



## Bridging the Gap between Agricultural Technology Development and Adoption in Northern Kenya

George A. Keya, Michael Ngutu, Amos Adongo,  
Isako Tura, National Arid Lands Research Center, KARI  
Pastoral Risk Management Project

Research Brief O5-O5-PARIMA

December 2005

*Starting in 1998, the Kenya Agricultural Research Institute (KARI), through its National Arid Lands Research Center (NALRC), initiated and tested new research and outreach approaches with the aim of improving the acceptability and adoption of technology among pastoralists and agro-pastoralists in northern Kenya. These approaches included participatory research and technology development, local capacity building, catalyzing the adoption process, formation of partnerships among researchers and community members, giving priority attention to the gender dimensions of rural development, and actively disseminating research results among local people. Our results indicate that these approaches can be very effective in bridging the traditionally weak linkages between research and extension in Kenya and can improve the access of local people to technology and enhance rates of technology adoption. This philosophy seems likely to yield major benefits in terms of helping achieve positive impact on the rural poor and thus helps justify major research investments in arid areas.*

### Background

The challenge of improving technology adoption by farmers and pastoralists in Africa is immense. It is an important issue in the international donor community as well as developing country governments that must justify large investments in research. Likewise, national research institutions like KARI are coming under increasing pressure to achieve tangible impacts in the form of deliverables that enhance the productivity and welfare of rural producers and hence help justify research investments. The problem is therefore one of creating impact. In the arid areas where alternative livelihood options for local communities are limited, the technical and logistical constraints are formidable. Donors have queried research investments in these areas, in particular. Efforts to improve productivity are often hampered by the low adoption rates of technologies. This is linked to—among other factors—non-participation of stakeholders in the research process, weak linkages between research and extension, and lack of access to suitable technologies in risk-prone environments. Some of the factors that limit the access of rural producers to technology include poverty, inadequate information, illiteracy, and the often high cost and high risks of technology implementation.

From 1998, KARI, through its National Arid Lands Research Centre, initiated and tested new research approaches with the aim of improving acceptability and use of agricultural technologies among pastoralists and agro-pastoralists of northern Kenya. These approaches were implemented within the framework of the European Union supported Agricultural/Livestock Support Programme and the World Bank supported Agricultural

Technology and Information Response Initiative (ATIRI). Intervention areas included natural resource management, improved crop production through water harvesting, livestock husbandry and health, and development and marketing of livestock products. Work was conducted in the Marsabit, Samburu, Turkana, Moyale, and Wajir Districts of northern Kenya. These are predominantly arid areas with a few arable sites. This research brief summarizes some of our experiences and lessons learned.

### Findings

The diagnostic and constraint identification phase of the research cycle included participatory methods, rapid rural appraisals, and detailed exploratory and diagnostic surveys where 5,000 pastoralists and agro-pastoralists from 38 target areas throughout the region were involved in rigorous “self-evaluation” exercises. Identification, development, testing, and dissemination of technologies aimed at solving identified production constraints was carried out on site using Farming Systems Research (FSR) and Participatory Learning and Action Research (PLAR) approaches. Some of the tools used included community-based planning workshops, feedback workshops, and participatory monitoring. Producers were included in research planning process and invited to participate in institutional workshops and research advisory committee meetings, both at the local (NALRC) and national levels.

Capacity building involved providing adult literacy

Table 1. Profile of five groups supported through the Agricultural Technology and Information Response Initiative (ATIRI) in northern Kenya.

GROUP	MEN	WOMEN	TOTAL	OBJECTIVES	ACTIVITIES
Malakino	0	21	21	Integrate small-scale farming with income diversification and improve human nutrition	Tree nurseries and horticulture
Goro Ruksha	0	38	38	Increase productivity of small farms via use of labor-saving technology	Farming and Water harvesting
Songa	9	6	15	Increase milk production, enhance nutrient cycling, and increase incomes	Zero grazing
Mwangaza	0	26	26	Diversify income and improve food security	Loan scheme and drip irrigation
Robaf Nage	0	22	22	Income generation	Poultry keeping
<b>Total</b>	<b>9</b>	<b>113</b>	<b>122</b>		

classes for participating groups, technical training and demonstrations, and exposure of producers to novel concepts and practices through study tours. Participants were debriefed immediately after the tours through discussions on what had been learned and the actions they planned to take.

The process of catalyzing technology adoption involved empowering producers to access technologies through ATIRI. In this approach producers began the process by submitting competitive proposals to KARI. The proposals were evaluated for their merit and once approved, seed funds were allocated to participating Community Based Organizations (CBOs) to access demanded technologies. The scientists and other subject-matter specialists from select government line ministries and non-governmental organizations provided the necessary backstopping. The first phase of ATIRI support commenced in July, 2002, and was implemented through December, 2003. Table 1 shows a sample of groups that benefited from ATIRI support during this period.

To ensure a sustained process, partnerships were developed with relevant and willing stakeholders underpinned by clear Memoranda of Understanding (MoU). There were several purposes for developing partnerships: (1) Mobilize communities where the presence of a development partner was strong; (2) more efficiently utilize financial and human resources from partners to support activities of common interest to achieve greater impact; (3) increase outreach coverage in areas far removed from KARI's main circuit of operations, but where collaborating partners had activities and strong presence on the ground to ensure greater potential for up-scaling of successful technologies and management practices.

Using participatory rural appraisal tools, it was possible to elucidate gender roles with regard to various activities at the household level and therefore appropriately target the participants for different types of interventions. For example, where it was learned that women and children are the managers of goats and sheep, then these groups were targeted with small-stock interventions. In cases where milk technologies are concerned, women were targeted since they are the group that has primary access and control over dairy resources.

Local dissemination of research results was achieved through field days and agricultural shows. The major intervention areas included natural resource management, improved crop production through water harvesting technologies, livestock husbandry and health, and development and marketing of livestock products. During these events producers participating in different research activities were taken as resource persons to demonstrate and explain various technologies and management practices. In this way these "adopters" felt more appreciated and this increased their motivation. Overall, compared to the staff of government agencies or NGOs, the innovative producers were the superior facilitators of change within their peer groups. The main benefit of this new approach was the increase in the number of pastoralists, agro-pastoralists, and farmers adopting technologies and improved management practices and an increased awareness by rural people as to the importance of research and how research results can positively affect their daily lives. This was demonstrated by the relatively high adoption rates reported from among the different projects being implemented. For example, 100% adoption rates were recorded within three years for the following activities among target populations of several hundred people: (1)

Demarcation of protected tree-recruitment sites using red paint; (2) water harvesting and water saving technologies; and (3) use of movable housing for young livestock. Figure 1 depicts the adoption pattern for water harvesting and water saving technologies over three years.

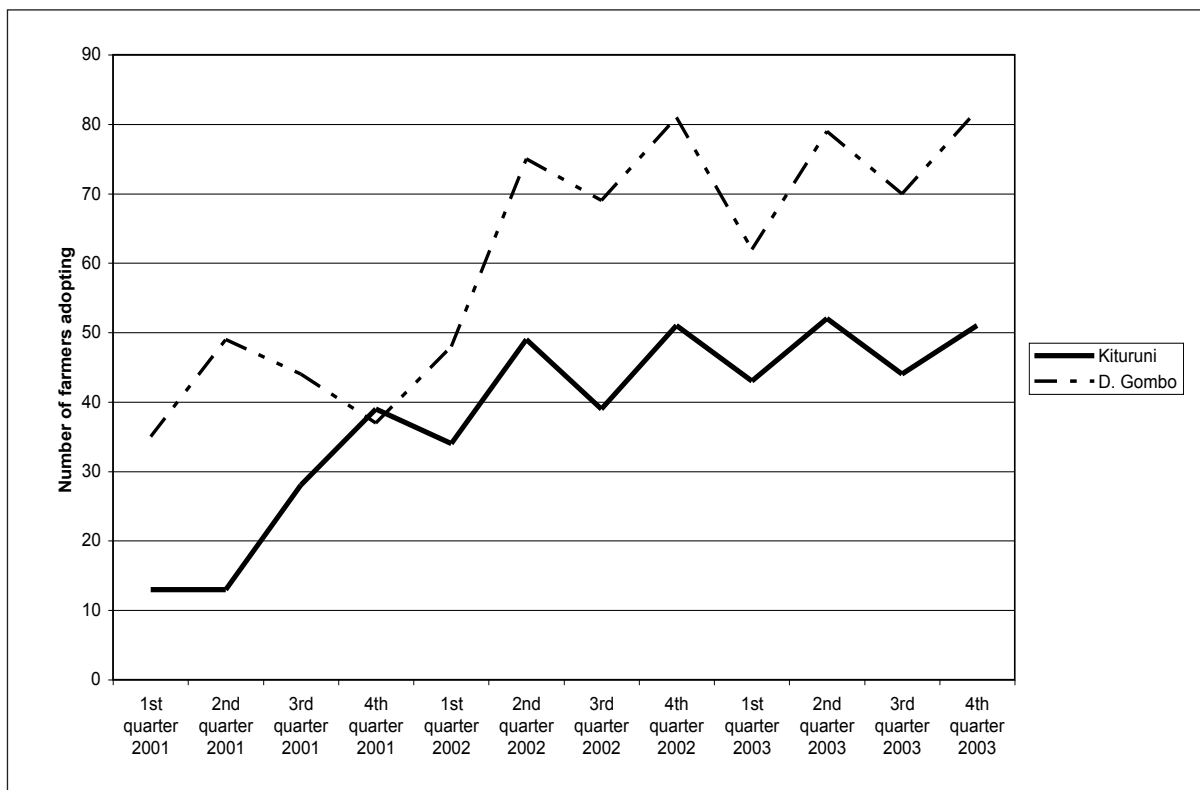
The process of catalyzing adoption has also been employed with various forms of producer groups. Three mini-dairies have been established. These mini-dairies have been managed by people trained in the management of micro-enterprises and group dynamics. Reliable markets have been established for about 400 producers who supply raw milk to dairy collection centers and this has resulted in higher household incomes. In wet seasons milk prices have stabilized at higher levels than were previously offered by brokers. Improved milk handling, processing, and marketing has reduced rates of milk spoilage. The dairies have created direct employment for about 10 non-group members with a total monthly income of over USD \$200. This income supports more than 60 other relatives. Partnership with a collaborating local NGO resulted in the building of three additional small-scale milk-processing units. Through capacity building, formally illiterate people are now maintaining records of their sales transactions. This has increased their understanding of technology and has enhanced their decision-making processes. Training and demonstrations have assisted groups to take better charge of activities themselves.

It has also been noted that the new approaches have some negative attributes. These include difficulties in the verification of impact from technology tested with “on-farm trials” because strict compliance of participants with agreed experimental protocols could not be guaranteed. Issues related to education level and cultural beliefs also hampered full participation by some community members. The Rendille community, for example, restricted women from participating in some community gatherings related to our work, meaning that female perspectives were not readily accessible. Some of our scientists have proposed that a mixture of participatory and formal research methodology needs to be employed to ensure that strengths of each are achieved.

### Practical Implications

To better bridge the gap between research and development, and to enhance the ability of producers to adopt beneficial research technologies, the agenda of the NALRC of KARI has embraced stakeholder participation, capacity building, development of partnerships, catalyzing adoption processes, increased effort to locally disseminate research results, and gender mainstreaming. These tenets should be institutionalized if research in Africa is to be seen as an engine of development.

Figure 1. Adoption of water harvesting and water saving technologies by small farmers around Marsabit Mountain, 2001-2003.



## Further Reading

Ndung'u, J.N, G.A. Keya, I. Tura, A.O. Adongo, M.N. Ngutu, S.G. Kuria, I.N. Maina, J.C. Njanja, G.W. Njoroge, B.O. Nyamori, F. Wayua, and A.J.N. Ndathi. 2004. "Sowing hope in the face of declining productivity of arid lands: A case study of Marsabit District, Kenya." In *Agricultural Research and Development for Sustainable Resource Management and Food Security in Kenya. Proceedings of an End of Programme Conference*. Agriculture/Livestock Research Support Programme, Phase II, held 11-12 November 2003. Kenya Agricultural Research Institute (KARI), Nairobi. ISBN: 9966-879-55-2.

Ngutu, M.N, H.M. Warui, J.N. Ndungu, and G.A Keya. 2004. "Changing faces of pastoralism: Experiences and possibilities of mountain and oasis farming in Marsabit District, Kenya." In *Agricultural Research and Development for Sustainable Resource Management and Food Security in Kenya. Proceedings of an End of Programme Conference*. Agriculture/Livestock Research Support Programme, Phase II, 11-12 November 2003. Kenya Agricultural Research Institute (KARI), Nairobi. ISBN: 9966-879-55-2.

Haverkort, B., W. Hiemstra, C. Reijntjes, and S. Essers S. 1988. "Strengthening farmers' capacity for technology development." *Newsletter for the Information Center for Low-External Input and Sustainable Agriculture (ILEIA)* 4(3): 3-7.

Reijntjes, C., and M. Moolhuijzen. 1995. "Searching for new methods." *Newsletter for the Information Center for Low-External Input and Sustainable Agriculture (ILEIA)* 11(2): 4.

*About the authors:* All of the authors are staff members of the National Arid Lands Research Center (NALRC) for the Kenya Agricultural Research Institute (KARI) in Marsabit. Dr. George Keya is the Center Director; he has spent 22 years working on natural resource management issues in the arid zones of Kenya. Mr. Michael Ngutu, Mr. A. Adongo, and Mr. Isako Tura are all Research Officers. All can be contacted via the post at P.O. Box 147, Marsabit, Kenya, or by email at karimar@africaonline.co.ke. The authors acknowledge the contributions of all NALRC staff who contributed to the work described in this research brief.

The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve welfare of pastoral and agro-pastoral peoples with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University, Email contact: Lcoppock@cc.usu.edu.



The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East Africa, Central Asia and Latin America.

*This publication was made possible through support provided by the Office of Agriculture, Bureau of Economic Growth, Agriculture and Trade, under Grant No. PCE-G-00-98-00036-00 to the University of California, Davis. The opinions expressed herein are those of the authors and do not necessarily reflect the views of USAID.*

*Design by Susan L. Johnson*