

Final Progress Report
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1. Project abstract:

This project applied an innovation framework developed by the principal investigator's work the US National Academy of Science to sustainable livestock development research projects in Africa and Asia. The focus of these projects ranged from pastoral systems to poverty and ecosystems services mapping to market access by the poor to fodder and natural resource management to livestock parasite drug resistance. We found that these projects closed gaps between knowledge and action by combining different kinds of knowledge, learning, and boundary spanning approaches; by providing all partners with the same opportunities; and by building the capacity of all partners to innovate and communicate.

In addition, briefly describe:

1) How the project has advanced research promoting sustainable development in the developing world:

The broad goal was to understand the contributions research can make to delivering real and sustainable benefits in real communities. Our hypotheses originated in earlier work led by the PI at the Roundtable on Science and Technology for Sustainable Development of the US National Academy of Science. That work produced a series of propositions on what kind of institutional arrangements increase the likelihood that research and development will promote sustainable development in the field. The work on this project tested and enriched those propositions through application to a series of case studies in international agricultural research. In particular, we conducted case studies of 5 International Livestock Research Institute projects. The cases were selected to reflect a wide range of countries, agricultural systems, type of partners, type of research outputs, and length of time since the start of the project. They cover 5 different broad problem areas with data gathered from multiple regions within each of 9 countries:

1. Better policy and management options for pastoral lands (Kenya, Tanzania)
2. Fodder and natural resource innovations for smallholders (India, Nigeria)
3. Poverty and ecosystem services mapping (Kenya, Tanzania, Uganda)
4. Improving productivity and market success of smallholders (Ethiopia).

5. Improving the management of trypanocide resistance in West Africa (Burkina Faso, Guinea, Mali)

We focused on these criteria and projects to generate lessons that are broadly applicable to international agricultural research for development in general, not just livestock research. Thus, this set of case studies allows us to make comparisons and learn across a wide range of cultural, socioeconomic and agroecological systems.

Lessons generated on how to ensure success or failure of getting your research into use:

1. Problem Definition.

DO: Define the problem to be solved in a collaborative and user-driven manner.

HOW TO FAIL? Separate yourselves (scientists who produce knowledge) from the decision-makers who use it.

2. Program Management.

DO: Adopt a project orientation and organization and appoint dynamic leaders accountable for achieving user-driven goals.

HOW TO FAIL? Let your 'study of the problem' displace 'creation of solutions'.

3. Boundary Spanning.

DO: Use 'boundary-spanning' organizations, individuals and actions to help bridge gaps between research and research-user communities, construct informal arenas that foster producer-user dialogues, develop joint 'rules of engagement' and define products jointly.

HOW TO FAIL? Allow dominance by groups committed to the status quo.

4. Systems integration.

DO: Recognize that scientific research is just one 'piece of the puzzle' and apply systems-oriented strategies.

HOW TO FAIL? Don't engage partners best positioned to help transform knowledge into useful strategies, policies, interventions or technologies.

5. Learning orientation.

DO: Design your project as much for learning as for knowing and to be frankly experimental, expect and embrace failures to learn from them throughout the project's life.

HOW TO FAIL? Punish or fail to fund or reward risk-taking managers

6. Continuity with flexibility.

DO: Strengthen links between organizations and individuals operating locally, building strong networks and innovation/response capacity.

HOW TO FAIL? Leave development of communication strategies and products to the communication experts to do and development of research products for the researchers to do.

7. Manage asymmetries of power.

DO: Level the playing field by generating hybrid, co-created knowledge.

HOW TO FAIL? Don't deal with the often large (and largely hidden) asymmetries of power felt by stakeholders.

2) The project's intellectual merit:

A workshop was convened at the International Livestock Research Institute on November 15-17, 2006, drawing on two prior workshops organized by the National Academies' Roundtable on Science and Technology for Sustainability's Task Force on Linking Knowledge to Action for Sustainable Development. The ILRI workshop participants first considered the set of six propositions put forth at the Roundtable workshops in relation to their case studies in advance of the meeting, and were asked to prepare an analysis of their case studies in light of these propositions for distribution to all attendees. Participants' written answers to the questions were collected as a set of case summaries to be discussed at the meeting. The criteria used to select these case studies included geographic focus, problem area, type of partners, and research outputs. This compilation of case studies on linking knowledge with action for sustainable development will be further developed for future research and teaching.

3) How the project has contributed to solving a practical problem of sustainable development:

Assessments of the impacts of agricultural projects aiming for sustainable development suggest that measurable livelihood, and particularly environmental, impacts take at least 15–20 years to be realized (39, 40). Our research indicates that projects aiming to improve livelihoods in sustainable ways are more successful if they incorporate most if not all of these 7 propositions.

Our results further indicate that boundary-spanning work is most effective when it is regularized yet flexible and when it enlists the support of informal communities of actors. Boundary spanning may be institutionalized by creating a new organization or by making it a function of part of an existing organization. Existing institutions, however, are often disinclined to invest in boundary-spanning activities that appear extrinsic rather than central to their core mission, whereas government and private funding agencies have proved reluctant to invest in the creation of new organizations aiming to serve as "go-betweens." Largely for this reason, there exists little incentive for individuals to build their careers in the "boundary space." Our valuation and refinement of NAS's propositions in light of research experiences by ILRI and its partners underscores the importance not only of boundary-spanning efforts but also of supporting the individuals who do such work. It is not yet clear what kinds of institutional change is likely to encourage and accelerate boundary work, what kind of incentives are needed to encourage individuals to pursue such work, and what kinds of courses and training materials will build capacity in this area. Although we are ambitious to design experiments that test our hypotheses about what propels research knowledge into development action, we frame the lessons from our case studies as described above to help us and others sharpen current thinking about closing the knowledge-action gaps in sustainable development.

4) Any developing world component, including field work, engaging a co-investigator or practitioner from the developing world, the development of institutional links with an academic or practitioner/ applications/ problem-solving oriented institution in the developing world:

The project engaged Dr. Patti Kristjanson at the International Livestock Research Institute and Dr. Robin Reid, now directing the Center for Collaborative Conservation at Colorado State

University, and formerly at the International Livestock Research Institute where they continue pioneering work on boundary organizations and their role in the area of poverty alleviation and wildlife conservation.

5) The engagement of a student or research fellow in the project and whether the project has provided any opportunities for a thesis or masters student exercise:

David Kepue ole Nkedianye, a citizen of Kenya and a doctoral student at the University of Edinburgh, Scotland was a doctoral fellow in the Sustainability Science Program in Spring 2007. His research project was on “Linking knowledge with action using community facilitators to span boundaries: Lessons from East Africa”

<http://www.cid.harvard.edu/sustsci/people/alumni/index.html#nkedianye>

6) Any funds leveraged as a result of this project:

National Science Foundation grant “Integrated Knowledge and Policy for the Management of Natural Resources in International Development: The Role of Boundary Organizations” to Bill Clark.

7) Reports, papers, publications or presentations building on this support (please list full citations here and attach copies or URL’s if possible):

Kristjanson, Patti, Robin S. Reid, Nancy Dickson, William C. Clark, Dannie Romney, Ranjitha Puskur, Susan MacMillan and Delia Grace. 2009. [Linking international agricultural research knowledge with action for sustainable development](#). *Proceedings of the National Academies of Science*. 9(13):5047-5052. http://www.cid.harvard.edu/sustsci/docs/Kristjanson_2009_PNAS.pdf

Kristjanson, Patti, Robin Reid, Nancy Dickson, William Clark, Prasad Vishnubhotla, Dannie Romney, Peter Bezkorowajnyj, Mohammed Said, Dickson Kaelo, Ogeli Makui, David Nkedianye, Julius Nyangaga, Paul Okwi, Ranjitha Puskur, Shirley Tarawali, Susan MacMillan, Delia Grace, Tom Randolph, Hippolyte Affognon. 2008. [Linking International Agricultural Research Knowledge with Action for Sustainable Poverty Alleviation: What Works?](#) *CID Working Paper* 173. Joint Center for International Development and International Livestock Research Institute Working Paper, Cambridge, MA: Harvard University and Nairobi, Kenya: International Livestock Research Institute.

<http://www.cid.harvard.edu/cidwp/pdf/173.pdf>

Nkedianye, David, Dickson Kaelo, Robin Reid, Moses Neselle, Leonard Onetu, Ogeli Makui, Mohammed Said, Steven Kiruswa, Patti Kristjanson, Ololtisatti Kamuaro, Shem Kifugo, Nancy Dickson, and William Clark. 2008. [Linking Knowledge with Action Using Community Facilitators to Span Boundaries: Lessons from East Africa](#). *CID Graduate Student and Research Fellow Working Paper* No. 25. Joint Center for International Development and International Livestock Research Institute Working paper, Cambridge, MA: Harvard University and Nairobi, Kenya: International Livestock Research Institute.

http://www.cid.harvard.edu/cidwp/pdf/grad_student/025.pdf

8) Discussion of any significant deviations from the proposed work plan:

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