Australian Government

Australian Centre for International Agricultural Research

Annual report

project

Developing capacity in cropping systems modelling to promote food security and the sustainable use of water resources in South Asia

project number	LWR/2010/033
period of report	March 2011 – August 2011
date due	31st May 2011
date submitted	7th September 2011
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approved by	Dr Andrew Noble

Contents

List of acronyms and commonly used terms

ACCA	Adaptation to Climate Change in Asia (project logo)
APSIM	Agricultural Production Systems Simulator (cropping systems model)
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BRRI	Bangladesh Rice Research Institute
CAF	Climate Adaptation Flagship (CSIRO)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSISA	Cereal System Initiative South Asia
ICAR	Indian Council of Agricultural Research
IRRI	International Rice Research Institute
MTR	Midterm review
NARC	Nepal Agricultural Research Council
NARS	National Agricultural Research System
NRM	Natural resource management
NRMC	Natural Resource Management Center (Sri Lanka)
ORYZA	IRRI rice crop model
PARC	Pakistan Agricultural Research Council
RPM	Research Program Manager
SAC	SAARC Agriculture Centre
SAARC	South Asian Association for Regional Cooperation

1 Progress summary

The project commenced in March 2011 with a planning meeting involving the project leader and the partners in SAC (SAARC Agriculture Centre; SAARC being the South Asian Association for Regional Cooperation). The first activities consisted in appointing project staff (IRRI PostDoc and the SAC project coordinator) and the selection of project trainees from across the six participating SAARC Member States.

An APSIM-ORYZA exposure workshop was held at SAC in Dhaka from the 8-10th August 2011. It involved 31 formal SAARC trainees from Bangladesh (5), Bhutan (3), India (9), Nepal (3), Pakistan (4) and Sri Lanka (7) and three trainers from CSIRO (Don Gaydon, Perry Poulton) and IRRI (Dr Balwinder Singh). The workshop was seen as very successful by the project team, receiving very positive feedback by the trainees and stakeholders from the Bangladesh Agricultural Research Council.

A formal project launch event preceded the workshop on the 8th August 2011. The event was inaugurated by the Secretary General of SAARC, Ms Fathimath Dhiyana Saeed, in the presence of about 30 dignitaries, including the HC of Australia to Bangladesh, Mr Justin Lee, alongside ACIAR and AusAID representatives. The launch received a very high profile in the media and within SAARC, this being the first project of its kind to be implemented within SAC.

Workshop participants progressed through a set of prepared APSIM exercises, interspersed with specific presentations on APSIM science component processes. Training certificates were awarded to each of the trainees at the conclusion of the workshop. During the workshop trainees were assessed by the three trainers on their potential for future APSIM training, and a final core set of 21 trainees were selected to continue training activities through the remainder of the project.

Concurrently to the workshop activities, work on compilation of datasets to be used during the training and to test APSIM-ORYZA has commenced.

2 Achievements against activities and outputs/milestones

NOTE: Due to delays in project approval by ACIAR and subsequent delays in contract sign-offs, the project started about 3 months after its planned start date of 1st December 2010. This means that generally, all milestones are about 3 months behind the original plan laid out in Table 5.2 of the proposal.

Objective 1: To establish a network of agricultural research scientists in SAARC Member States collaborating on rice-based cropping systems analysis and modelling

No.	Activity	Outputs/ milestones	Completion date	Comments
1.1	Identify suitable participating scientists from SAARC Member States from research hubs working on key rice-based cropping systems	32 candidates identified for initial exposure workshop	Jan 2011	32 trainees (10 from India, 7/Bangladesh, 5/Sri Lanka, 3/Bhutan, 4/Pakistan, 3/Nepal) were selected in April following a rigorous selection process based on criteria established in 2010 with the agreement of SAC and all relevant NARS.
		21 candidates for core training identified	Mar 2011	Trainees were assessed by the three trainers (Gaydon, Poulton, and Singh) during the exposure workshop on their potential for future APSIM training, and ranked accordingly, reducing the original participant group from 32 down to 21 participants for the remainder of the project. A list of final trainees is provided in Appendix 1.
1.2	Conduct workshops to train selected scientists in APSIM-ORYZA and its application	Exposure workshop conducted	Feb 2011	Of the 32 trainees, 31 attended the exposure workshop in Dhaka in August 2011. Workshop participants progressed through 7 prepared APSIM exercises over 3 days interspersed with specific presentations on APSIM science component processes. Training certificates were awarded to each of the trainees at the conclusion of the workshop.
		1st training workshop conducted	May 2011	Planning for the next workshop is progressing well and is scheduled for the first week in November 2011.
		2nd training workshop conducted	May 2012	This workshop will be deferred until after the results of the dry season trial work and data have been documented, probably to take place in July 2012.
1.3	Conduct field courses to train selected scientists in sampling and monitoring techniques to acquire supplementary climate, soil and crop phenology datasets from their ongoing research trials for APSIM-ORYZA parameterisation and validation	Development of and training in data acquisition and monitoring protocols	May 2011	This activity is now scheduled to take place during the next training workshop in November 2011.
		Sampling and analysis of supplementary data	Ongoing May 2011 - Apr 2012	This process has commenced. All final trainees have submitted datasheets with their current data holdings. Over the coming months, the key datasets will be compiled. Some vey high quality datasets will be accessed, in particular from India.
		Supplementary data compiled in APSIM format	Apr 2012	

1.4	Conduct training in acquisition of location specific farming practices and farmer-defined crop and water management scenarios for evaluation using APSIM-ORYZA	Survey templates and protocols developed and training in survey methods completed Farmer surveys and farmer group discussion notes documented	May 2011 Apr 2012	This activity is now scheduled to take place during the next training workshop in November 2011. No actions against this activity yet.
1.5	Utilise the data generated in activities 1.3 and 1.4 to parameterise and validate APSIM-ORYZA for major rice-based cropping systems for selected locations in SAARC Member States	Initial parameterisation of APSIM carried out for all trainee's sites	May 2011	This activity is now scheduled to take place during the next training workshop in November 2011.

Objective 2: To apply APSIM-ORYZA to identify a suite of improved crop and water management practices that increase water productivity (WP) of representative rainfed and irrigated rice-based cropping systems

No.	Activity	Outputs/ milestones	Completion date	Comments
2.1	Use the first set of modelling training workshops to perform a gap-analysis to determine potential options to increase WP of rice-based cropping systems	Proceedings documenting results of gap -analysis published as SAC publication Draft journal paper	Aug 2011 Apr 2012	This activity is now scheduled to take place in December/January after the next training workshop in November 2011. Possibly the document will provide benchmarking results rather than results of a formal gap analysis, depending on the outcome of the workshop. No actions against this activity yet.
2.2	Use the second set of modelling training workshops to perform scenario analysis to test farmer-defined crop and water management scenarios	Proceedings documenting results of scenario-analysis published as SAC publication Draft journal paper	Aug 2012 Sep 2012	No actions against this activity yet. No actions against this activity yet.

2.3	Integrate the outcome of the gap-analysis with results of the scenario analysis to identify feasible crop and water management practices that will improve WP	Series of in-country farmer-researcher forum discussions held Report documenting farmer -preferred suite of crop and water management practices Policy briefs for NARS leaders and key stakeholders	Sep 2012 Oct 2012 Nov 2012	No actions against this activity yet. No actions against this activity yet. No actions against this activity yet.

Objective 3: To strengthen institutional support in SAC and in SAARC Member States for systems analysis and cropping systems modelling as a means of enhancing research impact in addressing water scarcity and other future cross-sectoral issues

No.	Activity	Outputs/ milestones	Completion date	Comments
3.1	Strengthen SAC's role by including modeling support to SAARC Member States and by establishing a resident APSIM-ORYZA modelling support capacity within SAC	Suitable SAC modeling support person appointed SAC modeling support person fully trained in APSIM-ORYZA and database management Approval from SAARC Standing Committee obtained to establish ongoing modeling support position in SAC	Feb 2011 Dec 2011 Nov 2012	Dr Ibrahim Saiyed was selected as the SAC project coordinator and modeling support person. He comes with very strong credentials (5 yrs PostDoc in Canada). Dr Ibrahim Saiyed participated in the APSM training workshop as a trainee. He is continuing his training through on-the-job training, supported by the IRRI PostDoc Dr Balwinder Singh, and Don Gaydon at CSIRO. No actions against this activity yet.
3.2	Develop a database with comprehensive model parameterisation and validation datasets to be maintained by SAC and made accessible to the modelling network established in SAARC Member States	Appropriate database format selected Data from trainee research trials and additional trial data sets (CSISA, ACIAR) entered into database SAC data access website operational	Apr 2011 Ongoing May 2011 - May 2012 May 2012	Initial scoping of options for a database has commenced. Currently, we are exploring the feasibility of using the database format used for APSIM (APSOIL). Data templates are in the process of being designed. Over the coming months, in preparation for the next workshop as well as for populating the database, these templates will be completed by the trainees, with assistance from Dr Singh and Dr Saiyed. No actions against this activity yet.

3.3	Conduct workshops to expose NARS research managers and policy makers to the scope and value of systems modelling in order to foster greater institutional support	Annual project review workshop including NARS stakeholders	Feb 2012	Discussions with the ACIAR RPM Dr Andrew Noble have confirmed the intent to conduct the MTR in February 2012. However, timing does not match project activities, and we intend to discuss options to defer this review, preferably to coincide with the 2nd APSIM training workshop in July 2012.
		Design and conduct SAARC stakeholder and NARS decision maker workshops	Nov 2012	The Executive Chairman of the Bangladeshi Agricultural Research Council has been kept fully apprised of the project. He attended the launch event in August 2011. Otherwise no actions against this activity yet.
		Policy briefings to SAARC Intergovernmental Core Group and Technical Committee on Agriculture and Rural Development	Ongoing	The Secretary General of SAARC, Uz Fathimath Dhiyana Saeed has been fully briefed of the project. She presided over the launch event of the project in August 2011.

3 Impacts

3.1 Scientific impacts

It is anticipated that a key scientific outcome of this project for CSIRO and IRRI will be a robust validation of APSIM-ORYZA across a wide range of rice growing environments in South Asia. This will establish credibility in APSIM-ORYZA with modellers in the region and internationally that APSIM-ORYZA is a tool capable of realistically simulating rice farming situations, over time making it a modelling tool of choice. It is anticipated that the resultant increased uptake of modelling by South Asian farming systems scientists will significantly boost research strategy setting and will impact on the way farming systems research questions are formulated and evaluated.

3.2 Capacity impacts

The main impacts expected to arise from this project are in the capacity building domain. Accordingly, this project has been designed in a way to maximise a strong legacy of systems analysis and modelling capability to continue beyond the life of the project. It is anticipated that each of the participating SAARC partner countries (India, Bangladesh, Pakistan, Nepal, Bhutan and Sri Lanka) will be endowed with networks of farming systems modellers, building sufficient critical mass across the region (rather than in a particular country) to withstand loss of individual modellers.

Broadening the current mandate of SAC to include a SAARC-wide support role in modeling is also anticipated to constitute a significant capacity building impact. This should significantly boost the relevance and effectiveness of SAC in SAARC Member States, in turn strengthening SAARC's ability to foster regional cooperation.

3.3 Community impacts

Given the capacity building nature of this project, significant community impacts with end users (rice farmers) are not likely to occur before 5 years after conclusion of the project. Next users of project outputs and outcomes are research scientists and NARS managers in the partner countries, and in their case impacts can be expected in 0 - 5 years after project completion. At this early point in the life of the project, there are not yet any community impacts that we can report on.

3.4 Communication and dissemination activities

An advisory committee consisting of NARS representatives was established prior to the project commencing in mid 2010. This reference group was consulted in the design of the trainee selection process and has been kept informed about the project. It will be invited to participate during the planned midterm review of the project. The membership consists of:

- Dr AK Singh – Deputy Director General NRM, ICAR, India
- Dr Ghulam Hussain – Member Director NRM, BARC, Bangladesh
- Dr Shahid Ahmed – Member Director NRM, PARC, Pakistan
- Dr Niranjan Prasad Adhikari, Director Crops & Horticulture, NARC, Nepal
- Dr Chencho Norbu, Director, Dept. of Agriculture, Bhutan
- Dr WMADB Wickramasinghe, Additional Director NRMC, Dept. of Agriculture, Sri Lanka

A formal project launch event was organised for the 8th August 2011, Bangladesh Agricultural Research Council (BARC) in Dhaka. The event was chaired by the Secretary General of SAARC, Ms Fathimath Dhiyana Saeed, in the presence of about 30 dignitaries, including the HC of Australia to Bangladesh, Mr Justin Lee, alongside ACIAR and AusAID representatives. The launch received a very high profile in the media and within SAARC, being the first project of its kind to be implemented within SAC.

The Chairman of BARC has taken a strong personal interest in the project, and has been regularly briefed by the Project Leader in the course of each visit to Bangladesh. The NARS representatives on eth advisory committee will be advised shortly on the outcome of the final trainee selection, and provide with an update on the project's progress.

4 Training activities

The APSIM-ORYZA exposure workshop was held at SAC in Dhaka from the 8-10th August 2011 following the project launch event. It involved 31 formal SAARC trainees from Bangladesh (5), Bhutan (3), India (9), Nepal (3), Pakistan (4) and Sri Lanka (7) and three trainers from CSIRO (Don Gaydon, Perry Poulton) and IRRI (Dr Balwinder Singh). The workshop was seen as very successful by the project team, receiving very positive feedback by the trainees and stakeholders from BARC.

Workshop participants progressed through 7 prepared APSIM exercises over the 2 ½ days, interspersed with specific presentations on APSIM science component processes. Training certificates were awarded to each of the trainees at the conclusion of the workshop. During the workshop trainees were assessed by the three trainers on their potential for future APSIM training, and ranked accordingly with the aim of reducing the original participant group from 32 down to 21 participants for the next workshop. The final list of project trainees is provided in Appendix 1.

The workshop was held in the refurbished SAC training room, which had been upgraded with project funds to accommodate 32 trainees, working in pairs around shared laptops acquired by SAC for the workshop. In addition to the trainees, Liz Humphreys and Ibrahim Saiyed also participated in the full training program.

5 Intellectual property

No significant IP issues have arisen during the reporting period.

6 Variations to future activities

In view of the slippage of the project start, we plan submitting a request to ACIAR to carry out a variation on the project by providing an unfunded extension of the project to re-align the project plan with the actual timelines. It is proposed to extend the life of the project until the 28th February 2013.

7 Variations to personnel

No variations to report.

8 Problems and opportunities

To date the project has been proceeding very smoothly. SAC has been very efficient at carrying out the trainee selection process, organising the workshop and the launch event. At this stage, there are no potential problems to the project proceeding as planned.

In terms of major opportunities, this project is closely aligned to ACIAR project LWR/2008/019 - *Developing multi-scale climate change adaptation strategies for farming communities in Cambodia, Laos, Bangladesh and India.* The work proposed here will enable a far wider validation of APSIM-ORYZA than what is currently envisaged under the auspices of LWR/2008/019. This is because APSIM-ORYZA will be tested across a far wider spectrum of rice cropping environments in the proposed project. In the course of this testing it is possible that residual weaknesses of the model will be identified, as well as generally confirming the model's robustness in capturing the key dynamics of rice-based cropping systems. These benefits will constitute a key flow back to LWR/2008/019 (and the wider APSIM consortium in Australia).

Conversely, we are also training a range of collaborators in LWR/2008/019 within BRRI and BARI in APSIM-ORYZA. We intend to pool the Bangladesh trainees of both projects and form a somewhat more formal BRRI-BARI modelling group, so as to build critical mass and help institutionalise modelling within these two organisations. This reciprocal modelling support leads us to believe that the capacity being developed in Bangladesh will persist beyond the life of both projects.

The project is also enabling us to form a more direct link to the IRRI partners involved in the CSISA project, with the prospect of training one of the CSISA research coordinators in APSIM in October, in turn enabling us to access some of the high quality datasets being generated at the CSISA research hubs in India and Bangladesh.

9 Budget

Acquittals for payments 1 and 2 have already been provided to ACIAR. A summary of payments received and expenditure between 1 Dec 2010 and 30 June 2011 is provided below:

	AUD
Payments received from ACIAR	537,675.00
Expenditure CSIRO	40,616.14
Funds sent to SAARC	193,200.00
Funds sent to IRRI	149,089.00
Carry over into FY 2011-2012	150,624.42

The significant under-expenditure of CSIRO funds is due to the slippage of actual project start. Since June 2011, major activities have occurred (project launch and APSIM exposure workshop in August), so that the under-expenditure has already been significantly reduced. Increased CSIRO salary draw down in FY 2011-2012 will balance out the under-expenditure by the end of this FY.

Appendix 1: List of final project trainees

Name	Address
Dr. Sohela Akhter	Senior Scientific Officer, Soil Science Division, Bangladesh Agricultural Research Institute (BARI), Gazipur-1701, Bangladesh Cell: +880-1922242737 Email: sohela@bangla.net
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