Improving information on rice pests and diseases in Bangladesh

RIU

Validated RNRRS Output.

A computer programme to record and analyse information on pests and diseases will help agricultural departments in Bangladesh alert farmers quickly to threats. The new system speeds up the time it takes for data from districts to be analysed and the results fed back to the local offices. This means early warnings for farmers who can then take action. As it's based on the old paper system, the new system is very user-friendly. Proven for rice pests and diseases in Bangladesh, the software could also be used for other crops, and even across borders. Indian authorities are already interested in using the software to monitor pests in the border area with Bangladesh.

Project Ref: **CPP61:**
Topic: **7. Spreading the Word: Knowledge Management & Dissemination**
Lead Organisation: **CABI, UK**
Source: **Crop Protection Programme**

Document Contents:

Description

CPP61

A. Description of the research output(s)

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

Geographical regions included:

Bangladesh,

Target Audiences for this content:

Crop farmers,

1. Working title of output or cluster of outputs.
In addition, you are free to suggest a shorter more imaginative working title/acronym of 20 words or less.

Managing rice pests in Bangladesh: improving Extension Service information management for policy and planning

Suggested shorter working title: Improving pest information management in Bangladesh

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

Crop Protection Programme

Some partner project staff in Bangladesh were supported by DANIDA (under the DAE-DANINDA Supporting Plant Protection Programme - SPPS)

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

Project numbers: R No 8447 / ZA 0672

Institutional partners and contact persons:

The project activities were undertaken by a coordinated team effort involving the following scientist and extension staff:

CABI, Europe-UK, Ascot, Berkshire, UK
Dr. S.T. Murphy, Ecologist and Biological Control and Project Leader

Imperial College, London, UK
Dr. J.M. Stonehouse, Socioeconomist

Natural Resources Institute, Chatham Maritime, Kent, UK
Dr. J. Holt, Plant and Animal Health
Dr. J. Venn, Plan and Animal Health

Bangladesh Rice Research Institute, Gazipur, Bangladesh
Dr. N.Q. Kamal, Head of Entomology
Mr. M.F. Rabbi, Principal Scientist, Entomology
Dr. D.A. Monsur Choudhury, Scientist
Dr Md. Abdur Razzaque, Principal Scientist, Adaptive Research Division
Dr. D.N.R. Paul, Head of Agricultural Statistics

Department of Agricultural Extension, Dhaka, Bangladesh
Mr Md Hasanul Haque, Director, DAE-DANIDA Strengthening Plant Protection Services Project

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

Insects, pathogens and weeds still represent a major constraint to **rice crop production** in **Bangladesh**. A major thrust has been the promotion and implementation of **integrated pest management (IPM)** techniques as **national policy.**

The **Government Department of Agricultural Extension** (DAE) provides state support to IPM. DAE attempts to coordinate its central and local activities through a nation-wide **pest/disease surveillance, forecasting and early warning scheme**. This scheme was developed in the late 1990s in response to perceived deficiencies in the original system but the scheme still fails objectives. Critically, DAE only have a capacity to undertake pest surveillance and the whole operation is based on the hand processing of data that creates a range of problems. Lack of capacity and technology within the infrastructure is undermining the previous investment in IPM and is unintentionally promoting insecticide use by farmers.

In this project activities were undertaken to build on the current pest surveillance operation by clarifying its purposes and the information required and improving information collection methods, management and flow (within DAE and to farmers, NGOs). Three researchable constraints were addressed; key outputs were:

Design of an improved rice pest surveillance and forecasting scheme

The design of a modified pest surveillance/forecasting scheme was developed with DAE and other partners and the technical barriers to overcome in order to achieve the purposes have been identified. Recommendations have been agreed for efficient data management and also for data products; specifically the development of electronic data sheets for processing data at the District and National levels
Recommendations have been agreed for the **training of trainers** and the training of DAE District level officers in the use of electronic data sheets

Rice pest data collection and collation methods

A report was produced describing the information contained in the current pest surveillance and reporting forms, identifying potential ambiguity and subjectivity and ways in which the use of the forms can be standardized as possible. Recommendations were made for the improvement of sampling protocols and for methods for data synthesis at the Upazilla and above levels. There is also a need for new officers to be trained in **pest identification.**

Development of a centralised **electronic database for pest surveillance**

Automated spreadsheet versions of the series of forms used at the District level and above were produced

along with a written specification of the software. The soft ware package was validated at a workshop held at the **Bangladesh Rice Research Institute**. This included 38 DAE officers from across Bangladesh and 18 trainers/ resource personnel. Recommendations were made for the future role out of the technology.

The RNRRS outputs were produced/delivered in January 2006

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

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

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

The outputs are focussed on rice but Bangladesh partners have requested that the results are also applied to vegetables. This can be easily done by extending the database and field monitoring scheme.

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

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

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

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

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

The outputs of this RNRRS project have the potential to link the outputs of many other projects – RNRRS and non RNRRS – thus in combination creating support for an increased national uptake of environmentally benign IPM for small holders in Bangladesh. This would benefit many of thousands of farmers (male and female) across the country.

In the first instance, pest/weed status information and management tools developed under other RNRRS projects

could be linked into the national database. This would allow a more efficient use of and channelling of government resources and farmer training to those areas that need most attention. RNRRS project that are likely to provide potential for linkages are:

R 8409/R 8233/ R 7377 and R 8412/ R 8234/R 7471 – Weed management in rice
R 7778 – Rice sheath blight complex
R 6519/R 5243/R 5244/ R5245 – Management of rice tungro virus

Secondly, the outputs could also link with and utilize RNRRS outputs that have focussed on 'methods', for example data management (R 8301 – Data management)

The project outputs would also complement the current national thrust to improve and increase farmer field schools and organic farming. This is being promoted by the DAE-DANIDA Strengthening Plant Protection Services (SPPS) Project. Many in the DAE team in this project are the same as those who have worked on the RNRRS project.

Finally, the project would also link well with DFIDs Plant Clinic initiative being run by CAB International.

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

Validation

B. Validation of the research output(s)

*10**. How** were the output(s) validated and **who** validated them?*

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

The main output of this project was the first listed under question 4 – 'design of an improved rice pest surveillance and forecasting system' and its implementation. The other two outputs are in support of this main output. The main output has at its core the development of a computerised system for data management and information flow based on the current paper system for recording pest/disease incidence in the field and then collation at various administrative levels for final processing at DAE headquarters. The main product (output) developed under the project was an electronic database involving the automation of the surveillance forms used at the district and headquarter levels of DAE. This will allow data and information to be processed quickly and passed onto stakeholders (DAE field officers and NGOs) for actions such as awareness raising/support in areas at risk from pest/disease attack. The aim was to establish this computerised system as a core such that the computerised

database can be extended down to include forms used at the field level as a post-project activity. The system can also be extended to include historical data on pests and diseases held in DAE archives (on paper) and this can be used to develop simple forecasting models.

The automated forms developed for the district levels and above were validated at a workshop organised by BRRI and DAE for extension workers. (DAE is the organisation that is responsible for pest surveillance and forecasting - rice and vegetables - and BRRI is a research –based organisation that supports DAE on matters related to rice.) Thirty-eight officers (male and female) attended from across Bangladesh and representing DAE at all levels from block level (i.e. field) through to headquarters level. These participants were supported by 18 trainers and resource personnel from BRRI, DAE and external collaborators. Trainers and resource persons from BRRI included their Agricultural Statistics Division and their Adaptive Research Division. The main aims were to train the participants but also to test the software at the same time. DAE master trainers (for extension workers) also attended. They used the workshop as model for further training courses.

This process validated the software. It also enabled the Bangladesh partners to take complete ownership. The software was packaged and delivered to DAE as a product complete with full instructions on use.

Finally, India have show interest in this computerised surveillance system as some of the Indian states in the east and northeast are affected by the same pests and diseases as Bangladesh. So far both countries have agreed to develop plans to exchange information. This was done as part of the rice hispa project (see the proforma for R 7891).

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

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

The output discussed under question 10 was validated in Bangladesh at BRRI headquarters at Gazipur in early 2006. The DAE staff that attended the training and validation process were both male and female and represented Extension workers at all levels from within DAE; i.e block (field), Upazilla, District and Headquarters. DAE was also represented at the most senior level.

The production system is Land-water and all rice farming systems. Although the computerised system has been produced for rice systems, DAE have requested that it be extended to include vegetable crops as they also have a national surveillance system for vegetable pests and diseases. Many smallholders across the country grow rice and vegetables.

Current Situation

C. Current situation

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

The technology for the output discussed is held by BRRI and DAE in Bangladesh. The current situation is as follows:

DAE. – The pest management wing has a plan to implement and expand on the computerised system for pest surveillance. But they are hampered by a lack of computer skills to organise the system internally. Nonetheless, they have reconfirmed their commitment to implement during the preparation of this proforma. Also new government policy to computerise the civil service will facilitate implementation The barriers mentioned here are discussed below.

BRRI – The Division of Agricultural Statistics hold the software as well and are ready to support DAE once a system is implemented. BRRI are also making preliminary investigations into extending the automated form software as mentioned above

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

The central output has yet to be implemented but when it is DAE may implement the computerised system in a few Districts to 'trial' the system and then expand to all Districts.

DAE also have requested that the computerised system be extended to vegetable pests; this will also be national in coverage.

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

As mentioned under question 13, the main output has still to be implemented in Bangladesh. But India (Assam state) has expressed an interest because of the potential to exchange information about pests and diseases of regional significance.

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

In Bangladesh a major thrust at national level has been the promotion and implementation of integrated pest management techniques. This also captured in national policy that explicitly aims to reduce pesticide use and support the development of environmentally benign tools. The main body responsible for the 'role out' of this policy is the DAE, supported in the case of rice, by BRRI. There is an understanding that IPM by farmers will also be supported through state level actions by DAE; e.g early warning through pest surveillance and the supply of some materials such as sweep nets and sprayers. A core element of the IPM framework has been the development of farmer field schools and these are being implemented on a national basis.

The overall IPM framework has provided the platform on which the CPP project output been able to build and

strengthen the pest and disease surveillance and forecasting system. The out has also benefited from the research support that BRRI provides DAE; e.g through BRRIs Agricultural Statistics Division.

Current Promotion

D. Current promotion/uptake pathways

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

At this promotion is taking place within DAE (Bangladesh) and to government to engineer the support for the implementation of the main output. The output has strong support within DAE at the most senior levels but DAE only have limited resources and may commitments so the continued championing of particular initiatives is very important.

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

The main barrier is the lack of capacity for the organisation of a computerised database system within DAE and the lack of computer skills. There is also a need for further training of DAE staff at the District and Upazilla administrative levels in computerised systems. But the validation workshop clearly demonstrated that DAE field staff do not have a problem with learning computer skills.

An additional problem is that the current pest surveillance system (based on hand-filled paper system) is essentially defunct. Thus most stakeholders in the field have limited knowledge of pest surveillance systems and the benefits they can bring to the application of pest management. Thus there is also a need for promotional work on the benefits of pest surveillance and forecasting and how the system can support farmers; and help in what they are learning through farmer field schools.

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

There is an intention by government to computerise the civil service and this will have benefits for the implementation of specific initiatives under government departments such as pest surveillance and forecasting under DAE. However, the main need is for a ‘critical mass’ of skill to be available in DAE, not a complete ‘computerisation’ of the whole department

Investment is also need in training in computer skills; again this could be focussed to allow a critical mass of skill to be established in DAE. Wider computer skill training is also needed for DAE staff in the districts etc.

Finally, investment is needed to promote the concept of pest surveillance. This could be realised through the

farmer filed school programme.

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

Pest surveillance and forecasting is mostly about developing early warnings about the status of pests and diseases for field extension workers, farmers and NGOs working in support of farmers. Such information allows time and resources by these stakeholders to be used to best effect. In general, computers and internet are being used more and more widely, even in some poor countries like Bangladesh. Computers and software can make the processing of information such as pest surveillance data so much more efficient for an Extension service. Thus an emphasis on getting computerised systems working on pest surveillance will bring benefits to many people who live in rural areas and whose crops are at risk form major pests and diseases.

Impacts On Poverty

E. Impacts on poverty to date

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

The output is not at the stage where impact studies can be conducted. But this will be possible once a computerised system for pest surveillance is established in a few trial districts. The information processed will allow a better targeting of effort and resources against particular pests and diseases that may develop in some areas.

21. Based on the evidence in the studies listed above, for each country detail how the poor have benefited from the application and/or adoption of the output(s) ***(max. 500 words):***

- *What positive impacts on livelihoods have been recorded and over what time period have these impacts been observed? These impacts should be recorded against the capital assets (human, social, natural, physical and, financial) of the livelihoods framework;*
- *For whom i.e. which type of person (gender, poverty group (see glossary for definitions) has there been a positive impact;*
- *Indicate the number of people who have realised a positive impact on their livelihood;*
- *Using whatever appropriate indicator was used detail what was the average percentage increase recorded*

Information is not available to answer this question.

Environmental Impact

H. Environmental impact

24. What are the direct and indirect environmental benefits related to the output(s) and their outcome(s)? ***(max 300 words)***

This could include direct benefits from the application of the technology or policy action with local governments or multinational agencies to create environmentally sound policies or programmes. Any supporting and appropriate evidence can be provided in the form of an annex.

The implementation of the output will underpin the current efforts to promote environmentally benign IPM through farmer field schools. Advance warning about pests and diseases will allow farmers and support workers time to implement control tools promoted through the field schools. Thus, the output will facilitate efforts to conserve native natural enemies of rice and vegetable pests. There will also be similar benefits to other biodiversity.

It will also help efforts to reduce use of chemicals such as insecticides.

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

There are no adverse environmental impacts associated with the development or implementation of this output.

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

Yes, this output provides a direct means for a national system to be established that provide an early warning system for emerging pests and diseases that threaten rice and vegetable crops. Some of these pests and diseases can destroy crops on a regional basis.