning would help the NRM research group to develop a shared vision, to set priorities, and to identify which research areas not to enter. The report contains several suggestions regarding key specifics that should CIP should decide upon in a strategic plan for NRM research, including its geographic scope, subject matter focus, and major clients.

Second, in order to clarify the blurred relationship between CIP's NRM research and CONDESAN, the panel emphasizes that CIP is a member of the CONDESAN consortium, which is an independent entity with its own board of directors. CIP provides CONDESAN with secretariat and convener facilities. But it is not appropriate for CONDESAN to be located under Project 14 in CIP's research hierarchy. Instead, CIP should grant CONDESAN a separate status within the organization.

As a third area, the panel felt that CIP's NRM research would benefit from closer communication among its participant scientists. There seem to be two major poles of research in the unit, as well as several minor research thrusts. While diversity is by no means problematic in and of itself, greater communication and debate would strengthen the distinct research thrusts, including a shared research site that allows competing methodologies to be examined side by side.

The fourth major area of recommendations concerns staffing. The current strengths of the NRM research would be complemented by the addition of researchers in two new fields. Given the importance of water as an integrating factor in mountain natural resource management and the suggested orientation toward watershed-based research, a hydrologist would add powerfully to developing understanding of water resource quality and quantity. Although the program currently includes agricultural production economists, it has not addressed the natural resource economics issues related to public goods and externalities that are essential to successful incentive design for policy solutions to natural resource problems. Addition of a resource economist would be a major asset for accomplishing this. Finally, the addition of an administrative assistant to the leader of Project 14 would make an important contribution by freeing more of the project leader's time for research and research management.

APPENDIX 1. TERMS OF REFERENCE INTERNALLY COMMISSIONED EXTERNAL REVIEW OF THE NATURAL RESOURCE MANAGEMENT PROGRAM AT CIP

History

CIP has responded to its new mandate area on mountain natural resources management (NRM) by creating a critical mass of scientists, a process that started in 1993. The core group was consolidated in 1996 and since then has been active in bringing funds for complementing CIP's investment in the implementation of its new mandate. The NRM group has had the double challenge of developing a research program in the relatively new area of sustainable natural resource management as well as developing alliances with new partners as the task at hand required more and different expertise than could be unified in a single institution. CIP management has recommended commissioning an external panel to review its NRM orientation and strategies between October 7-12, 1999.

Purpose

The ICER will evaluate scientific merit and management, and recommend improvements to the proposed orientation and strategies for the natural resource management research in CIP.

Membership

Four (4) scientifically recognized experts in natural resource management would form a panel of experts to evaluate CIP NRM research. Relevant documents will be selected and sent to the team by mid September

Terms of Reference

The panel will review documents related to the programmatic efforts prior to assembling in Lima, Peru. At CIP, presentations will be made by principal scientists and staff to provide in-depth consideration of key aspects of the orientation and strategy of CIP NRM research. These presentations are intended for open discussion. In closed session, the panel of experts will deliberate the merits of the research program and write a report suggesting improvements and making recommendations for changes. CIP Management considerations should also accompany the scientific recommendations from the panel.

Specifically the panel will address the following issues:

- The quality of the research program
- The balance between strategic and applied research
- The balance between the development of methodologies and tools for natural resource management and the research to increase production and incomes
- CIP eco-regional research
- The extent and success of strategic alliances that CIP has made with other IARCs, advanced research institutes, and regional partners
- Relationship CIP - CONDESAN

Duration

The panel met at CIP headquarters in Lima, Peru for one week, October 7-12, 1999. An agenda was prepared in consultation with the designated chair of the panel.

Output

The product of the panel is a written report of comments and recommendations based on the deliberations of the panel. The panel will deliver the report to the Director General of CIP prior to departure from Lima.

THE REVIEW PANEL

Dr. Scott M. Swinton, Department of Agricultural Economics, Michigan State University, East Lansing, MI, USA

Dr. Jack Hess, Executive Director, Division of Hydrological Sciences, The Desert Research Institute, University and Community College System of Nevada, Las Vegas, NV, USA

Dr. Julio A. Berdegue, President, RIMISP, Red Internacional de Metodologias de Inverstigation de Sistemas de Produccion, Santiago, Chile

Dr. Hans Schreier, Institute for Resources and Environment, University of British Columbia, B.C., Canada (Chair of Review panel)

APPENDIX 2. LIST OF PERSONS CONSULTED DURING THE REVIEW:

C. Baigorria, Meteorologist
T. Bernet, Dairy Modelling
W. Bowen, Soil Nutrient Management
W. Collins, Deputy Director, CIP
C. Crissman, CIP, Quito, Ecuador (by telephone)
S. Danielsen, Quinoa Research
A. Devaux, Potato Systems
D. Herve, IRD, France
R. Hijmans, GIS (via email)
M. Holle, Bio-diversity
S. Jacobson, Quinoa, Research
C. Leon-Velarde, Livestock
E. Mujica, CONDESAN
R. Nelson, Late Blight
J. Posner, CONDESAN
R. Quiroz, MRM program manager
J. R. Reinoso, Ex. Director Natural Resource & Environment Research Centre, Puno
C. Romero, Soil Erosion
P. Sanchez Levellos, President ASPADERUC, Belen, Cajamarca
M. Tapia, Agro-biodiversity
F. Tenorio Calderon, Director CEDEPAS, Cajamarca
T. Walker, Rice Potato System
H. Zandstra, Director, CIP
P. Zorogastua, GIS/Remote Sensing

APPENDIX 3. LIST OF MATERIAL CONSULTED:

1998 Work Plan: Sustainable Land Use in the Andes
 1999 CGIAR review of eco-regional approach, TAC Secretariate, FAO
 1998 CGIAR strategy towards defining a pro-poor NRM, CGIAR-NGOC
 1999 CGIAR-Integrated NRM –Bilderberg Consensus
 1998 Annual Project Progress Report # 14, R. Quiroz
 1999 Annual Progress Report # 14.01, R. Hijman
 1999 Annual Progress Report # 14.02 C. Chrissman
 1999 Annual Progress Report # 14.03 C. Leon-Velarde
 1999 Annual Report –Policy Intervention, 14.04, R. Dario-Estrada
 1998 Progress Report NRM Consortium, 14.05, J. Posner
 1999 Progress Report # 5 RS, GIS and Modelling
 1999 Progress Report # 5 Regional Scaling and Econ.-biophysical models
 1999 Ecoregional Research, a vision from the Andes, CONDESAN
 1999 Heresy from the Hilltop, CONDESAM
 1999 InfoAndina, Techn. Report, CONDESAN
 1999 Consorcio CARCHI, Newsletter

PUBLICATIONS:

- Bowen et al. 1998. Stimulating the response of potato to applied nitrogen, CIP Program Report
- Bowen et al. 1998. A process based Model (WEPP) for simulating soil erosion in the Andes, CIP Program Report
- Leon-Valerde and Quiroz. 1998. Selecting optimum ranges of technological alternatives by using response surface designs in system analysis, CIP Prog. Report
- Quiroz and Saatchi, 1998. Mapping aquatic and semiarid vegetation in the Altiplano using multi-channel radar Imagery, CIP Program Report
- Hijmans, 1998. Estimating frost risk in Potato production on the Altiplano using interpolated climatic data, CIP Program Report
- Wiegiers et al. 1999. Land use intensification and disintensification in the upper Canete Valley, Peru. *Human Ecology*, 27:319-339
- Jongschaap, 1999, Conversion of evapotranspiration by NOAA-AVHRR
- Jongschaap, 1999, FAO Soil map interpretation for simulating properties
- Jongschaap, 1999, LINPAS simulation model: Latest adaptation
- Hijmans, 1999. High resolution climate surfaces
- Leon-Velarde, et al. 1999. Ecoregional livestock research in the Andean Region
- Bernet et al. 1999. Tailoring agricultural extension to farmer needs: A user friendly farm-household model to improve decision making in participatory research. SAAD III Conference Paper
- Bardhan et al. 1999. Intensification of potatoes in rice-based cropping systems: A rapid rural appraisal in West Bengal. CIP Working Paper 1999-1 Social Science Dept.
- Summary of Recent Publications in Project 14, 1998-1999: 65 entries

Appendix 4: List of Acronyms

AHI	African Highlands Initiative
ARI	Advanced Research Institute
CONDESAN	Consortium for Sustainable Development of the Andean Ecoregion
CGIAR	Consultative Group for International Agricultural Research
DANIDA	Danish International Development Agency
GIS	Geographic Information Systems
GMF	Global Mountain Forum
GMP	Global Mountain Program
IARC	International Agricultural Research Center
ICER	Internally Commissioned External Review
ICIMOD	International Center for Integrated Mountain Development
ICRAF	International Center for Research in Agro-Forestry
IESA	Investigacion y Extension en Sistemas Agropecuarios
ILRI	International Livestock Research Institute
IRD	Institut de Recherche pour le Developpement (France)
NRM	Natural Resource Management
PRONAMACHS	National Program for Management of Small Watersheds
SAAD	Systems Approaches for Agricultural Development
TAC	Technical Advisory Committee (Of the CGIAR)