

Chapter 3 Evaluation of Crop Protection Programme (CPP)

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3.1 Summary

Key Issue	Key Findings
<p>Science Quality</p> <p>(a) Quality of experimental design and analysis</p>	<p>The quality of experimental design and analysis of the ten projects reviewed holds in general a relatively high standard.</p>
<p>(b) Contribution of projects sampled to new knowledge;</p>	<p>Three of the ten selected projects scored average, giving this criterion a total lower score than the others, with one exception: Innovation and risk. Still, the contribution to new knowledge was relatively high.</p>
<p>(c) Extent the projects use existing knowledge creatively in new contexts;</p>	<p>The high score of the ten projects sampled shows that new knowledge has been used creatively in new contexts.</p>
<p>(d) Awareness of all current knowledge</p>	<p>The score for awareness of current knowledge of the CPP Programme is high.</p>
<p>(e) Innovativeness and scientific risk-taking with comment on projects that are innovative and projects that are not;</p>	<p>One noticeably lower rating was obtained for the CPP Programme in relation to its innovativeness and scientific risk-taking, but still above average. Half of the ten projects reviewed cannot be evaluated as especially innovative.</p>
<p>(f) How risk was managed by programmes and project managers and the lessons from this should be included.</p>	<p>Most of the projects studied had a rather low risk inherent and presented also a low risk to the donors.</p>
<p>Address the issue of measuring science quality for applied projects with non-peer reviewed reports.</p>	<p>Any project should preferably always produce scientific reports of internationally accepted standards, i.e. peer reviewed articles. However, circumstances may require donors to accept other standards highlighting the way projects fulfil the goal set out in the planning papers. The production of production system manuals must be judged per individual project and in our review we found good/pertinent examples of such documentation.</p>
<p>Science Capacity Building</p> <p>Science capacity building in the south for both individuals and institutions.</p>	<p>The contribution of the CPP projects to science capacity building in the scientific communities in developing countries involved has been high. In fact, this criterion had the highest rank of all the eight criteria used in the evaluation.</p>
<p>Include development of long-term institutional relationships between UK institutions and Southern institutions;</p>	<p>The longer-term institutional relationships between UK institutions and Southern institutions have developed in an excellent way. The projects were given a high score (the second highest) with regard to this relationship.</p>

Key Issue	Key Findings
<p>Knowledge Dissemination</p> <p>Adoption, lessons etc. from different approaches to dissemination and uptake promotion.</p>	<p>The overall result knowledge dissemination from the CPP Programme is rated high. There are some minor differences which can be observed when dissemination is subdivided into the given five categories. For a few of the projects, especially within the categories end users and international donor community, the score was average, giving a reduction in the total score.</p>
<p>Management Approach</p> <p>Identify the lesson learning on identification of demand, relevant project design, appropriate dissemination and uptake pathways etc.</p>	<p>We found the project designs applied to be scientifically relevant and appropriate for the purpose of the projects.</p>
<p>Identify the lesson learning from different approaches in selecting and designing projects to achieve the purpose.</p>	<p>Dissemination and uptake made use of existing pathways and in many instances endorsed already existing infrastructure in the countries involved.</p>
<p>Identify how the programme has evolved and become more demand driven.</p>	<p>Identification of demand is impossible to understand because we have only been presented accepted projects. All these projects are judged to be very relevant and could easily be classified in the larger programmes.</p> <p>We find clustering of individual projects into larger programmes to be an efficient means to augment impacts of scientific work because bigger networks may be involved in problem solution. Also it presents project outputs to a broader geographical audience.</p> <p>The 19 thematic clusters of CPP seem to have had an excellent synergistic effect.</p>
<p>Conclusions and Lessons for the Future</p> <ul style="list-style-type: none"> • Knowledge dissemination • Capacity building • Maintaining high science quality • Management 	<p>As an overall conclusion, the CPP Programme held a relatively high score for most criteria given. Some variation can be seen, e.g. in dissemination, but often a subsequent project will continue this processes.</p> <p>However, one relatively low score is notable on innovation and risks. The CPP-projects evaluated are not dominated by cutting edge natural science with new high risk technology, but relying and developing crop protection methods, such as biological control of pests, proved to be successful in other tropical and sub-tropical areas. The majority of small-scale rural and peri-urban farmers in a region are the projects beneficiaries as soon as the outputs have been implemented by the research community, NGOs, extension service and the private sector.</p>

Key Issue	Key Findings
	<p>Future research projects within the framework of DFID's CPP will be able to hold a continuous high quality regarding capacity building, science quality and management.</p> <p>The key ingredients to success within CPP are:</p> <ul style="list-style-type: none"> ○ Regional and local capacity building ○ Infrastructural development ○ Promotion. Upscaling ○ Scientific approach. Academic level
<ul style="list-style-type: none"> • Research themes for the future <p>Recommendations on the future research themes should refer to DFID's comparative advantage (or otherwise) in the context of international support to natural resources research.</p>	<p>Research theme for the future should include:</p> <ol style="list-style-type: none"> 1. Insect pests in Sub-Saharan Africa Non-chemical pest control options emphasizing microbial control of insect pests. One should keep in mind that future control options cannot be based on one single control method only, e.g. microbial control, therefore a combination with other techniques is probably the best solution, i.e. integrated pest management (IPM). 2. Weed problems in rice in Asia A continuation of this research theme should focus on the environmental impact of such a development, emphasizing risks for human health by use of pesticides and pesticide contamination of rice growing regions, which often include important water resource areas. 3. Disease control in Sub-Saharan Africa We find it important to support projects that aim at presenting means of sustainable disease control amongst which exploitation of disease resistance ranks high.

3.2 ACHIEVEMENT OF PROGRAMME OUTPUTS (current logframe in Annex 3)

The Logframe is a useful tool for the leadership of the Crop Protection Programme. The outputs and the indicators seem to be specific enough and are on a realistic level to follow up the progress during the project period. The expected science achievements outlined in the Logframe have been met at programme level. For most projects the achievements have been met in a very satisfactory way. The specialist has laid out in the tables below, the outputs and indicators for the projects sampled within the report against the March 2003 CPP Logframe.

Semi-Arid Production System Purpose 2

Outputs	Indicators of Achievements		Selected Projects Evaluated	
	No.	Indicator	No.	Title
<p>1. Strategies developed to reduce the impact of pests, and stabilize yields in semi-arid cereal-based cropping systems, for benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests and stabilise yields in semi-raid cereal-based cropping systems, for benefit of poor people.</p> <p>Outputs are realistic and representative of the programme.</p>		<p>By 2005, new knowledge validated that stabilizes yields, sustains the resource base and reduces drudgery through improved and sustainable management of:</p>	R7572	Pests of Sorghum
	SA203	<p>Insect pests of cereals and legume crops (2 systems by 2002, 2 by 2003).</p> <p>Main pests identified. Effective control methods tested.</p> <p>Indicators are useful and fulfilled.</p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihood of poor people through:</p>		
	SA203	<p>IPM in cereal based cropping systems (1 System by 2005).</p> <p>Useful indicators, more emphasis on dissemination.</p>		

Land/Water Interface Production System Purpose 2

Outputs	Indicators of Achievements		Selected Projects Evaluated	
	No.	Indicator	No.	Title
<p>1. Strategies developed to minimise impact of target pests in rice-based Land-Water interface cropping systems, for benefit of poor people.</p> <p>2. Promotion of strategies to minimise impact of target pests in rice-based Land-Water interface cropping systems, for benefit of poor people.</p> <p>Outputs are realistic.</p>	LW201	<p>By 2005, new knowledge validated with target organisations that stabilises yield, sustains the resource base and reduces drudgery through improved and sustainable management of:</p> <p>Weeds in rainfed/floodplain rice systems (1 system by 2002).</p> <p>New weed management strategies (herbicides) did not reduce yield compared to traditionally methods (hand weeding).</p> <p>Indicators are useful. 1 system fulfilled in 2002.</p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people for:</p>	R7471	Developing weed management strategies for rice-based cropping systems in Bangladesh.
	LW203	<p>Rice insect pests (1 system by 2003). Methods adopted. Some dissemination, more in next project.</p> <p>Indicators are useful.</p>		

Peri-urban Production System

Outputs	Indicators of Achievements		Selected Projects Evaluated	
	No.	Indicator	No.	Title
<p>1. Strategies developed which benefit poor people by reducing impact of key pests, improving yield and quality of crops, and reducing pesticide hazards in peri-urban systems.</p> <p>2. Promotion of pro-poor strategies to reduce impact of key pests, improve yield and quality of crops, and reduce pesticide hazards in peri-urban systems.</p> <p>The outputs are realistic.</p>	PU101	<p>By 2005, new knowledge validated with target organisations that stabilises yield, sustains the resource base and reduces drudgery through improved and sustainable management of:</p> <p>Insect pests, diseases and nematodes in market gardening and horticultural enterprises (2 significant pest problems by 1999, 3 more by 2003). <i>R6764: Several IPM-methods tested and recommended.</i> <i>R7449: Non-chemical methods in place. Progress towards a commercial bio-control agent.</i> <i>R7960: Biological control system in place. Demand for a commercial product.</i></p> <p>The indicators are specific and useful.</p>	R6764	Environmental acceptable crop protection strategies based on improved use of pesticides and adoption of integrated pest management strategies by smallholder farmers in Zimbabwe.
		<p>By 2005 improved and sustainable crop production methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people for:</p> <p>Horticultural systems (1 by 2002 and another by 2005). <i>R6764: IPM-handbook published.</i> <i>R7449: Protocol for biopesticides developed.</i> <i>R7960: A method developed. Good collaboration between local institutions.</i></p> <p>Highly relevant and useful indicators.</p>	R7449 R7960	Development of biorational brassica IPM in Kenya. Public-private partnerships for development and implementation of entomopathogenic viruses as bioinsecticides for key lepidopteron pests in Ghana and Benin, West Africa
	PU101		R6764 R7449 R7960	

Forest/Agricultural Production System Purpose 1

Outputs	Indicators of Achievements		Selected Projects Evaluated	
	No.	Indicator	No.	Title
<p>1. Strategies developed to reduce the impact of pests, and stabilize yields of herbaceous crops in Forest Agriculture systems, for benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests in herbaceous crops in Forest Agriculture systems, for the benefit of poor people.</p> <p>Outputs are realistic and representative of the programme.</p>	FA107 ???	<p>Two indicators seem to be missing: Should have been: "Insect pests in bananas".</p> <p>One indicator for stabilise yields etc. and one for methods adopted and disseminated.</p> <p>Results obtained: A bio-control agent tested (will need more time for the final conclusion). Other IPM-methods developed. Information disseminated to many national institutions.</p> <p>Promotion must be strengthen when the product is fully tested.</p>	R7972	Integrated management of the banana weevil in Uganda

Forest/Agricultural Production System Purpose 1

Outputs	Indicators of Achievements		Selected Projects Evaluated	
	No.	Indicator	No.	Title
<p>1. Strategies developed to reduce the impact of pests and stabilize yields of herbaceous crops in Forest Agriculture systems, for benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests in herbaceous crops in Forest Agriculture systems, for the benefit of poor people.</p> <p>Outputs are realistic.</p>	FA106	<p>One indicator for stabilise yields etc. and one for methods adopted and disseminated.</p> <p>Results obtained: Useful resistant plant material has been obtained through research</p> <p>Promotion based on research result from the project has successfully been carried out.</p>	R7563	Control of cassava diseases in eastern and southern Africa.

Hillsides Production System Purpose 1

Outputs	Indicators of Achievements		Selected Projects Evaluated	
	No.	Indicator	No.	Title
<p>1. Strategies developed to reduce impact of pests, and stabilise yields and cultivation practices, of crops in Hillsides systems, for benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests and stabilise yields of crops in Hillsides systems, for the benefit of poor people.</p> <p>Outputs are realistic.</p>	HS202	<p>One indicator for stabilise yields etc. and one for methods adopted and disseminated.</p> <p>Results obtained: Useful resistant plant material has been obtained through research</p> <p>Promotion based on research result from the project has started.</p> <p>Indicators are partly useful.</p>	R7568	Characterisation and epidemiology of root rot diseases caused by Fusarium and Pythium spp. In beans in Uganda.

Land/Water Interface Production System Purpose 2

Outputs	Indicators of Achievements		Selected Projects Evaluated	
	No.	Indicator	No.	Title
<p>1. Strategies developed to minimise impact of target pests in rice-based Land-Water interface cropping systems, for benefit of poor people.</p> <p>2. Promotion of strategies to minimise impact of target pests in rice-based Land-Water interface cropping systems, for benefit of poor people.</p> <p>Outputs are realistic.</p>	LW204	<p>One indicator for stabilise yields etc. and one for methods adopted and disseminated.</p> <p>Results obtained: Knowledge generated and disseminated.</p> <p>Promotion at farmers' level questionable according to reports.</p> <p>Indicators are partly useful.</p>	R7778	Rice sheath blight complex caused by Rhizoctonia species: Pathogen epidemiology and management strategies.

Forest/Agricultural Production System Purpose 1

Outputs	Indicators of Achievements		Selected Projects Evaluated	
	No.	Indicator	No.	Title
<p>1. Strategies developed to reduce the impact of pests and stabilize yields of herbaceous crops in Forest Agriculture systems, for benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests in herbaceous crops in Forest Agriculture systems, for the benefit of poor people.</p> <p>Outputs are realistic.</p>	FA106	<p>One indicator for stabilise yields etc. and one for methods adopted and disseminated.</p> <p>Results obtained: Useful more or less resistant plant material has been obtained through research and phytosanitary measures identified.</p> <p>Promotion based on research result from the project has successfully been carried out.</p> <p>Indicators useful.</p>	R7492	Promotion of and technical support for methods of controlling whitefly-borne viruses in sweet potato in East Africa.

3.3 BACKGROUND

The Crop Protection Programme (CPP) – Background Information and General Comments

CPP was able to build on the resource base of knowledge delivered by the previous Integrated Pest Management Strategy Area (IPMSA) 1989-1995. The last of the IPMSA project was completed in 1997. Project activities in several countries that were included in IPMSA, e.g. Central American countries, especially Costa Rica, Caribbean countries, Mexico, Egypt and Thailand, not continued after the end of IPMSA initiated projects.

CPP can also use integrated pest management (IPM) as one of its key words, emphasizing a combination of different pest control measures to reduce the impact of pests and to increase yields in a sustainable manner.

CPP is the largest and most diverse of the 10 DFID RNRRS programmes supporting 60-70 operational projects at any one time with a total budget of £ 4-5 mill. per year).

Many projects are still ongoing and will end in March 2005. Recently CPP has been extended to March 2006.

CPP has jointly funded or linked projects with other DFID RNRRS programmes as Plant Sciences, Crop Post Harvest and the Livestock Production Programme.

In its strategy to promote outputs, CPP has focused on several levels of end users, policy level (e.g. biocontrol guidelines and regulation), NARS, NGOs and national extension services (IPM techniques, publication of manuals) and small-holder farmers, both in rural and peri-urban districts (new IPM methods available). It has also worked with the private sector and through sub-regional offices.

CPP has during the recent years focused on the following topics (see Annex 1):

- Biological control, especially microbial control.
- Plant diseases, especially virus diseases.
- IPM strategies within important crops.
- Alternative low-cost and sustainable pest control techniques, e.g. by use of pheromones.

Uptake, impact and promotion: Within CPP, Programme Advisors (PA) and the Programme Advisory Committee (PAC) have continuously monitored the projects' outputs to ensure that all project stakeholders had access to the achievements. Target groups have included NARS, NGOs, national extension service, the private sector and the farmers.

Geographical focus of CPP is on approximately 20 countries in sub-Saharan Africa, South Asia and Latin America. In DFID's lists of 325 CPP projects with in-country collaborators were 63% of the projects in Africa (25% in West Africa and 45% in East Africa), 28% in Asia (51% in India and 11% in Bangladesh) and 9% of the projects were in Latin-America, of these 33% in Bolivia.

CPP has since the start of the programme been divided into 6 production systems (and 10 sub-groups): Forest-Agriculture, Hill-sides, High Potential, Land/Water Interface, Peri-Urban and Semi-Arid (see Annex 2).

The five largest production system units (2002-2005) have been (budget in £ 1000): Forestry-Agriculture (FA1 herbaceous crops) 2050, Peri-Urban (PU) 2000, Land/Water Interface (LW2 rice-based) 1950, Semi-Arid (SA2 cereal-based) 1600 and Hill-Side (HS) 1600.

HS production system is nearly totally dominated by the potato cropping projects in Bolivia. CPP operates with 19 thematic cluster based on crop commodity within the six production systems (see Annex 2).

The cluster strategies are discussed with PA and PAC once a year. Since 1999 the cluster strategy has been strengthened to benefit from the synergy between related projects.

The five largest clusters 2004-2005 are (budget in £1000): roots and tubers (£531), horticulture (£492), semi-arid cereals and legumes (£421), rice systems (£379) and maize (£379).

In many of the clusters covering commodities as cereals, root, banana and vegetables, the majority of beneficiaries targeted are small-holder rural or peri-urban farmers.

A few clusters are not commodity based, eg migrant pests and the whitefly initiative. Migrant pests within the semi-arid production system include locusts, armyworms and *Quelea* birds. Forecasting systems have been developed for several of these pests. The white-fly initiative is important to understand the ecology and dispersal of this insect group of vector transmitters of serious virus diseases on e.g. cassava, sweet potatoes and vegetables.

The White Paper “Eliminating World Poverty” was published in 1997, and in 1999 CPP placed a greater emphasis on the elimination of poverty and promotion of environmental sustainable plant protection technologies. This is clearly reflected in the projects’ title during the 10 year period (see Annex 1).

The log frames of the CPP projects had a major revision in 1998.

In 1998 CPP reduced the number of inputs given in The Yellow Brick to two:

- Strategies developed to reduce impact of pests on poor people’s crop.
- Promotion of these strategies.

The two outputs are clearly linked to the revised log frames for 2003-2004 for all production systems within CPP. A list of specific indicators of achievement is given for each production system in the log frame.

The excellent CPP website was launched in 2003 and contains much relevant information (structure, strategies, outputs, current projects etc.). The website gives a good overview of the programme and makes it easy to follow the progresses made from one year to the next.

CPP has produced a long list of publications in international journals, extensive manuals on IPM, pests and on natural enemies and overviews of production constraints in cropping systems.

The risks the pesticides impose on poor farmers’ health and on the environment have not been strongly emphasized in the CPP-projects, and in some of the projects such issues should have been more in focus. However indicated in a new DFID⁵ leaflet, by using new plant protection methods created by the projects, farmers benefit by purchasing less pesticides and by reduced hazards from pesticide application.

3.4 SAMPLING AND METHODOLOGY

Sampling of Projects for Detailed Analysis

Ten projects have been selected on the basis of commodity importance for rural populations, scientific and promotional challenges as well as project size (£200-400,000) and geographical considerations (sub-Saharan Africa and South Asia). The projects covered all major disciplines of plant protection: entomology, plant pathology and weed sciences. Some projects had a wider objective, e.g. integrated plant protection (IPM) including several disciplines.

The promotional aspect varies from project to project, rendering it a little bit difficult to assess justly the rural impact when a project for instance is geared to produce a sound scientific platform for later promotional project(s).

⁵ DFID 2004. Natural resource management and human health: the forgotten link? Insights health 5 May 2004.

Evaluation of projects 1-10

Project 1

Title: Environmental acceptable crop protection strategies based on the improved use of pesticides and adoption of integrated pest management strategies by smallholder farmers in Zimbabwe.	
Project no.: R6764	Project cost: £ 337,831
Start date: 01.04.1997	End date: 31.03.2001
Country: Bangladesh	
Lead institution: NRI	Associated institute in developing country: PPRI (Plant Protection Research Institute, Zimbabwe)
Production System: Peri-Urban	Cluster: Vegetables

Project overview

Project purpose: “To improve the long-term sustainability of pest management in smallholder high potential systems by improving the way pesticides are used, by identifying potentially useful natural control organisms and production systems, and by opposing the combination of pest control methods”.

The project worked with small-scale vegetable producers in two areas in Zimbabwe and included a socio-economic survey on plant protection constrains, alternative crop protections strategies (resistant crop varieties), improvement of pesticide spraying equipment and negative ecological effects of pesticides (residues, on natural enemies).

The most important output from the project is a handbook on integrated vegetable pest management in brassicas and tomatoes, which will be of great value for the extension services and NGOs, not only in Zimbabwe but also in a greater part of East Africa. Another handbook on recognition and conservation of natural enemies (“Farmers’ Friends”) has been worked out in a separate CPP project, but in close collaboration with the present project.

Project evaluation – its strengths and weaknesses

The projects came up with several recommendations, but would totally have made better progress by including fewer experimental aspects.

Criteria no.	Scoring	Comments
1	5	New knowledge in a few biological studies (pest and disease tolerance in new varieties) and by improving the effect of spraying equipment.
2	5	The project has combined existing and new knowledge, but not in a very creative way.
3	5	The project cannot be characterized as highly innovative and scientific risk-taking.
4	8	Few IPM studies available from Zimbabwe.
5	9	Output PUA: Non-chemical strategies recommended reducing pesticide hazards. Output PUB: Promotion of these strategies through the published handbook.
6	9	A considerable number of scientific staff in Zimbabwe participating in the lab and field experiments and in publishing.
7	9	Good collaboration demonstrated between PPRI, Zimbabwe, and NRI.
8a	8	One refereed publication on IPM in vegetable in Zimbabwe. One handbook on IPM in vegetables. Several internal reports.
8b	7	No specific information given, but the handbook published should inspire and have an impact on country policy level on emphasizing IPM in the future.
8c	10	The handbook and published posters will have great influence. The project has worked in collaboration with ACRITEX (Agricultural Technical and Extension Services).
8d	8	The new IPM strategies outlined and the publication of the handbook should be of great help for the extension service and have an impact on the end users (small-scale vegetable producers).
8e	8	Through CPP website, annual reports etc. Publications of posters etc. could have an impact on the international donor community. The project serves as a good baseline for further IPM-projects in Zimbabwe.

Project 2

Title: Development of biorational brassica IPM in Kenya	
Project no.: R7449	Project cost: £ 330.570
Start date: 01.08.1999	End date: 31.05.2002
Country: Kenya	
Lead institution: NRI	Associated institute in developing country: KARI, CABI ARC
Production System: Peri-Urban	Cluster: Vegetables

Project overview

Project purpose: “To secure and enhance the incomes of small holder peri-urban vegetable farmers by developing an improved sustainable IPM system for brassica production in Kenya”.

A socio-economic survey including 200 farmers identified the diamond back moth as the priority pest problem for vegetable farmers in Kenya. Two non-chemical control options were found promising in an earlier project (R6615), a virus and pheromone mating disruption. The present project showed that the pheromone technique was not successful on small plots, typical for Kenyan farmers. It could be demonstrated that the virus, endemic to Kenya, gave better control than the insecticide most widely used for diamond back moth.

The project has made progress towards a commercial product. A large number of field trials were performed at two national research centres, including different application rates, persistence and new formulations of the virus, comparing it with an untreated control and insecticide use. A tank mixing of the virus and an insecticide could control aphids, the second most important pest.

The conclusion by the project that the virus is economically competitive with expensive imported insecticides, is valid based on the many field trials performed.

A draft protocol for biopesticides in Kenya has been developed and adopted by the Kenyan authorities. Development of a local production of the virus biopesticide to control the diamond back moths continues in another CPP project (R8217), and production in Kenya will start as soon as the authorities give permit.

Project evaluation – its strengths and weaknesses

The project has achieved its purpose by presenting a new biocontrol technique which farmers can use as a non-chemical control method, however, a commercial product is not available. Another promising technique, based on pheromones, was not successful in small fields typical for Kenyan farmers.

Criteria no.	Scoring	Comments
1	8	The project has demonstrated that the virus (isolated in an earlier project) gave good control of the pest in field trials and that the mass production could be improved by adding juvenile hormone.
2	10	Several CPP projects emphasis microbial control of insect pests in Kenya. The present project is a continuation of project R6615, so work on practical application of this non-chemical method for peri-urban farmers has been going on for 6 years (1996-2002).
3	7	The project does not represent a very high innovativeness since virus products for a long period have been available as an option for insect control. However, to test the efficacy of a local strain and especially development of local mass-production may include a great deal of risk-taking towards a final commercial product ready for sale. The study of pheromone mating disruption was based on promising results in an earlier project. However, after several field trials it was concluded that the method was not successful and do not represent a feasible control option for small vegetable farmers in Kenya.
4	9	The project demonstrates a good overview of current knowledge. Its collaboration with project R7960 in West Africa links with French language literature.
5	8	The project has made substantial progress towards the output PUa in the log frame by reducing impact of pests, improving yield and reducing pesticide hazards. The final goal must be the commercial product.
6	8	Training of KARI staff. 1 MSc at Kenyatta University.
7	10	The CPP work on biopesticides in Kenya has established a long-term relationship between KARI and NRI (3 projects 1996-2004).
8a	10	One refereed paper in press 2002. It is intended to submit two papers to international

Criteria no.	Scoring	Comments
		journals by the end of 2002. In 2002, at least 5 papers presented and printed in the proceedings from international conferences/symposia on biocontrol/IPM.
8b	10	Close collaboration with Kenyan authorities on a draft protocol for biopesticides.
8c	5	One video produced. There has been little activity in dissemination to extension service etc., but the ongoing project (R8217) will include demonstration of the final product.
8d	5	See above, point 8b. The socio-economic survey included 200 farmers around Nairobi. One field day for farmers was organized.
8e	7	CPP has highlighted several of the ongoing peri-urban projects in East Africa in several "highlights" papers and in the brochure "Combating vegetable pests in Kenya".

Project 3

Title: Developing weed management strategies for rice-based cropping systems in Bangladesh	
Project no.: R7471	Project cost: £ 249,410
Start date: 01.10.1999	End date: 31.12.2002
Country: Bangladesh	
Lead institution: NRI	Associated institute in developing country: Bangladesh Rice Research Institute (BIRRI)
Production System: Land-Water Interface 2	Cluster: Rice

Project overview

Project purpose: "Improved and cost effective methods for control of weeds in floodplain rice production systems developed and promoted".

Background: Weeds are a major source of yield loss in rice. In Asia, as a result of increasing labour costs, the farmers are looking for other options and hand-weeding is being replaced by herbicides. In a recent brochure⁶, based on CPP projects both in Bangladesh and India, it is concluded: "Once farmers learn to use herbicides effectively, labour costs can be halved with change to direct-seeding rice instead of transplanting".

The project reviewed weed management practices, and weed population ecology and the impact of weeds on rice yield were studied. The study also included strategies to reduce the build-up of weed populations by regulation of soil seed banks. Socio-economists made a survey describing farmers' perception of weeds and their control measures. Yield resulting from the use of herbicides followed by one hand weeding was as good as three hand weedings. Even if some weed species seemed to be difficult to control by herbicides, the project concluded that herbicide adoption will not necessarily disadvantage poorer households.

Project evaluation – its strengths and weaknesses

A solid study including a large range of field trials to underpin the overall conclusion. One aspect, which has not been studied in detail so far, and should raise some concerns, is the possible negative effects of herbicides to farmers' health and in the environment and a possible building up of resistance. In project R7471 these issues have only been peripherally commented upon.

Criteria no.	Scoring	Comments
1	9	New knowledge provided on weed impact in rice in two areas of Bangladesh.
2	10	Little research has been performed on impact of weeds in Bangladesh.
3	5	The project has not been very innovative as it relies on traditionally weed experiments and effects on yields.
4	9	Regional publications from Bangladesh and India are included, as well as literature sources from the international centres like IRRI and WARDA.
5	9	The outputs in the LW1a log frame (developing strategies by minimizing impact of target pests and promotion and dissemination of such strategies) have been achieved.
6	10	The project has contributed to science capacity building in Bangladesh by including staff from BIRRI.

⁶ Johnson, D., Mortimer, M., Orr, A. & Riches, C. 2003. Weeds, rice and poor people in South Asia. NRI, CPP, IRRI. 10 pp.

Criteria no.	Scoring	Comments
7	10	Several projects on weed problems in rice in Asia (R7377 in India and R8243 – dissemination of the present projects in Bangladesh) have strengthened the links between NRI, BRRI and Indian partners.
8a	6	In refereed journals: 2 (if the proceedings from the Brighton Crop Protection Conference can be included in this category?). Four additional papers presented at international conferences/workshops.
8b	8	BRRI staff maintained liaison with the Department of Agricultural Extension during the course of the project.
8c	8	Workshops and field days for extension workers have been organized and some fact sheets and posters produced for dissemination of findings. The new project (R8234) will make the outputs more available to the extension service.
8d	7	Farmer field days were also organized (cf. project R8234).
8e	7	Brochures like the one published by NRI, CPP and IIRI (see footnote 1 above) are supposed to be noticed at the international donor level.

Project 4

Title: Pests of African Sorghum	
Project no.: R7572	Project cost: £ 304,520
Start date: 31.03.2000	End date: 31.05.2003
Country: Kenya	
Lead institution: NRI	Associated institute in developing country: KARI, ICRISAT
Production System: Semi-arid 2	Cluster: Cereals and legumes

Project overview

Project purpose: “Strategies developed to reduce the impact of pests and stabilize yields in semi-arid cereal based cropping systems for the benefit of poor people”.

The main insect pests of sorghum were identified, and the project also provided biological information on how stover management influenced the pest population, and how simple treatment of stover could be taken into consideration to reduce the population between growing seasons. Host plant resistance, intercropping and manipulation with sowing dates were shown to be efficient control methods.

Project evaluation – its strengths and weaknesses

The project is not innovative in its experimental design, but has tested traditional and low-cost plant protection methods, which could easily be implemented farmers to reduce the pest influence and increase sorghum yields.

Criteria no.	Scoring	Comments
1	6	New sorghum varieties developed for Southern and East African countries from KARI/ICRISAT tested for pest resistance for the three most important insect pest species in Eastern and Western Kenya.
2	9	Pest resistance and low-cost cultural practices (two traditional pest control strategies) were identified and tested in field trials under semi-arid conditions in Kenya, where little information on the effect of these control methods was available.
3	6	Not a prominent innovative project, however, several large on-farm and on-station trials during partly unreliable growing conditions during two years in both Eastern and Western Kenya represented a risk on data produced.
4	6	The latest reference given on sorghum pests is from 1995 (PCSS dated 06/11/2003, FTR dated = ?). Recent sorghum pest studies in West Africa (CIRAD) and from Eritrea (University of Asmara) should have been consulted.
5	8	The outputs of SA2 log frame have been achieved (SA2a Strategies developed – SA2b Promotion of strategies), especially the development of simple and user-friendly cultural (non-chemical) methods for farmers.
6	9	Excellent co-operation with KARI in studies both in Eastern and Western Kenya. 2 theses produced (1 PhD and 1 MSc) by national research staff.
7	10	The project continued long-term relation between KARI and NRI, involving other CPP projects in East Africa, e.g. R7518 (1999-2002).

Criteria no.	Scoring	Comments
8a	4	No paper published in international journals, papers only available as technical reports etc. through CPP.
8b	6	No specific effort seen, but since KARI has played a significant role, some information has probably been delivered to a higher political level in Kenya.
8c	8	National extension staff has been involved in the study at various levels (PRA methods, interviews, workshops etc.)
8d	10	Simple and efficient crop protection methods produced and validated, 7 farmers panels trained in on-farm experiments. Emphasis should now be given to spread the results to the end users, smallholders' sorghum producers, by NGOs and the national extension service in Kenya. The extension service seems to function well and has a high rank by the farmers.
8e	5	No specific leaflet or project highlight seen apart from CPP annual reports.

Project 5

Title: Public-private partnerships for development and implementation of entomopathogenic viruses as bioinsecticides for key lepidopteran pests in Ghana and Benin, West Africa	
Project no.: R7960	Project cost: £ 285,607
Start date: 01.01.2001	End date: 31.03.2004
Country: Bangladesh	
Lead institution: IITA, NRI	Associated institute in developing country: Plant Protection and Regulatory Services Directorate, Ghana, Service Protection des Vegetaux et Controle Phytosaitaire, Benin
Production System: Peri-Urban	Cluster: Vegetables

Project overview

Project purpose: “Promotion of pro-poor strategies to reduce impact of key pests, improve yield and quality of crops, and reduce pesticide hazards in peri-urban systems”.

The project identified diamond back moth as the most important pest in vegetable in peri-urban systems, creating heavy pesticide use. A granulovirus imported from Kenya showed to be significantly more virulent towards diamond moth larvae than the same virus from Benin. Field trials demonstrated that the virus was as effective as the use of chemical control in brassica. Farmer demand for the product was evident, and they were disappointed that the product was not commercially available.

Development of an export market for vegetable where small-scale farmers are included, will stimulate the use of biopesticides and reduce the risk of pesticide residues in the products.

Project evaluation – its strengths and weaknesses

Overall a good project and an excellent example of south-south collaboration. There is a need to establish specific regulatory guidelines and local production.

Criteria no.	Scoring	Comments
1	8	The effect of the granulovirus was known from another CPP project in Kenya (R7449), and when it was shown in the lab that the virus from Kenya was more virulent than the similar virus from Benin, the Kenyan isolate was used in field trials. New knowledge includes the testing in fields in Benin and Ghana showing an increase in yield and commercial value of cabbage.
2	10	The project had close liaison with the CPP project R7449 in Kenya, which already had identified a virulent endemic granulovirus in Kenya (see above).
3	8	To test the virus from Kenya in West Africa when the indigenous isolate failed, was an innovative step towards commercialization in the region. The risk-taking could be a low effect of the virus in West Africa. One of the project's activities was to examine the constraints and opportunities for production and use of biopesticides in Ghana and Benin.
4	10	The project showed an excellent awareness of current knowledge in East and West Africa, including English and French literature.
5	10	The outputs and indicators (2004) achieved.
6	10	The project represents excellent science capacity building, especially through the many

Criteria no.	Scoring	Comments
		students involved in research from the universities both in Ghana and Benin.
7	10	Good collaboration between West African institutions and IITA and NRI. The close links to several other similar thematic CPP projects strengthened the impression of longer-term relationships. The project is also a good example of an excellent south-south collaboration.
8a	10	Several reports from international symposiums available in proceedings (some also on web). So far no refereed papers, however three articles are in preparation, probably headed for international journals. Ten student reports or theses (1 MSc., rest Diplôme d'Ingénieur des travaux etc.).
8b	10	Plant Protection Departments and Pesticide Regulatory Authorities in Ghana and Benin have been involved in the project from the start.
8c	10	Socio-economic surveys have identified stakeholders interested in developing biopesticides, and information exchange workshops for private and public sectors have been organized. Priorities in a second phase (market development) will emphasize distribution and farmer/extension education programmes.
8d	8	When the commercial product is produced, it will have a great impact on peri-urban vegetable growers as an important non-chemical insect pest control option.
8e	7	The many donor-supported projects on biopesticides in developing countries should be coordinated to secure regulatory guidelines on a regional basis. The present project had collaboration with pesticide regulatory authorities in West Africa and has important links to similar work in Kenya. CPP has in several project highlights tried to raise awareness on this issue.

Project 6

Title: Integrated management of the banana weevil in Uganda	
Project no.: R7972	Project cost: £ 183,304
Start date: 01.03.2004	End date: 30.04.2004
Country: Uganda	
Lead institution: University of Reading	Associated institute in developing country: National Agricultural Research Organisation (NARO), National Banana Research Programme Kawanda, IITA, CABI ARC
Production System: Forest-Agriculture FA1	Cluster: Banana

Project overview

Project purpose: “To validate the use of a biological control agent, the fungus *Beauveria bassiana*, within an integrated crop management system for controlling banana weevils”.

The project evaluated several local waste products for mass production of the fungus *Beauveria bassiana* for microbial control of the banana weevil, however there was no advantage of using this alternatives compared to grain substances such as maize or rice. On-station experiments evaluated efficacy and persistence of *B. bassiana* under different soil amendments. The field evaluations showed that the fungus will need to be applied 3 or 4 times a year.

The effect of banana spacing was also studied to see the effect of the fungus on the weevil. The yields demonstrated that lower spacing than the traditional one, gave a higher yield per unit area, even if the greatest weevil damage occurred at the closer spacing. Studies including the use of pheromone-based traps or kairomone-baited traps (using banana tissue as an attractant) showed that the weevils aggregated around such traps. When the fungus is placed on such traps, a large amount of adult beetles will then be infected and killed.

Project evaluation – its strengths and weaknesses

The project included many interesting lab and field experiments, showing that *B. bassiana* could be a promising candidate for biocontrol of the banana weevil in Uganda. However, new studies must be performed (large on-farm field trials), the mass production techniques must be refined and proved to be cost-effective and locally producers must be located.

Criteria no.	Scoring	Comments
1	6	The entomopathogenic fungus <i>Beauveria bassiana</i> has been used as a biocontrol agents for many years, but the new knowledge of this projects includes that local isolates can be effective and produced on locally available grain substrates. A study of use of pheromone traps showed that beetles aggregated around traps and became infected by the fungus.
2	7	The fungus <i>B. bassiana</i> has for many years been studied as suitable candidate for microbial control of different insect pests. The project evaluated local waste from industry etc. as possible substrates for mass production. The use of pheromone traps to spread the fungus infection in the beetle population can be an important part of a future integrated strategy to control the banana weevil.
3	6	The project built on an existing knowledge (<i>B. bassiana</i>), however it ran into some production constraints due to lack of equipment and inadequate laboratory space.
4	9	The project was a collaboration between University of Reading, IITA, CABI ARC, South African scientists, NARO NBRP, representing a sound scientific knowledge on the potential of biocontrol in Africa.
5	8	The output FA1 in the log frame has been achieved; developing strategies that reduce impact of pests and stabilize yields.
6	10	The project has emphasized capacity building in Uganda by including 2 MSc and 1 PhD as well as scientists at the National Banana Research Programme (NBRP)
7	5	Other projects on promotion of improved IPM practices for banana in Uganda will together with the present project have strengthened Ugandan scientists' African network and the relationships with University of Reading and NRI.
8a	10	Publications in international refereed journals and books: 2; + 2 papers in Uganda Journal of Agricultural Sciences. 13 papers presented at international conferences.
8b	6	The project had close contact with National Agricultural Research Organisation, National Banana Research Programme in Uganda.
8c	5	The dissemination to the outreach services in this project has not been very extensive, however, other recent project ensure promotion of outputs.
8d	5	10 farmers' fields were included in the on-farm evaluation. One farmer workshop and one farmers open day organized.
8e	5	No specific effort seen from this project, however, CPP strongly promote its research within biocontrol as an important option for small-scale farmers to reduce risks of pesticides.

Project overview

The project purpose was to contribute to the sustainability of rural livelihoods in coastal areas of Tanzania and Mozambique by addressing the threat to food security posed by cassava brown streak and cassava mosaic virus diseases [CBSD and CMD]. Research activities were undertaken to develop control measures for the virus complex and these were divided into four main categories:

- i) Basic research on the transmission and spread of Cassava brown streak virus [CBSV].
- ii) Adaptive research to multiply and distribute virus-free planting material of CBSD-tolerant cultivars.
- iii) Surveys to determine the incidence and severity of CBSD in parts of the Region not previously surveyed.
- iv) Monitoring and evaluation activities consisting of socio-economic studies of the role of cassava in rural livelihoods and the impact of CBSD and also, an assessment of the usefulness of the recommended control measures.

Project 7

Title: Control of cassava virus diseases in eastern and southern Africa	
Project no.: R7563	Project cost: £ 268.136
Start date: 1 January 2000	End date: 31 December 2001
Country: East Africa; Tanzania and Mozambique (Malawi and Kenya)	
Lead institution: NRI	Associated institute in developing country: MAFS Naliendele and Kibaha Institutes
Production System: Forest-Agriculture1	Cluster: Roots & tubers

Evaluation of research activities

Vector transmission studies

Field studies in southern Tanzania to determine rates of spread at different altitudes and screenhouse studies Kibaha Research Station appear to be very relevant methodology for this kind of work. Although the actual populations of suspected vector organism (*Bemisia tabaci* and *B. afer*) were too low to yield solid information, other observations indicated a covariation of whitefly population and the CBSD occurrence. New experimentation applying better control over experimental conditions was proposed as well as looking at other possible vector organisms.

Screening of local and improved cultivars for resistance to CBSD.

Field trials for the identification of resistance to CBSD the development of leaf and root symptoms were conducted. This investigation revealed useful material for the purpose of multiplication of better planting material.

Socio-economic assessment of cassava in four target villages.

This study revealed a big potential for the adoption of growing new resistant cultivars both to improve food supply and farm income by selling cassava as a commodity.

The deployment/dissemination methodologies chosen for the resistant cassava have given the expected results in terms of high number of farmers affected by the participatory approach.

Documents show that all of the planned activities were undertaken and expected outputs achieved to a very satisfactory degree. The impact of the project on poverty reduction apparently has been great due to its fulfilment of the goals set out.

Project evaluation – its strengths and weaknesses

Being a project of short duration it succeeds to take earlier findings and new results into a practical use for the benefit of rural populations in the East African region by dissemination of resistant cassava material as well as increasing awareness of the CBSD. The scientific challenge of disclosing the vector relationship could not be finally solved during this project.

Criteria no.	Scoring	Comments
1	9	Vector studies, resistance testing needed as a prerequisite for advance
2	8	
3	7	Exploitation of resistance
4	8	Selection builds on own earlier research in the area
5	9	Results in accordance with goals
6	8	Scientific achievements have been further exploited by local authorities and a number of NGOs
7	8	Collaboration has been fortified through the project
8a	9	All relevant for this project, including TV program
8b	9	Several countries involved
8c	9	Yes, but different services available in different countries
8d	9	A large number of farmers/households have gained from the deployment/dissemination of new, resistant material and awareness created by the project
8e	9	Comprehensive reporting. Also workshops arranged

Project 8

Title: Characterisation and epidemiology of root rot diseases caused by <i>Fusarium</i> and <i>Pythium</i> spp. in beans in Uganda	
R7568	Project cost: £ 445,832
1 April 2000	31 March 2003
Lead institution: Horticulture Research International, Wellesbourne, Warwick, UK	Associated institute in developing country: Namulonge Agr. & Animal Res. Inst., Uganda
Production System: Hillside	Cluster: Beans

Project Overview

Objectives: To refine and promote methods for the sustainable control of bean root rots. The project aims to take an innovative approach to the problem by determining the significance of interactions, not only between components of the pathogen complex causing the disease, but also between different farming practices and crop environments. This will enhance the productive capacity of bean crops, particularly in Uganda (as a representative east African country), but also in countries where beans are grown under similar conditions, such as Kenya, Rwanda and Tanzania. The project aims to understand farmers' perceptions of the causes and potential control measures for bean root rots. The epidemiology of root rots will be studied and the significance of interactions between the pathogens causing the disease, other soil micro-organisms and associated bean pathogens and pests will be determined. Focussed interviews and surveys of smallholder farmers will be undertaken to determine the socio-economic factors influencing pest management decisions and control strategies. The information obtained will be applied to develop improved crop management methodologies for sustainable production of beans by resource-poor, smallholder farmers.

Project Evaluation - its strengths and weaknesses

The reports clearly show that eight different goals have been attained through the project. Basically, research has provided the farming community with knowledge about the further use of available bean cultivars in different cropping environments.

The actual direct impact on rural development and poverty reduction is, however, difficult to assess. A follow-up promotional project has been started to develop this aspect.

Scientific capacity building in Uganda has been attained during this project in the form of MSc and PhD training.

Root rots have been identified as major constraints to the cultivation of beans as cropping intensity increases. Farmers' perception of causes of crop failures and their understanding of possible remedies to improve yield has been studied. Participatory plant breeding has been undertaken as one direct solution.

No peer-reviewed articles have been published in the wake of the project.

Criteria no.	Scoring	Comments
1	8	Root rots have been identified as major constraints to bean growing
2	8	Local development of diagnostic tools
3	7	
4	8	Builds on relevant knowledge
5	8	Results in accordance with goals
6	8	Scientific capacity building through local participation has been secured
7	8	Extension of earlier collaboration
8a	6	Peer-reviewed articles are lacking
8b	8	Leaflets
8c	8	Yes
8d	6	The project highlights research as a prerequisite for extension for rural impact
8e	7	No peer-reviewed articles have been published in the wake of the project.

Project 9

Title: Rice sheath blight complex caused by Rhizoctonia species: Pathogen epidemiology and management strategies	
Project no.: R7778	Project cost: £ 276,941
Start date: 1 June 2000	End date:30 November 2003
Country: Bangladesh	
Lead institution: Warwick NRI, University of Warwick, UK	Associated institute in developing country: Bangladesh Rice Research Institute, University of Rajshani, Bangladesh, Rural Development Academy, Bangladesh, Bangladesh
Production System: Land/Water Interface	Cluster: Rice

Project Overview

Project purpose: To develop, validate and promote new knowledge that reduces poverty through improved and sustainable management of important fungal diseases of food crops – Rhizoctonia sheath diseases of rice.

Specific objectives of this project were to establish the occurrence and epidemiology of the Rhizoctonia species involved in the sheath disease complex by assessing the diversity and distribution of the pathogen populations and their importance in the disease complex, utilising diagnostic PCR and molecular markers. To develop disease control strategies exploring host resistance, cultural and biological control. Achievement and promotion of these outputs will provide BRRI and associated agencies with knowledge and resources to develop improved management strategies for rice sheath disease complex, which is a primary objective of the target institution.

Outputs: Knowledge of the Rhizoctonia sheath diseases and the pathogens established and disseminated to target beneficiaries.

Disease management strategies based on host resistance, cultural and biological control developed and promoted.

The applied methodology using socio-economic surveys, disease surveys and new tools for diagnosis is relevant and has yielded results in accordance with the objectives outlined. Disease management strategies based on resistance/tolerance and soil amendments were established as a scientific platform for further practical work at the farm level. This entails a major strengthening of the capacity at various levels.

Project overview - its strengths and weaknesses

The project has succeeded in sorting out the causes of the leaf sheath disease complex and to depict the relative importance of the tree component diseases in all seasons for four districts of Bangladesh.

Moderately resistant cultivars have been identified as well as soil amendment practices.

It is not clear to what extent disease management strategies based on host resistance, cultural and biological control have been promoted at the farm level. Publications addressing other audiences are comprehensive.

Criteria no.	Scoring	Comments
1	8	Increased knowledge of the Rhizoctonia sheath diseases
2	8	The project encompasses very diversified disciplines; socio-economic, disease surveys and molecular studies
3	7	Exploitation of resistance, soil amendments
4	8	Builds on all available existing information
5	7	Results in accordance with goals
6	8	Several academic institutions have been involved in the project as well as field workers. Exchange of knowledge and material
7	8	Very satisfactory
8a	9	All relevant for this project
8b	8	Several universities and rural academy institutions involved
8c	8	Yes
8d	6	Not clear to what extent farmers are addressed directly in the present project
8e	9	Comprehensive reporting. Also workshops arranged

Project 10

Title: Promotion of and technical support for methods of controlling whitefly-borne viruses in sweet potato in East Africa	
Project no.: R7492	Project cost: £ 218,366
Start date: 1 November 1999	End date: 31 October 2002
Country: Uganda, Tanzania	
Lead institution: NRI, University of Greenwich	Associated institute in developing country: Namulonge Agr. & Animal Res. Inst., Uganda, Maruki Agr. Res. Inst., Tanzania, Ukuriguru Agr.Res. Inst., Tanzania
Production System: Forestry – Agriculture 1	Cluster: Roots & tubers

Project overview

Major constraints to sweet potato productivity have been pointed out as a result of the project, and resistance to SPVD has been located. Phytosanitary procedures for the cultivation have been prepared as a way of minimizing disease impact.

Direct beneficial impact on rural development is only expected as the outcome of the next phase of the activities.

Objectives: The project aimed to safeguard an improve sweet potato production in East Africa by minimising the impact of sweet potato virus disease (SPVD) through the identification of superior resistant varieties and the development of appropriate phytosanitary measures.

Project evaluation – its strength and weaknesses

Farmers' perceptions of interesting traits for sweet potato cultivars has been used as part of the basis for a participatory breeding program.

More or less complete resistances have been identified, but local experiments reveal cultivar x place interactions. This has been interpreted as a justification of localised breeding/selection work. This work has already been taken up by a follow-up project on participatory breeding as a farmers' field school activity.

Due to the prevalence of other disease problems, the approach needs a fortification through the use of phytosanitation procedures at the farm level.

Reporting at various levels has been adequate and forms a solid basis for local actions on stabilising sweet potato yields.

Criteria no.	Scoring	Comments
1	8	Varietal x place interactions
2	8	Challenged by strong geographical interactions which call for tailored cultivars locally adapted
3	8	Exploitation of resistance, local phytosanitation procedures
4	8	Builds on all available existing information
5	8	Results in accordance with goals
6	8	MSc student work
7	8	Extension of earlier collaboration
8a	9	Peer-reviewed articles
8b	8	Leaflets
8c	8	Yes
8d	6	The project highlights research as a prerequisite for extension for rural impact
8e	8	Comprehensive reporting. A follow-up project on participatory breeding has been drafted and implemented.

3.5 SCIENCE QUALITY

Overall Evaluation of the CPP Programme

Comments to each scores for the eight criteria are given in paragraphs 42-51, where the ten project are reviewed in more details. As an overall conclusion, the CPP Programme held a relatively high score for most criteria given. Some variation can be seen, e.g. in dissemination, but often a subsequent project will continue this processes.

However, one relatively low score is notable on innovation and risks. The CCP-projects evaluated are not dominated by cutting edge natural science with new high risk technology, but relying and developing crop protection methods, such as biological control of pests, proved to be successful in other tropical and sub-tropical areas. The majority of small-scale rural and peri-urban farmers in a region are the projects beneficiaries as soon as the outputs have been implemented by the research community, NGOs, extension service and the private sector. The projects held a relatively high score in most cases, however, some variation can be seen, eg in dissemination, but often a subsequent project will continue this process.

To highlight one important output from the Crop Protection Programme the work on understanding the transmission and stop the rapid spread of cassava virus diseases in Eastern Africa can be mentioned (see evaluation of project R7563 below). International Institute of Tropical Agriculture (IITA) has also recently highlighted these viruses as an important biological risk for African farmers⁷. African farmers put biological risks at the top when categorizing the risks they face (biological, political, labour, asset loss and war/crime). Mr. Hartmann, DG of IITA, wrote⁸: “We do not know much about this virus (i.e. cassava brown streak virus) and much research is still needed, but DFID’s earlier contributions gives us a head start”.

Contribution of Projects Sampled to New Knowledge

Three of the ten selected projects scored average, giving this criterion a total lower score than the others, with one exception: Innovation and risk. Still, the contribution to new knowledge was relatively high.

Extent the projects Use Existing Knowledge Creatively in New Contexts

The high score of the ten projects sampled shows that new knowledge has been used creatively in new contexts.

Innovativeness and Scientific Risk-Taking

One noticeably lower rating was obtained for the CPP Programme in relation to its innovativeness and scientific risk-taking, but still above average. Five of the ten project cannot be evaluated as especially innovative (see comments given for projects no. 1, 2, 3, 4 and 6).

Awareness of All Current Knowledge

The score for awareness of current knowledge of the CPP Programme is high.

Achievements of Science Outputs in Log Frames

The expected science achievements outlined in the log frame have been met at programme level. For most of projects the achievements have been met in a very satisfactory way.

3.6 SCIENCE CAPACITY BUILDING

Science Capacity Building in the South

The contribution of the CPP projects to science capacity building in the scientific communities in developing countries involved has been high. In fact, this criterion had the highest rank of all the eight criteria used in the evaluation.

⁷ Hartmann 2004. An approach to hunger and poverty reduction for sub-Saharan Africa. IITA, 18 pp.

⁸ UK parliament STC 2004. Use of science in UK’s development policy: oral and written evidence. Vol II.

Development of Long-Term Institutional Relationships between UK Institutions and Southern Institutions

The longer-term institutional relationships between UK institutions and Southern institutions have developed in an excellent way. The ten projects were given a high score (the second highest) with regard to this relationships.

3.7 KNOWLEDGE AND DISSEMINATION

Rating of the Overall Result Knowledge Dissemination from Programme

The overall result knowledge dissemination from the CPP Programme is rated high. There are some minor differences which can be observed when dissemination is subdivided into five categories (see the following paragraphs). For a few of the projects, especially within the categories end users and international donor community, the score was average, giving a reduction in the total score.

Knowledge Dissemination to Science Community

The knowledge dissemination to science community scored high.

Knowledge Dissemination to Developing Country Policy Audiences

The knowledge dissemination to developing country policy audiences was regarded as high, however, some differences in scoring between projects could be seen.

Knowledge Dissemination to Developing Country Outreach Services

The knowledge dissemination to developing country outreach services can be regarded as high. However, two projects scored average.

Knowledge Dissemination to Developing Country End Users

The scoring in this dissemination category can still be regarded as relatively high, but it is lower than the three previous categories as some projects scored average.

Knowledge Dissemination to the International Donor Community

The dissemination to the international donor society is evaluated in much the same way as for the end users, relatively high, but with some projects scoring average.

3.8 CONCLUSIONS AND LESSONS LEARNT

As an overall conclusion, the CPP Programme held a relatively high score for most criteria given. Some variation can be seen, eg in dissemination, but often a subsequent project will continue this processes.

However, one relatively low score is notable on innovation and risks. The CPP-projects evaluated are not dominated by cutting edge natural science with new high risk technology, but relying and developing crop protection methods, such as biological control of pests, proved to be successful in other tropical and sub-tropical areas. The majority of small-scale rural and peri-urban farmers in a region are the projects beneficiaries as soon as the outputs have been implemented by the research community, NGOs, extension service and the private sector.

Future research projects within the framework of DFID's CPP will be able to hold a continuous high quality regarding capacity building, science quality and management.

Key ingredients to success within the programme

The evaluators of the ten projects find that the projects largely have contributed to a success, and this overall finding may be briefly summarized in the following bullet points because these points are relevant success factors and because the projects may be described using these phrases:

- Regional and national capacity building has been the main focus throughout.
- Infrastructural development relevant for the needs of the target communities has been adequately addressed throughout the programme. The projects have supported the development of using research and research networks as tools for combating rural poverty
- Promotion and up scaling of research findings have been addressed in some of the projects and the needs for further promotion project have been proposed.
- Scientific approach has been applied throughout giving an overall impression of high academic standard for the research activities described.

The insight into the programme is based on a more or less random selection of projects, but the “instant pictures” seem to reveal a sound craftsmanship in planning, management and reporting at the scientific side while at the same time addressing the needs for promotion and up scaling for the benefit of poverty reduction.

Key lessons emerging from the programme that need to be considered for future research strategies.

- To ensure that all separate projects fit into an overall Integrated Pest Management strategy that is acting on a regional base emphasizing knowledge dissemination to the end users, the small scale farmers.

Research Themes Recommended for Continuation in the Future

We will recommend the following research topics for a continuation:

1. Insect pests in Sub-Saharan Africa

Non-chemical pest control options emphasizing microbial control of insect pests. The regional focus should be strong, however, production units could be locally based. Examples of such research activities were given in the evaluated projects no. 2 (R7449), 5 (R7960) and 6 (R7972).

One should keep in mind that future control options cannot be based on one single control method only, eg microbial control, therefore a combination with other techniques is probably the best solution, ie integrated pest management (IPM).

IPM-projects within one country, projects no. 1 (R6764) and 4 (R7572) have been too limited in scope and should not be continued unless they are upgraded to a regional scale.

IPM and its holistic approach to pest control will constitute a key factor within plant protection for the foreseeable future. Coordination of IPM research on a regional base in Sub-Saharan Africa (East, West, Central, Southern) would ease the access to international markets, e.g. by meeting EU-regulations for export of agricultural products to Europe.

2. Weed problems in rice in Asia

The future use of herbicides in Asian rice fields seems to increase considerably in the future due to increasing labour costs and reducing water losses. (project no. 3 – R7471).

A continuation of this research theme should focus on the environmental impact of such a development, emphasizing risks for human health by use of pesticides and pesticide contamination of rice growing regions, which often include important water resource areas.

3. Disease control in Sub-Saharan Africa

We find it important to support projects that aim at presenting means of sustainable disease control amongst which exploitation of disease resistance ranks high. Thus projects like no. 7 (R7563, Control of cassava virus diseases in eastern and southern Africa) and no. 9 (R7778, Rice sheath blight complex caused by *Rhizoctonia* species: Pathogen epidemiology and management strategies) and no. 10 (R7492 Promotion of and technical support for methods of controlling whitefly-borne viruses in sweet potato in East Africa) would be good examples of themes that merit more work. Scientific staff operating across several countries could support work on important crops grown over vast regions.

3.9 KEY RESOURCES

The most useful key resources for information during the reviewing of the programme have been:

- The final technical report for each project.
- Publications, both scientific and outreach material, from each project.

Annex 1 CPP. Thematic overview of totally 307 CPP projects. The projects are categorized by title, and each project is placed in one category only. The year the project terminated is given

Category	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Sum
Pesticide mode of actions etc	1	8	2									11
Diseases Biology	11	23	3	3	10	5	1	6	3	4	1	70
Nematodes Biology	1	2		1	1	1						6
Insects Biology		4	2			2	1	2	1			12
Weeds Biology	1	9	1	1	3	3	1	2			1	22
Virus & vectors	2	1		1	3			3		1	3	14
Migrant pests		1		1	3	2			3	3	1	14
Other pests e.g. rodents			1					1			1	3
Integrated Pest Man. IPM		8	1	1	7	7	4	12	8	5	10	63
Biocontrol of pests		18	3	3	10	2	1	1	1	2	1	42
Pesticides & environm.		2				1						3
Plant resistance	1	4			1	2		1	3		1	13
Publications Extension		1			1	1	1					4
Promotion of IPM practices						8	1			3	17	29

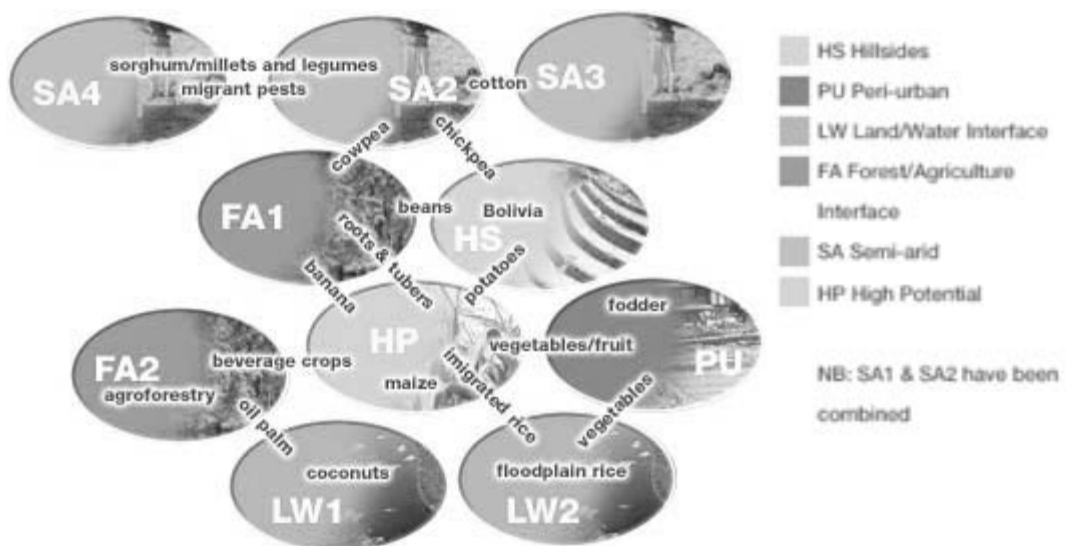


End of IPMSA Programme

The table must be interpreted with caution since each project was placed in one thematic category only, but some general tendencies can be suggested:

- The last projects in the previous programme IPMSA ended in 1997. IPMSA projects seemed to focus more on the biology of pests, diseases and weeds than on control and impact.
- Biocontrol was also emphasized in IPMSA, but such projects have continued in CPP during its 10-year period.
- Some IPM projects were included in IPMSA, however, in CPP's recent years IPM has been a prominent component of the programme.
- Promotion of new IPM techniques etc. has clearly been emphasized towards the end of the CPP programme.

Annex 2 CPP. Schematic to show relationship between CPP production system and thematic clusters



**Annex 3. DFID CROP PROTECTION PROGRAMME 1999–2005
HIGH POTENTIAL PRODUCTION SYSTEM – LOGFRAME March 2003**

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.</p>			
<p>PURPOSE Benefits for poor people generated by application of new knowledge on crop protection to High Potential production systems.</p>	<p>By 2005 improved maize crop protection methods promoted by at least three target organisations in order to achieve beneficial impacts on poor farmers and, as measured against baseline data, are contributing to one or more of the following:</p> <ul style="list-style-type: none"> • End-user satisfaction • Increased and/or stabilised food production • Increased productivity (labour, land use or capital) • Enhanced marketing opportunities 	<p>Project reports Reports of target organisations Programme and external evaluations</p> <p>Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment).</p> <p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose .</p> <p>Reports of target institutions e.g. NAFS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>	<p>Poor people invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed to reduce the impact of pests on poor peoples' crops and to improve quality and yield from High Potential cropping systems.</p> <p>1. Promotion of strategies to reduce the impact of pests and improve quality and yield from High Potential cropping systems for the benefit of poor people</p>	<p>A/B By 2005 factors affecting poor farmers' abilities to adopt improved crop protection methods in target systems identified and actions to remove barriers and create opportunities for poor farmers recommended. By 2005 new knowledge validated that can help stabilise yields, sustain the resource base and reduce drudgery through improved and sustainable management of:</p> <p><i>(HP102) Weeds in irrigated rice and rice-fish (2 systems by 2005). Addressed in LWPS2</i></p> <p><i>(HP104) Weeds in non-rice crops (1 system by 1999, 1 by 2005)</i></p> <p><i>(HP106) Nematode pests of bananas (2 systems by 1999) Addressed in FAPS2</i></p> <p><i>(HP107) Fungal, bacterial and phytoplasma diseases of food crops (3 diseases by 2001).</i></p> <p><i>(HP109) Insect-vectored virus diseases in maize-based cropping systems (1 system in each of 2 target countries by 2000).</i></p> <p><i>(HP110) Soil-borne pests (1 system in 1 target country by 2002).</i></p> <p><i>(HP111) Virus diseases of banana, cassava, yam, sweet and solanum potato and food legumes (strategy for 1 virus disease by 1999 and another by 2002) Addressed under FAPS1, SAPS2.</i></p> <p><i>(HP113) Imperata and Cyperus on cleared lands (Cyperus in 1 country by 1999). Imperata addressed under FAPS2.</i></p> <p><i>(HP114) Environmentally acceptable agrochemical use systems (1 by 2005) Addressed under PUPS</i></p> <p><i>(HP115) Insect pests of fruit and vegetables (2 systems by 2002). Addressed under PUPS</i></p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people through:</p> <p><i>(HP104) improved management of weeds in non rice cropping systems (1 system by 2000, 1 by 2005)</i></p> <p><i>(HP111) Virus diseases of banana and root crops (promoted under FAPS1)</i></p> <p><i>(HP114) Environmentally acceptable agrochemical application techniques and schedules (1 by 2005) Addressed under PUPS</i></p> <p><i>(HP115) Insect pests of fruit and vegetables (2 systems by 2002) Addressed under PUPS</i></p> <p><i>(HP116) improved integrated crop management for at least one maize-based based cropping system by 2005.</i></p>		<p>Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions.</p> <p>Resources of target institutions are adequate and sustained.</p> <p>Resources of technology transfer partners are adequate and sustained.</p> <p>Target beneficiaries adopt strategies and practices.</p>

Indicators underlined have been achieved. Indicators in italics represent non-maize outputs which are contributing to outputs in Forest-Agriculture, Land-Water Interface or Peri-Urban PS .

DFID CROP PROTECTION PROGRAMME 1999–2005 PERI-URBAN PRODUCTION SYSTEM – LOGFRAME March 2003		INDICATORS OF ACHIEVEMENT		MEANS OF VERIFICATION		RISKS AND ASSUMPTIONS	
NARRATIVE SUMMARY							
GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.							
PURPOSE Benefits for poor people generated by application of new knowledge on crop protection to peri-urban production systems.		By 2005, improved crop protection methods promoted by at least three target organisations in order to achieve beneficial impact on poor farmers and, as measured against baseline data, are contributing one or more of the following:		Project reports Reports of target organisations Programme and external evaluations Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment).		Poor people invest benefits to improve livelihoods.	
OUTPUTS 1. Strategies developed which benefit poor people by reducing impact of key pests, improving yield and quality of crops, and reducing pesticide hazards in peri-urban systems. B. Promotion of pro-poor strategies to reduce impact of key pests, improve yield and quality of crops, and reduce pesticide hazards in peri-urban systems.		By 2004 factors affecting poor farmers' abilities to adopt improved crop protection methods at least two target systems identified and actions to remove barriers and create opportunities for poor farmers recommended. By 2005 new knowledge validated with target organisations that stabilises yields, sustains the resource base and reduces drudgery through improved and sustainable management of: (PU101) Insect pests, diseases and nematodes in market gardening and horticultural enterprises (2 significant pest problems by 1999, 3 more by 2003). (PU102) Diseases of pastures and forage crops in intensive dairy production systems (1 system by 2002, programme development to identify demand and possible second project by 2004). (PU103) Pests which affect the quality of fruit (1 system by 1999, another by 2005). By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people for : (PU101) Horticulture systems (1 by 2002 and another by 2005). (PU102) Diseases of pastures/forage crops (1 system by 2005). (PU103) Pests affecting quality of fruit (1 system by 2000, another by 2005).		Reviews by Programme Management including recommendations for the evaluation of contribution to purpose. Reports of target institutions e.g. NARS, CG centres, development programmes, community organisations. Endorsement of outputs by development fora. Reports of workshops. Project technical reports, publications etc.		Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions. Resources of target institutions are adequate and sustained. Resources of technology transfer partners are adequate and sustained. Target beneficiaries adopt strategies and practices.	

Indicators underlined have been achieved

**DFID CROP PROTECTION PROGRAMME 2002– 2005
LAND/WATER INTERFACE PRODUCTION SYSTEM PURPOSE 1 – LOGFRAME March 2003**

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.</p> <p>PURPOSE Benefits for poor people generated by application of new knowledge on crop protection to coconut-based systems at the Land-Water Interface.</p>	<p>By 2005 improved crop protection methods disseminated and promoted by at least two target organisations in order to achieve beneficial impact on poor farmers and, as measured against baseline data, are contributing to one or more of the following:</p> <ul style="list-style-type: none"> • End user satisfaction • Reduced or stabilised losses to coconut pests • Improved programmes for screening and breeding coconuts for reduced susceptibility to key pests and diseases • Implementation of a strategy for replanting or rehabilitating areas affected by lethal coconut diseases 	<p>Reports of national, bilateral and multilateral organisations. Programme and external surveys of indicators of improved benefits (productive capacity, food security, wealth, nutrition and environment).</p>	<p>Policy, enabling environment and economics of coconut production are conducive for poor people to invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed for improving sustainable livelihood options of poor communities by minimising impact of target pests in Land-Water interface coconut-based systems.</p> <p>B. Promotion and dissemination of strategies to improve sustainable, environmentally-positive control of target pests in Land-Water interface coconut-based systems.</p>	<p>By 2004 factors affecting adoption of improved crop protection methods in at least two target countries identified and ameliorative actions recommended.</p> <p>By 2005 new knowledge validated that can help stabilise yields, sustain the resource base or reduce drudgery through improved and sustainable management of: (LW103) Coconut lethal yellowing-like diseases (at least 1 target country in Africa by 2002; second target country in Africa or Caribbean by 2004). (LW104) Budrot/premature nutfall (1 country by 2001). (LW105) Priority arthropod pests of coconut (1 pest guild in 1 country by 1999; another by 2005). (LW106) Coconut diseases of uncertain etiology (knowledge in 3 target countries by 2000; recommendations in 1 country by 2003).</p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people through: (LW107) Adaptive IPM and rehabilitation programmes (in two contrasting coconut-based systems, 1 in place by 1999, 1 by 2005).</p>	<p>Project technical reports, publications etc. Reviews by the Programme Manager. Project reports Reports of workshops Scientific publications Reports of target institutions. Endorsement of outputs by development fora. Adoption by development programmes or community organisations.</p>	<p>Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions. Resources of target institutions are adequate and sustained. Resources of technology transfer partners are adequate and sustained. Target beneficiaries adopt strategies and practices.</p>

Indicators underlined have been achieved

DFID CROP PROTECTION PROGRAMME 1999–2005
LAND/WATER INTERFACE PRODUCTION SYSTEM PURPOSE 2 – LOGFRAME March 2003

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.</p> <p>PURPOSE Benefits for poor people generated by application of new knowledge on crop protection to rice-based systems at the Land-Water Interface.</p>	<p>By 2005 improved crop protection methods promoted by at least three target organisations in order to achieve beneficial impact on poor farmers and, as measured against baseline data, are contributing to one or more of the following:</p> <ul style="list-style-type: none"> • End-user satisfaction • Increased and/or stabilised production • Increased productivity (land use, labour, capital) • Reduced use of toxic pesticides 	<p>Project reports Reports of target organisations Programme and external evaluations</p> <p>Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment). 3.10</p>	<p>Poor people invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed to minimise impact of target pests in rice-based Land-Water interface cropping systems, for benefit of poor people.</p> <p>B. Promotion of strategies to minimise impact of target pests in rice-based Land-Water interface cropping systems, for benefit of poor people.</p>	<p>By 2004 factors affecting poor farmers' abilities to adopt improved crop protection methods in two target systems identified and actions to remove barriers and create opportunities for poor farmers recommended.</p> <p>By 2005 new knowledge validated with target organisations that stabilises yields, sustains the resource base and reduces drudgery through improved and sustainable management of:</p> <p>(LW201) Weeds in rainfed/floodplain rice systems (1 system by 2002) (HP102) Weeds in irrigated rice systems (1 system by 2002). (LW203) Major insect pests in rice based systems (1 by 1999, 1 by 2003) (LW204) Major rice pathogens (1 system by 2003). (LW205) Major rice virus diseases (1 system by 2000). (HP109) Insect-vectoring virus diseases in rice-based cropping systems (1 in 2 countries by 2000).</p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people for:</p> <p>(LW203) rice insect pests (1 system by 2003) (LW206, incorporating outputs from LW 201,203,204) Low input rice systems (2 by 2005) (HP116) one irrigated rice based cropping system (1 by 2005). (LW207, incorporating HP114) at least one dry season cropping system (1 system by 2002, another by 2005).</p>	<p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose.</p> <p>Reports of target institutions e.g. NARS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>	<p>Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions.</p> <p>Resources of target institutions are adequate and sustained.</p> <p>Resources of technology transfer partners are adequate and sustained.</p> <p>Target beneficiaries adopt strategies and practices.</p>

Indicators underlined have been achieved

**DFID CROP PROTECTION PROGRAMME 1999–2005
FOREST/AGRICULTURE PRODUCTION SYSTEM PURPOSE 1 – LOGFRAME March 2003**

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.</p> <p>PURPOSE Benefits for poor people generated by application of new knowledge on crop protection to annual and herbaceous crops in Forest Agriculture production systems.</p>	<p>By 2005, improved crop protection methods disseminated and promoted by at least three target organisations in order to achieve benefit on poor farmers and, as measured against baseline data, are contributing to one or more of the following:</p> <ul style="list-style-type: none"> • End-user satisfaction • Increased and/or stabilised production • Increased productivity (land use/ labour/ capital) • Enhanced marketing opportunities 	<p>Project reports Reports of target organisations Programme and external evaluations</p> <p>Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment).</p>	<p>Poor people invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed to reduce the impact of pests and stabilise yields of herbaceous crops in Forest Agriculture systems, for benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests in herbaceous crops in Forest Agriculture systems, for the benefit of poor people.</p>	<p>AB/By 2005 factors affecting poor farmers' abilities to adopt improved crop protection methods in target systems identified and actions to remove barriers and create opportunities for poor farmers recommended.</p> <p>By 2005 new knowledge validated that can help stabilise yields, sustain the resource base or reduce drudgery through improved and sustainable management of:</p> <p><i>(FA101) Weeds in forest margins (1 system by 1999 & one by 2003). Addressed under HSPS</i></p> <p><i>(FA102) Nematode pests in bananas (1 system by 2000).</i></p> <p><i>(FA103) Nematode pests in root crops (1 system by 1999).</i></p> <p><i>(FA104) Insect pests of legumes and root crops (2 pest guilds by 2002). Transferred to SAPS1</i></p> <p><i>(FA105) Pathogens of root crops and bananas (2 systems by 2005).</i></p> <p><i>(FA106) Virus diseases of root crops (2 systems by 2000).</i></p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impact on the livelihoods of poor people through:</p> <p><i>(FA101) Weed control and conservation (1 system by 2002). Addressed under HSPS</i></p> <p><i>(FA 103,105) Root and tuber cropping practices (1 system by 2003).</i></p> <p><i>(FA102,105) Banana cropping systems at benchmark sites (1 system by 2005).</i></p> <p><i>(FA106) Production and promotion of virus-free resistant/tolerant cassava varieties (1 system 1997, 1 system by 2002).</i></p>	<p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose.</p> <p>Reports of target institutions e.g. NARS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>	<p>Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions.</p> <p>Resources of target institutions are adequate and sustained.</p> <p>Resources of technology transfer partners are adequate and sustained.</p> <p>Target beneficiaries adopt strategies and practices.</p>

Indicators underlined have been achieved - Indicators in italics are contributing to outputs in the Hillside and/or Semi-Arid production systems

DFID CROP PROTECTION PROGRAMME 1995–2005
FOREST/AGRICULTURE PRODUCTION SYSTEM PURPOSE 2 – LOGFRAME March 2003

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNP systems.</p> <p>PURPOSE Benefits for poor people generated by application of new knowledge on crop protection to tree crops in Forest Agriculture production systems.</p>	<p>By 2005 improved crop protection methods disseminated and promoted by at least two target organisations in order to achieve beneficial impact on poor farmers and, as measured against baseline data, are contributing to one or more of the following:</p> <ul style="list-style-type: none"> • End-user satisfaction • Increased and/or stabilised production • Increased productivity (land use/ labour/capital) • Enhanced marketing opportunities 	<p>Project reports Reports of target organisations Programme and external evaluations</p> <p>Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment).</p>	<p>Poor people invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed to reduce the impact of pests and stabilise productivity of tree crops important to livelihood security of poor people in Forest Agriculture systems.</p> <p>2. Promotion and dissemination of strategies to reduce the impact of pests and stabilise productivity of tree crops important to livelihood security of poor people in Forest Agriculture systems.</p>	<p>By 2004 factors affecting poor farmers' abilities to adopt improved crop protection methods in target systems identified and actions to remove barriers and create opportunities for poor farmers recommended.</p> <p>By 2005 new knowledge validated that can help stabilise yields, sustain the resource base or reduce drudgery through improved and sustainable management of:</p> <p>(FA207) Pests of coffee (1 system by 2000; another by 2003).</p> <p>(FA203) Herbaceous weeds in tree crops (1 system by 2000).</p> <p>(FA205) Ganoderma in palms (2 systems by 1999)</p> <p>(FA206) Pests and diseases of cocoa (1 system by 2002).</p> <p>(FA207 with 208) Pests of tree crops and multipurpose agroforestry species (1 system by 2000)</p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people through:</p> <p>(FA207) Coffee IPM (2 systems by 2003).</p> <p>(FA202) Control of Grass weeds (possible further promotion in Bolivia under HS107 by 2005).</p> <p>(FA203) Control of Herbaceous weeds (1 system by 2005).</p> <p>(FA206) Control of cocoa pests grown by poor farmers (1 system by 2005).</p> <p>(FA207, 208) Management of tree pests and diseases (to be taken forward in partnership with FRP or NRRSP, or with LPP under possible fodder initiative).</p>	<p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose.</p> <p>Reports of target institutions e.g. NARS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>	<p>Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions.</p> <p>Resources of target institutions are adequate and sustained.</p> <p>Resources of technology transfer partners are adequate and sustained.</p> <p>Target beneficiaries adopt strategies and practices.</p>

Indicators underlined have been achieved

**DFID CROP PROTECTION PROGRAMME 1999–2005
HILLSIDES PRODUCTION SYSTEM PURPOSE 1 – LOGFRAME March 2003**

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.</p> <p>PURPOSE Benefits for poor people generated by application of new knowledge on crop protection to cultivation of herbaceous crops in Hillside production systems.</p>	<p>By 2005 improved crop protection methods promoted by at least three target organisations in order to achieve beneficial impacts on poor farmers and, as measured against baseline data, are contributing to one or more of the following:</p> <ul style="list-style-type: none"> • End-user satisfaction • Increased and/or stabilised crop production • Improved productivity (labour, land or capital) 	<p>Project reports Reports of target organisations Programme and external evaluations</p> <p>Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment).</p>	<p>Poor people invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed to reduce the impact of pests, and stabilise yields and cultivation practices, of crops in Hillside systems, for the benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests and stabilise yields of crops in Hillside systems, for the benefit of poor people.</p>	<p>By 2003 factors affecting poor farmers' abilities to adopt improved crop protection methods in target systems identified and actions to remove barriers and create opportunities for poor farmers recommended.</p> <p>By 2005, new knowledge validated with target organisations that stabilises yields, sustains the resource base and reduces labour requirements through improved and sustainable management of:</p> <p>(HS101) Weeds, by practices that do not contribute to soil erosion (1 system by 2002).</p> <p>(HS202,203) Diseases, nematodes and insect pests of vegetables, root, tuber and forage crops (1 system by 2002; 2 systems by 2004), using appropriate knowledge under development in FA1, HP and PU systems).</p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people through:</p> <p>(HS101) Sustainable weed and cultivation practices (1 system by 2005).</p> <p>(HS104) IPM in vegetable, root, tuber or forage crops (2 systems by 2005).</p>	<p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose.</p> <p>Reports of target institutions e.g. NARS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>	<p>Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions.</p> <p>Resources of target institutions are adequate and sustained.</p> <p>Resources of technology transfer partners are adequate and sustained.</p> <p>Target beneficiaries adopt strategies and practices.</p>

Indicators underlined have been achieved

DFID CROP PROTECTION PROGRAMME 1999–2005
SEMI-ARID PRODUCTION SYSTEM PURPOSE 2 – LOGFRAME March 2003

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.</p> <p>PURPOSE Benefits for poor people generated by application of new knowledge of crop protection in cereal-based semi-arid cropping systems.</p>	<p>By 2005, improved crop protection methods promoted by at least three target organisations in order to achieve beneficial impacts on poor farmers and, as measured against baseline data, are contributing to one or more of the following:</p> <ul style="list-style-type: none"> • End-user satisfaction • Increased and/or stabilised crop production • Increased productivity (labour, land use or capital) • Enhanced marketing opportunities 	<p>Project reports Reports of target organisations Programme and external evaluations</p> <p>Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment).</p>	<p>Poor people invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed to reduce the impact of pests, and stabilise yields in semi-arid cereal-based cropping systems, for benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests and stabilise yields in semi-arid cereal-based cropping systems, for benefit of poor people.</p>	<p>By 2004, factors affecting poor farmers' abilities to adopt improved crop protection methods in target systems identified and actions to remove barriers and create opportunities for poor farmers recommended.</p> <p>By 2005, new knowledge validated that stabilises yields, sustains the resource base and reduces drudgery through improved and sustainable management of:</p> <p>(SA201) Diseases of sorghum and millets (2 systems by 2002). (SA203) (FA104) Insect pests of cereals and legume crops (2 systems by 2002, 2 by 2003). (SA204) Virus diseases (1 system by 1999 another by 2002). (SA205,206,207) Weeds (2 systems by 1999, 2 by 2003). (SA208) Parasitic weeds (<i>Striga</i>) (1 system by 2000).</p> <p>By 2005 improved and sustainable crop protection methods adopted and disseminated by target institutions to achieve beneficial impacts on the livelihoods of poor people through: (SA201,203,205) IPM in cereal based cropping based systems (1 system by 2005). (SA207) Weed management (2 systems by 2005). (SA204) Application of crop resistance for virus disease control (1 system by 2003).</p>	<p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose .</p> <p>Reports of target organisations e.g. NARS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>	<p>Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions.</p> <p>Resources of target institutions are adequate and sustained.</p> <p>Resources of technology transfer partners are adequate and sustained.</p> <p>Target beneficiaries adopt strategies and practices.</p>

Indicators underlined have been achieved

DFID CROP PROTECTION PROGRAMME 1999–2005
SEMI-ARID PRODUCTION SYSTEM PURPOSE 3 – LOGFRAME March 2003

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.</p> <p>PURPOSE Benefits for poor people generated by application of new knowledge of crop protection in semi-arid cotton production systems.</p>	<p>By 2005 improved crop protection methods promoted by at least three target organisations in order to achieve beneficial impacts on poor farmers and, as measured against baseline data, are contributing to one or more of the following:</p> <ul style="list-style-type: none"> • End-user satisfaction • Increased and/or stabilised production • Increased productivity (land use, labour, capital) • Reduced use of toxic pesticides 	<p>Project reports Reports of target organisations Programme and external evaluations</p> <p>Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment).</p>	<p>Poor people invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed to reduce the impact of pests and stabilise yields in semi-arid cotton-based cropping systems, for benefit of poor people.</p> <p>2. Promotion of strategies to reduce the impact of pests and stabilise yields in semi-arid cotton-based cropping systems, for benefit of poor people.</p>	<p>By 2003 factors affecting poor farmers' abilities to adopt improved crop protection methods in two systems identified and actions to remove barriers and create opportunities for poor farmers recommended. (SA301 & SA303) Assessment of IPM needs and development of relevant IPM technologies (2 systems by 2003).</p> <p>By 2005 new knowledge validated with target organisations that stabilises yields and sustains the resource base through improved and sustainable management of:</p> <p>(SA302) Diseases and nematodes (1 target country by 1999, another by 2003).</p> <p>By 2005, improved and sustainable cotton crop protection methods adopted and promoted by target organisations to achieve beneficial impacts on the livelihoods of poor people through: (SA301,303) IPM of insect pests in cotton (1 system by 2000 another by 2005). (SA302) Control of spread of seed-borne diseases of cotton in East Africa (1 system by 2005). (SA304) Weed control through application of conservation tillage in cotton (1 system by 2003).</p>	<p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose .</p> <p>Reports of target institutions e.g. NARS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>	<p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose.</p> <p>Reports of target institutions e.g. NARS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>

Indicators underlined have been achieved

DFID CROP PROTECTION PROGRAMME 1999 - 2005
SEMI-ARID PRODUCTION SYSTEM PURPOSE 4 – LOGFRAME March 2003

NARRATIVE SUMMARY	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
<p>GOAL Livelihoods of poor people improved through sustainably enhanced production and productivity of RNR systems.</p> <p>PURPOSE Benefits for poor people generated by application of new knowledge to control of migrant pests in semi-arid systems.</p>	<p>By 2005 improved forecasting and or control methods for key migrant pests used by at least three target organisations to achieve beneficial impacts on poor communities and, as measured against baseline data, contributing to one or more of the following:</p> <ul style="list-style-type: none"> • Regional capacity to produce and disseminate forecasting information strengthened • Regional capacity to develop and promote environmentally effective control measures strengthened 	<p>Project reports Reports of target organisations Programme and external evaluations Reports of national and local level surveys of improved benefits (productive capacity, food security, wealth, nutrition and environment).</p>	<p>Poor people invest benefits to improve livelihoods.</p>
<p>OUTPUTS</p> <p>1. Strategies developed to improve forecasting and reduce the impact of migrant pests in semi-arid cropping systems, for benefit of poor people.</p> <p>2. Promotion of strategies to improve forecasting and reduce the impact of migrant pests in semi-arid cropping systems, for benefit of poor people.</p>	<p>By 2000, factors affecting target organisations' abilities to disseminate improved forecasts identified and actions to remove barriers and create opportunities for regional networks recommended. (1 region by 2000)</p> <p>By 2005 new knowledge developed and validated with target organisations that helps to sustain the resource base through improved forecasting and environmentally-benign management of: (SA401) Locust, grasshopper and armyworm outbreaks (4 technologies by 2000). (SA402) Avian pests outbreaks, notably Quelea (1 technology by 1999).</p> <p>By 2005, Technologies targeted on control of migrant pests disseminated via southern African regional networks and adopted in national and regional programmes to achieve beneficial impacts on poor communities based on: (SA401) improved forecasting model for the control of locusts validated by end-users (regional and global organisations) (1 model by 2000). (SA401) Ground moisture measurements incorporated into forecasting models for locusts (1 forecasting system by 2002). (SA402) One forecasting model for the control of Quelea birds validated by target organisations. (1 model by 2005)</p>	<p>Reviews by Programme Management including recommendations for the evaluation of contribution to purpose .</p> <p>Reports of target institutions e.g. NARS, CG centres, development programmes, community organisations.</p> <p>Endorsement of outputs by development fora.</p> <p>Reports of workshops.</p> <p>Project technical reports, publications etc.</p>	<p>Enabling environment exists for widespread adoption of new knowledge through regional and national plans and programmes of target institutions.</p> <p>Resources of target institutions are adequate and sustained.</p> <p>Resources of technology transfer partners are adequate and sustained.</p> <p>Target beneficiaries adopt strategies and practices.</p>

Indicators underlined have been achieved