Bean farmers go with the information flow

RIU

Validated RNRRS Output.

Smallholder farmers throughout East and Central Africa are benefiting from new, integrated strategies to protect their bean crops. The methods are particularly beneficial to women, who are the principal bean growers. Control options include pest-tolerant, high-yielding varieties, fertilisers and weed control. The key to success is the use of a participatory approach that builds on indigenous knowledge to generate interest among farmers. Each group and community selects its preferred dissemination methods from a range of options, including media (radio, newspapers, TV, video), promotional materials (extension posters and leaflets, group reports), and traditional communication methods (word of mouth, drama, poems and songs).

Project Ref: **CPP08:**
Topic: **1. Improving Farmers Livelihoods: Better Crops, Systems & Pest Management**
Lead Organisation: **CIAT, Tanzania**
Source: **Crop Protection Programme**

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Geographical regions included:

Kenya, Malawi, Tanzania, Uganda,

Target Audiences for this content:

Crop farmers,

Document Contents:

Description

CPP08

A. Description of the research output(s)

1. Working title of output or cluster of outputs.

Promotion of bean ICPM strategies

2. Name of relevant RNRRS Programme(s) commissioning supporting research and also indicate other funding sources, if applicable.

DFID Crop Protection Programme

Provide relevant R numbers
R7568 (ZA0373)
R7569
R7965 (ZA 0465)
R8414

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3. Describe the RNRRS output or cluster of outputs being proposed and when was it produced? ***(max. 400 words)****. This requires a clear and concise description of the output(s) and the problem the output(s) aimed to address. Please incorporate and highlight (in bold) key words that would/could be used to select your output when held in a database.*

Projects R8414/R7965/R7568/R7569 sought to develop strategies for disseminating, promoting and scaling-up of **integrated pest and disease management** options for the major **insect pests** and s**oilborne diseases** of **beans**. Farmers' perception of diseases and pests, their relative importance, **indigenous technical knowledge (ITK)** and management strategies, and uptake of IPDM technologies were determined using informal and formal surveys (**PRAs**) and information flow within communities. Dissemination methods that incorporate group action, participatory approach and that build on indigenous knowledge generated interest among farmers. Novel / innovative approaches and processes in scaling up IDPM technologies were evaluated; guidelines to enhance technology dissemination were developed, and used in the dissemination and adaptation of bean IPDM technologies within and between communities. **Participatory** approaches involving men and women were used at all stages of promotion and adaptation. Methods included training of extension staff (GOs and NGOs), farmers' representatives, rural school teachers, on-farm participatory groups and individual farmer demonstration / evaluation of IDPM strategies, cross visits / farmers' field days and conferences, formation of **farmer research groups** (FRGs), use of media (such as radio, newspapers, TV, Video) and promotional materials (such extension posters and leaflets, group reports and other reading materials), traditional communication methods (such as word of mouth, drama, poems and songs, exchange of seed). Different groups and communities selected dissemination methods that best suited them. These approaches have resulted in increased numbers of farmers, farmer groups, and partners using the technologies on beans and other crops. Adoption especially of improved bean varieties has occurred at all project locations. Women were better adopters and offered better diffusion pathway since they shared information more easily and faster than men. Pilot **village information centres** (VICs – small village libraries) to facilitate for information to be availed to them within reach of their communities, have been set up by the local community and stocked with reading materials including those prepared with participating farmers. A number of farmers have linked with local NGOs to form credit associations. Resistant varieties were the more preferred technologies and prompted small seed multiplications. Other technologies experimented on and adopted by farmers included improved cultural practices, botanicals and their traditional derivatives as pesticides (wood ash, cow urine and slurry, crude botanical plant extracts *Tephrosia* spp, *Vernonia* spp., Neem, *Neuratanenia* spp.) organic and inorganic amendments for fertility improvement in beans, maize, vegetables and other crops. Group participation facilitated credit access for inputs (in maize). Involvement of policy makers (government and political leaders) greatly supported promotion of project initiatives and is now benefiting other production systems and commodities / areas including livestock, soil, water and environmental

conservation.

Outputs from the above projects include datasets that are listed in Project Completion Summary Sheets. Other written outputs include 38 farmer group activity reports booklets, six leaflets, four posters, one MSc theses, presentations at regional and international conferences, publications in journals and conference proceedings and IPM learning and practicing guide is under preparation.

5. What is the type of output(s) being described here?
Please tick one or more of the following options.

Product	***Technology***	***Service***	***Process or Methodology***	***Policy***	***Other Please specify***
X	*X*		*X*		

6. What is the main commodity (ies) upon which the output(s) focussed? Could this output be applied to other commodities, if so, please comment

The main commodity upon which the outputs focused on is common beans (*Phaseolus vulgaris* L.). However, the methods, lessons learnt and approaches generated in through these project's have helped establish bean farmer research groups (FRGs- social capital) at pilot sites in Uganda, Kenya, Tanzania and Malawi with potential for spillovers to other bean network (PABRA) countries. The FRG approach can be applied and scaled out to other commodities and to more areas in the region. Already these outputs have benefited other commodities such as maize, vegetables and coffee production systems in target locations. For example Village Information Centres established are not only a source of IPDM information but are a source agricultural, educational, nutritional and health information. In western Kenya, for example, these centres are partly furnished by the Ministries of Health and Education, which are interested in using the centre for HIV/AIDS awareness and adult literacy campaign activities. School teachers have used the demonstration fields for classroom instruction in agricultural and pest management lessons.

7. What production system(s) does/could the output(s) focus upon?
Please tick one or more of the following options.
Leave blank if not applicable

Semi-Arid	***High potential***	***Hillsides***	***Forest-Agriculture***	***Peri-urban***	***Land water***	***Tropical moist forest***	***Cross-cutting***
	X	*X*					

8. What farming system(s) does the output(s) focus upon?
Please tick one or more of the following options (see Annex B for definitions).
Leave blank if not applicable

Smallholder rainfed humid	***Irrigated***	***Wetland rice based***	***Smallholder rainfed highland***	***Smallholder rainfed dry/cold***	***Dualistic***	***Coastal artisanal fishing***

			X			

*9. How could value be added to the output or additional constraints faced by poor people addressed by clustering this output with research outputs from other sources (RNRRS and non RNRRS)? (**max. 300 words**).*

Please specify what other outputs your output(s) could be clustered. At this point you should make reference to the circulated list of RNRRS outputs for which proformas are currently being prepared.

Since the project was mainly concerned with promotion of integrated pest and disease management technologies (both varieties and cultural) of beans and, it could be linked to other CPP projects addressing similar aspects, i.e., promotion and dissemination of technologies. Project outputs have links with CPP projects cluster: *R7568/R8316/ R8478, Bean Root Rot Disease Management*. The project outputs could also be linked to project, R 7569, *Participatory Promotion of Disease Resistant and Farmer Acceptable Phaseolus Beans in the Southern Highlands of Tanzania;* R8415, *Dissemination of improved beans*; R8449/R8212, *Promotion and dissemination of Integrated Pest and Soil Fertility Management strategies to combat striga, stemborers and declining soil fertility in the Lake Victoria basin* and R8417, R8341, *IPM promotion through improved manuals*. In addition, they link with the Rural Innovation Activities/Beyond Agricultural Production to Poverty Alleviation (BAPPA) initiative that is managed by CIAT, and implemented through NGOs: AfriCare in Uganda, Concern Universal in Malawi, and a local NGO in Tanzania. Project outputs also complement existing collaborative studies conducted under Pan-Africa Bean Research Alliance (PABRA) which include;

- Developing bean varieties with multiple constraint resistance.
- Wider Impact Strategy – focusing on reaching as many end users as possible across PABRA countries.
- Empowering communities to demand and make informed choices of available options.
  - Technology transfer of some of the tested IDPM components (varieties; soil fertility management) (ISAR, KARI, NARO & NGOs)

Validation

B. Validation of the research output(s)

*10**. How** were the output(s) validated and **who** validated them?*
*Please provide brief description of method(s) used and consider application, replication, adaptation and/or adoption in the context of any partner organisation and user groups involved. In addressing the "who" component detail which group(s) did the validation e.g. end users, intermediary organisation, government department, aid organisation, private company etc... This section should also be used to detail, if applicable, to which social group, gender, income category the validation was applied and any increases in productivity observed during validation **(max. 500 words)**.*

- Selected bean based IPM technologies were validated through on-farm experimentation using demonstrations and learning plots set in on farmer group sites, school compounds and individual farmer fields using the Farmer Research Groups (FGR) approach. Improved disease and pest tolerant bean genotypes were also offered to participating farmers for experimentation. Planning for the seasons experiments were done in a participatory

manner by Farmer Research Groups (FGRs), with backstopping from extension agents and researchers. Field planting, monitoring, evaluations, field days, harvesting dates and storage were done by FGR's. Participating and non-participating farmers, local leaders, extension officers, other local government policy makers, NGOs, the private sector, neighbours (including villages, districts and regions), and the media (radio, journalists) validated the outputs (different bean IPM strategies that proved not only to be suitable for beans but also for maize (such as pest tolerant high yielding varieties, fertilizers, weed control and improved cultural practices) through field days that allowed them to view some of the outputs and listen to presentations from the farmer group representatives.

- Due to the adoption of IPDM technologies, most farmers had observed a two to three fold increase in the production of beans, maize and vegetables. For example, before IPM experimentation, farmers in Hai district would hardly harvest 15kg of beans and 500kg of maize. After experimentation and access to high yielding improved varieties, use of manure and inorganic fertilizers and improved cultural practices, the same farmers harvested 50-80 kg of beans and 1200-1800kg of maize from the same fields.

- The demonstrations, field days, visits by neighbours, traditional drama, radio and promotional materials were very effective in disseminating the information to other communities. These communities adopted the group approach and processes and the number of FRGs and participating farmers increased in each planting season.

- Partners and other project implementing groups have adopted the group approach and or used the bean IPM groups for rural programme implementation.

*11. **Where and when** have the output(s) been validated?*

*Please indicate the places(s) and country(ies), any particular social group targeted and also indicate in which production system and farming system, using the options provided in questions 7 and 8 respectively, above **(max 300 words)**.*

The project targeted bean growing regions, and included, Kabale district (Uganda), Kisii and Rachuonyo districts (Kenya), Hai, Monduli, Babati, Moshi, Lushoto, Mbeya and Mbozi districts (Tanzania), Dedza and Kasungu districts (Malawi). Most of these lie in highland regions that have high incidences of pests and diseases. Most of these regions are rain-fed with the exception of some areas in northern and southern Tanzania where traditional irrigation along or near river valleys and in Dimbas in central Malawi are used in the dry season (winter crop). Although beans are grown mostly by smallholder women farmers, of recent due to the increased cash value attached to the crop following the fall in global coffee prices, more men have increasingly been involved in bean cultivation, therefore, this project targeted rural small scale bean farmers (both women and men) who have no access to technology.

Current Situation

C. Current situation

*12. **How and by whom** are the outputs currently being used? Please give a brief description **(max. 250 words**).*

- The main beneficiaries of the outputs are the smallholder farmers, initially in Uganda, Kenya, Malawi and Tanzania

but ultimately throughout the ECABREN region. The project was gender sensitive, and outputs generated benefited both men and women, although women were particularly targeted as beans is a "women's crop".

- The information gathered and technologies developed are being used by researchers in the Bean programmes in these countries and other ECABREN countries. The disease control strategies developed during the project are appropriate, sustainable, and do not have any adverse environmental effects and will sustain the current crop genetic resource base and cropping system diversity, and increase the efficiency of production.
- Different bean IPM strategies proved not only to be suitable for beans but also for maize, for example the use of pest tolerant high yielding varieties, fertilizers, weed control and improved cultural practices.

*13. **Where** are the outputs currently being used? As with Question 11 please indicate place(s) and countries where the outputs are being used **(max. 250 words).***

The outputs were initially being used in the pilot sites in Kabale district in southwest Uganda, Kisii and Rachuonyo districts in western Kenya, Hai, Monduli, Babati, Moshi, Lushoto, Mbeya and Mbozi districts of northern Tanzania, Dedza and Kasungu districts of Malawi. The outputs have been shared with other ECABREN countries through information exchange. Promotional materials of different bean based technologies have been developed and some have been translated into some local languages and are being distributed to other rural farmers in the ECABREN region.

*14. What is the scale of current use? Indicating how quickly use was established and whether usage is still spreading **(max 250 words).***

The extent to which outputs have been adopted is related to availability of materials/resources, and also on how well the beneficiaries understand the accruing returns. Technologies, whose returns beneficiaries are confident about, have been adopted to significant levels with clear sustainability plans. Those technologies that require extra resources or those of which beneficiaries have relatively little previous knowledge have been adopted on a more limited scale. A socio-economic impact study revealed that a wide range of IDPM options are now being used by farmers/farmers groups in south western Uganda. These include use of soil amendments [Farm Yard Manure (FYM), compost and green manure, inorganic fertilisers), improved bean varieties, soil and water conservation measures, as well as other recommended agronomic practices. The scale (measured as % survey respondents utilising technologies) at which these have been adopted for purposes of controlling BRR are as follows: Application of compost manure (46%); use of improved varieties (8%); use of FYM (64%) planting in lines (15%); digging trenches & stabilizing bands with agro-forestry trees and grasses (22%). An impact study done in western Kenya in 2005 showed that, 85% of the farmers in the participating category had adopted several different types of IPDM technologies compared to the non-participating category (35.9%). IPDM technologies adopted included use of improved crop varieties, regular scouting for insects, timely planting, use of botanical pesticides and conventional chemicals, soil nutrient management, timely weeding and harvesting, drying, cleaning, sorting, type of storage facility and storage pest control. In northern Tanzania, Hai district, due to the bean foliage beetle (*Ootheca* spp.) a FRG comprised of 14 innovative farmers in 2000/2001 was formed. The group identified other constraints which included infertile soils, poor seed quality, unreliable weather and land shortage. Various management strategies, including the use of wood ash, cow urine, soap, kerosene, botanical crude extracts, farmyard manure as well as timely planting, and intercropping) and improved strategies (such as crop rotation, use of high yielding pest tolerant bean varieties, row planting, timely weeding, pest scouting, timely pest control, application of neem powder, and rock phosphate fertiliser and timely harvesting) were tested in farmers' fields in different combinations with backstopping from

extension personnel, researchers and local leaders. The most suitable strategies, blending traditional and improved options were selected and successful results spread to other farmers in other districts in Tanzania and across borders to Kenya, Malawi and Uganda. The IPM technology dissemination awareness has also spread to DR Congo, Ethiopia, Rwanda, Madagascar, Mozambique, Sudan and Zambia through promotional materials and visits.

15. In your experience what programmes, platforms, policy, institutional structures exist that have assisted with the promotion and/or adoption of the output(s) proposed here and in terms of capacity strengthening what do you see as the key facts of success? ***(max 350 words).***

- A number of approaches were developed and used by different farmers in disseminating technologies among community members. These include formal and informal participatory group training, individual farmer and group demonstrations, farmer organised meetings and field days, cross village and cross site visits, involvement of policy makers/local leaders and service providers, leaflets, posters, field manuals, drama, choir/poems, radio, TV, and setting up of village information centres (VICs). For example, a radio programme on agriculture (including beans as one of the major crops) implemented by MEDIAE Company and broadcasted in 3 radio channels in Tanzania has tremendously increased awareness among village communities

- Involvement of policy makers (government and political leaders) who increasingly participated in dissemination and promotion activities by exchanging ideas with farmers and changing policy issues related to agricultural production has greatly assisted the adoption of outputs. For example, the Government of Tanzania has adopted the group approach in all its community development activities. In May 2003, the ministry of agriculture and food security instituted a district focus policy where authorities have to sensitise their communities in setting up group demonstration plots for testing and evaluating new technologies. Local authorities have sensitised communities to form community based associations (CBAs) for access to information, technologies and farm inputs

- Collaboration between partners such as NARO, KARI, TARO and NGOs, under the Pan-Africa Bean Research Alliance (PABRA) and other extension services has been instrumental in the success of projects.

- The establishment of a MFFS stands out as an appropriate capacity building tool that is enabling detailed-learning among beneficiaries, resulting into empowerment in terms of knowledge and skills. Key indicators of empowerment among IPDM groups include enhanced capacity to test, adopt and disseminate appropriate innovations, the confidence with which group members mobilized communities, handled training events and influenced decision-making within and outside their communities. Equally important is the ability to articulate their service demands and networking with other service providers. Group members are becoming resource persons in their communities and some have been elected into leadership offices. Unlike other approaches, the MFFS enhances ownership of technologies and offers opportunities for sustainability. Compared to other approaches, the MFFS from the start focused on a specific enterprise (beans), which was done in great detail giving beneficiaries a chance to closely follow up various trends – learning, adoption and dissemination and, they are thus better able to think through the future.

Current Promotion

D. Current promotion/uptake pathways

*16. **Where** is promotion currently taking place? Please indicate for each country specified detail what promotion is taking place, by whom and indicate the scale of current promotion **(max 200 words).***

Promotion of bean IPM strategies is taking place in Democratic Republic of Congo-DRC, Rwanda, Uganda, Kenya, Tanzania and Malawi. In all countries, promotion is taking place at limited project areas in target sites and this involves testing, evaluation and adoption of improved high yielding pest tolerant bean genotypes, use of traditional pest and soil management strategies, application of improved cultural practices and sensitisation of farmers to form research groups for easy access to technologies and information. In some areas (e.g. SW Uganda) farmers have gained skills in becoming trainers of trainees and extension agents of their own. In DRC there is an initiative to analyse active pesticidal substances of traditionally used botanical plants. In Rwanda the effectiveness of village information centres is being evaluated. In Uganda and soil fertility management strategies are being promoted. In Kenya, seed of pest tolerant varieties is being multiplied and strategies for bruchid control are being tested. In Tanzania, screening for bean stem maggot tolerance, evaluation of Minjingu Rock Phosphate (supplied in small 1kg packages- FIPS Africa methodology) and other organic fertilizers on beans and other crops, formation of credit associations and market studies is taking place

In Malawi focus is on formation of credit associations. These activities are supported by the national bean research programmes and the regional bean networks (CIAT/PABRA, ECABREN & SABRN) in collaboration with locally active NGOs and the private sector.

In Kenya, Tanzania, Uganda and Malawi, farmer groups have solicited their local village leaders to set aside rooms or pieces of land for constructing village information centres (VICs) through self-help-schemes and donations. Currently there are 10 VICs at project sites (Uganda- 1, Kenya- 2, Tanzania- 6, Malawi- 1).

In Kenya, south-western Uganda, Malawi, and in northern and southern Tanzania, farmers have established seed multiplication plots for the improved pest tolerant bean genotypes, etc.

*17. What are the current barriers preventing or slowing the adoption of the output(s)? Cover here institutional issues, those relating to policy, marketing, infrastructure, social exclusion etc. **(max 200 words)**.*

Farmers in various sites mentioned and ranked some factors that had constrained their adoption of IPDM technologies. In Kenya for example, IPDM participating category ranked high cost, followed by lack of skills as the major factors hindering the adoption of IPDM technologies. The majority of the IPDM non-participating farmers ranked lack of information the highest followed by lack of skills in application of IPDM technologies. Lack of information on use of IPDM technologies was ranked third by IPDM participating respondents while high cost in the application of IPDM technologies was ranked third by IPDM non-participating respondents.

Others included;

Social barriers

- Social differences e.g. wealth, age, and education level. If trainer is at a lower status, they are despised

- Unrealistic learner expectations; Historically, NGOs were giving participants hand outs or inputs or providing lunch during training sessions, This has been a hard habit to overcome such that people still expect rewards for coming to learn
- Inadequate community/group cohesion and unwillingness to work
- Poor community mobilization resulting in waste of time.
- Poverty and low literacy levels of beneficiaries make them less confident to make demand of new technologies.
- In a number of communities the women are not allowed to participate in any public or official gathering and if they do they are not allowed to speak. Such women cannot travel out of their villages. This social aspect is a strong barrier to technology and information dissemination.

Institutional barriers

- Due to short project live and local beauracratic procedures the project could not provide most of the feedback required by the communities at the target locations.
- Few extension workers and big areas of jurisdiction
- Lack of good market
- Inadequate inputs and tools
- Lack of supportive policies
- Political interference by local leaders
- Limited access to service providers
- Failure of groups to co-fund as required by Government programs
- Limited enterprise selection for technologies being accessed. Beneficiaries can only access services for a few enterprises while the rest of the enterprises are unattended to.

18. What changes are needed to remove/reduce these barriers to adoption? This section could be used to identify perceived capacity related issues ***(max 200 words).***

- There is need to have frequent interaction and participation of local policy makers and other key community stakeholders to raise awareness about intended project interventions and expected benefits to target community members.

- Communities need to be empowered and enhanced to use their inherent traditional capabilities in identifying their strengths, weaknesses and resources to solve their own problems with modest external support. This enables them to gain knowledge about themselves and realize that external input can be integrated into their own to solve problems and enhance their own development.

- Expand IPDM training content to include savings and credit mobilisation or revolving input fund schemes; group dynamics and leadership skills enhancement, establishment of information centres and development of teaching guides/popular field hand books. Where possible the IPDM enterprises would be linked to markets and the project would facilitate groups to open up linkages with the existing government programs (or advocate for supportive policies?)

- Groups need to build capacity to pool savings that can be borrowed by members to access the inputs. Alternatively

a revolving fund could be given by the project so that it is managed by the group and members borrow the fund for a specific period of time and repay. Such a strategy would enable group to have subsidized access to inputs.

- Group dynamics and skills enhancement would strengthen groups to become more cohesive and able to run their businesses in a more sustainable manner. This would also enable them to manage their finances properly.

- Teaching guides/field handbooks would provide skills back up to the groups while the information centres would be provide appropriate information in popular language. Additionally groups could identify persons that could be trained so that they remain in the community as reference points.

19. What lessons have you learnt about the best ways to get the outputs used by the largest number of poor people? ***(max 300 words).***

- We have learnt that using a participatory group approach and respecting the poor people through learning together and lifting the farmers and partners up like a teacher would do to new pupils in class is the best way to reach a large number of farmers.
- Respecting farmers' indigenous knowledge, and blending it with improved technologies restored farmers' confidence and hastened farmer to farmer technology dissemination
- Smallholder farmers can be catalysed and imparted with skills to research on their own production constraints
- Participatory research with strategic partnerships can be used to address community production constraints
- Farmers learn from each other faster than from extension/research workers
- Farmers including the illiterate are capable and very happy in training other farmers if and when sensitised to do so
- Farmers can efficiently become their own extension agents
- Farmer groups form very strong on-the-ground development units

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Impacts On Poverty

E. Impacts on poverty to date

20. Where have impact studies on poverty in relation to this output or cluster of outputs taken place? This should include any formal poverty impact studies (and it is appreciated that these will not be commonplace) and any less formal studies including any poverty mapping-type or monitoring work which allow for some analysis on impact on poverty to be made. Details of any cost-benefit analyses may also be detailed at this point. Please list studies here.

A socio-economic analysis of approaches used in the management of bean pests and diseases in south western **Uganda** of the *CIAT/NARO/DFID IPDM PROJECT* (Edidah Ampaire and Patrick Kananura, 2005) was conducted to assess how the adoption of IPDM innovations introduced in Kabale district (Buhara and Rubaya sub-counties) through the combined outputs of CIAT/NARO and /DFID projects since 2001, had influenced the livelihoods of beneficiaries. The study (linked with the Root Rot Project *R7568 (ZA0373) R8316 (ZA0586) R8478 (ZA0689)***)** also examined farmers' knowledge of BRR, its management practices and how the IPDM technologies were diffusing into the communities. The study was further intended to analyse and compare the different approaches that researchers and development workers use in disseminating IPDM technologies with particular emphasis on beans. Random and

purposive random sampling methods were used to gather primary and secondary data (analysed using SPSS). Formal questionnaires were administered during interviews with individual farmers. Check lists and semi-structured discussions were used to solicit information from focus groups, key informants (local leaders, members of partner programmes/NGOs) and individual farmers. A formal questionnaire was administered to 100 Ugandan farmers (53 men, 47 women) with hands-on-experience in bean production. Data were analyzed using the SPSS statistical computer package. (In addition to assessing impact in Uganda, In northern Tanzania, where over 6,000 farmers have also been made aware of bean IDPM technologies, 236 individual bean farmers took part in the socio-economic impact study (114 men, 122 women). In Kenya, an Impact study, Assessing the Impact and Uptake of Integrated Bean Pest and Disease Management Technologies (IPDM) in the Kisii Mandate Region, **Kenya** (Dymphina Andima and John Ogecha) was conducted to assess the impact of integrated bean pest and disease management technologies on the livelihoods of communities, the study also assessed the factors influencing uptake of IPDM technologies and the diffusion of IPDM technologies among the targeted communities. Data and information were collected using Participatory rural appraisals (PRAs) where training of frontline extension workers was undertaken to ensure the correct information was collected and a formal questionnaire was also used for data collection- Data was collected from individual interviews from the sample group of CBOS directly participating in IPDM activities at the household level (20 farmers in total selected purposively) and (30 selected randomly) and those not directly involved in IPDM work . Farmers (85%) in the IPDM participating category had adopted several different types of IPDM technologies compared to the non-participating category (35.9%). IPDM technologies adopted by farmers included use of improved crop varieties, regular scouting for insects, timely planting, use of botanical pesticides and conventional chemicals, soil nutrient management, timely weeding and harvesting, drying, cleaning, sorting, type of storage facility and storage pest control. Comparison at division level showed that over 80% of the IPDM participating farmers from each division had adopted more than seven IPDM technologies in a period of more than 3 years whereas only 37% of the on-participating farmers had adopted the same number of IPDM technologies. Groups were the most common channel of sharing IPDM technology in both categories accounting for 87.3% of the total cases mentioned by IPDM participating farmers and 54.5% by IPDM non-participating farmers Up to 66.1%, n=59) of the IPDM participating farmers sought additional IPDM technology services from other providers as compared to 39.8% (n=62) of the IPDM non-participating farmers. In Tanzania, a study on the Social economic benefits of IPDM technologies to bean farming communities in Hai district, northern **Tanzania**, by Komba Sophia and Susan Kaaria was conducted with a mission to promote strategies to reduce the impact of pests and stabilise yield of crops in Hai district, northern Tanzania. The study used participatory methods to generate and evaluate different IPDM technologies by forming IPDM groups for problem diagnosis and monitoring, evaluation and dissemination of IPDM technologies. The study also involved training of extension staff (including participating NGOs), participating rural schoolteachers and students in order to disseminate the IPDM technologies appropriately. It facilitated cross village visits to enable information exchange among farmers and encourage farmer to farmer dissemination. Village information centres were set up to provide IPDM information to the communities and policy makers were sensitized through the mass media and invitation to farmers' technical meetings, field days and seminars. IPDM technologies were found to be easy to use, effective in bean pest and diseases control, cost effective and produced the high yield. IPDM groups and village Extension officers (VEOs) played a great role in disseminating information about the technologies where about 72% and 68% of the farmers interviewed got the information about the technologies from VEOs and IPDM group members.

21. Based on the evidence in the studies listed above, for each country detail how the poor have benefited from the application and/or adoption of the output(s) ***(max. 500 words):*** *What positive impacts on livelihoods have been recorded and over what time period have these impacts been observed? These impacts should be recorded against the capital*

assets (human, social, natural, physical and, financial) of the livelihoods framework;

Generally, the practical sessions used in implementing project activities have helped to empower men and women farmers in the management of their resources. Skills of individual farmers and groups in the identification and management of production constraints (such as diseases, insect pests, soil fertility and markets) have been improved. In addition, farmers' confidence in the effectiveness of indigenous practices has been built and they can now blend them with improved technologies.

In **Uganda**, bean IPDM technologies were introduced in Kabale district in 2001 and the impact study was done in August 2005. In terms of affecting livelihoods, there has been increased food production at household level, group members confessed increased household incomes and the disadvantaged groups (women, the elderly and youths), who belonged to groups, were able to access learning and acquire skills. There was general change of attitudes from upholding traditional beliefs and rituals to believing proven scientific facts. Men were becoming more cooperative with women in relation to land use decisions and there was increased male participation in bean production. Thirty two percent of responses indicated that beneficiaries had acquired free agro-inputs (chemicals, fertilizers and high yielding improved seed), 30% had acquired new knowledge and skills about improved technologies, 22% had realized increased production, 9% had realized increased incomes, 12% freely shared information, and 7% had learnt group dynamics. In **Kenya,** IPDM technologies were introduced between 1994 to 1997 with on-farm evaluation of new bean varieties and cultural control; time of planting, fertilizer use etc in Nyamonyo and Otondo villages. In 1998 onwards, CIAT (International Centre for Tropical Agriculture) released more materials for evaluation both on-station and on-farm with the participation of farmer groups from Suneka, Marani and Bototo clusters where biological data was collected. Impact study was done in 2005. Eight five percent (85%) of the farmers in the participating category had adopted several different types of IPDM technologies compared to the non-participating category (35.9%). Benefits mentioned included increased yields as the most important by both categories. In the IPDM participating category, the benefits accounted for 84.6% (n=52) of the total mentioned cases and 60.9% (n=23) by the IPDM non-participating category. The increase in yields had enabled them to have sufficient food at household level during periods of scarcity (59.6%) and improvement in general family health (53.9%).There was also general increase in household income (41.7%) and increased household food supply all year around (53.9%). Other effects included increase in income controlled by women farmers and improvement in farmer-to-farmer and community relationships. In **Tanzania,** up to 91% of interviewed farmers considered IPDM technologies as advantageous. Increase in bean and maize production was the major advantage mentioned by 86% of surveyed farmers. The increase in bean and maize production led to the improved food security and increased household income among farmers in the community. The increased income was used to pay children school fees, purchase extra and better food, acquire better building materials and clothing, hire additional land for cultivation and some farmers were able to purchase livestock. Other socio-economic benefits included access to inputs, improved skills, access to information and new technologies. Eighteen percent (18%) reported that the IPDM technologies were safe and relatively cheap compared to conventional chemical pesticides and fertilizers and 17% indicated that the technologies were easy to use. As such there was reduced use of conventional chemical pesticides and fertilizers and links to new partners for information and services. The use of the village information centres had expanded to include other information materials on other aspects of development, for example, publications on malaria control, HIV/AIDS management and nutrition, adult education and other news letters and magazines are available at the centre.

- *For whom i.e. which type of person (gender, poverty group (see glossary for definitions) has there been a positive impact;*

Both men and women have benefited, however impact on women and the elderly has been commendable. The participation of women in activities on the promotion of IPDM technologies (training sessions, on- farm trials, visits, etc.) has helped them gain recognition and publicity from farmers and stakeholders from within and outside the community. Participating women's confidence has improved substantially in all groups. The studies revealed that a number of women farmers were holding leadership positions in different groups and they were being selected to attend training sessions and seminars to improve the performance of their groups and the community at large. Leadership in the research groups has helped women to have confidence in discussing different issues especially those concerning household and community development. Women participation in decision making on various agricultural activities such as problem identification and suggestion of solutions, planting time, what and when to plant, participation in policy and research group leadership and activities is a positive impact for future development and adoption of technologies. Men and women share research group membership and leadership positions in northern Tanzania.

- *Indicate the number of people who have realised a positive impact on their livelihood;*

The number of people who have accessed and used at least two of the bean IPM technologies todate should be more than 100,000 in eastern, central and southern Africa. Specifically the numbers were estimated at 3500 in Uganda, 5400 for Kenya, 1700 in Malawi and 70,000 in Tanzania**.**

- *Using whatever appropriate indicator was used detail what was the average percentage increase recorded*

In each of the countries the increase in number of farmers reached with technologies was enormous because the starting point was in the range of 1 or 2 digit figures (for example 12 farmers in northern Tanzania and 5 in central Malawi).

Adoption rates for environmentally friendly options for ISFM and IPDM are as high as 86.7% and 85% respectively in pilot sites.

Environmental Impact

H. Environmental impact

24. What are the direct and indirect environmental benefits related to the output(s) and their outcome(s)? ***(max 300 words)*** *This could include direct benefits from the application of the technology or policy action with local governments or multinational agencies to create environmentally sound policies or programmes. Any supporting and appropriate evidence can be provided in the form of an annex.*

The bean IPM promotion practice advocates use of traditional and environmentally friendly options including appropriate cultural practices, host plant resistance and judicious use of commercial chemical pesticides and fertilizers. We have observed in the last four years that bean, maize, vegetable and coffee farmers have used less commercial chemical pesticides and fertilizers in that they have reduced the number of pesticide sprays on their

crops. For example the project participating farmers who also grow coffee in northern Tanzania have reduced insecticide sprays on coffee from 5 to 3 per season through the use of cow urine and cowshed slurry at their coffee and banana intercropped farms. Participating bean farmers have also used cow urine and wood ash on their small bean plots production field instead of commercial insecticides. Spray frequencies for armyworm control on young maize in the same location has been reduced drastically due to the use of the pheromone trap to monitor the moths and target the sprays. A number of farmers also apply animal manure and compost in their bean and maize fields as most of them are unable to afford large amounts of commercial chemical fertilizers. If such practices are publicised and practised over a large area, farm products, water sources and livestock feeds will be clean of the poisonous pesticides that are currently affecting human and animal health. Natural enemies for the pests will also be conserved as farmers learn more about the friendly living animals in their environments and preserve them. The farmer research groups (FRGs) provide excellent platforms for effecting policy changes in favour of their wellbeing and the environment. For example, community groups in northern Tanzania have established by-laws to safe guard water sources and their crop fields from destruction by livestock belonging to pastoralists in the neighbourhood.

25. Are there any adverse environmental impacts related to the output(s) and their outcome(s)? ***(max 100 words)***

The bean crop is short lived and of high market value for the fresh and dry grain and the leaves as spinach. In areas where water for irrigation is available, there is a tendency for farmers to grow the crop continuously over the seasons sending signals of pest build up and consequent intensive use of commercial chemical insecticides if rotation is not advocated.

26. Do the outputs increase the capacity of poor people to cope with the effects of climate change, reduce the risks of natural disasters and increase their resilience? ***(max 200 words)***

Yes, to some extent. The use of environmentally friendly options that combine both indigenous knowledge and improved technologies could offer more stable management of natural disasters unlike in a situation where farmers rely on their knowledge only. Improved varieties (with resistance to pests, disease and drought) could offer some capacity to cope with natural disasters like disease and pest epidemics or drought. The FRG enabled participation by all stakeholders in problem identification and in a way increased awareness of farmers to their environment and empowered them on how to manage natural disasters. In addition, increased productivity on farms due to use of IPDM technologies being promoted would lead to improved nutrition and incomes and in turn lead to better health of the end users and thus reduce vulnerability to HIV and other human diseases infections, hence ensure a productive human force.

Annex

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