

Consultative Group on International Agricultural Research (CGIAR),
Task Force on Integrated Natural Resource Management

Integrated Management for Sustainable Agriculture, Forestry and Fisheries

Held at CIAT in Cali, Colombia, August 28-31, 2001

Workshop Documentation



compiled by: Abra Adamo and Dr. Jürgen Hagmann (Workshop Facilitator)

August 2001

This documentation report documents the workshop which took place in August 28-31, 2001. The report here is not a final synthesized report, but tries to capture the crude output of the workshop in a non-interpreted way as a base for shaping the final report.

THIS DOCUMENTATION IS MEANT TO BE A REFERENCE DOCUMENT for all participants which intends to provide the desired transparency. Almost all results of the working groups and plenary sessions are documented here. In addition, it includes the summary reports of the synthesisers.

Table of Contents

| | |
|--|------------|
| TABLE OF CONTENTS | I |
| ACRONYMS AND ABBREVIATIONS | II |
| FOREWORD OF ORGANISERS AND FACILITATOR | III |
| SUMMARY | IV |
| <hr/> | |
| 1 <u>Workshop Opening and Introduction</u> | 1 |
| 1.1 <u>PARTICIPANTS' INTRODUCTION</u> | 1 |
| 1.2 <u>EXPECTATIONS AND FEARS</u> | 2 |
| 1.3 <u>OBJECTIVES OF THE WORKSHOP</u> | 4 |
| 1.4 <u>ANTICIPATED WORKSHOP PROGRAMME</u> | 4 |
| 1.5 <u>WORKSHOP ORGANISATION</u> | 5 |
| 2 <u>Key Issues in INRM: Plenary Presentations</u> | 6 |
| 2.1 <u>INTEGRATED NATURAL RESOURCE MANAGEMENT: A PROGRESS REPORT</u> | 6 |
| 2.2 <u>INTEGRATED MANAGEMENT FOR SUSTAINABLE AGRICULTURE, FORESTRY AND FISHERIES</u> | 9 |
| 2.3 <u>RESILIENCE, SUSTAINABILITY AND ADAPTIVE MANAGEMENT IN SOCIAL-ECOLOGICAL SYSTEMS (SES)</u> | 12 |
| 2.4 <u>GENETIC RESOURCES IN ECOSYSTEM MANAGEMENT</u> | 15 |
| 2.5 <u>KNOWLEDGE MANAGEMENT: ORIGINS AND IMPLICATIONS FOR INRM</u> | 17 |
| 2.6 <u>THE SUSTAINABLE LIVELIHOODS APPROACH (SLA)</u> | 20 |
| 3 <u>Critical Factors for Success in INRM</u> | 23 |
| 4 <u>Field Visit and External Visitors</u> | 27 |
| 5 <u>What is INRM ?– a brief Recap</u> | 28 |
| 6 <u>Outcomes of the Parallel Sessions on INRM Themes</u> | 30 |
| 6.1 <u>ORGANISATIONAL FRAMEWORKS FOR INRM</u> | 31 |
| 6.2 <u>CONCEPTS</u> | 34 |
| 6.3 <u>RESILIENCE AND ADAPTIVE MANAGEMENT</u> | 35 |
| 6.4 <u>KNOWLEDGE MANAGEMENT</u> | 37 |
| 6.5 <u>CLIMATE CHANGE</u> | 38 |
| 6.6 <u>INNOVATIVE TOOLS</u> | 41 |
| 6.7 <u>SCALES OF ANALYSIS</u> | 42 |
| 6.8 <u>POLICY</u> | 44 |
| 6.9 <u>PARTICIPATORY RESEARCH</u> | 45 |
| 6.10 <u>SOCIAL ORGANIZATION, PARTICIPATORY WATERSHED MANAGEMENT AND SUSTAINABLE LIVELIHOODS</u> | 47 |
| 6.11 <u>AGROBIODIVERSITY</u> | 50 |
| 6.12 <u>IMPACT ASSESSMENT</u> | 52 |
| 6.13 <u>WATER</u> | 55 |
| 6.14 <u>INTEGRATED NUTRIENT MANAGEMENT</u> | 57 |
| 7 <u>Rounding up the Conceptual Discussions</u> | 59 |
| 7.1 <u>A FIRST CONCLUSION: WHAT IS NEW OR DIFFERENT?</u> | 59 |
| 7.2 <u>DEFINITION & UNDERSTANDING OF INRM</u> | 60 |

| | | |
|-----------|--|-----------|
| 7.3 | OPERATIONAL MODELS FOR INRM | 62 |
| 7.4 | IMPACT AND RELEVANCE | 62 |
| 8 | Taking INRM Forward in Practice | 63 |
| 8.1 | AN EXAMPLE: THE ZIMSAT PARTNERSHIP IN ZIMBABWE | 63 |
| 8.2 | BUILDING SCENARIOS: PEER-ASSIST WORKING GROUPS | 67 |
| 8.3 | BUILDING COMMUNITIES OF PRACTICE FOR INRM | 68 |
| 8.4 | HOW TO MANAGE COMMUNITIES OF PRACTICE IN INRM – SOME PRACTICAL IDEAS | 70 |
| 9 | Next Steps | 72 |
| 10 | Workshop Evaluation | 74 |
| 11 | Annex | 77 |
| | ADDRESS LIST OF PARTICIPANTS | 77 |
| 11.1 | ANNEX 2: PHOTOGRAPHS OF GROUPS | 85 |

Acronyms and Abbreviations

| | |
|---------|---|
| ARI | Advanced Research Institute |
| ASB | Alternatives to Slash and Burn Consortium |
| CBD | Convention on Biological Diversity |
| CDC | Centre Directors Committee |
| CEO | Chief executive officer |
| CGIAR | Consultative Group on International Agricultural Research |
| CIAT | Centro Internacional de Agricultura Tropical |
| CIFOR | Center for International Forestry Research |
| CIMMYT | International Center for the Improvement of Maize and Wheat |
| CIP | International Potato Center |
| DFID | Department for International Development (UK) |
| EIA | Environmental Impact Assessment |
| EPMR | External Program and Management Review |
| FPR | Farmer Participatory Research |
| GCP | Global Challenge Program |
| GDP | Gross Domestic Product |
| GHG | Greenhouses Gas(es) |
| GIS | Geographical Information Systems |
| GMO | Genetically-modified Organisms |
| GRM | Genetic Resources Management |
| GTZ | German Development Cooperation |
| IA | Impact Assessment |
| IARC | International Agricultural Research Center |
| ICRAF | International Center for Research in Agroforestry |
| ICARDA | International Center for Agricultural Research in Dry Areas |
| ICRISAT | International Crop Research Institute for the Semi-Arid Tropics |
| IDRC | International Development Research Centre (Canada) |
| INM | Integrated Nutrient Management |
| INRM | Integrated Natural Resource Management |
| IPCC | Intergovernmental Panel on Climate Change |
| IPGRI | International Plant Genetic Resources Institute |
| IPM | Integrated Pest Management |
| KM | Knowledge Management |
| M&E | Monitoring and Evaluation |
| MoU | Memorandum of Understanding |
| NARI | National Agricultural Research Institute |
| NARS | National Agricultural Research System |
| NGO | Non-Governmental Organization |
| NRM | Natural Resource Management |
| PR | Participatory Research |
| R & D | Research and development |
| R,D&E | Research, Development, and Extension |
| SES | Social-Ecological Systems |
| SGRP | System-wide Genetic Resources Programme (CGIAR) |
| SLA | Sustainable Livelihoods Approach |
| SPIA | Standing Panel on Impact Assessment (CGIAR) |
| SWNM | System-wide Program on Soil, Water and Nutrient Management |
| TAC | Technical Advisory Committee (CGIAR) |
| TSBF | Tropical Soil Biology and Fertility Institute |
| UNCED | United Nations Conference on Environment and Development |

Foreword by the Organisers

This workshop was the third in a series of meetings on I NRM first in Bilderberg, then in Penang and now in Cali. The objective has been to make both conceptual and practical advances in integrating the management of different natural resources –such as soils, water, forests together with a better orientation and integration of CGI AR specialized programs, be they commodity or methodology or tool based.

Out of about 100 participants, only 20 had participated in the Penang meeting, so we had the rather daunting task of bringing the newly-interested up to speed while continuing to make advances among those with more experience. In the end, a reasonable balance was struck. The steady rate of increase in participant numbers—all self-financed from the CGI AR-- is a good indicator that the objective of mainstreaming I NRM is being met.

We reached relatively easy agreement on what I NRM is not. It is not a program, nor is it a dogma. Rather I NRM is a flexible set of integrative frameworks, methods and tools aimed at capturing synergies among specialized research areas. At the heart of I NRM is the need to balance people's competing interests in multiple uses for any natural resource . For this reason, I NRM is strongly concerned with the institutional and ecological requirements for long term sustainability.

The atmosphere of the meeting was both creative and friendly and multiple groupings of common interest formed. This event is a unique opportunity for exchange of ideas and information among many CG and non CG scientists who would not run into each other in the normal course of their work, and yet are working on similar problems, facing the same kinds of methodological challenges and seeking new ways to do I NRM research. Perhaps the most significant outcome was the formation of 5 communities of practice with an agreement to work on making these effective for scientists to learn and advance together.

Joachim Voss
Chair of I NRM Task Force
Director General CIAT

Jaqueline Ashby
Director NRM, CIAT

Foreword by the Facilitator

The third meeting organised by the INRM task force was a particular challenge. Last year, in Penang, great progress was made in conceptual terms with a much smaller group. In this year's meeting, these results needed further consolidation while simultaneously 'mainstreaming' INRM to a broader audience.

In the end, the group managed to achieve the desired outputs and INRM became more clear to the large group than it was before. However, as it was expressed very well in the meeting, INRM will probably never be as clear as production technology approaches of the 1970's where the level of complexity was 'C' compared to 'C⁵⁰' with the multi-dimensions and interactions which need to be dealt with now. INRM is 'a way of doing business' towards better 'dealing with complexity'. This makes it so challenging but also interesting! The high spirit and the enthusiasm with which many participants left the meeting, committed to initiate practical activities, was very encouraging and is likely to bring about new insights.

I would like to thank all the participants for their active participation and dedication during the 'large group event' in Cali. The rapporteurs and synthesizers took on an important extra work to capture all the creative ideas and the process steering group also spent a lot of extra time to jointly design and plan the workshop. Without their 'steering' and ideas, it would have been much more difficult make the 'loose ends meet'. The effective work of John Poulsen who co-ordinated all the diverse parallel groups and of Andres Palau and his team in the background in organising logistics was really appreciated by all. Abra Adamo did a wonderful job in capturing the outcomes of the plenary discussions which allows all to recap the issues we discussed. I really do appreciate very much the contribution of all to this joint success. It was a pleasure to work with you!

Wish you all the best!

Jürgen Hagmann

Independent Process Consultant / Facilitator

Summary

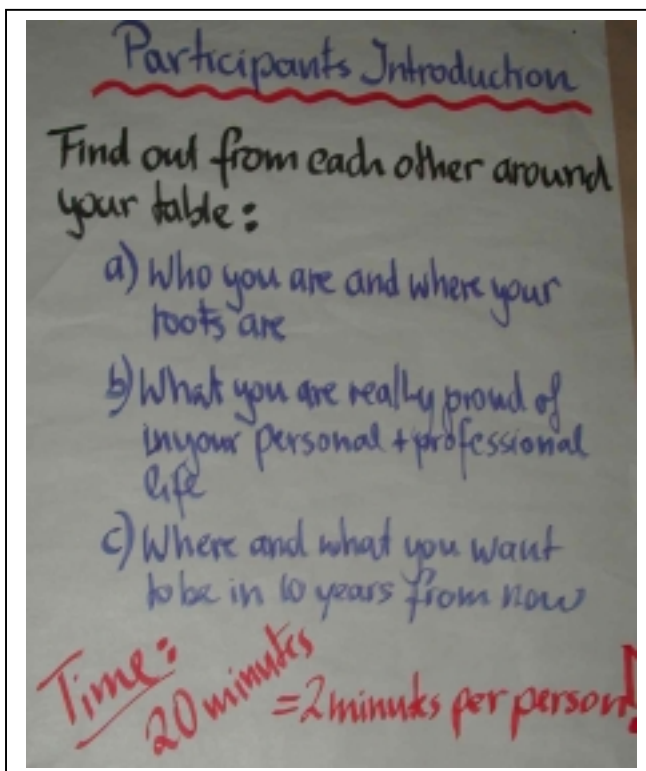
An executive summary / synthesis report will be available soon from the organisers. In case you do not receive it soon, please contact a.palau@cgiar.org

1 Workshop Opening and Introduction

The workshop was opened by Joachim Voss, DG of CIAT. Joachim Voss welcomed participants and handed over the workshop to Dr. Jürgen Hagmann, who was tasked to manage the workshop process as a professional facilitator.

1.1 Participants' Introduction

The facilitator first briefly explained his task as an independent, neutral moderator and asked the participants to introduce each other around the table people were seated on the basis of the following task:



The people in the table groups made discoveries about each other in an interactive way. Given the large number of workshop participants, the small groups could not present their discoveries about each other to the larger group.

The introduction of participants created an open atmosphere and revealed interesting details about the personal and professional characteristics of the participants.

1.2 Expectations and fears

The expectations and fears were identified through the following questions:

What I would like to see happen in this workshop is:

| | |
|---|---|
| <p>Integrating social and natural research:</p> <ul style="list-style-type: none"> • How to articulate policy and social development within I NRM • Recognition of the human/social dimension in I NRM | <p>Identification of new initiatives and programmes:</p> <ul style="list-style-type: none"> • Develop good cases of successful integrated research • Clear, tangible programmes across institutional barriers |
| <p>Developing a common understanding of I NRM:</p> <ul style="list-style-type: none"> • Guiding principles for I NRM • What does the concept of "integrated" mean in the areas covered by I NRM? • Convergent understanding of I NRM • More integration with germplasm enhancement • Common understanding of conceptual framework for I NRM • Exchange experience • Positive synthesis reporting (successes and failures) | <p>Effective delivery and implementation of I NRM:</p> <ul style="list-style-type: none"> • Clarity of purpose of I NRM • Clarity regarding goals (clients – problems – partnerships) • Clear purpose, rationale and implementation strategy • Tangible benefits to real people • Move from theory to practice • Clear vision of how I NRM can solve important problems on a large scale • Articulate a framework for applying I NRM strategies and methodologies • Clarification of aims and objectives of I NRM • Transparency on issues beyond our mandate |
| <p>Formation of appropriate partnerships:</p> <ul style="list-style-type: none"> • Stakeholder interests accommodated (NARS, NGOs ...) • Strengthened partnerships within and around the CGIAR for I NRM research • Trigger partnerships • Closer and more productive partnerships • Coordination CG-NARS-ARI s for I NRM • Focus on system (not on institutions) | <p>Other</p> <ul style="list-style-type: none"> • Clearing house for maintaining collective action • Influence CG agenda |

and the fears:

What should not happen in this workshop is:

| | |
|--|---|
| <ul style="list-style-type: none"> • Disintegrated natural resource management • Geographical, institutional, and thematic islands • Fragmentation rather than integration of I NRM issues • Too much concepts and too little practical examples • We can't stop here with vision or philosophy - got to go beyond! | <ul style="list-style-type: none"> • Nobody changes their mind • Will not break any new ground • Retreat back to discipline areas |
| <ul style="list-style-type: none"> • Don't get bogged down in complexity • Change for changes sake! Undermining existing good works | <ul style="list-style-type: none"> • Talk fest • Outcome should be more than another I NRM workshop • Empty rhetoric • Not just another talk shop |
| <ul style="list-style-type: none"> • Issues will not emerge by size of the workshop | <ul style="list-style-type: none"> • Carried away in very diverse ideas due to the dynamics ???? |
| <ul style="list-style-type: none"> • No hidden agendas • Hijacking of the agenda | <ul style="list-style-type: none"> • Isolation of non-CG participants • Insistence on a single approach or method • Mammoth projects |
| <ul style="list-style-type: none"> • No egocenters! | |

Expectations and fears revealed some of the key concerns of the participants and issues to be discussed. The strongest concerns were the issues of being too theoretical and also to have another 'talk-fest' which indicated a certain fatigue of workshops without concrete outcomes and follow-up measures. Some of the warnings which came out of the expectations and fears served as reminders for the group.

The expectations were compared with the workshop objectives worked out by the organising committee and agreed upon by all the participants.

1.3 Objectives of the Workshop

Once participants expectations were clarified, the facilitator presented the anticipated outputs and products of the workshop as agreed by the workshop process steering group beforehand:

| <i>Anticipated Outputs / "Products"</i> | |
|---|--|
| 1. | A set of clearly articulated goals of operational models and guiding principles and success cases to put INRM in practice in the context of environment of CG + partners |
| 2. | Clarification on how INRM can improve the relevance and impact of CG + partners work in solving major human + environmental problems |
| 3. | Elaboration of CGIAR + partners contribution to CBD and other conventions |
| 4. | Ideas, agreements and way + means to nurture communities of practice in INRM |
| 5. | Agreement on publication of papers and outcomes |
| 6. | A briefing paper. |

These anticipated outputs were levelled with the expectations. No major differences were assessed.

1.4 Anticipated Workshop Programme

The facilitator presented a programme, based on the objectives and anticipated outputs. However, it was stressed that the workshop process might require adaptations that will be done flexibly from day to day.

| | Tuesday | Wednesday | Thursday | Friday |
|--------------------------|--|----------------------------------|---------------------------|---|
| Session 1 8:00-10:00 | Opening Warm-up | Field Visit External Visitors | Report back to Plenary | Report back to Plenary |
| Session 2 10:30-12:30 | Keynote presentations | Open space / Marketplace | Parallel Sessions II | Communities of Practice |
| Session 3 14:00-15:30 | Keynote Presentations | Open | Parallel Sessions II | Planning for future activities |
| Session 4 16:00-18:00 | Critical success and failure factors in INRM | Parallel Sessions I | Report back to Plenary | Next Steps Workshop Evaluation Closing |

Participants agreed on this broad outline and on the fact that the programme will be handled flexibly.

1.5 Workshop organisation

Some issues on the workshop organisation were clarified. The 'workshop process steering group' had a very important role to play. Together with the facilitator they elaborated the detailed agenda for every day based on the objectives and the general group dynamics. This ensured that the process fully considered the needs and concerns of all participants. The steering group was composed of a cross-section of participants and the organising group.

Workshop Process Group

Task

- To get feedback from participants on the workshop process
- To plan together with the facilitator in the evenings, the next day, based on the desired outputs and participants feedback.

Members

| | |
|------------------|--------------|
| Brian Walker | Joachim Voss |
| John Poulsen | Steve Song |
| Jacqui Ashby | G. Otim-Nape |
| Larry Harrington | A.M. I zac |
| Jurgen Hagmann | |

The workshop documentation was also clarified. Besides this documentation of the crude outputs as a reference document for participants a number of other outputs were anticipated:

Workshop Documentation:

- All crude outputs of the workshop will be documented and distributed soon after the workshop
- Rapporteurs will summarize group work sessions
- Synthesis groups will prepare synthesis on major topics
- Editorial committee

Other outputs / publications will be agreed upon in plenary

2 Key Issues in INRM: Plenary Presentations

Once the 'ground was levelled' with regard to the workshop setting, the topic of INRM was entered through a set of keynote presentations. The first three presentations were closely related to the state of the discussions as reached in the last meeting in Penang in 2000. The objective was to bring the 75 participants who had not been to the Penang meeting to a similar level of understanding than those 20 who were part in the discussions a year ago.

The following texts are the original presentations as they were presented as power point slides. Due to the file space, they were imported into word. The original files can be obtained from CIAT.

After each of the presentations, participants were asked to note down a few main points which they consider crucial for the discussions. These were to be taken up through a group reflection at the end of the presentation sessions.

2.1 Integrated Natural Resource Management: A progress report

Jeff Sayer, the DG of CIFOR and former chair of the INRM task Force gave an overview presentation of the state of the art of the discussions

- 1998 System's Review: Criticism of the Green Revolution
- 8-12% of Global GDP lost due to bad land management (World Bank)
- Natural Resources losses will be the main causes of conflict in the next 50 years (Cyrus Vance)

- CDC Task Force Meetings in Bilderberg, 1999 and Penang, 2000
- But:
- 1980s Eco-regional approaches
- Inclusion of new Centers
- 1990s Several TAC papers
- TAC Priorities and Strategies (Etc - See August 2001 TAC paper)

INRM Defined

- INRM is a conscious process of incorporating multiple aspects of NR use into a system of sustainable management to meet explicit production goals of farmers and other users (e.g. profitability, risk minimisation) as well as goals of the wider community (sustainability).
(Izac, Campbell, Sayer)

Some Conclusions

- INRM runs the risk of being dismissed as being too wooly and achieving little quantifiable impact, just as happened with the farming-systems research of the 1980's
- The challenge: To demonstrate measurable benefits from INRM research to large numbers of people in reasonable time-frames

- Improved INRM and genetic improvement are mutually inter-dependent
- Systemic Impact Assessment - A tool for: Performance enhancement, Negotiation, Learning, Adaptation, Resource allocation
- Moving along the R&D continuum: All Management is Experimental, indicators provide adaptation and negotiation framework

Next Steps:

- Models of agro-ecosystems
- Protocols for data management
- Communities of practice
- Knowledge management
- Impact assessment
- Special Issue of Conservation Ecology: Synthesis volume (Conceptual Paper)

Conceptual Challenges

- Jargon is mystifying not clarifying: Rhetoric running ahead of science
- The Challenge of Scales: Communities, Landscapes, Watersheds, Ecosystems, Eco-regions, Global
- What to integrate and where to draw the limits
- The UNCED processes
- Bridging the gap between communities and global environmental concerns
- Climate Change: Weak basis for integrating across scales; potential global challenge program
- Biodiversity: Local and global benefits often in conflict
- PRINCIPLES! – Obvious but often forgotten
- Knowledge Management: We have not been good at learning lessons, Mistakes are repeated, rate of adoption of best practice slow
- Tacit knowledge is as important as explicit knowledge
- Social learning is more important than teaching
- Social Organization: Social Capital is more important than Financial Capital
- Negotiations and Trade-offs are more common than win-wins
- Build Constituencies: Political, Civil Society, Local People
- Process is everything and it takes time
- Adaptive capacity is more important than plans
- The end of scientific arrogance: Humility and respect beat charismatic leadership
- Accountability may be the enemy of flexibility
- Aid agencies are hopeless at it. They must manage by outcomes.
- The word “project” carries overtones of ownership. We intervene and we are not disinterested.
- Be clear on what defines success. Define performance indicators.
- Institutional arrangements: Tenure, Laws, Regulatory capacity, Civil society
- Democratisation of Science: Citizen’s Science
- Common Property Resource Management: Clear Boundaries and Rights, Locally Adapted Rules, Participatory Rule-Making, Accountable Monitoring, Sanctions, Enforceable, Graduated, Local Conflict Resolution Capacity, Government Recognition of Local NGOs, Effective Devolution (Subsidiarity)
- Don’t rush it – its better when you take your time

The content of this summary is drawn directly from the presentation by Jeff Sayer. For a full copy of the presentation, please contact Andres Palau: a.palau@cgiar.org

Plenary Discussion

Rapporteur: Abra Adamo

- There was some discussion of the place of “research” in an INRM framework. Mr. Sayer indicated that, as a system, we are trying to move away from a strictly reductionist approach to research and toward a research-management approach which embeds hard science and technology development within the concrete realities of our clients – the poor and to make a better link between research and management of natural resources.
- Participants discussed the concept of adaptive management. It was agreed that this is a very different approach than the very planning-based, logical framework approach commonly used within the CG. Given the complexity of issues on the ground and at regional, national and international scales a planning-based approach was identified as limiting and often unrealistic. Plans need to be flexible (e.g. farmers do not make formal plans per se, but adapt the activities according to various key system indicators). Adaptive capacity is the key to sound long-term management.
- There was some discussion regarding the inertia of institutions to implement change. It was suggested that we are still making the same mistakes and there is little motivation for change given the way that the CG system is currently structured (e.g. incentives to publish and protect knowledge rather than share it).
- The lack of sound and successful INRM cases studies was a concern for many participants. Why is it that it is so difficult to find a successful INRM case study? It was agreed that a principle difficulty is that there is no clear definition of what “successful INRM” looks like.
- It was suggested that, both within the context of INRM and GCPs, it is crucial that research is driven less by the motivations of individual Centers but rather begin working more as a system. Mr. Sayer suggested that Centers should be seen more as repositories of skills and knowledge that can be drawn on instead of individualist Centers pushing their own agendas.
- A question was raised concerning how we can move social learning and adaptive management beyond the community level to include other scales and stakeholders (e.g. NARS, governments, international organisations etc. as “learning institutions”).

2.2 Integrated Management for Sustainable Agriculture, Forestry and Fisheries

Joachim Voss, DG of CIAT and present chairman of the INRM Task Force outlined some of the key issues to be dealt with

Where Brown Meets Green

- INRM must focus on the relationship between production, resource management, human well-being and ecosystem health - INTERNALIZING ENVIRONMENTAL EXTERNALITIES

Why Do We Need INRM ?

- develop effective and relevant solutions under real-life operational conditions
- facilitate better decision-making
- manage complex technical changes with multiple impacts
- maintain options and resilience
- reconcile conflicting objectives
- facilitate/improve access and benefit-sharing
- examine resource degradation over time

Analyze off-site effects

- analyze higher systems-level dynamics, stresses and interactions
- link global and local processes e.g. biodiversity loss, climate change
- evaluate future system scenarios
- promote adaptation and learning

How Integrated Do We Need To Be ?

- Integrated approaches need not integrate everything and be all-embracing - the problem drives the integration
- Integrate only those additional components, stakeholders or scales that are essential to solving the problem at hand

INRM: Key Themes / Meeting Program

- INRM Concepts
- Scales of analysis
- Adaptive management
- Knowledge management
- Participatory research and social organization
- INRM modeling
- Innovative tools
- Water
- Agrobiodiversity
- Integrated nutrient mgmt.
- Climate change
- Sustainable livelihoods
- Impact assessment
- Policy
- Organizational Frameworks

Adaptive Management, Resilience, Sustainability

- Change is inevitable
- Adaptive capacity is essential (e.g. development of tools and models to assist people and institutions to make management decisions and the adjustments necessary to achieve desired INRM goals)
- Learning paradigm:
- flexible combination of concepts and methodologies
- Participatory learning & action and social capital development
- Hard science
- Common sense

- To ensure resilience and long-term health of an ecosystem, its stocks of key resources (water, biodiversity, etc.) must be carefully, and integrally, managed
- Building the resilience of agro-ecosystems requires increasing the adaptive capacity of the structures and processes (ecological, social, economic) that maintain that system
- Adaptive Capacity and Resilience are key to Sustainability
- Beyond the Two-Pillar Approach: Genetic Diversity in INRM
- Biological diversity is critical to the adaptive capacity and sustainability of ecosystems and to human well-being

Sustainable Livelihoods

- Our clients must be at the center of any INRM approach
- Sound INRM is integral to sustainable livelihoods
- natural capital one of the foundations of a Sustainable Livelihoods approach
- From a livelihoods perspective, integrated resource management is crucial because it analyzes the interactions between different kinds of resources, different fields of knowledge, and different types of stakeholders

Knowledge Management

- KNOWLEDGE IS MOSTLY IN PEOPLE'S HEADS
- Knowledge and learning are socially constructed
- People, not computers, are chief knowledge repositories
- Need to focus on how knowledge moves around (flow not stock)
- Connecting people in innovative ways (e.g. INRM communities of practice)

Organizational Principles

- Based on our experience we are now better at managing Systemwide Programs and Ecoregional Initiatives
- We can learn a great deal from these for organizing multi-institutional INRM activities
- Integration requires both an effective division of labor and the bases for collaboration
- How do we govern multi-institutional activities to ensure that they are: effectively managed, inclusive, transparent, productive
- Other issues to be addressed:
- Division of Labor
- Collaborative advantage
- Knowledge management: how do we organize for mutual learning and to manage knowledge effectively?

INRM and Global Challenge Programs

- Climate Change
- World Water Crisis
- Conservation and Use of the World's Genetic Resources
- Stopping Desertification
- Restoration of Degraded Lands
- Sustainable Forest Management
- Sustainable Fisheries Management
- INRM and Global Challenge Programs
- Conceptualizing GCPs within an INRM framework with common sets of approaches, methodologies and organizational principles allows for cumulative learning
- How can INRM contribute to and contextualize GCPs?
- Problem drives the integration

Joachim Voss then thanked Jeff Sayer (the former Chair of the INRM Task Force) for his leadership in this field; Jacqui Ashby (Lead Organiser of this workshop), Andres Palau, John Poulsen and Abra Adamo for their efforts in organising this workshop. IDRC was thanked for their financial support to enable national researchers from developing countries to participate in this meeting. GTZ was thanked for sponsoring Jurgen Haggmann to facilitate this meeting. DFID was then thanked for sponsoring Jon Tanner to present DFID's Sustainable Livelihoods Approach. Danida was also thanked for sponsoring John Poulsen's effort with the INRM Task Force. Lastly, Dr. Voss thanked all participants for travelling to Colombia to participate in this meeting.

The content of this summary is drawn directly from the presentation by Joachim Voss. For a full copy of the presentation, please contact Andres Palau: a.palau@cgiar.org

Plenary Discussion (*Rapporteur: Abra Adamo*)

- A clear gap was identified between the GCPs and the priorities of the poor. It was suggested that a bridging of these two (the global and the local) is crucial.
- It was agreed that beyond small farmers at the village level there are a whole other set of very powerful stakeholders (e.g. transnational corporations, governments, etc.) who have no interest in INRM (e.g. pesticide industries) but are driven principally by profit. The idea that “if we just get INRM right ...” we can save the world from poverty and environmental disaster was therefore called into question. It was agreed that there is a clear need to understand the political economy of the context in which INRM is situated and to consider include the interests of such stakeholders in any INRM framework. It was noted that among many governments (e.g. China) there is a growing awareness of the environmental costs of bad resource management. Building awareness is key.
- The participants discussed the need to bring stakeholders into the INRM process at the first stages of problem definition, priority setting, and research design. It was agreed that there is a clear need to improve the way in which CG scientists work with stakeholders. INRM is all about working with relevant partners to solve real-world problems.
- It was identified that the CG needs to work at the interfaces of different scales (between community and watershed, watershed and ecoregion, ecoregion and country, country and planet).
- It was suggested that the CGIAR needs a GCP on Urbanization as an important driving force in the agricultural, economic and social contexts in which we work.

These presentations brought the participants to the same level of understanding the process and the context in which INRM is being discussed.

2.3 Resilience, Sustainability and Adaptive Management in Social-Ecological Systems (SES)

Brian Walker of the Resilience Alliance gave a presentation on issues of adaptive management and resilience and their importance to the sustainable management of ecosystems.

Overview:

- The goal of INRM is to increase net social welfare over time = increasing total wealth (and equity?)
- Total wealth is the sum of natural, social, human, financial, and manufactured capital
- INRM is concerned with maintaining the balance between human-made, social and natural capital (the sum of ecosystem goods and services), such that total wealth can be maintained or increased
- The management of natural resources has two components: Attempting to increase production of valued goods and the levels of valued services and ensuring the sustainable supply of these goods and services

Sustainability

- Sustainability is ecological, social and economic
- Sustainability is dynamic: there is no optimal, sustainable state or configuration; there is *continuous change* along sustainable (desirable) or unsustainable (undesirable) trajectories

Patterns of Changes

- ecosystems, and social-ecological systems, are characterized by non-linear dynamics with marked threshold and hysteresis effects. They tend to exhibit multi-stable behaviour
- though apparently very complex, their dynamics are usually controlled by a limited number of dominant variables (3-5, the "rule of hand")
- they involve at least three different time scales
- -cross-scale effects (spatial and temporal) are crucial
- SESs exhibit, and require, periods of both change and persistence
- they cycle through different, characteristic phases
- the metaphor of the adaptive cycle is a useful way to describe and analyze this behaviour

Patterns/Stages of Change

- r – K (exploitation to conservation): slow, strong controls, increases in marginal efficiency; planning and decision tools can be useful
 - a (collapse to re-organization) : rapid, no equilibria, chaotic, novelty can enter; how to manage or plan?
- The amount of change a system can undergo and still retain the same controls on function and structure (still be in the same state - within the same basin of attraction)
- The degree to which the system is capable of self-organization
- The degree to which the system expresses capacity for learning and adaptation
- Productivity (profitability) – is about optimization, increasing production efficiency, during times that are stable and predictable (r through K). Planning and decision tools such as optimal control, decision analysis, multi-criteria analysis, etc. can be used
- Sustainability – is about maintaining and building resilience and adaptive capacity, especially during periods of disturbance, instability and re-organization (Ù through á), but also during r-K. Requires resilience analysis and management

Aims of Resilience Management

- to prevent the system from moving to undesired states
- to increase the resilience of desired states (and decrease the resilience of undesired states)
- to move systems from undesirable to desirable states
- Cannot use conventional decision analysis tools for choosing policies/management.
- They consist of: policy evaluation using probability distributions of system trajectories or outcomes, choose the policy that maximises expected utility, minimizes regrets, or balances multiple criteria
- This makes them inappropriate because: In the dynamics of social-ecological systems some probability distributions are not known; and decision analyses do not capture the reflexive nature of people – the capacity of people to create novel visions of the future and to change the future by acting on those visions

Phase 1: Resilience of what?

- Initial assessment phase : A conceptual model based on what we know, aimed at identifying what we don't know, and what is considered to be of value and important
- Spatial boundaries and sub-divisions of the system ?
- Key ecosystem services ?
- Key components of the SES – plus spatial pattern, turnover times ?
- Historical profile of the SES ?
- Important slow and fast variables ?
- Controllable (eg land-use policy) vs uncontrollable (climate) factors ?

Phase 2: Resilience to what?

- External shocks
- A set of stakeholder visions / aspirations for the future
- A set of possible policies or actions (rules that influence use of the SES), leading to:
- (maximum 5) possible scenarios spanning the uncontrollable and ambiguous drivers

Phase 3: Exploring Resilience

- Use of models and other analyses to determine the SES dynamics across the range of scenarios, focusing on resilience
- dialogue
- historical analysis
- spatial models - linkages and spatial dynamics
- dynamic models, based on slow and fast variables, focusing on resilience and phase shifts in terms of ecosystem goods and services
- other methods??

Phase 4: Stakeholder Evaluation

- Example 1: North American lake ecosystems with two alternate stable states
- Example 2: Semi-arid rangelands that can exist in two states:

Two sets of information needed to assess resilience in an SES:

- The crucial (slow) driving variables that govern the supply of ecosystem goods and services
- The processes/drivers that determine the dynamics of this set of crucial variables – ie what causes changes in the positions of critical thresholds?
- Identifying this set of processes/drivers leads to a corresponding catalogue of management and policy actions that will increase resilience and build adaptive capacity in the SES

Resilience Management consists of:

- Maintaining or increasing the resilience (size) of the desirable state OR, conversely, decreasing the resilience of an undesirable state
- Keeping the system on a desirable trajectory (within a desirable state), OR trying to get the system from an undesirable onto a desirable trajectory

Summary:

- NRM aimed at an optimal pattern of use (space and/or time) is bound to fail, because
- the adaptive cycle happens, and too many uncertainties in a SES are irreducible - expect the unexpected
- consider the SES as a complex adaptive system (cas) with multiple possible trajectories
- establish the boundaries (domain) of the desirable trajectories – the critical values of the slow variables (the resilience of what)
- determine the attributes of the SES that confer resilience – how to increase the size of the domain of desirable trajectories
- determine the cross-scale effects, and the effects of linkages between the socio-economic and ecological systems, on the processes governing these attributes

The content of this summary is drawn directly from the presentation by Brian Walker. For a full copy of the presentation, please contact Andres Palau: a.palau@cgiar.org

Plenary Discussion (Rapporteur: Abra Adamo)

- It was suggested that the “social-ecological systems” concept is a useful starting point for thinking about integration of NRM.
- The idea that adaptive management is more important than rigid planning was discussed. Adaptive management is crucial to build the resilience of a system and to stay within thresholds (as identified by stakeholders), to withstand shocks to the system, and to take advantage of opportunities.
- It was suggested that understanding a system within an adaptive cycle enables researchers and other stakeholders to use unexpected shocks (e.g. El Nino) as windows of opportunity (using swings in dynamics of a system to meet desired outcomes).
- It was agreed that “what is a desirable outcome” would be different for different stakeholders and at different scales. Stakeholders need to have a common understanding of the system and how it is functioning (what factors determine its dynamics). All stakeholders are critical to this process. Vision-building to define scenarios with stakeholders was identified as one activity to identify and analyze trade-offs and create a platform for decision-making. Based on a shared understanding of the system and its dynamics there needs to be a building of adaptive capacity (to avoid undesirable states and stay within thresholds). Adaptive management is therefore less about planning and more about staying within thresholds (defined by stakeholders) to withstand shocks to the system.
- The issue of property rights vis-à-vis notions of resilience and sustainability was raised. It was agreed that one needs to look at what kinds of institutions (social, economic, and political) are required to build and strengthen trust and resilience. Social capital was identified as critical.
- The issue of common property (new range ecology) vis-à-vis the SES approach was raised (getting beyond fixed notions of carrying capacity etc.).

2.4 Genetic Resources in Ecosystem Management

Kamal Bawa, of the Department of Biology, University of Massachusetts, USA, gave a presentation on the need to integrate genetic resources into INRM conceptual and organisational frameworks.

Overview:

- Genetic Resources: Genetic diversity within species, Diversity among species
- Importance of genetic resources: Adaptation and evolution, Options, Uncertain future, Productivity, Resilience
- Threats to genetic resources: Habitat loss, intensive agriculture, extraction, invasive species, climate change
- Severely depleted genetic resources: Loss of populations and decreases in population density, Loss of central populations
- Reduction in genetic variation due to reduction in the number of populations and population density (e.g. sandalwood)
- Substantial economic losses due to the loss of genetic diversity (e.g. sandalwood)
- Case Study: Biligiri Rangan Hills in Southwest India: Threats, Risks and Mitigation
- Biligiri Rangan Hills: Wildlife Sanctuary (540 km²)
- Soligas indigenous group – 4000 people in the Sanctuary
- Giant Asian Honeybee (*Apis Dorsata*)
- Amla *Phyllanthus Emblica*: the most important non-timber forest product sp. (used for its fruits, pickles, jams, medicines)
- Threats: Harvesting, Fire, Exotics (e.g. *Lantana camara*), Intensive Agriculture
- Risks: Loss of biodiversity and ecosystem services, loss of livelihoods
- Mitigation: Applied Research (causes, consequences, solutions), Incentives, Institutions and Policies
- Applied Research:
 - Monitoring of biodiversity-genes to ecosystems
 - Impact of extraction, fire and invasive species on genetic resources
 - Consequences of intensive agriculture
 - Valuation of ecosystem goods and services
 - Household determinants and patterns of resource use
 - *Phyllanthus* spp. most heavily extracted
 - contributes to the local economy
 - ecology and conservation status unknown
- Agroecosystems: Intensification of Agriculture
 - Intensive agriculture versus traditional agriculture (in terms of species richness)
 - Plant species richness- no significant trend
 - Insect species richness-no significant trend
 - Variation in insect abundance over time – increases with intensification of agriculture
- Mitigation: Applied research (causes, consequences, and solutions), Incentives, Institutions and Policies
- Institutions and Policies: Village level institutions, Empowerment, Capacity building, Resources, Participatory Resource Monitoring, Involve local communities in NRM, Strengthen village level institutions, Produce manuals on participatory management
- Genetic Resource Management in BRT Sanctuary – Summary
- Integrated resource management
- Genes to ecosystems

- Participatory approaches
- Linked with economic well being
- Social and human capital
- Challenges: Perceptions of users of genetic resources, Motivation for conserving diversity and complexity, Incentives, Institutions, Policies

The content of this summary is drawn directly from the presentation by Kamal Bawa. For a full copy of the presentation, please contact Andres Palau: a.palau@cgiar.org

Plenary Discussion (*Rapporteur: Abra Adamo*)

- In terms of integrating genetic resources management into INRM, it was suggested that the best area for investment is in the development of a common conceptual and organisational framework.
- In the case of the Biligiri Rangan Hills study, the presenter was asked if there has been any work done to establish linkages between the conservation of genetic resources and the conservation of other resources (e.g. water, soils, etc.) and how researchers in this study have managed this integration. It was indicated that there has been no real work yet at this site with resources beyond non-timber forest products.
- The presenter was asked about the extent to which they would pursue the objective of biodiversity in the Biligiri Rangan site given the high costs of conservation. In this case study, there has been no consensus yet in terms of the desirable levels of biodiversity conservation. It was suggested that most of the value of conservation is in carbon sequestration. The high costs of conservation are a problem and need to be balanced with the outcomes desired by stakeholders.
- It was agreed that a system of incentives is needed to encourage conservation of biodiversity.
- It was suggested that one of the lessons learned from this case study is that working with stakeholders is do-able. It only requires a reorientation in thinking. Participants agreed that research centers must develop strategies to better integrate stakeholders in research.

2.5 Knowledge Management: Origins and Implications for INRM

Steve Song of Bellanet gave a presentation which outlined the importance of knowledge management to organisations, and to multi-organisation initiatives.

Overview:

Origins of Knowledge Management:

- In the late 80's and early 90's, large organisations began to experience new pressures: Internet, cheaper telecommunications, deregulation, globalisation
- They found that they were unable to respond quickly enough to changing environments
- Being a large organisation went from being an asset to a liability
- Example: Barnes & Noble – Amazon.com
- Barnes & Noble: largest book retailer in America with 542 stores in 49 states (Sales: 1999 – 193 million)
- Amazon.com: Opened in 1995 with 4.7 million items for sale and 29 million clients in 160 countries (Sales: 1999 – 1.64 billion; 2000 – 2.76 billion)

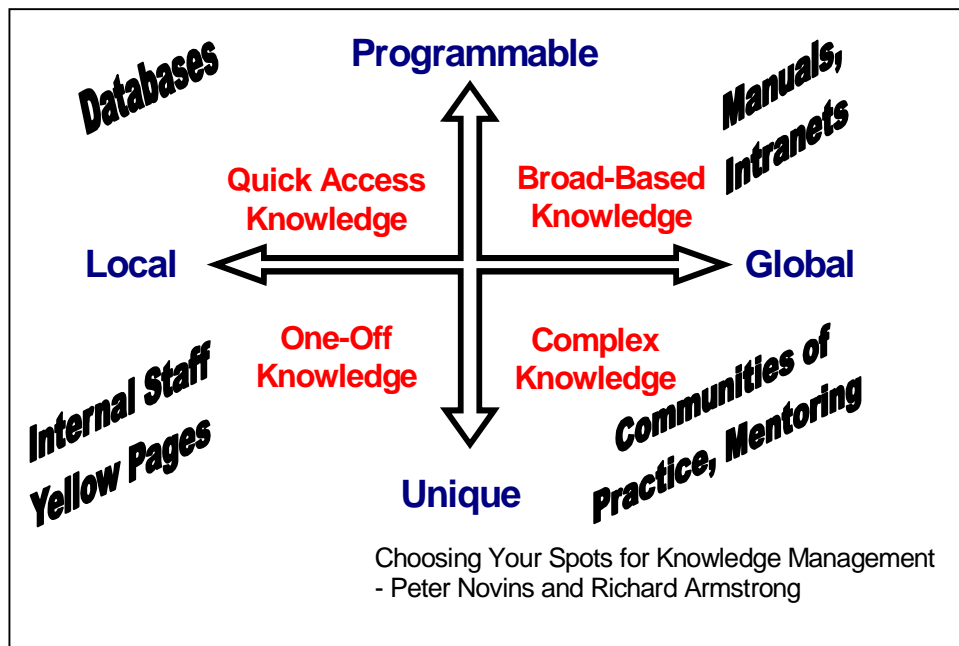
The CGIAR

- TAC's Views on Implications of the New CGIAR Vision & Strategy for Structure and Governance
- "TAC observes that the CGIAR may not be responding rapidly enough to change. Competition between centres for scarce donor resources, and disparate efforts between some centres on key cross-cutting research topics often limit the System's efficiency and effectiveness which, potentially, is in a unique position to gain from complementarities and synergies across centres."
<http://www.worldbank.org/html/cgiar/cdmt/reports.htm>
- Traditional approaches too slow
- Back to the drawing board ...
- Where is the value within our organisation?
- What is it that makes us unique and worthwhile?
- How do we differentiate ourselves from similar organisations?
- Result: Recognition of the role and importance of knowledge
- Does this change how we define ourselves?
- Just how important is knowledge to what we do?
- Result: "Knowledge" becomes part of the mission
- What should we do about it?
- Where does knowledge lie within our organisation and which knowledge is valuable?
- How can we husband, nurture, develop knowledge within our organisation?
- Result: Knowledge Management

What is Knowledge Management?

- Definition: "Knowledge Management caters to the critical issues of organizational adaptation, survival and competence in face of increasingly discontinuous change." <http://www.brint.com>
- There is a tendency to discuss data, information, and knowledge in the same breath
- Data: A Record of a Change of State (e.g. "3/10/3128/80")
- Information: Data organised with a purpose. A message. (e.g. "3 in 10 families disinfect vegetables that are to be eaten raw ...")

- Knowledge: Literally ... what people know (e.g. "Soil fertility is the key")
- Differentiating Knowledge:



- Only a small portion of what we know is codifiable or "explicit"
- The vast majority of knowledge is "tacit" or uncodifiable
- Early KM efforts failed to recognise the importance of tacit knowledge, focussing more on knowledge stock than knowledge flow (e.g. Document Management System, Best Practice Databases, more reporting)
- People are the Key
- Best knowledge transfer technology: face-to-face interaction (although not always possible)
- Best knowledge repository: a Community or Group of People

Elements of Knowledge Management

- Strategy: Committing the Organisation, Crafting the Vision, Leadership
- Tools: Email, Groupware, Yellow Pages, Communities of Practice, Facilitation, Dynamic Learning, Knowledge Asset Mapping
- Culture: Recognising the importance of knowledge sharing, valuing those who share knowledge, developing a knowledge sharing culture

Communities of Practice

- "Groups informally bound together by shared expertise and passion for a joint enterprise" – Etienne Wenger
- Characteristics: help drive strategy, solves problems quickly, diffuse best practices, develop professional skills, help recruit and retain staff, develop a common language

Dynamic Learning

- Lessons from the US Army, BP Amoco, etc.
- Learning should happen immediately
- The bar needs to be set very low
- Learning need to connect to behaviour change

- Types of Learning: Learning Before (Peer Assists), Learning During (After Action Reviews), Learning After (Retrospects)

Changing Work Culture

- Include knowledge sharing in performance appraisal
- Reward conspicuous knowledge sharers
- Create spaces for knowledge sharing
- Recognise conversation as a core practice

Technology

- Necessary for distributed organisations
- Should facilitate the way people already work
- Should never drive the process
- The goal of KM is to create a dynamic organisation capable of responding rapidly to change

The content of this summary is drawn directly from the presentation by Steve Song. For a full copy of the presentation, please contact Andres Palau: a.palau@cgiar.org

Plenary Discussion (*Rapporteur: Abra Adamo*)

- Participants questioned the extent to which communities of practice needed to be composed of people with shared experiences. Mr. Song indicated that “shared experience” per se related mostly to issues of trust. Communities of practice do not require that people share the same discipline, regional focus, etc. but there must be a common bond and shared passion among members. Communities of practice can only be sustained if they give value back on things that are important to members.
- Participants were interested in Mr. Song’s understanding of where CG centers are located within the Knowledge Matrix presented (see chart above). It was suggested that at present the CGIAR produces and possesses “complex knowledge” characterised as “unique” and “global”. In INRM, it was suggested that the CGIAR would want to move toward a more “broad-based” knowledge that is global and programmable. Participants were interested in how the CG could move from complex to more broad-based knowledge. It was suggested that moving or diffusing knowledge from the bottom – up within an institution would encourage knowledge access.
- One participant identified that knowledge within local communities is shared in the ways that knowledge management promotes (e.g. storytelling).
- How to link local knowledge within communities and communities of practice was raised as an important issue. It was suggested that overlapping communities of practice (some local and some non-local) would work best with bridges between them. Linking local knowledge to professional communities is crucial to sound INRM.
- The role of mentoring in knowledge management for INRM was discussed. It was suggested that the pairing of junior and senior people in innovative ways was an example of mentoring in INRM. It is invaluable to put people in relationships where they are inclined to interact and share knowledge and experience. Moving teams around will also encourage the sharing of knowledge.

2.6 The Sustainable Livelihoods Approach (SLA)

Jon Tanner of DFID presented the Sustainable Livelihoods Approach (SLA) developed by DFID and the ways in which such an approach may complement INRM conceptual frameworks.

Overview:

- We've got to do something about global poverty ...
- 20% - 1.2 billion - in extreme poverty and 2/3 are women
- Africa: less GDP/head than 30 years ago
- economic growth: got 2%, need 7%
- declining FDI and share of world trade
- conflict & climate
- <35% HIV/AIDS

Understanding Poverty

- Putting people not resources first
- SL Approach is one way of building this understanding

And we've got to do better than before ...

- R or D or E Projects [often]: don't reach the poor, are inappropriate for the poor, don't impact on numbers, don't add value economically, requires unsustainable external inputs
- We are [often] offering: technical fixes, research divorced from development

Better understanding - taking a Sustainable Livelihoods Approach

- Putting poor people at the centre of the analysis
- Understanding the dynamics and complexities of their livelihoods
- Thinking holistically about the factors that determine their ability to survive and thrive
- Sustainability at the heart of livelihoods

.... sounds a bit familiar...?

- Requires a mindshift
- Livestock keepers not livestock; dryland people not dryland ecosystems
- Get on the inside and look out
- '*Livelihood Assets*': not just \$\$\$

Livelihood Assets

- Natural Capital: Land, water, livestock, wildlife, biodiversity, environment
- Physical Capital: Transport, shelter, clean water, energy, communications
- Human Capital: Skills, knowledge and information, ability to work, health
- Social Capital: Networks, groups, trust, access to wider institutions, "ability to demand"
- Financial Capital: Savings, credit, remittances, pensions

... and what affects people's livelihood assets

- 'Vulnerability'
- Caused by the environment in which people exist

- Trends - population, resources, climate change, economic
- Shocks - illness, natural disaster, economic, conflict, pests & disease
- Seasons - prices, production, health, employment
- 'Policies, Institutions & Processes'
- Creating the environment in which people live by 'changing the rules of the game'
- Locally, Nationally, Internationally

Masvingo, Zimbabwe

- How ?
- A step back
- Some key questions – centring around livelihood themes (vulnerability, institutions etc)
- Not an audit but about trends and dynamics

Livelihood headlines:

- Overall downward trend in livelihoods
- Vulnerability context critical –environmental vulnerability being overlain by new shocks (HIV/economic)
- Institutional crisis - withdrawal upwards of formal institutions (collapse of health/education and AGRITEX)
- Informal institutions can not fill gap
- A new RD&E challenge
- A 'reversal of the usual livelihood themes'
- Movement back to rural areas
- Decreasing livelihood diversification
- Dryland agriculture remaining central and dependency on NR (common and private)
- Communities withdrawing into themselves (declining use of inputs)
- Dealing with institutions that have performed rather than never - so sustain and adapt capacity not build
- Dynamic poverty situation - not about rich and poor - but who is able to respond

Embu, Kenya

- A 'well characterised', mixed, upland-farming site
- Technology uptake for intensification not widespread
- Technologies inappropriate ?
- Characteristics of poverty ?

Livelihood headlines:

- High rural population – land pressure - poverty rising
- Services declined
- Poverty varies
- Vulnerability varies
- Coping strategies vary

A new RD&E challenge

- Outmigration
- Increasing livelihood diversification
- Diversified agriculture increasingly dependent on input and output markets
- 'Communities in contact'

- Build knowledge, institutions
- Improve policy ?

Some challenges ...

- It's not rocket science
- How can we ensure that we and our partners take a more people-centred approach?
- What are the rules and incentives that shape the way in which we do research?
- How can we ensure that poor people learn about new technologies? (Its all about human capital)
- Knowledge systems matter

The content of this summary is drawn directly from the presentation by Jon Tanner. For a full copy of the presentation, please contact Andres Palau: a.palau@cgiar.org

Plenary Discussion (*Rapporteur: Abra Adamo*)

- Participants questioned who the target of research should be – the poorest of the poor, the medium poor, wealthy rural people – in order to achieve the greatest impact. It was suggested that poor people expect a quick pay-off from research but CG research typically delivers results over a much longer period. It was suggested that quick pay-offs are possible provided that the poor – our clients – drive the process of research.
- Some participants felt that the Sustainable Livelihoods Approach (SLA) provided a useful framework to bring together researchers and institutions of different disciplines.
- It was suggested that while work at the grassroots is not “rocket science”, it can be very complex, and requires social science skills and experience in working with multi-disciplinary teams.
- Participants raised the concern that the SLA overshadows the fact that strong science does solve people's problems. Mr. Tanner indicated that the SLA puts scientific research into the social, economic, and political context of people's lives – putting science to work on the concrete problems of real people.

The presentations provided an intensive 'food for thought' for the discussions in the workshop. After six presentations, there was a strong need to process the information in small groups.

3 Critical Factors for Success in INRM

Following the plenary presentations, the participants organised themselves in small working groups around the tables in the plenary room to discuss the critical factors for success (and failure) in INRM.

Task for table groups

Reflecting on the presentations on the conceptual basis for INRM and your own experiences, what are the 4 most critical factors for success and the 4 most critical factors causing failure in putting INRM into practice.

Please write the 4 success and the 4 failure factors of your table on cards.

The small groups discussed this question amongst themselves and then presented their findings to the larger plenary group.

Following the presentations, the success and failure factors were presented, discussed and clustered in plenary. A small group was asked to synthesize the outcomes.

The results of this reflection are illustrated in the table below.

Critical Success Factors for Putting INRM into Practice ...

| | |
|---|--|
| Providing benefits to people in a reasonable time | |
| <ul style="list-style-type: none"> • Making the difference beyond research | <ul style="list-style-type: none"> • Up-scaling processes for location-specific solutions |
| Suitable Organizational Arrangements | |
| <ul style="list-style-type: none"> • Commitment and Governance • Long-term commitment/trust by core group to site or issue • Long-term commitment (donor and research effort) • Good governance and long-term financial support • Long-term commitments • Appropriate institutions • Institutions with adaptive rather than prescriptive approaches • Strong local institutions | <ul style="list-style-type: none"> • Stakeholder participation in all phases from conception to implementation to evaluation • Multi-stakeholder inclusion from the design stage • Careful choice of partners from research to development • Building strategic alliances and trust • Framework to build trust and effective communication • Transparent communication |

Cont'd on next page

| | |
|---|--|
| Determining Key System Drivers and Interventions | |
| <ul style="list-style-type: none"> Identify and understand the 3-5 key system drivers | <ul style="list-style-type: none"> Identification of problem and desired outcomes |
| Suitable Methods | |
| <ul style="list-style-type: none"> Critical to include 3 spatial and temporal scales (e.g. local, ecoregional, global) Entry point must be a NR problem Joint problem definition | <ul style="list-style-type: none"> Interdisciplinary science / local knowledge approach Social learning to build common understanding and social capital M&E to support adaptive management |
| Professional Facilitation | |
| Global Stakeholders | |

Factors Causing failure in Putting INRM into Practice ...

| | | |
|--|--|--|
| <p>Inadequate stakeholder participation</p> <ul style="list-style-type: none"> Lack of buy-in from stakeholders Failure to include institutions and partners in the INRM process Lack of involvement of all stakeholders Key stakeholder not included from the outset <p>Not sharing resources with stakeholders and local institutions</p> | <p>Inadequate commitment and governance</p> <ul style="list-style-type: none"> Discontinuous project funding (donor/research institution inconsistency) Donor driven agenda Institutional unwillingness to change Accountability procedures poorly developed (flexible, long-term) No follow through | <p>Narrow focus: too narrow expertise to tackle problem</p> <ul style="list-style-type: none"> Shortage of people with requisite skills Separation of genetic and NRM researchers |
| <p>Not identifying what is important</p> <ul style="list-style-type: none"> Focus on "descriptive" rather than desired outcome Over studying the problem | <p>Not putting people first</p> <ul style="list-style-type: none"> Lack of integration of local knowledge and agendas Inappropriate targeting Failure to select right scales of intervention Not addressing decision making across scales | |
| Unsuitable Organisational Arrangements | | |
| Unsuitable Methods | | |

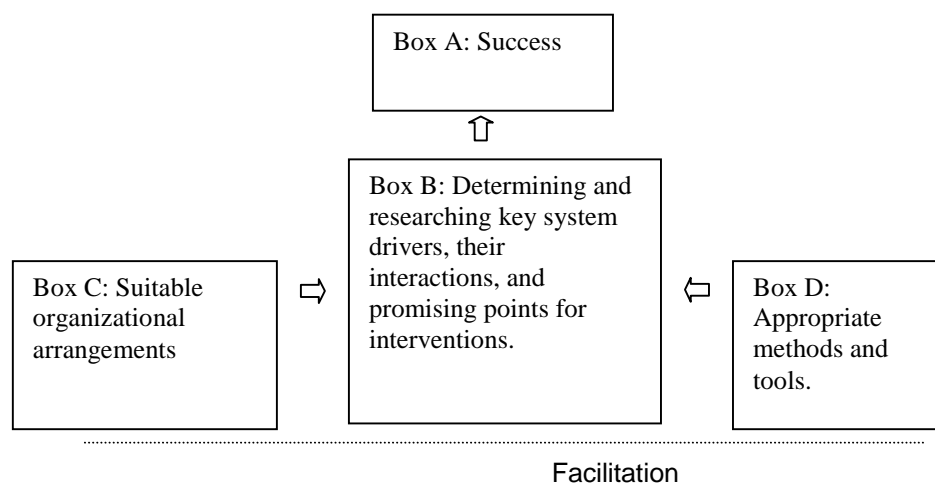
Critical Factors for Success in INRM: Synthesis Report

By Larry Harrington et al.

This summary describes the outcome of group discussions on factors influencing success vs. failure of INRM endeavors. Group discussions, and therefore our corresponding summary, were hindered by a lack of prior agreement on what was meant by “success”. This question may warrant a separate workshop session. In the meantime, however, we suggest that “success” be described in terms of the following:

- Improvements in livelihoods, system resilience, system productivity and environmental services, that benefit many people over a large area.
- The improvements above attributable to the development and scaling out of a set of innovations (developed through INRM research) that address key problems. Mechanisms in place for vertical and horizontal scaling up and scaling out.
- Local institutional innovations that empower communities to continue the process of experimentation with and adaptation of natural resource management strategies beyond the project life span.

Group members were asked to identify factors associated with the success of INRM endeavors – and also factors associated with failure. Since almost all the “failure factors” were negative expressions of “success factors”, we have lumped them together. With this in mind, the ideas that came forward can be organized in the following framework.



Note that boxes A and B are more likely to be achieved if boxes C and D are in place.

Suitable organizational arrangements

Two key aspects were identified here, name (a) stakeholder participation in all phases of the work and (b) long-term commitment and good governance. Specific components of stakeholder participation included adequate choice of partners to facilitate subsequent horizontal and vertical scaling up; the building of trust among partners through effective communication; knowledge management (communities of practice); and transparency of decision making. Components of long-term commitment included both institutional commitment to the research initiative and, to allow that to happen, long term donor support.

Appropriate methods and tools

Ideas put forward in this category did not specify the tools required for successful INRM but rather the outcomes that a suitable suite of methods and tools must produce. These included the identification of the appropriate scale of intervention and the possible interactions between these scales; clear definition and agreement on the problems to be addressed; a mechanism in place for social learning and the building of

social capital; a process in place for monitoring and evaluation to support adaptive management; an interdisciplinary team that is competent to included and analyze indigenous knowledge.

With C and D in place, the group felt that any given INRM initiative would be well placed to move via B to success. However, in reporting the output of this working group we are conscious that the “critical factors of success” depend on how success is defined. It is almost certain that we have individual visions of success. Because of this it would seem important that a consensus be sought on what success looks like. Once that is achieved, perhaps a more detailed and focused set of success criteria might emerge.

Plenary Discussion (*Rapporteur: Abra Adamo*)

- It was identified that when referring to “intervention” we are still referring principally to work at the community level. There is a need to expand this to include stakeholders and processes at multiple scales of analysis and intervention.
- It was suggested that INRM needs to target its interventions to improve the well-being of both people and ecosystems if it is to be successful and sustainable.
- We need to move on how we define success in INRM (*vis-à-vis* objectives) as we are dealing with concepts of livelihoods and resources - need for quantitative parameters to assess improvements in management practices, policies, institutional changes etc.

4 Field Visit and External Visitors

Prior to the parallel sessions in the late afternoon on the second day of the workshop, participants were given three different activity options:

Option 1: Open space for self-organized group discussion.

Option 2: Field Trip to Bolivar, Valle de Cauca, to illustrate the application of INRM research results and tools in community-based watershed resource management.

Option 3: External visitors involved in CIALs visited CIAT to give a series of presentations and to engage in a discussion with workshop participants.

Agenda for External Visitors

| | |
|-------------|--|
| 08:30-09:00 | Video: "Murmurings of Water" |
| 09:00-09:30 | Presentation of the CIPASLA Consortium Rodrigo Vivas, Coordinator |
| 09:30-10:00 | Presentation of the scale model of the Rio Cabuyal watershed, Carlos Trujillo |
| 10:00-10:30 | Coffee |
| 10:30-11:00 | Video: "Lessons from Poverty" |
| 11:00-11:30 | Presentation: CIAL research on blackberry crops. Pedro Herrera |
| 11:30-12:00 | Presentation, Milk project Carlos Trujillo Presentation: Flowers project Rosa Maria Munoz |

In the afternoon, the first round of parallel sessions took place.

5 What is INRM ?- a brief Recap

On the morning of the third day, before the report back from parallele sessions, Bruce Campbell was invited by the facilitator to give a short overview presentation of the INRM discussion in order to clarify more what was meant by INRM as it was discussed in Penang.

INRM =

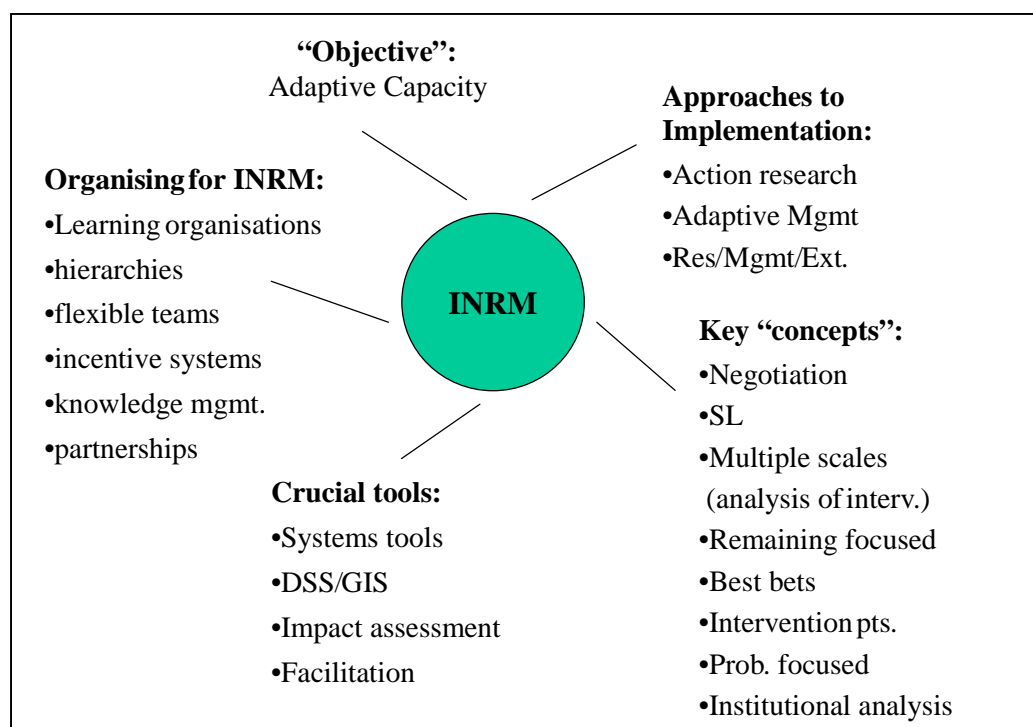
- Approach / Process / Framework / Road Map / Way of doing business
- Not a dogma with a set of things that must be done
- What to leave out / include in "the system" may be most difficult part!
- "Integration"
 - stakeholders
 - scales (geog, org, time)
 - disciplines
 - components

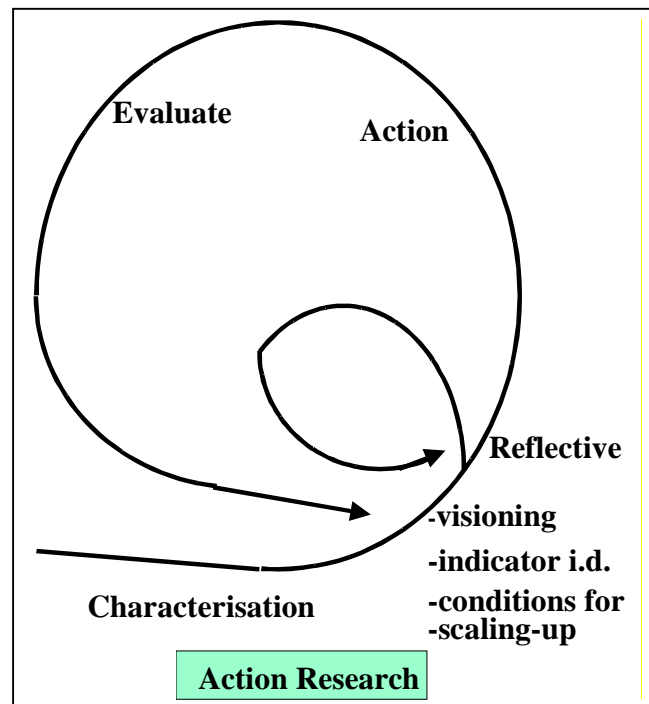
- Way of doing business
- Paradigm shift
- Getting balance right

Reductionism - integrative
Positivism - constructivism
Natural - social

Firmly people-centered
(not system / NR centered)

"INRM"





Plenary Discussion (*Rapporteur: Abra Adamo*)

- The issue of whether CG work, and INRM more specifically, is best conceptualised as a people-centered or NRM/system-centered approach. Some participants felt strongly that “NRM without people is called evolution” There are many issues that an SL approach takes into account that INRM many not (for example, the role of AIDS, conflict and other variables in shaping people’s lives and NRM). It was agreed that for the balance between a people-centered and system-centered approach will be different for different types of projects.
- It was suggested that the chart (third above) simultaneously describes the process of defining what GCPs are to be. The evolution of GCPs and INRM are parallel processes and the outcomes of decision-making processes in both are likely to be similar. It was suggested that an ideal outcome of this meeting would be to feed our results into the GCP definition processes.
- It was suggested that the problem with GCPs is that they are likely to loose focus on local relevance. It was suggested that INRM should be people-focused and driven by the empowerment of people – “empowering people to do something ... in this case, INRM”.
- The issue of integrating local knowledge into the chart (chart 3) is also crucial (e.g. as a discipline or tool).
- It was agreed that there is a need to define our objective (in INRM) in order to determine the extent to which we are successful in conducting INRM (e.g. indicators for meeting out objective).
- Definition of INRM as “a way of doing business” was thought to be inadequate. It was suggested that any definition of INRM must include “options development” as an explicit objective.
- Like the definition of Knowledge Management, some suggested that we should not get too hung up on the term “INRM” as most seem to generally agree what the term conveys.
- Referring to chart 1, participants discussed that INRM is the work of adding/integrating attention to “other factors” (e.g. livelihood options) into work on technology options development. INRM is intended to recognise all sorts of factors that affect people and ecosystems and deciding which ones are relevant and which are within our mandate. It was suggested that there is a clear need to define boundaries, as the CG is not in the business of solving all livelihood problems (need to be modest insofar as focussing our efforts).

Bruce’s presentation was well appreciated as it provided clarity and helped to bridge the initial presentations of Jeff Sayer and Joachim Voss with the discussions of the parallel sessions.

6 Outcomes of the Parallel Sessions on INRM Themes

The parallel sessions were self-organised by the 'session organisers' who volunteered long before the workshop to organise 2 hour long topic sessions. There was variety of ways how these sessions were designed: some presented papers, other just abstracts, others focused mainly on discussions. To enable all participants to access information presented during the parallel sessions, each session nominated a rapporteur to report back findings and insights to the whole group during the plenary session that followed.

In order to systematise the outputs, all the parallel sessions were provided with 2 key questions to which they should work from their theme. These were:

Guidelines for Parallel Group Sessions:

Analyze your cases and elaborations with regard to:

1. What does your session tell us about possible operational models, principles and success/failure factors in conducting INRM research?
 2. How can your sector/issue improve the relevance and impact of CG INRM work in solving major human and environmental problems?
- Please nominate a group rapporteur, who writes 2-3 pages as a summary of your discussion and findings
 - Please ensure your discussions are well-facilitated and everyone can contribute
 - Please present your findings to the plenary in a visualized way.

The report back of the 14 different themes was organised in two steps: first the sessions held on Wednesday afternoon reported the next morning, then the second round working groups took place followed by the final report back.

The following order was maintained:

Report-back from parallel sessions

- 1.) Organizational Frameworks
- 2.) Concepts
- 3.) Resilience and Adaptive Management
- 4.) Knowledge Management
- 5.) Climate Change
- 6.) Innovative Tools
- 7.) Scales of Analysis
- 8.) Policy
- 9.) Participatory Research
- 10.) Social Organisation
- 11.) Agrobiodiversity
- 12.) Impact Assessment
- 13.) Water
- 14.) Integrated Nutrient Management

6.1 Organisational Frameworks for INRM

Rapporteur: Dyno Keating

The group noted that a paradigm shift has taken place in terms of the way we do business with an increasing level of complexity to deal with:

| Period | Focus | Complexity Level (C) |
|--------|------------------------------------|----------------------|
| 1970s | Productivity | C |
| 1980s | Food Security | C ² |
| 1990s | Environment | C ⁵ |
| 2000s | Multi. Dimensions/ Interactions | C ⁵⁰ |

SUMMARY REPORT

I Summary of INRM background upon which their recommendations are based

The CGIAR Centres and their broad array of partners have been engaged in various forms of NRM research and its component facets for over 30 years. During the past 10 years the rapid evolution of the underlying science, tools and processes has been especially evident, as seen in reports here in Cali. Underlying theory

has been developed and tested in a wide range of projects in every continent and most ecoregions in which we work. The present INRM "Community of Practice has been making that knowledge explicit.

II Organizational implications from INRM theoretical frameworks

- It has been widely shown that managers of natural resources (farmers) do so within the context of their production systems, aimed at supporting and enhancing their livelihoods. The CGIAR system is thus organized both administratively and scientifically according to that pattern. It is strongly felt that INRM science and its approaches should be implemented in the field within the context of programs which enhance sustainable systems of agriculture, forestry and fisheries, our mandate areas.
- For ultimate success in eventual adoption and management, stakeholders in the natural resource base must be involved in the entire process, beginning with visioning, priority – setting and planning.
- There must be a clear identification of the problem, or problem set and a prioritization established. That set, and its prioritization can usually should evolve as research and development progress.
- Boundaries of the problem must be set, determined by funding, organizational capacity, priorities and the desirability of keeping the research focused on key "determinant" factors which limit effective resource management and their human and ecosystem utility.
- Institutional and community partnerships should be carefully chosen, based on mutual interest and commitment, potential for contribution to project goals and willingness to work as a team. The CGIAR has long experience in this team building. It must be carefully facilitated, use appropriate incentives and be well managed. Team composition in a project should evolve over time as project priorities and the problem set change. Composition must be driven by the problem set.
- The role of each partner should be carefully spelled out.
- There is strong requirement for flexibility in project structure. The problem sets are often complex, and unanticipated elements often demand new or different expertise and partners, or even new sites for additional validation. Research breakthrough should be expected. Scientists should be given reasonable latitude to follow new leads.

III Organizational lessons and implications from ecoregional programs

In addition to the above, generally – accepted principles which pertain to most complex, multi-partner projects, field experience has shown that:

- Any project using an INRM integrative approach must have a clearly defined and effective management structure with appropriate accountability.
- For INRM research and subsequent development to be effective it must operate at several scales both of subject content and geographical. A reasonable number of communities, watersheds or benchmark sites (or whatever the appropriate research unit chosen), must be included to achieve a reasonable and cost-effective sampling of ecoregional variability to give confidence in extrapolation for scaling up and out.
- The dynamic research integration process may need professional facilitation, particularly in larger projects. That integration is essential at benchmark sites and above as the ecoregion itself is addressed. The management team must assure that this integration truly occurs and is effective.

IV Functional activities and responsibilities at each level of scale

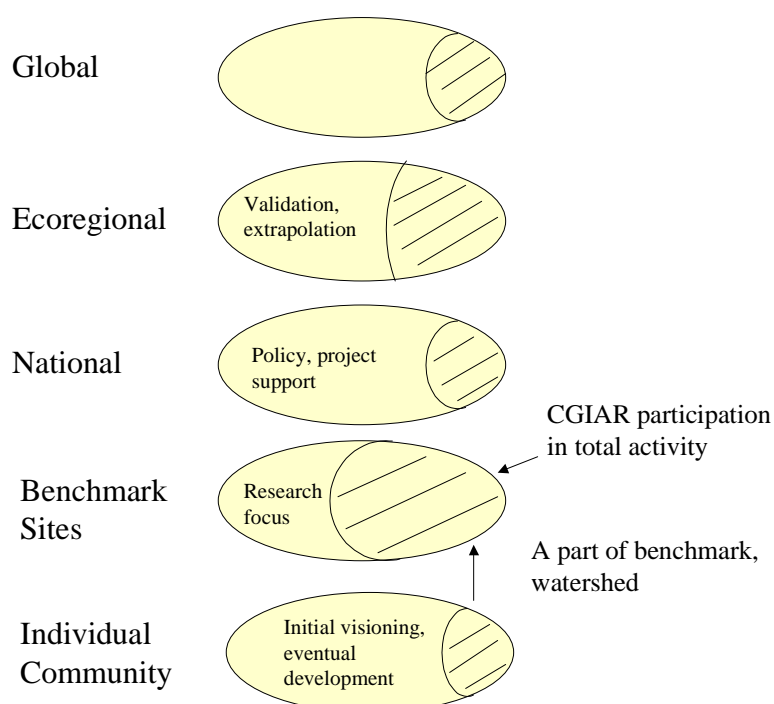
The structure and management of any project or program with a large INRM component is functionally based on levels of geographical scale. The groups involved, their activities and the level of their participation change with scale. This is a fundamental characteristic of INRM function. The degree of presence of CGIAR Centres changes with level as shown in Table 1.

Table 1.

| Level | Process driven by | Importance of CG & partners | Role of CG & partners |
|----------------|------------------------|-----------------------------|--|
| Community | Other stakeholder | Small | Backstopping Catalyst Option provider Product champion |
| Benchmark area | Needs CG & partners | Relatively large | Integrate component research |
| Ecoregional | | Somewhat small | Catalytic Scaling up Cross-fertilization |
| Global | Global Conventions | Small (variable) | IPG provision Resource mobilization Setting policy and procedures Conventions Scientific backstopping Mouthpiece for the poor |

CGIAR research activities are concentrated at the multi-community or multi watershed level where most research occurs. They occur at a national and ecoregional level in policy research and input and in research extrapolation and validation. This can be shown diagrammatically as in Figure 1.

Figure 1. Functional activities and responsibilities at each level of scale:



V INRM implications for the organization of the global Climate Change Challenge Program

- The various modules, addressing different elements of the problem, being environment – specific in their research and development implementation, must be regionally / ecoregionally focused. This, along with an absolute requirement for harmonizing local and national priorities with global concerns, requires the multi-scale approach outlined above. Program structure and management must reflect and support that framework.
- An oversight body, with an independent “expert” chairperson is needed. INRM experience and expertise is essential at this top level.

- A program manager is required.
- MOU / business plans are needed among partners.
- Funding should be assured for a reasonable time frame both to enhance probability of success and to justify the transaction cost of partnerships. Funding should be progressive, with project plans being specific for only a portion of available funds, leaving funding for project flexibility and the adding of partners / expertise as the program evolves.
- A portion of funds should be available for local and ecoregional visionary and priority setting and for integration costs and activities.

Plenary Discussion

No discussion followed the presentation.

6.2 Concepts

Rapporteur: Frits Penning de Vries

The session consisted of five very brief presentations and a discussion session.

Presentations:

1. **On tools for land use analysis: role and complementarity of methodologies for the evaluation of land use on different scales with applications in Costa Rica.** Dr. Hans G.P. Jansen, IFPRI.

Major observations: a broad set of models and modeling approaches was developed, parameterized and tested with a team of scientists over a decade. Models for different scales (farm to national level) feed results to each other. Documentation of the research and models is extensive. This decade-long ecoregional project yielded good understanding and models with opportunities for scenario analyses. Capacity building of Costa Ricans and particularly students of Wageningen University succeeded well. Transfer methodology and models to Costa Rican researchers OK, to politicians only little. Project ended shortly before job (towards Costa Rica) was completed.

2. **Multiscale agroecological frameworks for land management research.** Dr. Eddy de Pauw, ICARDA.

Major observations: the concepts 'agroecological zones' and 'resource management domains' have been developed for many years. This paper refined the approaches further. It is argued that agrotechnology transfer can make effective use of the concept of RMD's. In practice, one struggles with endless heterogeneity of land and people. Successful application requires distinction of 'nested' RMD's. The closest fit will be obtained at the deepest level. Good concept, examples are given, but it is not yet applied in practice.

3. **IITA's benchmark approach: putting INRM into practice.** Presented by Dr. Stephan Weise, IITA. Full paper available.

Major observations. The approach is a 6 years attempt to put ecoregional approaches into practice in the Humid Forest Zone of Africa, in a very large area. Key to the approach: recognize developments in land use as a function of population density and other major aspects (climate, soil), then distinguish the best developments at each level, and promote those at other areas with full input of local farming community. Practical results of the approach (for farmers) are not yet clear, but many signs of promise. Not strict planning, but follow directions. Intensive collaboration with NARS, who are trained in the process; IITA is leading partner in the process.

4. **Trade off analysis: a framework for INRM from field to regional scales.** Dr. David Yanggen and Dr. John Antle, CIP/Univ. Montana.

Major observations: the well developed at tested model distinguishes two major factors: economic and environmental sustainability. Since these are generally in conflict, a choice is to be made. This is repeated for alternative practices. The model then quantifies this choice, so that stakeholders, particularly farmers (farmers

associations) can make a conscious, sometimes negotiated choice. NARS are trained to adapt and use the model.

5. Management of natural resources at different scales by Dr. Amezquita, CIAT.

Major observation: simple, very practical and direct advice to farmers for crop species selection for RMD's with sloping lands in S. America.

Discussions

Several items were discussed. We agreed that all projects were directly contributing to or part of INRM research. We focussed at the question what model-aspects of these project are prominent for use in new projects with similar goals in other countries or regions.

The most interesting issue that surfaced was that will all projects aimed at transferring the project to partners in developing countries, this was most successful to researchers who were long time involved in and trained by the projects. ('Spontaneous' transfer of the methods to NARS in other countries was not observed, however, suggesting a major threshold for widespread use). Transfer of model-approaches and results to policy makers was still less successful. Their involvement at too early a stage leads to negative reactions (come back when you have something useful). They also need to trust the researchers, which often comes from early involvement in goal setting and by providing study results through NARS rather than directly.

Another observation was that 'stakeholders' do not form a constant group, but may change from place to place and evolve in time. Make sure that the right groups are involved. The term organic stakeholder platforms' was introduced for this purpose.

The projects were basically seen as very successful. It was confirmed that strict planning is not productive, as too many external and internal factors are not really under control, and flexibility in response to stakeholder suggestions is a positive feature in itself.

Plenary Discussion

Rapporteur: Abra Adamo

No discussion followed the presentation.

6.3 Resilience and Adaptive Management

Rapporteur: Brian Walker

Resilience and Adaptive Management

- 1) Sustainability is a changing goal
- 2) Build on developing understanding
- 3) Redundancy
- 4) Risk & sensitivity analysis
- 5) Target research
- 6) Cross-scale effects
- 7) The drivers change over time
- 8) Thresholds
- 9) Expect surprises
- 10) Red lines on the capitals diagram
- 11) Interactive S-E-E effects

REPORT

The group addressed the implications of this issue for the CGIAR and the question of how it will/should impact on INRM research in the CGIAR. The key points that need to be taken on board by the INRM task force and scientists are the following.

1. There is a lot of activity of this general nature underway and there is a tacit understanding of it developing among researchers. It needs to be encouraged and fostered, and it is important to maintain multiple "models" or approaches.
2. Sustainability, and the INRM research that goes towards it, is not about achieving an optimal state. There will always be new desired sets of goods and services.
3. The significance of redundancy in ecological and social systems needs to be recognized in INRM research.
4. In relation to 3 there are various methods for risk and sensitivity analysis that need to be included in the INRM portfolio.
5. It is helpful to think about where a particular region/system might be in respect to the adaptive cycle in order to better target the most appropriate kind of research. (There is little point in trying to develop optimal use recommendations for a region going through a period of major upheaval).
6. Cross-scale effects are of great importance and are inadequately considered in most research. INRM research should not be focused on just one scale. It should consider, at least, the scales above and below the one of primary interest, and the interactions between them. Also, it is necessary to determine the major time scales that are operating in the system.
7. Though the apparent complexity of social-ecological systems can usually be reduced to 3-5 driving (control) variables, the nature of these variables can change over time, as the system changes.
8. In INRM research it is crucial to consider the notion of thresholds or major break-points in system dynamics. Is there evidence that they exist? Is it likely that one or more might exist? How can they be recognized?
9. Expect surprises and the unexpected. What is the capacity of the system to respond to a major external change (eg the Asian financial collapse), or respond after a major change in the system itself (eg the Honduras floods)? What are the elements of this 'capacity' and can they be enhanced?
10. Is it possible to put "red lines" on the axes of the 5-capitals diagram, that identify minimum levels for inter-capital conversion? (ie in social-ecological systems we cannot assume full substitutability). Can this point to which kind of capital is in most need of attention?
11. In developing INRM research think carefully about the interactive effects of ecosystems (including agro-ecosystems), social systems and the economic system. How will a change in any one of these influence the other two (and, again, consider point 6 – the cross-scale effects – in this regard).

Plenary Discussion

Rapporteur: Abra Adamo

- A question was raised regarding how one can address compounding problems over time (on top of original problem set) – i.e. when does a team disengage from the INRM process (or does it simply go on forever). It was suggested that values always change and a desired set of goods and services is a shifting target, therefore a sound piece of work would never foreclose new future system options. It was suggested that fixed-term projects are not the ideal, long-term answer if there is to be a seamlessness between research and management.
- It was highlighted that the CG is not "delivering" INRM per se, but rather using this process toward the goal of INRM.

6.4 Knowledge Management

Rapporteur: Doug White

Communities of Practice

- benefits, establishment, use of technology, facilitation
- C of P and I NRM (via geography; theme)
- Multiple C of P
 - a feature For I NRM
 - a danger
- A Meta – C of P / Network

How?

- Maximize electronic medium yet recall the importance of face-to-face contact
- Implementation requires professional expertise
- Can the CG do it alone? Should it?
- The CG at Center-stage + engaging “external” organisations (often via outposted and regional offices)

REPORT

Presentation Subtheme: Communities of Practice- what are the benefits, how to establish them, use of technology, methods and the importance of facilitation.

Communities of practice within an INRM framework are likely to have a specific geographic location, or a common theme. To address the multifaceted nature INRM, multiple communities of practice are necessary. This can be a feature of the integration. Yet multiple communities of practice can lead to the danger of isolation. Therefore a INRM requires a Meta- Communities of Practice to network.

The CGIAR is already employing the Community of Practice concept without formal acknowledgement. Examples include the systemwide programs such as the Alternatives to Slash and Burn Consortium (ASB) and Soil and Water Nutrient Management (SWNM). These can function more smoothly and effectively by taking into account principles advanced by Knowledge Management literature (see reading list below).

Both the people who are part of many Communities of Practice and proper central facilitation can increase the chances of important cross-pollination of ideas. In the INRM context, we need to maximize the use of the electronic medium yet recall the importance face-to-face contact. These meeting are one of the few opportunities for CGIAR scientists to gather outside of the the typical disciplinary meetings. INRM fosters multi-disciplinary learning. Should the CGIAR be the champion and engage associate institutions? Within the CGIAR framework, both research outposts and regional offices have excellent experience in making networks, especially at the smaller scale levels (local, national, regional). The scientists involved can influence decisions at headquarters.

The number of participants in the INRM meetings have doubled for each workshop: 20 in Bilderberg, 40 in Penang, 80 in Cali. Are we suffering from growing pains with respect to communication and organization? How should we better prepare?

The implementation Communities of Practice requires professional expertise. We as CGIAR scientists are not properly trained. Can we receive the sufficient training or is it better to find personnel fully dedicated to the task?

Plenary Discussion

Rapporteur: Abra Adamo

- It was suggested that the CG is not the center of INRM work globally, but is contributing to this discussion. We need to be careful how we label “external organisations” – implying that the CG is the center (need to

be modest). The presenter indicated that it was not the intention of the group to situate the CG and the center of INRM work. As CG centers, we need to reach out to existing communities of practice in this field (outside the CG). What does the CG and its partners have to offer and grow can we reach out to and tap into other communities of practice for knowledge exchange in INRM?

- Participants discussed how we can assure that there is adequate access to science through knowledge sharing – is a framework for knowledge exchange needed?
- It was suggested that the knowledge divide is increasing. Are we only talking about knowledge exchange within and between formal institutions? What about sharing of knowledge with local communities? It was suggested that we also need to look at the privatization of knowledge and its impact on knowledge exchange in INRM.
- Participants identified that there is a need for forums for knowledge exchange for cross-pollination and better collaboration. Are there other/new mechanisms for creating innovative spaces for knowledge exchange? There is a particular need to identify mechanisms for the exchange of tacit knowledge (e.g. lessons) which is less “transferrable” than explicit knowledge (explicit knowledge will continue to be shared through existing mechanisms, publications, formal meetings, etc.).
- It was suggested that the principles of knowledge management have the effect of making organisations semi-permeable.
- Need to select effective communities of practice and relevant partners/stakeholders to participate.

6.5 Climate Change

Rapporteur: Mark Mulligan

Presentations:

Myles Fisher How the IPCC third assessment report (TAR) topics of Impact, adaptation and mitigation relate to CGIAR activities in INRM including genetic resources

Peter Jones Climate change and its impact on agricultural production systems

Steve Beebe Genetic approaches to adaptation to climate change in food crops

Sam Fujisaka Human impacts of climate change

Andrew Jarvis Climate change and its impacts on natural systems and biodiversity

Myles Fisher Mitigation options in production and natural systems

Key outcomes of the presentations:

Serious Issue:

The third assessment report of the IPCC further confirms the reality of climate change on the basis of data from instrumental records, and from increasing confidence in and agreement of GCM results. It is a serious global issue, which will be particularly important in areas marginal for agriculture such as those represented in the CG's mandate.

Pervasive effect:

The presentations showed that there are clear links between climate change and many of the CG activities in INRM. Climate is very pervasive and interfaces with crop breeding, production needs, human health and well-being, agricultural and natural resources management and conservation, the environment and bio-agrodiversity.

Multiplier effect:

Climate change is seen as interacting with land use change, soil degradation loss of bio, agro and cultural diversity and soil, land and water pollution to put pressure on agricultural and natural resources.

Clear link:

With the CGIARs stated priorities of: food security, poverty reduction and environmental protection.

Long term and strategic:

Climate change was identified as a long term phenomena outside of the scale of interest of most NARS, NGOs and farmers but which nevertheless will be critical to the successful long term outcome of their objectives. This necessitates the involvement of the CG as a knowledge broker for the long-term sustainability of responses to short term problems.

Impacts :

Climate change will have impacts on agricultural productivity and natural systems and these will probably be most severe in the tropics where temperatures are already close to the limits of tolerance for some species and where climate change will bring **new** climates that do not currently exist (rather than simply replace the climate in an area with one that exists somewhere else, as is the case for most temperate areas)

Opportunities:

In addition to impacts there are also opportunities in climate change : opportunities to reduce the contribution of greenhouse gases from agriculture (decreasing sources and increasing sinks) in order to mitigate climate change and gain the appropriate reward (financial as well as climatic). There will also be shifts in patterns of production and suitability for different crops, disease vectors, water and soil resources with winners as well as losers.

Prioritisation:

One of the fundamental INRM responses to climate change will be the development of tools and approaches to prioritise research geographically based on those areas in which agricultural productivity, human welfare or environmental health is likely to be greatest affected.

Iterative, integrated analysis of options

Spatial prioritisation has to be followed by the development of appropriate tools for iterative testing of options and solutions based at all levels from genetic to policy and analysis of the cross scale and cross sectoral implications of these solutions in a changing climate.

Outcomes of the Discussion

We felt it important to define the questions clearly rather than attempt to find answers:

Key scientific questions:

- How **will** climate *change* in the tropics at the community scale?
- What contribution does agriculture make to greenhouse warming and how can it be made to become a **mitigator** instead of a contributor to the problem?
- How will climate change **interact** with other human impacts on the environment (such as land use change, loss of biodiversity, air soil and water pollution, desertification...)?
- How will individual crop varieties **respond** to climate change/CO₂ fertilisation and further resource constraint?
- How will this translate to yield quantity, quality and reliability in the field and in spatio-temporally heterogeneous environments and how will this **affect** people as individuals, communities, regions and countries? How might people respond?
- How will climate change impact upon the **interaction** between natural and agricultural systems and how will climate change affect natural resources (forests, water, soils, biodiversity, agrodiversity)?
- How do we target genetic, cropping system, conservation and policy advances to minimise any adverse impacts **and** make best use of any new opportunities that climate change will bring?

Key conceptual issues for INRM:

- Does climate change **differ** from any other issue which is/are
- already part of the mandate of INRM?
- [such as climate variability, drought, climatically marginal environments]
- What does **INRM** have to offer that other approaches do not?
- [**integration** of productivity changes and natural resource management responses]
- What kind of **approaches** will be necessary to make decisions
- for a future we cannot know?
- [simulation, sensitivity, vulnerability, resilience]
- What should be the **distinctive** role of the CG centres in tackling
- climate change?
- [interaction with the end users (farmers), focus on poverty and hunger, tropics, knowledge broker, strategic view, genetic solutions]
- What is/are the **appropriate** scale(s) of analysis?
- [plant, field, farming system, region, country, none, all]
- What are the appropriate **tools**?
- [lab experiments, field experiments, participatory approaches, political instruments, GIS, modeling, decision support tools]

Conclusions

(a) Climate change is an issue, which permeates a number of INRM issues, and CG approaches, departments and foci since climate has both direct and indirect effects on people, productivity and the natural environment. The operational model and principle for success in INRM for climate change is a focus on **integration**. Equal resources and effort needs to be applied to the **integration of science** in genetic, crop, farming system, community and policy approaches to NRM as to the **actual science itself**. Only then will

iterative, integrated simulation of scenarios and their outcomes be able to support solutions for which we know close to the full range of implications and the balance between positive and negative outcomes across all sectors.

(b) The relevance and impact of CGINRM is improved by taking climate change on board because, to have relevance and impact short term policy and practical solutions must also be valid in the longer term. **Sustainable** agricultural and natural resource management solutions can only be provided within the context of understanding climate change: **impacts, adaptation and mitigation**.

Plenary Discussion

Rapporteur: Abra Adamo

- In an potential GCP on Climate Change, it was suggested that there will be a need for regional priority setting on climate change issues (regionalization of climate change work) given that different areas of the world with experience the impact of climate changes differently and on different times scales. Although a global prioritization of climate change issues is a good place to start, dealing with climate changes at a regional scale will be crucial in terms of adaptation and mitigation strategies. This has enormous significance for the structure and governance of GCPs. The CG needs to try prioritizing GCP themes by region.
- It was suggested that a strong monitoring system for monitoring climate change is needed. There is a problem however with climate change data and variables in terms of taking global work (e.g. data) and scaling down to produce regional and community scenarios.
- In a GCP on climate change we will also be dealing with the human dimensions of climate change (e.g. coping with climatic perturbations – leading to unsustainable practices and outcomes in the long-term). Time scales are also a critical issue for analysis and action along these lines. A major theme under the “adaptation” component of a GCP on climate change will be the human dimension.

6.6 Innovative Tools

Rapporteur: Reimund Roetter

Introduction

The ten papers that were accepted for oral and /or poster presentation provide excellent examples of how the INRM approach to 'doing business' can be supported by:

- a) innovative ways of applying existing tools for decision support on NRM issues
- b) innovative ways of integrating different tools and techniques into modeling frameworks to deal with multiple aspects of NRM from farm to regional levels
- c) new techniques and their potential

Appendix 1 gives a brief characterization of the ten tools/modeling frameworks (underlying techniques, NRM problems addressed, main purpose, users, case studies).

The various modeling frameworks presented address the functioning of agro-ecosystems in the wider sense i.e. ecosystems including people (resource managers and resource users).

Summary of discussions and findings:

- a) What does your session tell us about possible operational models, principles and success/failure factors in conducting INRM research?
- b) How can your sector/issue improve the relevance and impact of CG INRM work in solving major human+environmental problems?

COMMON OBSERVATIONS

- model developers responded to demands of different decision makers. They better respond to specific questions, and to the increasing complexity of resource management
- The tools / modeling frameworks presented provide excellent examples of supporting INRM research (integration across scales, disciplines, ecosystem components, different stakeholders and stakeholder objectives)

VALUE OF THE TOOLS

In general, provide conceptual frameworks for problem-solving

- they force us to discipline in thinking
- trade-offs act as a shell to different models
- development of tools/frameworks embedded in joint-learning process
- stakeholders no longer just users of the tools

SUCCESS FACTORS

- Investment in training : essential human capital (building)
- Easy access to the tools and outputs (via web; visualization techniques are important)
- Guarantee follow-up to model development: to meet generated interest with stakeholders
- Continued dialogue and exchange between scientists and resource managers (to adjust /modify to answer important questions → increase mutual understanding and relevance)

FAILURE FACTORS

- Amount of training needed to modify/apply them == too high and investment for many institutions
- Risk to shove too much work to stakeholders (degrade them to 'data suppliers')
- Temptation of fitting models in wrong situations
- Lack of good /appropriate data

- Lack of guidelines for using models/ lack of documentation on their capabilities – but even best guidelines can't prevent 'fools' of using them the wrong way
- Lack of continuity in funding training + software development activities
- Lack of institutional support

Summarizing, it can be said that model developers have responded to the demands of different stakeholders (INRM researchers, policy makers, planners, agricultural extension staff, etc.) regarding information needs, presentation of outputs and user-friendliness.

The different models/expert systems presented have evolved from tools for research and self-education of scientists to modeling frameworks that are capable of integrating data from different scales and disciplines, facilitate dialogue and discussion between scientists and resource managers and joint-learning on NRM problems – and related policy issues.

Presentations made:

Five oral presentations (15 minutes each) were given (see, Appendix 2) to demonstrate where different techniques and modeling frameworks come in /are needed to operationalize INRM research: From problem-focused analysis and design of management options at field and farm level to integrated analysis of management options and required policy decisions at watershed, provincial or national levels. A common goal of the majority of the modeling frameworks is the analysis of trade-offs between economic and environmental goals of agricultural activities/ land use.

Innovative tools in relation to the INRM way of doing business

Development of tools is embedded in joint (scientist – research manager) learning /knowledge exchange processes ; resultant modeling frameworks can subsequently further support decision-making and joint learning about complex problems;

Different tools /frameworks are available that support one or more of the following challenges :

- Integrating across stakeholders
- Integrating across scales (time, spatial; of analysis and interventions)
- Integrating across disciplines
- Integrating across sectors /ecosystem components

Plenary Discussion

Rapporteur: Abra Adamo

- While resources users are now increasingly involved in the development of new tools (not just recipients) all resources users (different communities, regions, etc.) cannot participate in the development of tools because tools need to be scaled-up for application and use across regions etc. (i.e. they need to be generalizable to some extent).

6.7 Scales of Analysis

Rapporteur: John Antle

A key issue in INRM research is how to represent relevant biophysical and social processes at different scales of analysis. Our goal is to have case studies presented representing different scales of analysis to facilitate discussion of how scale impacts analysis of resource management. Examples of issues that could be addressed include the choice of spatial scale in relation to research or policy objectives; data and model design at alternative scales; impacts of scale and aggregation on INRM analysis.

In the session several case studies will be presented, the organizer will comment on the presentations and then open the floor for discussion among the presenters and the audience.

Presentations:

1. Participatory Mapping, Analysis and Monitoring of Natural Resources in the Rio Calico Watershed, Nicaragua – J. Beltran, J.C. Zeledon, J. Morales
2. Ecological and Social Sustainability of Agricultural Sustainability in the Cordillera de Merida: the Flow of Environmental Services for Potato Crops in the High Andean Paramos – M. Monasterio, M. Molinillo
3. Nutrient Budget Modeling Over Different Scales – Hans Schrier
4. Variation of Soil Characteristics in a Sub-Watershed of the Mid-Altitude Andes: Magnitude and Implications for Landscape-Based Soil Management – T. Oberthur, E. Barrios, S. Cook and R. Thomas
5. Integrating Remote Sensing with Process-Based Models to Assess Management Options for Grazing Lands in the Andes – R. Quiroz, P. Zorogastua, C. Ibarra, R. Jongschaap and C. Leon-Velarde

Summary:

The participants thought that the session's implications were summarized eloquently by a statement made by one of the participants (Andy Nelson): "Scale is a paradigm or tool for analysis of resource management, rather than a problem to be overcome." There was agreement that the time is right for making advances in understanding the relationship of spatial scale to both bio-physical processes and decision making processes. New methods for addressing natural resource management are emerging that will advance our understanding of processes at different scales and their interactions across scales. A demand for information across different scales is rapidly emerging as its usefulness is being recognized by decision makers.

In response to the Guideline questions:

1. The session showed that there are a number of new and innovative approaches being taken to research on resource management. There are many useful concepts and methods being developed within and outside the RM field that are relevant to analysis that addresses issues related to spatial scale. Examples are:
 - a. the emerging use of various GIS tools and geostatistical techniques for analyzing and visualizing various types of data at various scales
 - b. multifractal scaling and related concepts for assessing suitable scales for different types of analysis
 - c. development of new down-scaling and up-scaling techniques and their application of both bio-physical and socio-economic data
 - d. development of process and decision models appropriate for different scales.
2. Many if not most resource and environmental management problems operate across spatial and temporal scales. Clearly, gaining a better understanding of how to incorporate scale into research and decision making will significantly improve their relevance and usefulness.

Plenary Discussion

Rapporteur: Abra Adamo

No discussion followed this presentation.

6.8 Policy

Rapporteur: Douglas Pachico

Three papers were presented, one each on the key resources of soil, water, and biodiversity.

Six major points of consensus were reached.

1. For INRM local policy is a particularly important dimension of policy. Any specific factor, be it population density, market access, susceptibility to soil erosion, will lead to very different natural resource outcomes in different situations. Since no specific factor always has the same effect, effective policy requires local information about local circumstances. Often INRM policy needs to be made at a decentralized local level to achieve desired outcomes.
2. Local policy must be linked to national policy and global issues. If broader global issues such as global warming or biodiversity loss are ignored, local policy may lead to locally preferred results at the expense of global resource issues. Likewise, national policies such as output prices, interest rates, foreign exchange rates, subsidies, education, investment in infrastructure, and the legal framework, can all have a major influence on incentives for INRM at the local level. Local policy needs to take these higher level factors into account.
3. In policy making decision situations, often relatively little reliable or scientific information is available to support decision making. Obtaining such information can be very costly.
4. Many CGIAR produced research results have significant policy implications. Much could be done by the CG to more effectively synthesize its results for policy purposes.
5. To effectively synthesize CG results for policy purposes, clear definition of the expected clients, be they local, national, or international, is needed to insure the policy relevance of the information to policy at the appropriate level.
6. Consistent with the Biosafety Protocol of the Convention on Biological Diversity, many countries have established a regulatory regime that requires an environmental impact assessment to deploy technologies developed by genetic engineering. In contrast to the Green Revolution era when problems such as induced pest resistance or soil degradation were treated as second generation problems that were observed and dealt with only after they, today such a short sighted single factor (crop yield) reductionist approach is not acceptable. A number of issues, not inconsistent with the INRM approach, need to be examined, including weediness and invasiveness, gene flow, effects on soil, effects on biodiversity, and changes in crop management and their consequences are required to be looked at from a scientific viewpoint before decision making process with mechanisms of consultation and participation as called for in national policy.

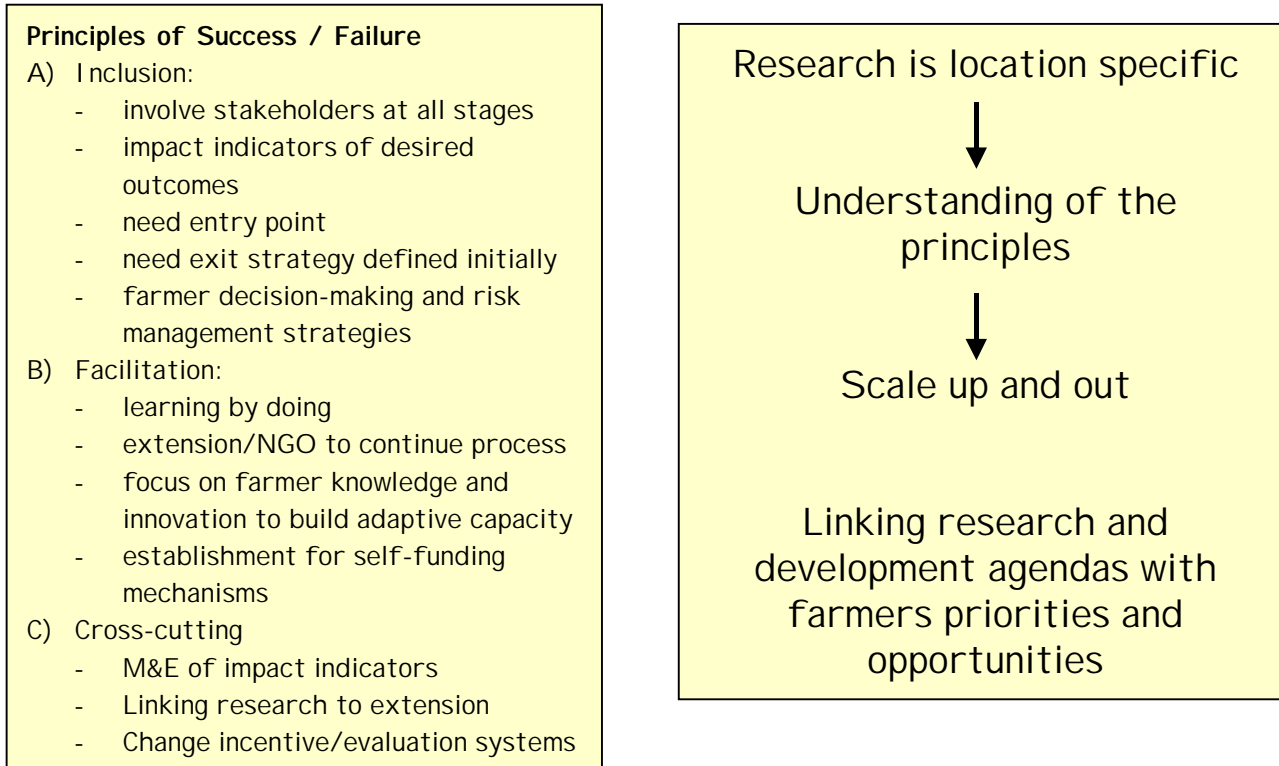
Plenary Discussion

Rapporteur: Abra Adamo

- It was suggested that policy can have a great or grave impact on poverty. To what extent are we addressing the underlying issues related to poverty that are closely linked to policy. Are we tinkering at the margins?
- It was argued that using INRM as a tool for the deployment of genetically modified organisms (GMOs) could create enormous problems within various national governments in the developing world. The presenter clarified that, in line with the Biosafety Protocol of the CBD, many countries have established regulatory bodies that require an environmental impact assessment (EIA) before the deployment of GMOs. The issues that such an EIA would examine (e.g. impacts of GMOs on soil and biodiversity) are consistent with the INRM framework. As such, such assessments may be effectively implemented within an INRM paradigm/approach.

6.9 Participatory Research

Rapporteur: Rob Delve



REPORT

The session started off with three presentations that covered a range of participatory examples.

1. Impact indicators for comparing participatory research approaches to promote soil fertility management in semi-arid Southern Africa

In Bulawayo the team is building on many years of experience with PR and is developing impact indicators to assess six different participatory approaches ranging from researcher designed and managed through the different levels of participation to farmer experimentation

2. Forage production and erosion control as a compliment to hillside weed management Brian Simms and Felix Rodriguez

This was an example of farmer participation in the design and species selection in grass contour lines for erosion control in the Andean Mountain region of Bolivia and how this evolved to include vetch in the grass strips for fodder supply to sheep. Examples of the methods used for participation and scaling out and up were given

3. Farmer participatory research on integrated soil water and nutrient management at ICRISAT-Bulawayo

The last presentation looked at the strengths and weaknesses of FPR in Zimbabwe and Malawi and gave the example of FFS being adapted by the national extension service in Zimbabwe and how these FSS's need to be linked together by a second order organisation to co-ordinate their work, develop curriculum and supply new research findings to the groups

The group contained 12 participants ranging from researches in Anthropology, biophysical sciences and simulation modeling. After the presentations the group discussed the two questions posed at the beginning of the workshop. Following is the summary of these discussions.

Question 1. What does your session tell us about possible operational models, principles and success/failure factors in conducting INRM research.

The discussions were grouped into three areas,

Inclusion:

- Include farmer decision making and risk management strategies
- Involve stakeholders at all stages
- Develop impact indicators of desired outcomes
- Need an entry point to work with farmers
- Need to develop an exit strategy at the beginning of the work

Facilitation:

- Learning by doing, learning by using
- Involve extension/NGOs to be able to continue the work once the researchers leave
- Focus on farmer knowledge and innovation to build adaptive capacity/empowerment
- Establish process for self-financing the groups

Cross cutting:

- Monitoring and evaluation profiles developed for impact indicators
- Linking of research to extension
- Change incentive/evaluation systems of national researchers and scientists

Question 2. How can your sector/issue improve the relevance and input of CG INRM work in solving major human and environmental problems?

Two major conclusions came out of the discussion.

1. Whilst FPR research is location specific, the participatory models and methods employed can be synthesized to draw out principles to enable the approaches to be used to scale out and up.
2. FPR can contribute by linking research and development agendas with farmers' priorities and opportunities

Plenary Discussion

Rapporteur: Abra Adamo

- What types of participation (given their respective transaction costs) are most suitable to INRM was raised as an issue. It was suggested that the type(s) of participation incorporated into a research-management activity depends upon the objectives and desired outcomes of the activity.
- The issue of inclusiveness – who participates – was raised given the tendency to marginalize specific segments of a community from research-management work at the grassroots level. The process of inviting affects who participates (e.g. in terms of gender, wealth etc.). It was suggested that before selecting participants for community-based work one needs to engage in some “anthropology of participation” – examining the venues, networks, and language of participation at the grassroots.
- Participants discussed different modes of entry into a community and questioned whether it is best to begin by establishing community acceptance and then working the way down to selecting specific farmers or starting with the formation of farmer research groups and working toward community acceptance (problems with both approaches).
- Participants suggested that there is a need to bring in political stakeholders into the process (e.g. workshops with policy-makers and researchers on the ground to work out a common problem).
- It was suggested that rather than simply building new forms of social organisation in communities we need to tap into existing forms of social capital such as social networks and local/regional political institutions as these are the key decision-makers and holders of power locally. One can then branch out from these local organisations. To forget, or exclude these institutions could have disastrous implications.

6.10 Social organization, participatory watershed management and sustainable livelihoods .

Rapporteur: Mark Lundy

Presentations in the session

1. ***The Role of Collective Action and Property Rights in Integrated Natural Resource Management – Ruth Meinzen-Dick, IFPRI***
 - INRM requires both property rights and collective action because it operates over long times and spatial frames.
 - Collective action may have organization or it may not. The key is action, not the existence of organization.
2. ***Rural Livelihood Strategies, Assets and Economic portfolios in coping with climatic perturbations: A case study of the Bolivian Andes – Corinne Valdivia, University of Missouri.***
 - Work done with CIP
 - Life cycles influence strongly on livelihood options as do market conditions.
 - Different population groups react differently to external shocks and access information.
3. ***Participatory Community Management of Watersheds: Six cases from Versalles, Colombia – Mark Lundy, CIAT***
4. ***Using GIS to promote spatial awareness and improve natural resource management in Andean watersheds – Coen Bussink, CIP***
 - GIS useful to expose existing information
 - Catchment approach has little interest
 - Requires substantial external support

Discussion

- What is CIP going to do with the data generated in Corinne Valdivia's paper?
- It's going into options tools to define what happens when different climatic events occur, what are your possibilities to shift and what are the results either of shifting or not shifting. How can they use this information to shift in response to climatic shocks?
- It is important to clearly link demand with research rather continue with supply driven research. Need to differentiate the appropriate scale for research from farm to watershed and regional level rather than looking for a "one size fits all" focus.
- We need to deal with food security first, then micro watershed and finally to the watershed level rather than starting at the larger scale. Food security is an important a possible entry point to NRM.
- Land security may be more important than land tenure. It is possible to have land tenure but not land security. Legal documentation does not necessarily convey secure property rights.
- If technology reduces vulnerability then it helps food security. We need to have a specific menu for different levels.
- How do we make technologies and INRM tools fit not only the physical environment but the socioeconomic ones as well?
- Working at different scales is not mutually exclusive nor is it necessary to move from one end to another. We need to understand the system in order to target points in the general scheme.
- What is the initial entry point? We are now saying that the entry point has to be people-centered one while we are still hearing that we look for mandate crops or production systems. Much CG work justifies this with a nice social wrapping to feel good about this.

One issue that still needs to be integrated is that of people's decision-making. What are the key messages in this sense?

- Importance of doing a proper diagnosis of what people are already doing and how INRM can help them. Understanding local knowledge and local knowledge flows and how to link that with scientific knowledge is important.

How does your sector/issue improve the relevance and impact of CG INRM work in solving major human and environmental problems?

- Need for collective action in INRM. Social organization, assets and people's incentives affect what NRM practices they can or choose to use.
- There is a difference between need and demand, and collective action is a means of understanding how that need may become a demand for what marginalized populations require. We need to be careful about who we hear.
- We talk about the need for demand-led research but how do we define demand for INRM research? Who demands what from whom? If you do research for development, the best way to start is to do development projects with research as a way to understand and get past bottlenecks. Scientists should accompany development projects and identify research issues through action and by responding to concrete needs as one way to move towards a demand-driven research agenda.
- Important to link in creative ways to develop demand-driven research agendas. CIAT is doing a good job with the soil management consortium in Central America. This is a process that takes time but starting with small projects is a way to learn how to do this.
- Need to include social factors, as indicators of impact, not only landscape based variables.
- This session discussed several examples of how to link scales not through models or GIS but rather nested social organizations (group → community → municipality → federation → etc.)

What does your session tell us about possible operational models, principles and success/failure factors in conducting INRM research?

- What should the CG role in organizing for INRM be? Institutional innovation is the new frontier for the CG. With INRM, it is becoming clear that this is an important area for research for the CG. Think about an innovation system that drives forward in loops and loops that link both research and action in a new way. It's not a question of whether skills are internal or external but rather finding the skills either inside or outside. Perhaps it is easier to do than we think.
- Need to find innovative ways to involve local communities in INRM using incentives and more long-term approaches that build capacity and social capital.
- We're not talking about INRM research but rather INRM and people as NR managers.

SL framework discussion

- Need to understand different perspectives of users versus researchers. Tools to articulate and understand the demand from communities are necessary to identify needs of research. Then alliances and partners need to be developed to respond to these needs.
- How do we get into people's and/or communities heads to understand what makes people poor? This is the focus of the SL framework..
- Experience of Roberto Quiroz: (a) community ownership of the project, (b) clustering of five or six communities within micro watersheds, (c) competition of communities about their past, present and future of INRM, (d) one community selected as the winner with participation of community members and they receive US \$1000, (e) move into variety of contests for different social groups. Ask Roberto Quiroz for the CD ROM on this.
- How do we identify people who do not participate as innovators within a community? How do we see the variability within the community and identify the poorest of the poor or those most at risk?

- Who are we working for and whom are we working with? We should work for the poorest of the poor but perhaps with people better off within the community to generate opportunities for the poorest (access to research activities and such). Question of how we go about entering a community...importance of attitude of researchers.
- Are we talking about research or development or research for development? Our focus is research where results accrue to the target population.
- Do you feel that you need to understand what poverty is or whom the poor people are? Do we feel that by doing agricultural research in developing countries we, by default, are reaching the poorest?
- Research about the structure and nature of the poor or poverty beyond the community level is important and currently a gap within the CG. We have IFRPI as a policy center but disconnected from the technology centers.
- Relationship between poverty and NRM. Do we need to work with the poorest of the poor – who may have limited access to NR – or rather with the better off to impact NRM?
- Range of complexity of risk and a range of impact of risk on the livelihood. How good is the relationship between risk and outcome? Does analyzing the risk help us understand where or how the poverty enters the system?
- Analysis of a sum of risks that are faced in a life is an attempt to organized complex themes to understand them. Development partners move into the solution of specific risks.
- Do people only see risks that they can do something about? Are they only capable of seeing simple risks and therefore do not visualize complex risk? Can we help them see and manage complex risk in a more effective fashion?
- Risk and uncertainty combine into vulnerability and impact my well-being. For real people uncertainty and risk is not a probability issue but rather something that empowers or disempowers you. They affect what your options are. The more that people can cope with these issues, the more capable they are to affect change. Reducing vulnerability reduces poverty and if you don't know that you haven't spent much time with poor families.
- Within the SL framework, it is useful that all the capitals and/or resources are counted. We aren't talking about convertibility yet but it is important to know how we can move from one type of capital to another. We haven't discussed the strength of the tool, really.
- Overall bucket of capitals can be shifted around, increased or decreased. Is it possible to place a point on each axis below which you can't go? This requires complete transferability, which is not clear.
- There are certain points beyond which it is difficult to continue. An agricultural society, which bankrupts its natural capital, cannot continue. Without external inflow to the system, the capitals tend to be zero-sum with the exception of social capital, which can generate itself.
- Transactions costs can be understood as a way to measure leakage in transfers between capitals.

Plenary Discussion

Rapporteur: Abra Adamo

- Policy needs to be linked to INRM to ensure better quality of life.
- GIS information can be useful to feed into local decision-making, however it was suggested that such information needs to be used in response to specific questions asked by local people.

6.11 Agrobiodiversity

Rapporteur: Anne-Marie Izac

The session was charged to examine:

1. Operational models, principles and success and failure factors in conducting INRM research
2. Improving the relevance and impact of CGIAR INRM work in solving major human/environmental problems
3. Contribution of the CGIAR and its partners to the CBD and other Conventions

The following presentations were made:

1. An approach to *in situ* conservation of dryland agrobiodiversity in a natural resources management context W.Erskine, A.Amri and J.Valkoun, ICARDA
2. Managing Crop Genetic Resources in Agroecosystems as part of the ecosystem approach, D.Williams, D.Jarvis, IPGRI and national partners
3. The exceptional diversity of trees and its relationships to the productivity and stability of agroecosystems A.Simons and R.Kindt, ICRAF
4. Geographic information systems(GIS): a common platform for natural resources and genetic resources management, L.Guarino, IPGRI, R.Hijmans, CIP and P.Jones, CIAT
5. Developing approaches for integrated management of genetic resources, M.Swift, TSBF
6. Strategies for the sustainable management of vesicular - arbuscular mycorrhizae (VAM) and other biofertilizing microorganisms in tropical agriculture, R.Herrera-Peraza, IES,CITMA,Cuba and partners in Cuba and Venezuela
7. Sharpening the agroecological research focus in the design of natural resources management strategies for poor farmers in marginal environments, M.Altieri, Univ. of California, Berkeley
8. Agro-biodiversity in integrated natural resources management , C.Hoogendoorn, IPGRI

Introductory remarks included an explanation of the interest and activities of the CGIAR System-wide Genetic Resources Programme (SGRP), in facilitating integration of genetic resources into ecosystem management, ie. management of agro-biodiversity in an INRM approach, for an effective contribution to the Convention on Biological Diversity.

The presentations covered activities on the *in situ* management of agro-biodiversity in farming and rangeland systems, and on the importance of below-ground biodiversity for system functions. It was noted that many of the presentations highlighted the community management of agro-biodiversity and agro-ecosystems and the importance of conducive institutions and policies as well as education to support their efforts.

Discussion

The discussion commenced with a clarification of the definition of agro-biodiversity and its relationship to biodiversity as a whole. It was agreed that agro-biodiversity was a subset of biodiversity, encompassing the diversity of the species important for the productivity and function of agricultural systems and the livelihoods of agricultural communities. It includes plants (crops, trees and others), livestock, invertebrates and micro-organisms. The definition of the Convention on Biological Diversity (CBD) was felt to encompass these dimensions.

CBD definition of agro-biodiversity

Agricultural Biological Diversity includes all components of biological diversity of relevance to food and agriculture. This includes:

- ***Genetic resources of harvested crop varieties, livestock breeds, fish species and non-domesticated (“wild”) resources within field, forest, rangeland and aquatic ecosystems;***
- ***Biological diversity that provides ecological services such as nutrient cycling, pest and disease regulation, pollination, maintenance of local wild life, watershed protection, erosion control, climate regulation and carbon sequestration.***

The Group agreed that agro-biodiversity can be divided into two types: Planned and Associated. These types carry different types of value to the people and the agro-ecosystem. For example, Planned (managed) diversity can have productive, functional and/or cultural/religious values; Associated diversity has mainly a functional value (ecosystem services).

Agro-biodiversity is a unique natural resource because it evolves – its living nature allows for rapid adaptation to changes in the environment whether natural or human induced.

1. Operational models, principles and success and failure factors in conducting INRM research

In considering the relationship of agro-biodiversity to operational models, principles and success and failure factors in conducting INRM, Participants developed an operational model to show how agro-biodiversity determines agro-ecosystem resilience (ensures productivity and adaptive capacity). See *Diagram*

The system is complex and the Participants felt that to maximise success the main entry point for INRM research should be the point of Human interventions on the system, which is on the Planned agro-biodiversity.

The importance of focussing research on selected components of the diversity – key functional groups – was also emphasised.

2. Improving the relevance and impact of CGIAR INRM work in solving major human/environmental problems

Since agro-biodiversity and interventions to manage it can have a significant influence on agro-ecosystems and the livelihoods of people dependent on them, the Participants agreed that it is important that agro-biodiversity management and improvement be an integral part of INRM research in the CGIAR, to enable the CGIAR to address major human and environmental problems.

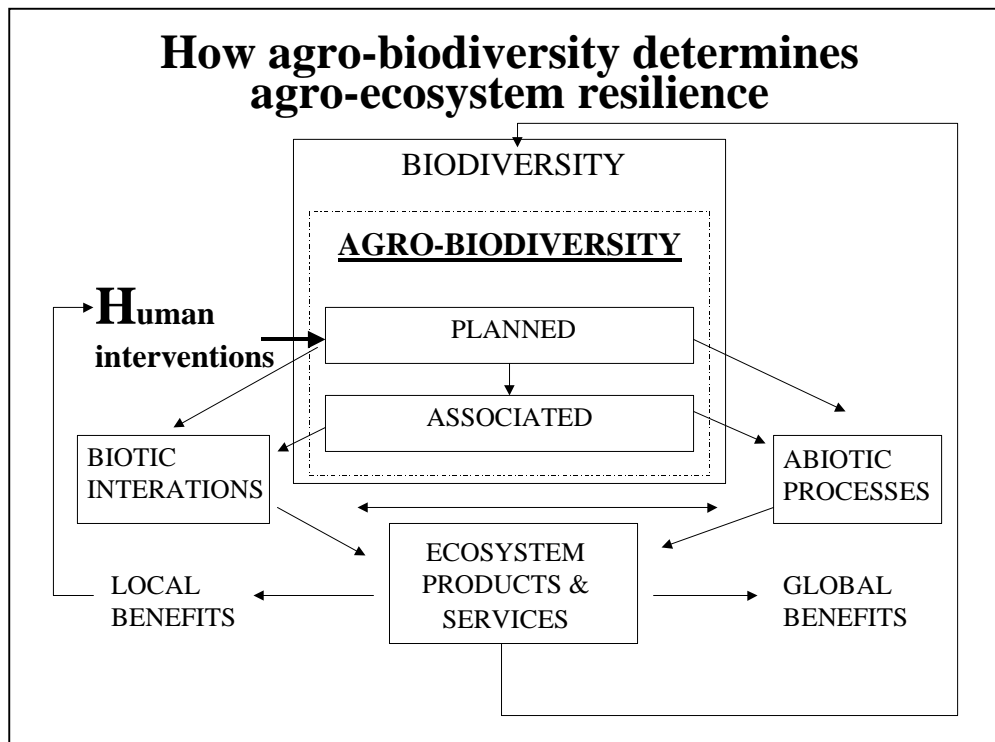
3. Contribution of the CGIAR and its partners to the CBD and other Conventions

Recently the INRM Taskforce has signed a Memorandum of Understanding with the CBD Secretariat. The text of this MoU was available to participants of the session.

The Participants felt that in developing this collaboration with the CBD, that it had to take into account the many existing shared activities between CGIAR institutes and the CBD Secretariat, but that this MoU provided a further framework for such interactions from an INRM perspective. Furthermore, much agro-biodiversity work going on within the CGIAR contributes to the objectives of the CBD. For example, the presentation by Williams and Jarvis *et al.* had shown how the *in situ* conservation work is addressing each of the four agro-biodiversity objectives of the CBD.

Participants also discussed a proposal for a Challenge Programme proposed by IPGRI on ‘Conserving and using biodiversity in agro-ecosystems’, which will be very relevant to the implementation of the CBD. Participants felt that the INRM approach provided a framework for the Convention on Biological Diversity to link itself better with the other major conventions on climate and desertification, and to Agenda 21 in general which will be discussed further at the World Summit on

Sustainable Development next year in Johannesburg. There was a general feeling that the MOU deserves wider discussion and involvement within the CGIAR.



Plenary Discussion

Rapporteur: Abra Adamo

- It was agreed that there is a clear problem with the separation between GRM and NRM.
- It was suggested that if INRM is used as a tool for the deployment of GMOs one needs to be careful as GMOs are not likely to reflect the agenda and priorities of the poor.

6.12 Impact Assessment

Rapporteur: Boru Douthwaite

Progress on Impact at Penang

The session on impact began with John Poulsen briefing us on the conclusions reached about progress made on monitoring and evaluation (M&E) and impact assessment (IA) during the Penang workshop last year. They were:

- M & E and IA must be an integral part of the INRM process
- While ex-post IA is still essential, greater emphasis needed on M & E. This is because INRM attempts to catalyse change in complex environments with complex interventions. Perfect knowledge is not possible before a project starts, and in any case things change. Hence projects need to learn as they go along and M&E is the feedback mechanism.
- Productivity gain is just one of many impacts
 - May not know which impacts you're going to have
 - Need adaptive IA

Possible Models, Principles and Success/Failure Factors in conducting M&E and IA of INRM

Have to know what success looks like!

First off the group agreed that we needed to know what success looked like before we could evaluate our progress in achieving that success. We agreed on the Penang model that defines the objective on INRM as enhancing productivity, human well-being and eco-system resilience. While we accepted that changes in 5 capitals (natural, social, physical, financial, human) would capture changes in these areas, the point was made that actual indicators chosen for a specific project should be guided by what people think and want (their idea of happiness). Participatory evaluation is an essential part of INRM.

Success must include scaling up

The group agreed that it is not enough for INRM carried out by CG centres to only produce location-specific solutions. It must also develop the processes by which location specific solutions can be scaled up both horizontally and vertically.

Figure 1 shows what we meant by vertical and horizontal scaling-up. Both horizontal and vertical scaling up is about changing people's opinions, thinking and practices at different levels from farmer to national stakeholders to international researchers. This is a vital impact of INRM, and an impact overlooked by much of CG centre research in the past. How it is done is still an issue though.

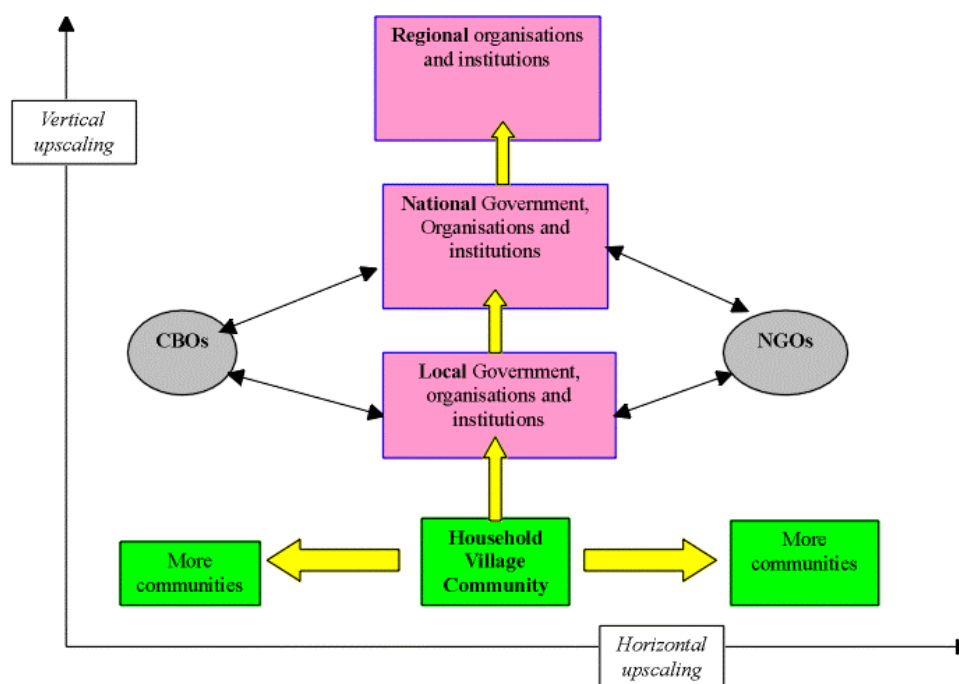
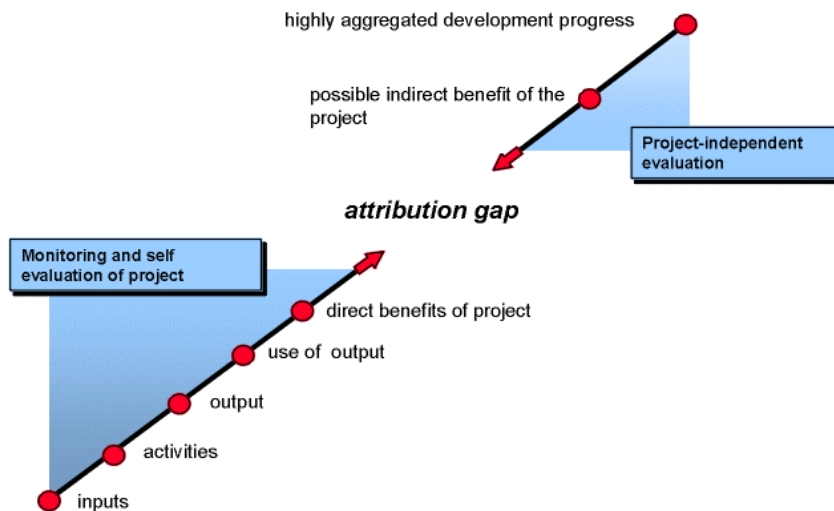


Figure 1: Concept of scaling up

Innovation is a social process, hence there is an attribution gap

Innovation is about people learning and using new knowledge. Learning itself is a social process because people construct new knowledge often in interaction with others. Hence one can say people 'socially construct' technology and in the process adapt new technologies and ideas to their systems and adapt their systems to new technology. This means that innovation is inherently a complex process with high degrees of non-linearity. This would seem to make conventional impact assessment that seeks to determine the impacts of INRM activities on highly aggregated development indices, such as poverty alleviation, almost impossible. The concept of this attribution gap is shown in

Figure 2: The GTZ Impact Model showing the Attribution Gap***Economic impact assessment won't span the attribution gap***

The non-linearities make the task of defining a linear impact pathway between the direct benefits of a project and highly aggregated development progress very unlikely. Hence, economic impact assessment methods, which require this link, can't work. Other approaches are needed and developing them is a crucial research area for INRM. We can learn from other fields, such as the field of evaluation which has been evaluating social programs for many years. However, this is going to require different skills, such as those offered by anthropologists, ecologists and sociologists.

Recommendation: We suggest that people with these backgrounds participate in the SPIA impact workshop in Costa Rica in February 2002.

How can M&E and IA help INRM?

In answer to this question the group agreed with the Penang position on the need for effective M&E to be the feedback mechanism for adaptive management. IA is also essential for establishing accountability and to secure funding.

Plenary Discussion

Rapporteur: Abra Adamo

- It was noted that technologies of the Green Revolution were scaled-up with high rates of return. However INRM is not as easily scaled-up. There are problems associated with the scaling-up site-specific technologies. It was noted that INRM involves farm more complex technologies than those that came out of the Green Revolution and therefore conventional extension approaches are not likely to be successful. Also, it is difficult to attribute impacts on the ground to INRM (given the array of other factors affecting local livelihoods and resource management).
- Scaling up and out is an issue but are examples of where it has been done. The difficulty is in how to attribute the scaling up and out of INRM to our work and not other variables (e.g. low price of fertilizer). It was noted that there is work being done in this area (e.g. rules of thumb on how to deal with attribution).
- It was suggested that we need to speak about "participatory" impact assessment/evaluation in any discussion of adaptive management and sustainable INRM.

6.13 Water

Rapporteur: Susan Poats and Frits Penning de Vries

The session consisted of three brief presentations and a brief discussion session.

Presentations

1. **Water, a limiting natural resource.** Dr. F. Penning de Vries, IMWI.

An overview was given of water as an essential resource for agriculture, other human activities and nature. The fact that many water sources are nearly fully utilized, and hence competition for water is increasing, was underlined. This leads to the conclusion that productivity of water should increase, an issue to which many CG-institutes can contribute, and that global agriculture probably will have to do with less water, leading to major changes in water allocation and management. The *DIALOGUE* was introduced as a process to bring together knowledge and concerns of all global organizations that deal with water, the *COMPREHENSIVE ASSESSMENT* as the contribution of the CGIAR to the *DIALOGUE*, and the *GLOBAL CHALLENGE PROGRAM on WATER* as the mechanism by which new research issues regarding water can be addressed in the CGIAR.

2. **Managing land and water resources under conflicting demands of shrimp and rice production for sustainable livelihoods in the Mekong River Delta, Vietnam.** Dr. S.P. Kam, IRRI. Full paper available.

The paper presented a project in Vietnam that was executed to mitigate effects of a large scale system in which irrigation and drainage were drastically modified by installation of sluices. The project documented biophysical (mainly land and water quality) and socioeconomic variables ('poverty'), summarized these in GIS, and used models to explore alternatives in water management that would minimize negative effects for people. The project is carried out under leadership of IRRI with several NARS and ARI partners. Reproducibility of the project in less centrally governed countries was discussed.

3. **On a watershed development project in the high Andes of N.Ecuador.** Dr. S. Poats, Ecuador.

This paper describes the activities of a NGO involved with the development of a small high zone in Ecuador where high mountains provide water for downstream use through old irrigation systems. Potato crops are being introduced and grow on increasingly steep slopes. While looking for improvements with CIP, it is found that water management between upstream producers and downstream users is crucial. The catchment perspective modified the understanding and activities for farmer groups significantly. Subsequently, stakeholders were identified and organized. The group participated actively in the development of the CIP-mountain catchment model.

Summary

Both case studies are typical examples of INRM-research: multidisciplinary, integrated, participatory, key limiting natural resources, management issues. By analyzing them, following insights were revealed:

1. Farmers and institutional stakeholders are identified by their 'stakes' and uses in the socio-environmental space defined by water management, i.e. collective natural resource management.
2. Many stakeholders recognize that conflicts over management and use of common property (water) are the cause of increasing instability in livelihood systems.
3. It is recognized that land and water management for livelihood improvement encompasses a complexity of interrelated issues and problems; tackling one aspect would not remedy the situation satisfactorily.
4. Multi-institutional and multi-disciplinary teams of local and international research institutes and local government professionals can collaborate with farmers at different scales of analysis, and can jointly identify scenarios for farmers and local planners to manage water for the improvement of livelihoods.
5. Effective management of water, more than that of other resources, requires and provokes greater social organization.

6. Entry and exit strategies in participatory action research on INRM vary according to institutional mandates, and should be made explicit from the start. For many local stakeholders, long haul commitment is needed.
7. Sophisticated GIS, modeling and multi-media tools can be truly integrated with farmers participatory research. But only trust based partnerships are productive and share information.
9. Knowledge at one detailed level (farm) was brought into the framework of knowledge at a higher level (district, irrigation scheme, watershed). This allows stakeholders to 'see' the broader pictures and to explore realistically different scenarios (provided that sufficient process knowledge at the lower level is available, which was the case in these case studies). Moreover, approaching the problems at two or more levels allows adaptation of the overall results to other watersheds/environments, enhancing strongly the possibilities for knowledge transfer.
10. Role CG in the projects was that of a facilitator of the process, a resource organization for objective scientific knowledge and skills. They also enabled collaboration across institutional barriers. The first of these roles can also be fulfilled a local NGO or another strong national partner.
11. The case studies are 'role models' in a sense that the scientific and participatory processes in both were essential to 'make the case'. The science part was essential to quantify the biophysical overview individual farmers and planners do not have. Only stakeholders can determine the real needs and goals, and bring in much local specific site characteristics. The 'objectivity' of the options for development derived in the efforts allowed the projects to become real motivators in the development process.

Plenary Discussion

Rapporteur: Abra Adamo

- In order to identify relevant stakeholders at the watershed level, the participants agreed that one needs to consider not only the environmental issues and definition of water by resource users, but the "stakes" that people have in water (i.e. the socio-economics and geography of water use). In the case of Vietnam, for example, stakeholders are identified and categorized according to who wins and who loses.
- Multiple stakeholder groups were defined on how they use and are bound together by water.
- Given that there are often hundreds of potential stakeholder groups in a given area, participants were interested to know if a systematic way of defining stakeholder groups had been developed. In the case studies presented, a more fluid process for identifying and working with stakeholders at the watershed level was used (e.g. Ecuador). It was suggested that stakeholders enter a given scenario all the time depending on the problem that is being addressed. Different stakeholders align and conflict depending on their stake within a certain issue etc. Therefore there is no magic number of stakeholders. Stakeholders become visible and disappear according to their stake in a specific problem.
- Participants were interested in to learn about what technical change, if any, was implemented during the Ecuador case study. Technical change was a component of each case study, although the presentations focused principally on the lessons learned.
- It was suggested that in many cases the introduction of a major new technology can instigate the re-negotiation of systems of rights etc. (e.g. El Angel) and can potentially generate conflict. Research needs to examine the interaction between the introduction of a new technology and the negotiation over rights to resources (e.g. water).
- In case of Vietnam, it was noted that the reverse is also true. In Vietnam, government policies are changing water regimes. These changes in agricultural systems and resource rights are now demanding technological change to enable farmers to cope with these very rapid changes.
- It was suggested that coordination of collective action (of many stakeholders) does not need to be a hierarchical process but can be decentralized. Example: a decentralized concentration of networks across a watershed can organize and act collectively to conserve water resources and implement technical change without a governing body.
- It was noted that systematic teaching tools for mapping of stakeholders do exist.

6.14 Integrated Nutrient Management

Rapporteur: Richard Thomas

Objective: To review advances in INM, including new strategic research, and means to engage farming communities with the scientific community using new approaches.

There were four presentations covering the continuum of strategic research to adaptation and adoption.

1. Harwood, Fortuna, Sanchez & Smeenk. Managing ecosystem processes as a starting point for nutrient management and soil quality.
2. De Haan and Tarawali. Moving from strategic research on herbaceous legumes to adoption by farmers as an INM strategy.
3. Barrios, Delve & Thomas. Integration of local knowledge for improved soil management strategies.
4. Vanlauwe, Ramisch, Delve & Swift. Integrated nutrient management from concept to practice: process studies at the technical and dissemination levels.

The main points that relate to the questions posed by the organizers were;

A) what does your session tell us about possible operational models, principles and success/failure factors in conducting INRM research?

1. The group felt that the work on INM has indeed moved away from strategic research into an approach that is consistent with the INRM proposed in Penang and presented here by Bruce Campbell.
2. It is possible to identify key processes that can be used to indicate changes in the status of the ecosystem. The group from Michigan State University have shown, for example, that soil nutrient flow and health can be based on organic matter or carbon management. The key indicator here is a range of a pool of active C. This is consistent with the concept presented by the resilience alliance whereby systems are generally regulated by 3-5 variables. In the case presented this was an active C pool that was related to an available N pool. This process has now been taken and used with farmers who can now better manage their ecosystems through this concept.
3. A more in depth understanding of farmers circumstances and available resources, taking a more holistic approach, is helping to better target and promote the use of herbaceous multi-purpose legumes. In this example from IITA, a focus on integrating crops and livestock is helping to increase the adoption of herbaceous legumes.
4. It was shown that a commonly developed tool on soil quality indicators (developed by CIAT, SWNM and partners) and an organic matter decision tree (developed by TSBF and partners), helps to develop a common language with farmers, NGO's, NARES, universities and IARC's. The development of a common language is extremely important to succeed in INRM. It could be used as a starting point for INRM.
5. It was also evident that the development of a common language by the involvement of stakeholders can have a positive effect on institutional change and a change in mind set of the various stakeholders, For example, university professors saw the benefit of a common language after they tried to put themselves in the place of farmers. The farmers saw the utility of the commonly developed indicators when they realized that it would mean that they could avoid the costs of soil analyses, which they cannot afford. They also saw the benefit of soil research done by scientists which they previously perceived as irrelevant and too costly.

These are all examples of how we are improving the efficiency and impact of our research by adopting the INRM approach.

B) How can your sector/issue improve the relevance and impact of CGIAR-INRM work in solving major human and environmental problems?

1. Work on INM focuses on the better management of natural capital (soil fertility, water quality) it increases productivity and/or profitability (financial capital) and introduces a common language that builds social capital. It addresses a major cause of land degradation i.e. nutrient depletion.

Plenary Discussion

Rapporteur: Abra Adamo

- It was mentioned that the three presentations on INM, Water, and Impact Assessment contribute substantially to the INRM organisational principles and it was fortunate that we were given the 3 questions to address.
- It was suggested that since it is possible to link soil carbon as indicator of soil health research (Michigan State presentation) with carbon sequestration and GHG emissions. This was seen to be an excellent example of possible scaling up between local, regional and global levels.

7 Rounding up the Conceptual Discussions

7.1 A First Conclusion: What is new or different?

Based on the output of the reports from the parallel sessions, participants were asked to draw some conclusions with regard to new insights and common agreements about the conceptual basis of INRM. The following points were extracted from the discussion and noted on a flipchart:

What is new / different?

- Site-specificity no longer seen as major bottleneck
- Systematic vertical integration strengthening scaling up and out'
- Convergence towards linking research with stakeholders – common process
- Success in INRM difficult to attribute to development indicators
- Acknowledging that there are winners and losers
- Huge gap in quantifying ecosystem services for different stakeholders
- Participatory research has a function to promote farmers capacity to innovate

Plenary Discussion

Rapporteur: Abra Adamo

- Site-specificity no longer seen as a major bottleneck
- Need to be doing research on local, regional and macro/international/global issues and integrating these. Research not only done at the local level (e.g. Indonesia – intervention needs to be systemic across scales – changing the way people understand and do things at all scales at the same time and integrating across these). Research needs to be taking place at all scales – new model for scaling-up and vertical integration. New concept of scaling-up – systemic vertical integration, strengthening scaling up and out.
- Significant convergence toward process of linking research with all (or relevant) stakeholders (institutions, activities, practices) as a way of doing business
- Success in INRM difficult to attribute as development indicators become more highly aggregated. Can look at changes in different forms of capital at the household and community level – good way of measuring INRM impact at these levels. Nevertheless it remains difficult to attribute changes strictly to INRM (other variables at play).
- If we are focusing on changing development trajectories we need to be cognizant of macro-level variables at play (in the real world) and their role in shaping. E.g. structural adjustment policies and their impact on forest management. We also need to begin thinking about the influence of our work on the ground on processes and issues at the policy level (e.g. structural adjustment).
- Huge gap in quantifying ecosystem services for different stakeholders.
- CG can be represented at macro level. For example, many countries are now developing their poverty reduction strategies. CG can contribute in this area. Need to be active politically at these levels.

- Participatory research methods need to be applied to help farmers to innovate not a means of persuading farmers to use a specific technology (as extension). Need to use it to support farmers to innovate (building social capital and SES resilience). PR as more than a tool.

Synthesizers Reports

In order to reach a convergence of the diverse ideas, synthesizer groups were organised capture the key outcomes of the discussions with regard to three main topics (as defined in the expectations). These synthesizers were given space to report back to plenary and to reach consensus on their findings. The group composition was:

| | | |
|--|---|--|
| <p>Group 1: Conceptual Framework & Definition of INRM</p> <p>Larry Harrington Anne-Marie Izac Jon Tanner Richard Thomas Dyno Keating Bruce Howell</p> | <p>Group 2: Operational Models for INRM</p> <p>Frits Penning de Vries Hans Jansen Stephen Weise Richard Thomas Reimund Roetter</p> | <p>Group 3: Relevance and Impact for INRM</p> <p>Boru Douthwaite Douglas White John Poulsen Tony Simons Jane Toll</p> |
|--|---|--|

7.2 Definition & Understanding of INRM

The first group had the task to synthesize the understanding and the definition of INRM as a joint output of the large group. It was supposed to be clear and easy to understand.

Group report

Definition: INRM is an approach to research that aims at improving livelihoods, system resilience, productivity and environmental services. In other words, it aims to augment social, physical, human, natural and financial capital.

It does this by helping solve complex real-world problems affecting natural resources in agroecosystems.

Its efficiency in dealing with these problems comes from its ability to:

- empower relevant stakeholders
- resolve conflicting interests of stakeholders
- foster adaptive management capacity
- focus on key causal elements (and thereby deal with complexity)
- integrate levels of analysis
- merge disciplinary perspectives
- make use of a wide range of available technologies
- guide research on component technologies
- generate policy, technological and institutional alternatives

It focuses primarily on agriculture, forestry and fisheries. It aims to solve only the most important problem sets. It does not deal with all kinds of natural resources, only those of relevant to agroecosystems. It does not embrace all elements and scales of agroecosystems, only the most important. It emphasizes the participation of only the most important stakeholders.

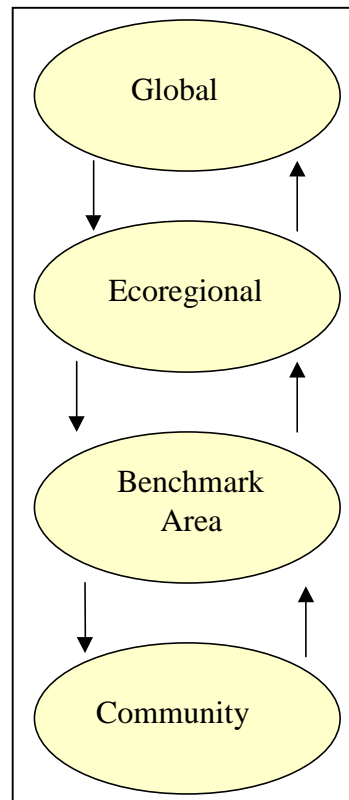
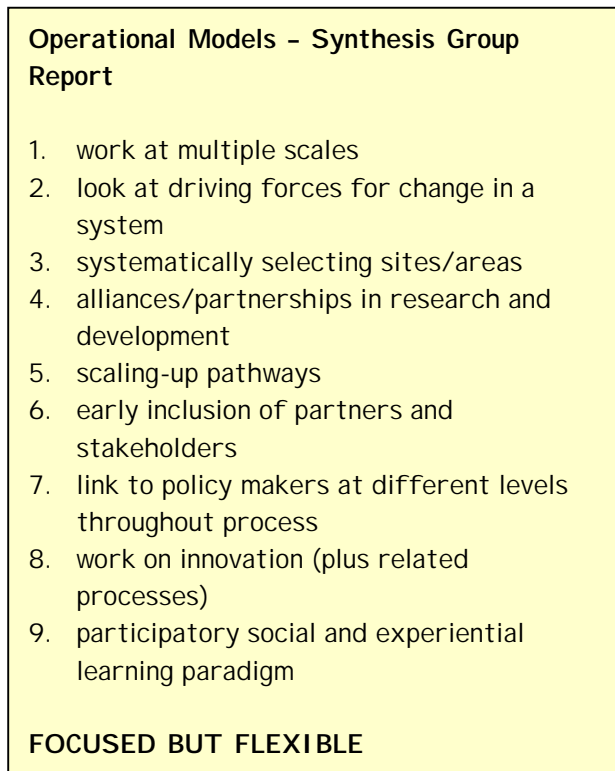
Plenary Discussion

Rapporteur: Abra Adamo

- Wanted simple definition accessible and understandable to all.
- However, scale not captured in this definition. Needed?
- Success in this approach is this measured in terms of changes in these 5 types of capital.
- Is INRM what farmers, whalers, and coal-miners do or what we (the CG) do?
- Not just solving problems but exploring and exploiting opportunities
- Need to glue all stakeholders together in the definition
- Is IPM in INRM? – not captured in definition. IPM seen as integral to management of natural resource base.
- There was considerable discussion regarding whether we are seeking to develop a working definition for ourselves (the CG) or a broad, all-encompassing definition of INRM for the world. So felt that two separate definitions could be developed to capture both. One definition as an INRM mission statement for the CGIAR and the other to define the broad approach of INRM. It was also noted that a strictly CG-centric definition will not reflect the ideas and interests of our partners and stakeholders. Many other players, not trying to impose this definition on the world
- “INRM is an approach to action oriented research in partnerships, in specific-locations, focused on stakeholder priorities, and generates results at different scales. Its objectives ...”
- “INRM is an adaptive research and management approach ... “
- “INRM helps people ...”
- “INRM is an innovation process ...”
- “solving problems AND exploiting opportunities ...”
- No decision made regarding a suitable definition of INRM. Will need to come back to this.

7.3 Operational Models for INRM

The group presented their findings briefly. There was no separate report submitted, but many of the aspects have been mentioned before in the feedback of the group on organisational frameworks.



- Need for understanding of interactions at all scales.

7.4 Impact and Relevance

Unfortunately this group did not deliver a synthesis report

8 Taking INRM Forward in Practice

In the Penang meeting in 2001, ways forward were discussed and certain agreements have been reached that time. One of the initiatives which have started to foster an INRM approach has materialised in Southern Africa. ICRISAT took the lead in bringing stakeholders in Zimbabwe together to come up with a joint agenda on INRM. Although the initiative is still in its early stages, it was able to provide insights relevant for others who are about to start similar initiatives. Steve Twomlow provided an overview of a case study involving the integration of INRM concepts and approaching into an on-going project in Zimbabwe.

8.1 An Example: The ZIMSAT Partnership in Zimbabwe

**Agro-ecosystem Productivity and Food Security for the Semi-Arid Tropics of Southern Africa in the 21st Century –
A View of an Integrated Natural Resource Management Approach from Zimbabwe**

THE ACTORS:

- ICRISAT
- CIFOR
- ICRAF
- CIMMYT
- TSBF
- Agricultural Research Council
- Agritex
- Department of Natural Resources
- Department of Research and Specialist Services
- Matopos Research Station
- Forestry Commission
- University of Zimbabwe
- Department of Soil Science & Agricultural Engineering
- Institute of Environmental Studies

PROCESS

- CGIAR Penang Workshop – August 2000
- ICRISAT Internal discussions - Dec 2000
- Consultation with IARCS and National stakeholders – Jan/March 2001
- ICRISAT internal revisions – May/July 2001
- National Planning Workshop – July 2001
- Synthesis by steering group – Aug 2001

THE QUESTIONS

- What factors are contributing to underdevelopment in the semi-arid tropics of Southern Africa in the 21st Century?
- What opportunities are there to enhance development in these systems over the next 10 to 20 years?

ISSUES

- Little social security: need for a safety net
- Poverty: few capital assets (natural resources, financial, physical, human, social), low productivity of assets, vulnerability to shocks and stresses, HIV aids impacts on household security
- Degrading natural resource base: water, land, forests, wildlife
- Annual per capita grain production in Zimbabwe is on a long-term downward trend
- Community empowerment: farmers' participation
- Macro-policies: land tenure, credit facilities, markets
- Micro-policies (Institutional arrangements): gender, culture and tradition
- Information: generation, learning and sharing
- Diversity of livelihood activities: risk spreading, how are new ideas incorporated - trade-offs?
- Range of stakeholders – 200 plus

ZIMSAT INRM Approach: The focal point:

- Smallholder farming communities in the Zimbabwe SAT: lack food security, lack income earning opportunities, exist close to or below poverty datum, constrained and unable to adopt new technologies, face a vicious cycle of poverty and resource degradation as soil fertility declines

ZIMSAT INRM Approach: The starting point

- Capitalize and add value to existing collaborative activities/sites and historical data sets, to better target interventions to increase the adaptive capacity of the agro-ecosystems and enable rural households to cope with uncertainty of risk and change, and help alleviate rural poverty and food insecurity.

ZIMSAT INRM Approach:**Task Force:**

Isiah Mharapara – ARC
 Siboniso Moyo – DRSS
 Enos Shumba – Forestry Commission
 Paul Mapfumo – Uni. Zim
 Peter Frost – IES/CIFOR
 Steve Twomlow – ICRISAT

- Identifying and refining the research focus
- Governance issues/boundary conditions
- MoUs
- Guiding role/links to new stakeholders

ZIMSAT INRM Goal:

- Enhanced adoption of sustainable crop, livestock, woodland and NRM practices in small-holder semi-arid farming systems to improve rural livelihoods and reduce poverty.

ZIMSAT Working Definition of INRM:

- Maintaining and improving smallholder household food and income security through sustainable utilization and management of resources in semi-arid tropical agro-ecosystems, thereby contributing to rural livelihoods and reducing poverty

ZIMSAT INRM Approach

- Food supply and security – from Masvingo to Matebeleland
- Selection of benchmark sites from the wet end of the SAT to the marginal SAT
- Characterization of sites at spatial and temporal scales
- Crop, livestock and forestry technology options identified and tested
- Impact monitored - indicators identified and applied

Guidelines for Implementing an Integrated Programme:

- Recognise and encompass the social and biophysical heterogeneity and variability of the SATs
- Capture interdisciplinary and inter-institutional involvement
- Involve and empower communities
- Encourage ownership of project activities by communities

- Mainstreaming gender
- Incorporate HIV/AIDS issues
- Build in continuity and sustainability at both community and institutional levels
- Programmatic approach > 15-year timeframe, in five-year impact phases
- Develop and monitor impact indicators as on-going activity
- Scales of operation: discrete research areas (benchmark sites as laboratories), broader areas (results and experiences made available for possible adoption and adaptation)

Generic Outputs

- Current status of the SAT agro-ecosystems and what can be done to maintain its sustainability: Diagnostics, Improved utilization of available resources
- Sustainable improvements in productivity: Diversification of crop and livestock enterprises, Diversification of woodlands and trees, Development of input/output markets
- Dissemination and technology transfer

The content of this summary is drawn directly from the presentation by Steve Twomlow. For a full copy of the presentation, please contact Andres Palau: a.palau@cgiar.org

Plenary Discussion

Rapporteur: Abra Adamo

- It was suggested that there is little point in planning ahead of stakeholder analysis and consultations – as things will be driven by stakeholders.
- Getting stakeholders involved from the start will settle ownership issues and ensure transparency
- Adaptive management means not planning too far ahead.
- Need venues/forums to come together regularly to modify/adapt the process of R&M
- The Bulawayo team is concerned about the high transaction costs of establishing these venues/opportunities for regular discussion and consultation.
- How do you bring in the stakeholders on the ground from the beginning without creating too many expectations? Do you bring in all 200 active institutions from the beginning (can raise expectations) or be selective? It was suggest that the team could start off organically with the people/ institutions who can bring tangible things to the table without expectations – of course, caution is needed.
- In this specific case how will the team identify the boundaries of the project – given multiple scales, stakeholders, issues, etc. and not get lost in an ocean of complexity? The presenter indicated that they have a feeling about our boundaries based on benchmark sites etc. Partnerships will be driven by stakeholders. A SLA approach will be helpful at this stage.
- It was suggested that the team needs to look at the scales to define boundaries. National, regional and household all active scales in this case. Building adaptive capacity in one can reduce it in another. Need to develop a conceptual model of the system and use spatial and temporal models as and entry point.
- Need for capacity in this area of research/management.
- May not be a win-win situation, need to accept this.
- Food-systems Under Stress Project – with Zimbabwe node (P. Sikana , J. Pottier, Dr. Lovejoy) with social science capacity and dealing with these issues.
- It was suggested that an organisation called Palum in Zimbabwe missing from the list of partners – need to link more effectively with NGOs already working on the ground with CG centers as support. Yet, without experience with working on the ground you have no credibility with others working on the ground – it is a balancing act.
- Need follow-up meeting with grassroots organisations on the ground – for joint learning.
- Jules Pretty – documentation of successful cases, need to learn the principles of these successful cases.
- The issue of partner participation in this INRM meeting was raised as a concern. Not an international workshop without partners. We are talking about partnerships without partners here. It was notes that it is difficult to bring in new/additional partners into a programme without money already on the table. For this workshop there was an open invitation to the NGO committee. Perhaps a greater effort could have been

made. It was suggested that this meeting was never conceived as an exclusive CG conference. Perhaps we need to do this better.

- It was suggested that the Bulawayo team not get bogged down in characterization etc. from the beginning (not participatory and client-driven) – get into the field with stakeholders doing visioning exercises etc. as a starting point.
- Rather than “operationalizing INRM” this case study is an example of contextualizing on-going work (using existing work as entry point, infusing our work with INRM themes and approach).

The discussion generated a good basis for other possible initiatives to discuss their way forward.

8.2 Building Scenarios: Peer-Assist Working Groups

Five participants / groups of participants who want to engage into new INRM work or transform on-going work, volunteered to have their case discussed with their peers. The task was:

Guidelines for Peer-Assist Group Work

When starting up your INRM initiative or building INRM into on-going work, how do you practically go about it?

- What do you want to achieve?
- What outcomes do you anticipate?
- How do you go about it?
 - What are your strategies?
 - What are the main steps?

Design an initial "road-map" for the process

- a) let the peer group explore your context

Participants broke into small self-selected groups to brainstorm and receive peer-coaching related to starting up an INRM initiative or building INRM into on-going work.

These groups were informal and were not asked to report back to the larger group.

However, a brief report back to the plenary showed a high satisfaction of the real-life discussions and scenario building through peer-assist groups.

8.3 Building Communities of Practice for INRM

A recurrent theme throughout this INRM meeting has been how to organize ourselves in order to encourage and ensure knowledge sharing within such a large and diverse INRM initiative. Establishing "Communities of Practice" (CoP) was identified already in Penang as one way in which to organize for knowledge exchange and institutional learning. The details and practicalities of CoPs however were not explicit so far. This step in the workshop was to clarify modalities and to identify committed CoPs within INRM.

Communities of Practice:

If we want to take INRM forward what are the three main issues/topics we need to pursue or deepen through communities of practice?

OR

Other mechanisms (please specify)

The participants broke into small groups to discuss this question, produce 3 cards per table and report-back to the plenary group.

In plenary, the cards were grouped according to similar theme. Based on these groupings INRM Communities of Practice were formed and participants could 'subscribe' to those groups:

Issues to be pursued or deepened through a community of practice are ...

| Impact | Learning to work together | Advocacy | Mainstreaming / Implementation | Learning from Cases |
|---|---|--|---|--|
| <ul style="list-style-type: none"> • Monitoring, evaluation, & impact • How to get benefits faster for the farmers • What is success? | <ul style="list-style-type: none"> • Facilitation & collaboration • Incentives and facilitation for implementation • Organisational function • Institutional analysis • Deal with complexity by forging partnerships • Non-traditional stakeholder involvement • Bridging scientific and local knowledge | <ul style="list-style-type: none"> • Task force of zealots • Spread the message to top CGIAR decision-makers and members | <ul style="list-style-type: none"> • Getting started with INRM CofP • Adopting/ adapting guiding principles for implementation of INRM • Mainstreaming of participatory approaches • Mainstreaming of INRM into existing programs | <ul style="list-style-type: none"> • Demonstrate advantages / disadvantages of working with INRM framework • Document & share failures and successes • ID of entry point for INRM |
| <p>Members</p> <p>Champion: B. Douthwiate</p> <p>M. Somaritz T. Simons D. White J. Dimes R. Delve R. Meinzen-Dick F. Penning de Vries K. Bawa D. Pachico A.M. Izac V. Chude J. Poulsen G. LeClerc B. Sims C. Valdivia N. de Haan A. Laborte</p> | <p>Members</p> <p>Champion:</p> <p>Bob Myers S. Twomlow M. Swift B. Campbell K. Bawa E. Barrios S. Weise M. Monasterio C. Valdivia N. Beaulieu</p> | <p>Members</p> <p>Champion: A.M. Izac</p> <p>L. Harrington R. Harwood J. Toll A. El-Beltagy</p> | <p>Members</p> <p>Champion: J. Poulsen</p> <p>S. Twomlow M. Swift R. Lefroy J. Toll L. A. Welchez G. LeClerc R. Delve N. Beaulieu</p> | <p>Members</p> <p>Champion: F. Penning de Vries</p> <p>T. Bontkes B. Campbell R. Quiroz L. Harrington L. A. Welchez J. Poulsen S. Tarawali J. Ashby</p> |

Plenary Discussion

Rapporteur: Abra Adamo

- Need to consider: “what are you prepared to dedicate your spare time to?”
- Communities of practice need to be driven by the things that you are passionate about and that matter to you.
- Are there people in your area that are ready to join you today in a community of practice.

8.4 How to Manage Communities of Practice in INRM – some Practical Ideas

Steve Song of Bellanet was asked to present some experiences from other communities of practice as an inspiration on how to do it in practice and what works....

Benefits:

For the organisation:

- Help drive strategy
- Solve problems quickly
- Help recruit and retain staff
- Diffuse best practices
- Cross-fertilize ideas, increase opportunities for innovation
- Build organisational memory

For the community:

- Develop a common language
- Develop professional skills

For the individual:

- Help people do their jobs
- Building a sense of community bonds within an organisation
- Helps people to keep up to date
- Provides challenges and opportunities to contribute

Establishing Communities of Practice:

- The seed of Communities of Practice already exist within organisations and groups of people with common goals
- Getting it right is difficult:
- Need to tap into people’s passions
- Get the balance right – big may be too general, small may not provide enough interaction
- Technology must be supportive
- Management must commit itself to allowing staff time for participation in CofPs
- Participants need to develop skills to participate effectively

Key Indicators:

- Trust: How safe do you feel here?
- Commonality of Purpose: To what extent are you in a similar discipline or face a similar obstacle
- Identification: How personal is the CofP topic for you?
- Usefulness: To what extent does the group actually do work, give you things you need?

Use a spectrum of technologies:

- Face-to-face
- Telephone
- Email
- Print

- Video
- World Wide Web

Find a Champion:

- Ensure support at highest possible level
- Communicate the purpose
- Promote the community
- Ensure impact

Employ A Facilitator**Set and communicate ground rules:**

- Clearly establish the purpose
- Communicate the expected outputs
- Explain the decision-making process
- Ask for buy-in

Promote understanding:

- Personalize communication
- Ask people to introduce themselves

Paraphrase:

- To ensure common understanding

Summarize:

- For people who join late or don't read consistently

Communicate proactively:

- Anticipate misunderstanding
- Investigate silence

Consistency:

- Communicate regularly
- Remain neutral

Follow through on commitments:

- Summarize
- Translate
- Investigate

Policies to support Communities of Practice:

- Identify potential communities: Use Social Networks Analysis if necessary
- Institutionalize support: recognize the workload, recognize skills required
- Build Capacity: Facilitation, technical
- Build a context: Situate collaboration within the context of other resources

The content of this summary is drawn directly from the presentation by Steve Song. For a full copy of the presentation, please contact Andres Palau: a.palau@cgiar.org

Plenary Discussion:

Rapporteur: Abra Adamo

- Can a champion also be a facilitator? Yes, if that person is very interested and very committed.
- How do we identify champions, facilitators, members, etc.
- Is the contact person the champion? The champion to create the CofP will not necessarily be the eventual champion of the CofP.
- CofPs now need to work together to develop their own ideas, agenda etc.
- Is overlap in multiple communities of practice a problem? No, "lurkers" are often very positive.

- Technology options for communication? There are many technology options from which to choose and the type of communication technology employed should be consistent with the type of knowledge sharing being sought for a particular activity.
- Do we need a mentor to help us get going on this? Many lessons to learn and encouragement needed. Steve Song, of Bellanet, agreed to support these CofPs in their development.
- TRG will also support the emerging CofPs.
- Development of listservers for each CofP.
- Has to be more than a mailing list (e.g. a website, archive of communication on the web, etc.) These interactions become the body of knowledge of a CofP.

9 Next Steps

The next steps related to workshop documentation, communication to the INRM listserve, development and announcement of the Communities of Practice, and future INRM meetings.

| What | When | Who |
|--|-------------------------------|--|
| Documentation of crude outputs | 15/9/2001 | J. Hagmann |
| Synthesis Report to CDC Task Force | 15/9/2001 | J. Voss |
| Briefing Note to partners (One pager overleaf) (Circulated to Steering Committee for comments) | | J. Voss |
| Message to INRM listserve | | |
| CofP Champions to consult with SS regarding start-up | 30/9/2001 | |
| CofP Champions to announce and welcome members | | |
| INRM-IV at ICARDA in Aleppo | Approximately 1 year from now | Adel El-Beltagy, INRM Steering Committee |

Plenary Discussion

Rapporteur: Abra Adamo

Other follow-up:

- Prabu Pingali would like a panel on Impact and INRM at the Impact meeting in Costa Rica in February 2002 – Impact group to follow up.

Next year: another large INRM meeting?

- Instead of another large INRM meeting some suggested that we should begin to introduce focused smaller meetings around gaps etc. Others however, feel that annual meetings remain crucial if we wish INRM to be central to the CG's work – e.g. mainstreaming of INRM (we still have a visibility problem – little acceptance of this approach, still a minority in the CG). It was suggested that we continue annual meetings along side introducing smaller focused meetings around key themes or gaps.

- It was agreed that there is a need for greater participation from the field and partners – smaller regional group meetings to enable partner participation and report back to the larger CG group.
- It was suggested that the next annual meeting should focus on gaps (e.g. contribution of IPM).
- Is it possible to meet in conjunction with some other forum? (e.g. Common Property meeting in Harare next year). Saves on expense and allows interaction with a broader diversity of people.
- Need success stories in future meetings. Focus of next meeting should be reporting on INRM work in progress in a more rigorous way. It may also be a good idea to organize the next meeting around a site where INRM work has been on-going (CG center or other organisation/partner) – meeting at case study site, and can still continue to have the larger annual meeting.
- Adel El-Beltagy suggested holding the next meeting at ICARDA in Aleppo (INRM-4) and that it be organized as an open house for partners. This was agreed by participants.
- World Congress of Soils in Bangkok next year – possible time for additional meeting

Feedback on the Editorial Committee (for the outputs of this meeting)

- Reviewing the abstracts and papers for publications
- Two journal interested: Conservation Ecology, International Journal of Sustainable Development and World Ecology
- Feedback from session organisers to review for papers and abstracts for journal submission by December 10, 2001
- Other ways of publishing: CD (indexed)
- Those wanting to still send in a paper must do so by September 30, 2001 (for papers, powerpoint presentations, etc.) for the CD
- Papers will also be posted on the INRM website

10 Workshop Evaluation

The participants reviewed the anticipated outputs and products that they had identified and agreed upon at the beginning of the workshop and were then asked to respond to 3 questions (provided by the facilitator). The responses were recorded by the plenary rapporteur.

Workshop Evaluation:

Discuss on your table and come with statements on:

1. What we liked in this workshop was ...
2. What we did not like in this workshop was ...
3. Next time, we should improve on ...

What we liked in this workshop was....

| | | |
|---|---|--|
| Meeting was very interactive, transparent, no one hijacking, therefore a lot of trust and collegiality | Excellent facilitation | Enthusiasm of participants. Comradery and participation good. |
| Friendliness and willingness to help by CIAT support staff – “going the extra mile so that things run smoothly”. Organization and logistics good. | Clarification of tools concepts and approaches | New ideas to take home and put into practice (e.g. resilience, communities of practice). Appreciated key note addresses – contributed substantially. Exciting discussion in sessions |
| Great climate | Diversity of topics, skills, etc. Great to be able to rub shoulders with people of various expertise. | Frank discussion |
| Good farmer meeting at CIAT | High-level participation and support (DG presence) | Good to get beyond navel-gazing / talk fest |

What we did not like in this workshop was ...

| | | |
|---|---|--|
| Lack of clarity in the focus of the meeting therefore too many parallel sessions (too much overlap couldn't attend what you wanted - ie. parallel sessions) | Field trip was very disruptive - should not have taken place at this time, should have shown how I NRM was being put in place, should have been much more inclusive. Field trip not satisfying | Absence of representation of key areas (e.g. I PM) |
| Insufficient clarity of process (in advance of the meeting) | Participation still very CG-centric, need to get message of this meeting out to a broader audience of partners etc. | Didn't learn enough from Penang, not enough bridging between Penang and Cali |
| Organisation of parallel sessions was "difficult" or chaotic - shifting agenda, room changes, papers shifting between sessions etc. - A lot of confusion | CG often dominated in discussions in plenary (need to find mix of issues that involve broader stakeholders in the future) | Too much philosophy and not enough meet - more case studies needed |
| Dynamic programming of agenda (people not able to present papers) - format should be fixed ahead of time | Too much diversity of parallel sessions (too many topics), could be better focused | Not enough time in discussion and synthesis (rather than presentation) |
| Mix of agendas (org, institutional, science, etc.) | Not enough interdisciplinary discussion - parallel sessions too disciplinary | |

Next time we should improve on ...

| | | |
|---|---|--|
| Would be good to agree now on the general theme for the next meeting (e.g. Putting / Having Put I NRM into Practice) to help clarify goals | More attention to other disciplines relevant to I NRM (I PM, crop improvement etc.) | Managing old and new participants (how can we do this better - e.g. re-discussion of issues already dealt with, moving forward) |
| Need steering committee to organise next meeting - Too many cooks spoil the broth (too many people involved in trying to organise things, conflicting objectives, etc.) | Want to know more about new ideas in practice and that have been successes or failures (improve on reality) More focus in next years meeting Case studies early on in the meeting (to bring people up to date) | Field trips: multiple thematic sites to choose from (smaller groups) with questions and issues raised during field trip that can be fed back to larger plenary |
| More non-CG, partners, and other stakeholders | Simpler structure for next meeting | I improve on ability and willingness of CG to air its dirty linen in public |
| More focus on the processes to put I NRM into practice | Handle one process at a time | Keep the ball rolling on I NRM |

After the evaluation, the facilitator thanked all the participants for their active and lively participation. Joachim Voss and Jacqui Ashby were thanked for organising the workshop at CIAT. Andres Palau and John Poulsen were thanked for their work in coordinating the logistics of the meeting, and Abra Adamo's work in documentating all plenary discussions was highly appreciated.

Joachim Voss then thanked IDRC for their support which enabled national researchers to participate in this meeting. BMZ was also thanked for funding Jürgen Hagmann to provide facilitation to the meeting. The workshop was closed by Joachim Voss.

11 Annex

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11.1 Annex 2: photographs of groups

See separate file