Farmers take the lead in learning

Validated RNRRS Output.

Farmer Field Schools (FFS) are helping to turn research results into improved livelihoods for the poor in Kenya, Mozambique, Uganda and Tanzania. In these open-air schools, farmers participate in evaluating new technologies, methods and knowledge. They also select the crops they wish to focus on, identify the problems they need to solve, and select the technologies they want to use. This approach fosters rapid uptake and has helped to improve the production of maize, beans, sweet potatoes, sorghum and tomatoes. Junior Farmer Field and Life Schools bring together orphaned youths in areas with high HIV/AIDS prevalence. They place a strong focus on health, nutrition and income generation and use drama and theatre to develop self esteem and confidence among the youths.

Project Ref: **CPP07:**
Topic: **7. Spreading the Word: Knowledge Management & Dissemination**
Lead Organisation: **CABI, Africa Regional Centre, Kenya**
Source: **Crop Protection Programme**

Document Contents:

Description

CPP07

A. Description of the research output(s)

1. Working title of output or cluster of outputs.

Accelerated Uptake and Impact of CPP Research Outputs

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

DFID Crop Protection Programme

3. Provide relevant R numbers (and/or programme development/dissemination reference numbers covering supporting research) along with the institutional partners (with individual contact persons (if appropriate)) involved in the project activities. As with the question above, this is primarily to allow for the legacy of the RNRRS to be acknowledged during the RIUP activities.

R8299 (ZA0571)
R8454 (ZA0678)

Research into Use
NR International
Park House
Bradbourne Lane
Aylesford
Kent
ME20 6SN
UK

Geographical regions included:

Kenya, Mozambique, Tanzania, Uganda,

Target Audiences for this content:

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4. 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.*

Innovation is the application of **knowledge** to do something new (Mytelka, 2000), and is necessary for any enterprise, including farming. An innovation may be a product, a process, a technique, a package, a market, but the key feature is that it is new to those using the knowledge, even if it is already well known to others. Thus the generation of new knowledge is not sufficient or even necessary for innovation, as relevant knowledge may already exist, but remain unknown and unused by those who could beneficially apply it. In the context of agricultural innovation, the uptake of research results and new technologies can thus be a major bottleneck in turning good research into improved livelihoods for the poor. The outputs described here aimed to address this problem in relation to accumulated CPP (and other programme) research outputs.

The outputs were produced under two projects undertaken in Kenya in the period from April 2003 to January 2006. There were three types of output.

1. An approach to promoting uptake and adoption of outputs of research (such as technologies, methods, new knowledge). The approach used was a combination of using existing **Farmer Field Schools** (FFS) and their associated networks, preparation and **dissemination** of a range of **information products**, and **participatory evaluation** of the farmer selected technologies/outputs. The approach was **demand-led**. Farmers selected the crops that they wished to focus on; they identified the constraints they wished to address; and they selected the technologies and outputs from the range presented that they wished to use. By using an existing organisational structure of FFS, the approach allowed rapid uptake to occur.

2. A set of promotional materials was produced, primarily targeted at intermediary organizations. These included new materials, as well as adaptation and reprinting of existing materials. All the source files

were also compiled on a CD, allowing other organizations to reprint as required. New materials included **radio** and **video** programmes based on farmers' successes in the first of the two projects.

3. A range of technologies were tested and evaluated by farmers and scientists, providing information on the validity and value of outputs from other research projects. Thus the output was the uptake and adoption of specific technologies in 5 crops.

As the project was promotional, output 3 provided some information on outcomes achieved the desired results to which outputs contribute. These are discussed further under later sections.

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		

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 outputs focussed on maize, beans, kale, sweet potatoes, tomatoes,

Outputs 1 and 3 could be applied to other production systems for which RNRSS outputs have been produced but not effectively disseminated. The specific products under output 2 are crop specific.

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						

The outputs focussed on high potential systems, but could apply to any.

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			

The outputs focussed on smallholder rainfed highland systems, but could apply to any.

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.*

Output 1 was itself an approach to clustering the outputs of other research from RNRRS and other programmes. Thus the output has the potential to add value to many other research outputs that have either stayed "on the shelf" or have not been as widely promoted as they merit. Value could be added to output 2 by further dissemination and utilisation of the products, perhaps as part of a wider effort to make research outputs easily available and adaptable by intermediaries. The R4D Portal contributes to this, but many target organisations do not yet have adequate internet access so additional dissemination pathways are still required.

A number of other RNRRS outputs have been concerned with promoting uptake of existing knowledge and technologies. Examples include:

R8312 on quality seed production, in which farmer field networks have embarked on seed production and group marketing.
R8457 sweet potato management and promotion through FFS.
R8417, R8341 IPM promotion through improved training manuals
R8448, R8313 Cocoa ICPM in W Africa
R8414 and projects on promotion of Bean ICPM.
R8449, R8212 Promotion and dissemination of IPSFM strategies in the Lake Victoria Basin
R8480 Good seed initiative

Other outputs have concerned methodologies more than specific production constraints or cropping systems, including:

R8428, R8349 Communication strategy for E African semi-arid systems
R8429, R8349 Linking demand with supply of agricultural information
R8404 Knowledge management
R7865 Scaling up processes
R8381 Scaling-up through uptake promotion
R8363 Scaling up through communication

The Innovation Systems approach possibly provides a suitable conceptual framework for clustering these and other outputs. The emphasis in this approach (only relatively recently applied to agricultural development) is on the full range of actors (beyond the traditional trio of research-extension-farmer), and the linkages between them, which primarily concern information and knowledge flow leading to learning and innovation.

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)****.*

The research outputs were validated through a network of farmer field schools, demonstrations, exchange visits and public meetings. The process was demand-led and the validation was conducted by the Ministry of Agriculture (Extension Department- NALEP), non-governmental organizations (NGOs) and community based organizations (CBOs). The NGOs included SACRED Africa, CREADIS, ARDAP and PATHFINDER, while the CBOs included Agro farmers' group and farmer networks.

Participatory identification of crop production constraints and intervention options was done through farmer interviews using priority setting questionnaire and focus group discussions using ranking and acclamation. The exercise was done for four seasons and different crops and their production constraints were prioritised: season 1: beans and sweet potatoes; season 2: Maize and sorghum; season 3: kale and groundnuts.

Scientist from KARI and CABI collated technologies for copping with production constraints identified for each crop from CPP and other research programmes, and presented to the FFS facilitators from the Ministry of Agriculture during four training workshops.

The facilitators introduced the technologies to the FFS, and farmers chose the technologies to try out in their own and/or group managed plots. In the group managed plots, season-long discovery-based farmer field school training was undertaken. Approximately 3600 farmers were directly involved in the FFS with a further 1800 attending 30 FFS open days to learn from their colleagues, along with nearly 400 representatives of intermediary and other local organizations.

During the season–long FFS training, FFS members were surveyed for their preferences on the content and format of dissemination materials. CABI collated relevant existing materials, adapted and modified where necessary. New materials were also created. Twenty two dissemination products were reproduced and disseminated to intermediary organizations as well as through the FFS. One of the products was a CD containing the source files for all the materials, allowing intermediaries to develop or reproduce further materials as required.

Surveys and farmer evaluations were carried out using questionnaires and focus group discussions. Thirty-three FFS facilitators were trained on how to administer the questioners before conducting farmer interviews where each facilitator interviewed 10 farmers each season from different FFS groups. CABI and KARI conducted the focus group discussions with six FFS groups from three districts each season. The surveys included participatory identification of crop production constraints and option for adoption, assessment of pre- adoption socio-economic situation and production practices of participating farmers, participatory evaluation of new IPPM technologies and post adoption socio-economic survey to assess impact on target farmers.

Farmers reported 10-15% yield increase in maize, sorghum and kale. 95% of the farmers reported an average increase of 50.9% in tomatoes. Over 80% of the farmers felt their food security had been improved. The method of farmer field schools was appreciated by the farmers. The validation of outputs for specific technologies and crops are in Appendix 1.

*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 validation was done in the target project areas (Bungoma, Busia and Kakamega Districts) and other districts. The other districts included Butere-Mumias, Vihiga, Kirinyaga, West Pokot, Advent group – Kisii District, Uasin Gishu and Trans Nzoia. Egerton University has also validated the outputs. The Intensified Social Forestry Programme (ISFP) of JICA also validated the outputs in 7 districts where it operates, in Kenya. The validation was conducted for the high potential production system. The farming system involved was smallholder rainfed highland. The social groups targeted were female and male farmers, farmer groups and religious groups. The validation was for the period 2003-2005.

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 range of IPPM technologies that were tested and evaluated by farmers and scientists are being used by the Farmer Field School Networks, individual farmers, other farmer groups, community based organizations, seed companies and non-governmental organizations to improve the production of maize, beans, sweet potatoes, sorghum and tomatoes. The FFS approach is being applied in agriculture, horticulture, livestock and forestry extension. It has also has proved a valuable approach in community and private development (marketing, business development and community empowerment). The FFS is now applied in Junior Farmer Field and Life Schools (JFFLS). The JFFLS include a group of orphaned youths formed in an area with high HIV/AIDS prevalence. The JFFLS follows the FFS principles but with a stronger focus on livelihood issues such as health, nutrition and income generation. Drama and theatre is used extensively as a tool for development of self esteem and confidence among the youths. Usually the group is facilitated by a team of facilitators including: agriculture officer, social animator and school teacher. Close links have been established with WFP for food relief among the participating children and assistance to their families. The promotional materials produced are being used by intermediary organizations to support their extension staff. The target organizations are capable of reprinting the materials as required. Video programmes based on farmers' successes are aired by the national television and private media house.

*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 are being used in Kenya, Uganda and Tanzania as well as Mozambique. In Kenya, the outputs are used in project target districts (Busia, Kakamega and Bungoma) , Butere-Mumias, Vihiga, Kirinyaga, West Pokot, Adventist group – Kisii District, Uasin Gishu and Trans Nzoia. Egerton University is also using the outputs. In Uganda: Soroti, Busia and Kaberamido; and Kagera Region (Bukoba, Muleba and Karagwe) in Tanzania.

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

To date, the FFS Networks in Eastern Africa support about 2,000 FFS with close to 50,000 direct beneficiaries. In Kenya the FFS Network supports 797 Farmer Field schools whose main activities

include promotion of improved IPPM technologies, training on quality control, farming as a business, bulking of produce, marketing and facilitating linkages with other stakeholders. In Uganda the FFS Network supports 545 farmer field schools in and the main activities are group marketing, processing sweet potato, saving and credit and storage structures, while in Tanzania the Network supports 257 farmer field schools whose main activities are certified seed production and group marketing.

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).***

The IPPM FFS Programme in Western Kenya provided over 3500 farmers grouped into Farmer Field Schools and 33 FFS facilitators for the validation of and uptake of the CPP research outputs. The DFID Crop Protection Programme provided the financial resources to different projects that generated the outputs that were promoted through and adopted by FFS members and intermediary institutions. The National Agricultural and Livestock extension Programme (NALEP), Kenya Agricultural Productivity Programme KAPP), Appropriate Rural Development Agricultural Programme (ARDAP) and the Community Research Environment Agricultural Development Initiative (CREADIS) have assisted with the promotion and/or adoption of the outputs. The institutions that have been involved with promotion include CABI Africa, Kenya Agricultural Research Institute (KARI), ICIPE, SACRED Africa, African Agricultural Technology Foundation (AATF) and seed companies. The platforms include the FFS networks, stakeholder forums, workshops, seminars and KENFAP. The policy structures include demand driven, networking and partnership. The key factors of success are full participation of the key beneficiaries in the process of adoption and adaptation of the outputs. There is also collaboration and the good will of the government. In terms of capacity strengthening there are key factors of success. Research outputs of previous CPP-funded projects increase the knowledge base of the extension staff to make them technically strong FFS facilitators. A competent International organisation (CABI) facilitates a multi-stakeholder process established that results in strong functioning linkages between researchers, farmers, extensionists and NGOs with increased capacity to accelerate uptake of the technologies. FFS networks in the project area provide innovative farmers who strengthen the extension team by facilitating farmer-run FFS. A cadre of skilled FFS facilitator on participatory methods and tools ensures a demand-led approach to the promotion of the outputs where relevant technologies address felt needs of the beneficiaries.

Details regarding the current situation are provided in Appendix 2.

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).***

The FFS approach has gained popularity in the country. Currently there are a large number of donors and implementation partners involved in FFS activities and a total of over 2500 FFS groups have been implemented in a broad range of enterprises. FFS Networks are currently promoting FFS approach and IPPM technologies. The networks are characterized as FFSs clustered in a registered or non-registered association or not-for-profit company. To date, the FFS Networks in Eastern Africa support about 2,000 FFSs with close to 50,000 direct beneficiaries. Promotional materials are in the process of being uploaded on a new web site that has been opened to upload FFS information (publications, experts, projects and organisations). This site, http://www.infobridge.org/ffsnet/, automatically links information to the FFSnet database on the Infobridge Foundation Knowledge sharing platform (http://www.infobridget.org/asp). Since December 2005, 166 experts (mostly from East Africa) and 25 publications have been entered on FFSnet. This web site web site links publications directly to the FFS network, and stakeholders are now uploading FFS publications and learning materials by themselves. A video programme shot in the farmers' fields and homes that show the actual crop protection technologies in 5 crops is aired through Regional Reach Company that has an estimated 1.2 million viewers per month in Kenya. Wider dissemination is being achieved through screening of the videos on KBC Television that has a viewership of 14 million people country-wide.

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)****.*

The first barrier slowing adoption of the FFS approach is variation among extension staff. Most existing extension staff in many countries were hired and trained under T&V top down extension funding (NAEP) that did not provide the staff with facilitation skills that allow a melding of local knowledge and external science based knowledge with client service orientation. Variation in extension staff result in variations of FFS quality. The second barrier is the investment cost (education is not for free) under structural adjustment and declining agricultural (national) budgets. The third barrier, despite FFS attracting mostly women farmers, is the social exclusion of the most vulnerable. While individual FFSs are capable of conducting their own business, they are too small to engage in meaningful negotiations. The most crucial bottleneck to market access for poor rural people is information on the existing and potential options for selling the things they can produce. Most FFSs are established in remote rural settings with limited contact to their potential markets. There is poor communication to small farmers within the FFS who need better access to markets and to reliable information about prices, product quality and market conditions.

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).***

As the FFS Networks grow and take on more complex initiatives, there is need for more investment in capacity building in the fields of financial management, marketing, standards and quality and ICT. A pool of competent and innovative facilitators and mentors should be in place to ensure sustainability of the process. More investments in training and equipping the FFS Networks with the relevant information and communication technology will bridge the information gap and enhance the diversification of business opportunities and improve efficiency of transactions. The revolving funds that have been operationalized within some of the FFS Networks need to be natured into a more sustainable and long-term investment venture by supporting the FFS Networks to identify viable income generating activities. Better documentation of the lessons learned will also be necessary for scaling-up the process of establishments of FFS networks. Lastly, there is a need for much more investment in FFS Networks in the rural areas of Eastern Africa. The potential for investments has not been fully exploited and farmers will still require external investments (grants or loans) to be able to move away from poverty. FFS should be seen as one element of up-scaling an appropriate response within demand-driven systems – not up-scaling of FFS for their own sake!

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).***

IPPM FFS approach to farmers' learning by doing rather than instructions and demonstrations, is an effective way of encouraging farmers adaptations of farming practices. It is also clear that FFS educated farmers are capable of establishing and running FFS in their areas thereby creating a multiplier effect of farming practices that enhance increased uptake of technologies. We have learnt that farmers are enthusiastic evaluators of new technologies, and they do it well.

Participatory IPPM FFS contributes to community development. FFS educated farmers have become more confident in running their day-to-day activities. They have assisted in strengthening existing groups and creating new ones which have become more organised and more responsive to community needs. There is enough evidence that given the appropriate policy support, the approach has a good potential of becoming a national program. Scaling up activities could start with documentation of a full-scale impact assessment.

Institutionalised networking from village grassroots to district levels accelerates the uptake rate. The farmer organizations have formed links with marketing organizations. The Chairmen of FFS Network in Busia and Kakamega sit on the District Poverty Eradication Committees while district network representatives sit in the district development committee meetings. The networks have thus opened up excellent avenues for information exchange between farmers and other stakeholders ranging from service providers to market access.

Facilitation of a multi-stakeholder process by CABI has created a platform for different stakeholders to share knowledge and different skills contributing to faster uptake of research outputs with strong positive implications of sustainability and ownership. Participatory training in conjunction with scientific institutions at local level influenced the uptake. Some NGOs provide facilities and access to credit for seed production and distribution, and can help to resolve this important bottleneck. NGOs are valuable partners. Some have contributed with infrastructure and personnel, allowing an increase in the uptake rate.

Promotional materials and the use of mass media (radio and TV) hastens adoption rates through wide geographical coverage.

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.

Only a single study has been conducted on poverty in relation to the cluster of outputs: Post adoption socio-economic survey to assess impact on target farmers by Musebe, R.O.; Odendo, M; Kimani, M.; Asaba, J.F.; Khisa, G. and Ajanga, S. This study was conducted in the target project areas namely Bungoma, Busia and Kakamega Districts as one of the activities under the project R8299.

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;*
- *For whom i.e. which type of person (gender, poverty group (see glossary for definitions) has there been a positive impact;*
- *Indicate the number of people who have realised a positive impact on their livelihood;*
- *Using whatever appropriate indicator was used detail what was the average percentage increase recorded*

Crop yield increased for all the prioritized crops except sorghum and beans (Table 1). Income received from crop production increased, especially for maize. Eighty six per cent of the farmers interviewed reported that there was an increase in income due to the use of CPP technologies. The actual average income increase and other percentage increases are reported in Table 1. Since maize is a staple food crop it is the case that food self sufficiency and food security increased due to adoption of the maize

production technologies. Kales production and the corresponding income also increased. There were some changes in the production of sweet potatoes, sorghum and beans, which were not as high as those from maize and kales. The increases in production of kales can also be explained by the fact that farmers were devising mechanisms for the production of the crop throughout the year possibly because of the increasing demand from government institutions and schools. Maize is also in high demand from these institutions. The percentage of farmers reporting increases in marketed surplus was less than the percentage reporting increase in output. This indicates that some of the crop output was used for increasing food self sufficiency at household level. When farmers were asked about the food self sufficiency situation following the adoption of the CPP technologies, 82% indicated that food self sufficiency had improved. This was attributed mainly to maize production. There were increases in the production of sweet potatoes and sorghum but not with the same magnitude as for maize and kales. The technologies promoted are therefore useful in this regard. Increase in the yield of sorghum was noted but the corresponding income was reduced by the low price. Farmers reported that they were having improvements in their livelihoods, which they could attribute in part to the use of improved crop protection practices that lead to high crop yield.

Table 1: Impacts on livelihoods recorded against capital assets, 2003-2005

		Capital assets				
		Human	Social	Natural	Physical	Financial
Impact indicators	Income					+25.0%
	Land cultivated				+7.98%	
	Pesticide use			Unchanged		Unchanged
	Crop yield				+14.5%	
	Access to information		+70.0%			
	Food self sufficiency	+82.0%	+82.0%			
	Pest and disease control	Improved	Improved	Improved	Improved	

Note: The reported impacts are the average from all the crops that were dealt with during the project period. A + indicates that some impact was noted and the figures indicate the percentage increases. A blank cell means that no change was noted.

Types of persons for whom there has been a positive impact were moderate poor and extreme vulnerable poor, including both men and women. The numbers of people who have realized a positive impact on their livelihood are reported in Appendix 1 under “who”.

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.

There was improvement in the pest and disease management by the farmers and efficiency in the use of agricultural resources. The use of pesticides did not change meaning that any adverse environmental effects attributed to the use of pesticides would be unchanged and would decrease with time. This is due to the fact that farmers were offered a wide range of pest and diseases control methods some of which are not based on the use of pesticides. These include improved husbandry practices, indigenous technical knowledge, habitat management and pest and disease control methods that do not involve pesticides. There was an increase in the percentage of farmers attempting control of different pests and diseases for some crops. Notable increases in the numbers of farmers attempting control were reported for bean root rot, bean fly, diamondback moth on kales, maize stalk borer and striga weed.

Over seventy percent of the farmers reported fewer incidences of pests and diseases. This may be because the project has sensitized the farmers regarding the importance of pests and disease control. Eighty eight percent of the kale farmers reported that there was less pest infestation compared to the time before the CPP project. Similarly, 87.2% of the farmers reported that there was less disease. Seventy seven percent and 73.3% of the beans and maize farmers reported that there was a reduction in pest infestation while 75.9% and 80.0% respectively reported there was a reduction in disease incidence.

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

There is reduced pesticide use that may cause limited adverse effect on the environment.

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)***

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. The poor are able to deal with high pest and disease infestations that occur during the heavy rain season. Planting in ridges and raised beds helps to preserve water, which is a problem during the dry season. There were improvements in access to crop protection information in terms of timeliness, content and reach of the information. The information

received enables the farmers to prepare adequately for crop protection.

Annex

Annex

APPENDIX 1: VALIDATION OF THE RESEARCH OUTPUT(S)

INFORMATION OBTAINED FROM A STAKEHOLDER WORKSHOP HELD IN SEPTEMBER 2006 IN KAKAMEGA.

BUNGOMA DISTRICT

CROPS	TECHNOLOGIES	WHO	HOW
Beans	Varieties Ash Earthing Indigenous technical knowledge (ITK) Intercropping	Ministry of agriculture Non-governmental organizations: SACRED Africa 20 groups x 40=800 ACE Africa 20 groups x 30=600 CREADIS 8groups x 20=160 NALEP GoK=100 Individual farmers>3000 World vision 14groups x 20=280 Seeds for Africa 4K members 7groupsx30=210	Farmer field schools (FFS) Demonstrations Public meetings NALEP GoK Farm visits Exchange visits/tours Pamphlets/posters
Maize	Varieties Push and pull Roguing Crop rotation	KMDP 40groups x 20=800 ICIPE=10farmers Kenya seed 5groups x 20 =100 Western Seed Co. 20groups x 20=400 SACRED Africa 20groups x 10=200 SACRED Africa field day =1500 NALEP 20groups x 20=400 Moi university=100 Mabanga ATC field day=5000 Mbambe 1 group=20 Individual farmers=3000	Demonstrations FFS NALEP SIDA Exchange visits Pamphlets/posters NETWORK
Kales	Varieties ITK Sticks/IPPM Mulching Raised beds	Seeds for Africa 5groups x 30=150 World vision 30groups x 20 =600 ACE Africa 30groups x 20 =600 Individual farmers=6000 SACRED Africa 7groups x 25 =175 NALEP GoK 20groups x 20=400 NALEP SIDA 40groups x 20 =800	FFS Demonstrations(4ks) NALEP GoK Farm visits Pamphlets/posters
Tomatoes	Varieties ITK Mulching Raised beds	NALEP SIDA 20groups x 20 =400 Individual farmers=400 NETWORK	NALEP GoK FFS Demonstrations Pamphlets/posters UMBRELLA NETWORK

BUSIA DISTRICT

CROPS	TECHNOLOGIES	WHO	HOW
Kales	Varieties Rotation Ash ITK Mulching Roguing Raised beds	Government departments 20 groups per division=20x6=2400 NALEP 4 groups per division x 15 members=380 farmers NGOs: ARDAP =300 farmers ICIPE =65 farmers CCF (Busibi) 8 groups of 40 farmers=320 World Vision 40groups x 25=1000 farmers KAPP =400 farmers CBOs: Nangina social work=180 Individual farmers=2600	FFS Demonstrations NALEP SIDA Public meetings Exchange visits Field days Posters Organized training (workshops) Individual farmers visits Information desk
Beans	Varieties Ash Intercropping Monoculture	Government departments NGOs: PATHFINDER-270 farmers ARDAP =450 farmers FFS network-2000 farmers Individual farmers-4000 farmers	FFS, demonstrations Field days, posters NALEP SIDA, Individual visits Public meetings Exhibitions, Information desks
Sweet potatoes	Roguing Varieties Rotation Multiplication Mounds/ridges Earthing up	Government departments KAPP-400 NGOs: ARDAP -1100 farmers WRCCS -90 farmers REFSO -360 PATHFINDER-270 CBOs: Musokoto -150 Agro farmers -75, Nasira 250 Individual farmers=1280	FFS NALEP SIDA (CIG) NALEP GoK KAPP, Demonstrations Field days/ Exhibitions Information desks Public meetings (barazas) Individual farm visits
Maize	Varieties Intercropping ITK Monoculture Drought management Striga management	Government departments -3000 NALEP-SIDA -3000 CBOs: Nangina s/work 200 farmers o BUCODEV NGOs: CCF Busibi 8 groupsx40=320 farmers Pathfinder=270 farmers IITA/AATF=300 farmers KARI 2groups= 60 farmers ICIPE 8 groups=400 farmers	FFS Shows/exchange Public meetings (barazas) Demonstrations Individual farm visits Field days Information desks
Tomatoes	Varieties Rotation	Government departments -2500 NALEP-SIDA -380	FFS, demonstrations Field days

	ITK Roguing Mulching Irrigation Raised beds	NGOs: World vision-1000 farmers FFS network-500 farmers KAPP-400 farmers Individual farmers-2500 farmers	NALEP SIDA (CIG) Exchange visits Public meetings (barazas) Individual farm visits Information desks

KAKAMEGA DISTRICT

CROPS	TECHNOLOGIES	WHO	HOW
Sweet potatoes	Improved varieties Seed multiplication Planting methods :mounds/ridges Crop rotation Roguing Earthing up	Government departments: KAPP-120, NALEP SIDA -7X4X25=700 NGOs: REFSO -750 farmers and CCS -250 farmers Intermediaries: FFS network 80x25=2000 Individual farmers=1000	FFS, NALEP KAPP, exhibitions, Demonstrations, farm visits, posters, radio, internet Public meetings (barazas)
Kales	Varieties Botanicals/ITK Trash burning Crop rotation Harvesting (methods and intervals) Soil fertility Safe and effective use of agro chemicals Companion planting Raised beds	Government departments KAPP -1x4x25=100 farmers NALEP- 4x7x20=560 farmers Individual farmers=3300 Seed producers/stockists=57 Agrochemical companies=57	KAPP NALEP FFS Demonstrations Individual farmers visits Public meetings(Barazas) Radio
Tomatoes	Varieties Trash burning Crop rotation Safe and effective use of agro chemicals Soil fertility Raised beds	Government departments o KAPP -100 farmers o NALEP- 560 farmers Seed producers/stockists=57 Agrochemical companies=57 Individual farmers=2500	FFS KAPP NALEP Posters Demonstrations Exhibitions Individual farm visits Public meetings (barazas) Radios
Beans	Improved Varieties Earthing up Fertilizer use Use of ridges/ drainage Post harvest management Intercropping	Government departments o NALEP-7x4x20= 560 farmers Seed producers/stockists o Kenya Seed Company=1000 o Western Seed Company= o KARI=400 Intermediaries FFS network=20x25=500	Demonstrations Farm visits Posters NALEP SIDA (CIG) KAPP CIG FFS
Maize	Improved Varieties Push and pull Post harvest management Soil fertility Intercropping	Government departments o NALEP-4x7x50= 1400 farmers Seed producers/stockists Kenya Seed and Western Seed Companies. KARI =4000 NGOs; ROP=750, Africa Now=1000, CCS=1250, Intermediaries: FFS network-170x25=4250 farmers	Demonstrations Farm visits Posters Public meetings (barazas) Radio Exhibitions FFS

Appendix 2: Current situation

Crop	Technology	How	Whom	Where	Scale	Program
Maize	Varieties: H623, H505, H513, H614 H502, H403, KSTP94 Pan 67, Pan 97	Being used as recommended, H623 has been rejected by farmers	Farmer groups and individual farmers	Busia, Bungoma and Kakamega	90-100%	Food security and F.A.B
	Push and pull Roguing, Soil fertility management	Push pull is being used with slight modifications	Farmer groups and individual farmers	Bungoma	40%	
Beans	Varieties: KK8, KK15, KK22	Varieties used as recommended, intercrop with maize	Farmer groups and individual farmers with a greater number of women	Bungoma	50% adopt	Food security and F.A.B.
	Ash					
	Earthing up	Adopted		Bungoma	Not popular	Food security and F.A.B
		Highly adopt	Farmer groups and individual farmers		90-100%	F.S
Sweet potatoes	Varieties:			Bungoma	40%	F.A.B
	Mugande	As recommended	Both crop and livestock farmer groups	Chwele	80%	F.A.B
	SPK004	As recommended		Kanduyi	50%	
	Kemb 10	As recommended		Nalondo	90+%	NALEP, FFS
	SPK013	Retained		Bumula	20-30%	NGOs, CBOs
		As recommended	CBOs ,NGOs, Farmer groups			FFS
	Ejumla				Increased speed but shortage of vines	GoK
		Newly introduced	CIP			
Sweet potato	Mound/ridges	Adopted with reduced size	Farmer groups	Bungoma	100%	NALEP, KARI
				Bungoma		FFS
						NGOs,
	Roguing	Adopted as recommended for management of weeds and diseases	Farmer groups	Bungoma	80%	CBOs
						CBOs
				Bungoma	50%	CBOs
						FFS
	Varieties:		Farmer groups	Bungoma	90%	FFS
Kales	Sukuma siku	Rejected	Farmer groups	Bungoma	20-30%	FFS
	1000 headed	Accepted	Farmer groups	Bungoma	90%	FFS
	Collards	As recommended	Farmer groups	Bungoma	20-30%	FFS
						FFS
	Raised beds	Adapted with reduced beds	Farmer groups	Bungoma	20%	NGOs
				Bungoma	5%	CABI
	Sticks / IPPM	As recommended	Farmer groups			KARI
	ITK	Cow dung slurry adopted				
	Crop rotation	Fully adopted				
Tomatoes	Varieties: Eden	Adopted	Farmer groups	Bungoma	40%	FFS, FG,
	Fortune maker	Increased adoption	Farmer groups	3 divisions now	60%	FAB,
	Munyala	Not adopted	Farmer groups	district wise	90%	networks
	Cal J	Maintained	Farmer	Bungoma	70%	"
	Nuru orlex			Bungoma		"
	ANNA				20%	"
	ITK	Botanicals to control bollworm	Farmer groups	Bungoma	90%	"
						"
	Mulching	adopted	Farmer groups	Bungoma	80%	"
	Raised beds	Adopted	Farmer groups			"
	Pesticides	Size of beds reduced	Farmer groups			
		Low rate used				

Appendix 3: Current promotion/uptake pathways

Crop	Where	What	By who	Scale
Beans	Lurambi, Kabras	Improved varieties(KK22, KK8,	KARI	2000
	Municipality	KK15, red haricot,)	GoK	2500
	Shinyalu, Ikolomani	Disease and pest management	FFS	1500
	Navakholo	Soil Fertility	Individual farmers	3300
	Bungoma, Busia	Post harvest	Intermediaries(network)	3300
				7150
	Shinyalu	Raised beds, ITK, improved	GoK, ARDAP, REFSO,	
Kale	Municipality	varieties	FFS, ICIPE, World	680
	Lurambi	Pest and disease management	Vision, PATHFINDER,	375
	Kabras	Soil fertility	Individual farmers, CCS,	1500
	Ikolomani	Crop rotation	Agro-farmer,	
	Navakholo	Mulching	Busia Agricultural	
	Bungoma		Training Centre	
	Busia			
		Improved varieties		
	Kabras	Soil fertility	FFS, CBOs, farmer	
Tomatoes	Lurambi	Pest and disease management	groups, CIG, NALEP,	375
	Ikolomani	ITK	GoK, ATC, networks,	680
	Navakholo	Raised beds	Individual farmers	1000
	Municipality	Crop rotation		
	Shinyalu	Mulching		
	Bungoma		FFS, KACE, SACRED	
	Busia	Improved varieties	Africa, KMDP, AGMARK,	
		Planting methods	NALEP, KARI, ICIPE,	
	Lurambi	Disease and pest management	GoK	
Sweet	Navakholo	Multiplication	Individual farmers	375
potatoes	Municipality	Value addition	NGOs, farmer groups	680
	Shinyalu	Mounds/ridges	Intermediaries	1000
	Kabras		KARI-Kakamega	1000
	Ikolomani		CBOs, networks	2000
	Bungoma			
		Striga tolerant varieties: KSTP94,	FFS, KARI, FRIKECON,	14000
		WH502,WH904,	NALEP, SACRED Africa,	
		Other varieties: H505, PAN 97,	networks, agro-shops,	
	Lurambi	PAN 67, H502,	GoK, Intermediaries	
Maize	Navakholo	Soil fertility and	Individual farmers	
	Municipality	post harvest management	KARI-Kakamega	450
	Shinyalu	Push-pull		1400
	Kabras			3300
	Ikolomani			
	Bungoma			2000
	Busia			3470