Title: Participatory IPM development with smallholder farmers in northern Tanzania
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A. SUMMARY

Duration: 5 years

Background and Objectives: Smallholders in rural African farming communities produce the bulk of the regional food requirements, yet their production system has many limitations including poor access to: information on improved production technology such as new high yielding varieties and better crop management strategies; as well as access to inputs and markets. As such their production is often for subsistence and productivity levels tend to stagnate and sometimes decline as their natural resource base degrades.

A project on participatory technology generation for improved productivity was initiated in 1995 with farmers in Patanumbe village, Mbuguni division of Arusha district in Tanzania, East Africa. The initial objectives were to develop IPM strategies with farmers to enhance adoption of technologies for increased productivity, food security and maintenance of a sustainable production environment. The project was quite successful and farmers' productivity increased within two years. As the farmers started realising surpluses from their production, they initiated a process to extend the technologies to neighbouring villages. The emphasis shifted towards access to markets to sell the surpluses as the different villages accumulated substantial surpluses and FAIDA, an NGO specialising in small enterprise promotion, was invited to assist.

Activities: The project activities included:

- Farmer research group formation, partner identification as well as their roles
- Constraint identification, analyses and prioritisation of possible solutions and the development of a research agenda
- Regular farmer group meetings to discuss problems and exchange information and possible solutions to problems
- Farmer led research and field demonstrations of improved technology, field visits and training including farmer exchange visits
- Consultations with other stakeholders on improvement of access to markets
- Farmer training in business awareness for better profits

Area: Natural Resource Management
Region: Sub-Saharan Africa

B. STAKEHOLDERS

Beneficiaries: The smallholder farming community of Mbuguni Division, south-east Arumeru district of Arusha region were the primary beneficiaries. The primary participants comprised about 200 farmers in 12 villages plus students from 2 primary schools and 2 secondary schools. The partnership brought a large group of farmers together to share their common interests, production and marketing constraints and seek help in addressing them. It enabled farmers to identify and analyze their production constraints logically and identify opportunities for overcoming them. The discussion and other activities enhanced the farmers' awareness of available resources in their environments and derived opportunities from them. The benefits spread fast to other communities through various extension activities. The partnership also enabled the communities to raise their production levels from subsistence to commercial and improved the livelihood of many of the farmers.
Research partners were farmer groups in Mbuguni Division, the Northern Zone Extension Service, FAIDA-Small Enterprise Promotion, Tanzania National Bean Program and CIAT-PABRA.

1. Donors and budget.
The donors to this project were SDC, and CIDA through their support to CIAT and PABRA; USAID through their support to the bean research network, (ECABREN), the Royal Netherlands Embassy in Tanzania and SNV through their support to FAIDA-SEP; and the Government of Tanzania through support to the National Agricultural Research and Extension System (NARES). Participating farmers contributed their land, time and other resources to the research and extension to other communities.

C. PROJECT RESULTS AND IPCMACT

Main results:
The principal constraints to low productivity were a lack of knowledge on improved production technology, pests (bean stem maggots, aphids and spider mites) and diseases (leaf rust). The area has sufficient land and access to irrigation water in a large part of the area for most of the growing season. The partners elected to focus on production technology as a start. The approach used in this research was to enable the farmers to understand some of the problems that affect productivity in their production systems and help them to develop solutions through research. This approach stimulated farmers' initiative and confidence and initiated further activities to share experiences with other farmers.

A key result from this process was the improved farmer understanding of the production system and increased capacity to make informed and guided decisions on constraint assessment, (observation on what works well and what does not), management and technology generation. Another result was a change in farmers' production status from subsistence to a commercial profit-making enterprise.

Farmers were trained in appropriate crop husbandry methods such as timely planting, optimal plant populations and soil fertility improvement strategies through field demonstration. They observed significant yield differences in the first season and became more aware of their problems, and they identified strategies with their research partners to address them. These included an evaluation tolerant lines to bean stem maggot (BSM), (a key pest that constrain productivity) and cultural practices for pest management (aphids, spider mites and BSM).

Technological packages: Crop husbandry methods such as timely planting to avoid peaks of pest attack and to capture the full benefits of the rainy periods were introduced and evaluated. These were supplemented with the use of grass mulches to conserve moisture and reduce the spread of diseases and enhance tolerance to pests such as bean stem maggots. They also identified BSM and drought tolerant lines that fitted their production system well and had good market potential. The farmers added their own traditional strategies such as the application of concoctions based on botanical pesticides and fermented cow urine for the management of aphids and spider mites.

Dissemination of the results:
Farmer to farmer extension: The parent group, Patanumbe Traditional Farmers Group (TFG) held a field day to demonstrate their newly acquired technology to other farmer groups, which was attended by the Arumeru and Hai districts extension staff and farmers, researchers and all partners. The visitors evaluated the new technology and sought assistance from the TFG to replicate them in their own fields. TFG multiplied and sold seed to them and organised them into groups according to their villages and gave them practical training in bean production. This was to ensure that they obtained the advertised yields. In the process 12 farmer groups including three schools were formed.

Radio broadcasts: The Information and Communication Section of the extension service made radio broadcasts and wrote newspaper articles about the Patanumbe-TFG, the field day and the new bean
production and pest management technologies. This created public awareness and led to a demand for seed. It also boosted the confidence and morale of the Patanumbe-TFG who multiplied and sold the varieties in demand spreading the technology beyond their division.

**Farmer exchange visit:** Two farmers were sponsored for a week-long visit with farmers participating in the Organic Matter Management Network in Kakamega, Kenya to learn about soil fertility management practices. In addition to cultural strategies for fertility management, they also acquired technology for using solar energy to dry fruits and vegetables, e.g. mangoes (an abundant commodity in their environment) for export with assistance from FAIDA-SEP.

**Village Information Centres and interaction with schools:** These activities have generated a demand for information and technology by the general farming community. They frequently visit the research station in search of information on crop production and other activities including market channels. They have in collaboration with researchers and the extension service, set up a Village Information Centre (a depository of literature including extension bulletins, posters, books and other informational material) in the local school for use by all, and appointed individuals with relatively better education (in addition to the schoolteachers) to lead them through the available information when needed. They have also collaborated with the researchers and extension staff to develop posters and other extension materials, capturing their experiences and understanding of the management of various pests. The extension service used this as a pilot case to promote farmer research groups in northern Tanzania. The partners worked together to generate technical bulletins from this exercise, which have been disseminated widely. The technical bulletins were multiplied on CD-ROMs and distributed through the Bean Research Networks to NARES in some 15 countries in eastern, central and southern Africa.

The schools used the process as practical teaching/learning tools and the students took the knowledge home to their communities and “trained” their parents and other relatives. The process has also become an income generating activity for the communities, including the schools. The Village Information Centres (VIC) set up in the schools, are also used to train the students and farmers who visit for information.

The field day was the beginning of a greater community based IPM research and development process. TFG and the newly formed groups merged to become the Mbuguni Division Farmer Research Groups. The newly formed groups appointed members to a committee embracing all the others. This committee met regularly to discuss problems and opportunities for their production. This was in addition to individual group meetings in their local villages along the same lines. In the process ideas and experiences from the different villages were shared by all. Each village had their own research or learning plots and took whatever they learned back to their individual farms.

**Impact of the project:**

A full impact study of the partnership has not been conducted but various areas of impact can be readily observed.

**Environmental:** The farmers met regularly, often on their own but sometimes with all partners to discuss their problems and strategies for their management, highlighting the merits and demerits of each potential action based on the information available to them. They frequently visited the research stations (with support from FAIDA) to seek information and answers to their other production problems. All partners are now more aware of the natural resource base and give greater recognition to the traditional IPM knowledge systems. They are generally cheaper to the farmers and promote better biodiversity management as farmers recognise the value of the resources and preserve them.

**Increased trade and fiscal income:** As production levels increased, small grain merchants emerged from the Masai communities to buy grain from the farmers and sell in the local markets. Middle level
grain merchants came in from Arusha to contract farmers to produce grain, which they bought and sold in the urban markets. Some large international seed companies also attempted to contract the farmers to produce seed for their external markets but farmers rejected their offers because they were not profitable.

**Repliability:** The experience gained from this partnership is replicable; already there is demand from other communities in using the process to improve the profitability of their production. In Tanzania it is being applied to commodities such as vegetable seed production and other cash crops.

**D. PARTNERSHIP**

The activity evolved from a researcher-farmer technology evaluation mode to a multiple stakeholder project in response to the changing needs of the farming communities. The initial objective was to increase bean productivity in farming communities at the target area and improve their household food security potential. However as more farmers adopted the improved technologies and became more proficient in their farming methods, productivity levels rose and a shift towards market oriented production emerged. Farmers’ needs shifted accordingly.

The project organization was in two phases; the first phase was farmer led and aimed at increasing productivity in farmers’ fields. The second phase was led by FAIDA in consultation with the farmers and researchers and other stakeholders and focussed on the development of market links with the production. With financial support from ECABREN, FAIDA trained the farmers on business awareness to enable them produce more efficiently and manage their resources profitably, something that would not have happened without the partnership.

There were no contractual agreements between the partners but mutual interests and complementarity of partner focus brought them together and kept them going. Each partner managed his own resources. The partnership however brought mutual benefits to all involved and our different roles were focussed on a common objective – to increase productivity and income generation among farmers. Research became more meaningful to all stakeholders as it became more focussed and achieved practical results within a short time.

**Added value of the partnership:** The Tanzania Bean Research Programme and CIAT-PABRA have a mandate to increase productivity at the farm level, they however do not have the capacity to disseminate technologies generated to farmers on a wide scale. The extension service, often do not find simple enough messages to transfer to farmers. By research and extension working together with farmers they were able to focus on real issues that affected productivity in their specific production circumstances. The results were easier to by the farmers who impulsively disseminated the new technologies to other groups in their community. In the process production from the community increased enough to attract middle level grain merchants to come in and buy their produce. To a lot of the farmers this was the first time they sold beans. The farmers were proactive and often expressed their need to the other parties who tried to address them; this kept the process on course to success.

**Extended benefits to other communities:** Through the greater farmer involvement in technology generation and evaluation, technologies were sometimes disseminated even before the evaluation process was complete. For instance, TFG identified grass mulches as a useful practice for moisture conservation and for pest and disease management. However they observed a conflict between the use of grass for mulch and fodder for animals and did not adopt the technology. Visiting farmers from the rice based cropping system in Usa River readily adopted the practice – they had abundant mulch material after harvest. They spread the straw after the rice harvest and planted a second crop of beans, which grew with little irrigation. The beans fixed nitrogen for the next rice crop. The practice is being promoted in other rice growing communities through an ECABREN sponsored sub-project.
E. CONCLUSION

Some lessons learned:

When farmers are able to grow a crop more profitably they tend to invest time and resources into the production system. Initially farmers in Patanumbe assumed "this is how beans grow here", because they knew no other way to produce the crop. Through this activity they realised they could grow more profitably and sell surpluses, they became eager to achieve even higher yields. They began to notice pests and diseases as constraints in their system and sought to control them. One farmer observed that "these days people are taking care of their beans" possibly because they realised a value for the crop. They were also willing to share their newly acquired technology with others. When other farmers observed that their colleagues "could do it" they became more convinced of the technology and were willing to try it themselves.

The process has enabled farmers to analyse and identify solutions to their problems, they meet regularly to do this beyond beans or agricultural production. This indicates an achievement of a sustainable process and the Mbuguni groups of farmers are likely to continue operating this way with little external support. The training of school children in this process in likely to bring a new generation of farmers with a good background in participatory problem analysis and identification of possible solution. The students will also be better grounded in awareness of their environments and the resources within.

Farmers adopt components within packages rather than whole packages. The farmers observed the potential of chemical seed dressing, inorganic fertilisers and farmyard manure. They also realised that chemicals were often beyond their reach and farmyard manure was difficult to cart. They opted for the more convenient component "BSM tolerant varieties" more readily. They also prioritised the distribution of their resources and applied farmyard manure to their maize crop rather than beans.

The Northern Tanzania Extension Communication Service is seeking funds to document the process and outcomes in a video for wider dissemination in Tanzania and for training extension staff and farmers in the country. CIAT and FAIDA are also in consultation to develop plans for scaling-up the process and the partnership more widely across the region.

Acronyms used.

PABRA Pan-Africa Bean Research Alliance
CIAT International Center for Tropical Agriculture
CIDA Canadian International Development Agency
ECABREN Eastern and Central Africa Bean Research Network
FAIDA-SEP Financial Advice in Development Assistance - Small Enterprise Promotion
NGO Non-Governmental Organization
SDC Swiss Development Cooperation
SNV The Netherlands Development Organization
USAID United States Agency for International Development