

The Agricultural Model Intercomparison and Improvement Project

## SOUTH ASIA WORKSHOP REPORT

REGIONAL INTEGRATED ASSESSMENTS

NOVEMBER 12-16, 2012 COLOMBO, SRI LANKA











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#### Introduction

The Agricultural Model Intercomparison and Improvement Project (AgMIP) is a major international effort linking the climate, crop, and economic modeling communities with cutting-edge information technology to produce improved crop and economic models and the next generation of climate impact projections for the agricultural sector. AgMIP aims to utilize inter-comparisons of various types of methods to improve crop and economic models and ensemble projections and produce enhanced assessments by the crop and economic modeling communities researching climate change agricultural impacts and adaptation. The South Asian Regional Coordination team is working towards enhancing the capacities of regional teams of South Asia.

#### **Goals and Objectives**

The "Enhancing Capacities of the AgMIP South Asia Regional Teams through Capacity-Building Workshops and Knowledge-Sharing Platforms" project capitalizes on the partnership between the Agricultural Model Intercomparison and Improvement Project (AgMIP) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). This Workshop is organized to help coordinate AgMIP Research Teams and facilitate compatible integrated regional assessments of climate change impacts and adaptation in selected agricultural systems. The workshop, organized by the South Asia Regional Coordination Team (RCT) and by the AgMIP Leadership Team aimed to:

- 1. Build capacity of the multi-disciplinary Research Teams throughout the region to prepare integrated assessments of climate change impacts and adaptation and
- 2. Design workshops, in collaboration with the AgMIP Leadership Team, to publish the results of the integrated assessments that each Research Team has put together during the project.

The goals of the workshop conducted are to build cohesiveness within and among regional AgMIP teams to achieve success across each region, consider stakeholders' concerns and needs, review and refine protocols for AgMIP regional integrated climate change assessments, conduct training on AgMIP integrated assessment methods and tools, develop specific plans for carrying out AgMIP integrated assessments during the project, and develop a timetable for incrementally writing material such that the assessments are ready by the end of the project.

#### **Pre-workshop Activities**

The SA coordination team has done the following pre-workshop activities:

• The regional research teams were informed and advised on how to organize their own internal meetings so as to meaningfully prepare for the workshop. For example, some of the topics for discussion would be on how to develop an inventory of available data and sources of data that are needed for regional assessments (weather, site experiment, soil, and socio-economic parameters); how to prepare these details so as to present them appropriately at the workshop; how to identify the IT goals of the project (data management plans, project website, etc.); how to prepare a summary of their crop and economic model analysis that have either been done or are underway in the region; how to identify the team members who should be in each of the AgMIP teams (climate, crop, and economic modeling, and IT); and finally, how to identify key stakeholders who are suitable for participating in the workshop.

- Initiate activities to accomplish what is needed for the SA-wide workshop;
- Develop an inventory of available Knowledge-Sharing Platforms that are needed for capacity building of regional AgMIP teams;
- Select regions, study sites and teams that are to be targeted, and prepare a summary of each to discuss in the first workshop; and,
- Different opportunities to build capacity of the multi-disciplinary research teams throughout the region to prepare integrated assessments of climate change impacts and adaptation.

A two-page synthesis highlighting key aspects including training needs and areas for collaboration/synergy across teams is appended (Appendix I).

The pre-workshop activities thus ensured that knowledge platforms were well in place to augment the participation in the SA-wide meeting. The agenda for this workshop is contained in Appendix II and the list of participants in Appendix III. There were 77 participants including 13 from AgMIP leadership team, 8 from South India, 6 from Pakistan, 13 from the Indo-Gangetic Plains, 8 from ICRISAT, 22 from Sri Lanka and 2 from IWMI. Five participants were stakeholders. See Appendix III for details of individuals.

## **Opening Remarks and Expectations**

Dr. Dileepkumar from the International Crops Research Institute for the Semi-Arid Tropics and PI for the South Asia Regional Coordination Team welcomed the delegates, especially all members of the SA region and other AgMIP members and underscored the following important aspects:

- Incorporate state-of-the-art climate products as well as crop and agricultural trade model improvements in coordinated regional and global assessments of future climate impacts to improve decisions and policies.
- Include multiple models, scenarios, locations, scales, crops, and participants to explore uncertainty and impact of data quality and methodological choices.
- Collaborate with regional experts in agronomy, economics, and climate to build strong basis for applied simulations addressing key climate-related questions.
- Improve scientific and adaptive capacity for major agricultural regions in the developing and developed world.
- Develop framework to identify and prioritize adaptation and mitigation strategies.
- Link to key on-going efforts.

During the session, Cynthia Rosenzweig (NASA GISS), Jim Jones (University of Florida), and Jerry Hatfield (USDA-ARS, Ames, Iowa), gave a presentation on AgMIP, its various activities and also briefed about the 5-day workshop. They mentioned that the growing agricultural risks, as a result of climate change, call for a consistent approach to enable the agricultural sector across relevant scales and disciplines.

## Day 1: Overview of Regional Project Plans

The South Asia Regional projects Kickoff Workshop started with a welcome address from Dr. Dileepkumar Guntuku. Dr. Cynthia Rosenzweig and Dr. James W. Jones explained the overview of workshop goals and introduced AgMIP and South Asian Regional Research Teams followed by brief introductions of stakeholders, participants and representatives from the media.

Each regional project team presented their project proposals and goals. Later the Regional Research Team Breakout sessions were organized to discuss the anticipated challenges, areas of concentration, and training requirements.

Further, discussion went on the various Regional Projects in South Asia on integrated analysis of food production systems with a focus on climate contribution to food insecurity with the projects being implemented in Pakistan, the Indo-Gangetic plain, Southern India, and Sri Lanka. For capacity building, it suggested to plan, coordinate, and organize workshops to build capacity for the AgMIP regional climate assessments and guide the projects. This discussion was concluded by emphasizing on coordination, capacity building, and knowledge sharing, giving examples of KSI Connect, AgED Open Course Ware, and Open Access Repositories.

Harvir Singh from IGB explained that the challenge is to focus on crop modeling, keeping in mind integrated farming like livestock. He discussed the challenges in approaching an integrated farming system keeping in mind the time frame. Achieving it at present is quite a task but the broader picture must be kept in view without losing track. The present challenge is to revise the activity mileage stance at regional and global levels to achieve an integrated farming system within a given time. Capacity building programs are to be conducted in collaboration with the partners to bring in an equal footing of understanding among partners on the different models.

The workshop was a good opportunity for cross-team understanding and sharing of ideas and identifying areas of collaboration. There were also discussions on the need to build regional scenarios that are consistent with global scenarios based on "shared social economic pathways" (SSPs). This arose from a presentation on integrated assessments made by Dr. John Antle that cut across the methods, outputs, and framework for integrating across climate, crop, livestock, economic, and IT teams as well as scaling up aspects. It was insisted to use TOA-MD in AgMIP regional projects because it provides a parsimonious, generic framework to assess impacts.

## Day 2: Detailed Discussions of Climate, Cropping Systems, Economics, and IT Goals and Round-robin Discussions

Jim Jones and John Antle introduced the agenda of the day. John Antle (AgMIP Global Economics Co-Leader) discussed about Representative Agricultural Pathways, explaining RCPs, SSPs and RAPs, their key issues and implementation. The participants, guided by the AgMIP leadership team, discussed on the best strategy to deliver outputs through a proof of concept based on one or two selected sites rather than multiple sites in the region for enabling fast track analysis. Long-term climate data and one future climate scenario will be used (simplest possible cases), running this for a number of sites to capture variability within the selected sub-region. This first set of runs is to evaluate impact of climate change on productivity and poverty levels, and results should include for example % gainers and losers. The idea is that participants go through the whole sequence of the integrated regional assessment using one sub-region/site. This should include also developing RAPs and looking at adaptation. The timelines set for the proof of concept activities is reported under <u>timelines</u>.

Round-robin discussions were scheduled ensuring that each of the RRTs spent time with AgMIP leadership to discuss collaboration, management, and outputs with IT, economics, and crop modeling experts to discuss relevant issues for the teams. The key aspects in each of these sessions are highlighted:

#### Round-Robin on Collaboration, Management, and Outputs

The purpose of these sessions was to build an understanding within teams on the expected timelines and reporting and training within teams and within the SA region. The following are the key issues discussed:

- 1. Synergies between different teams can be achieved through additional SA-wide training workshops addressing specific needs. Participation to these workshops should be restricted to only those persons that needed the specific capacity. Regional teams were requesting capacity building in the area of crop modeling, TOA-MD and climate modeling.
- 2. Dr. Cheryl Porter intimated to the regional teams that AgMIP website is being fine-tuned and includes public facing pages and AgMIP tools for integrated assessments. It was noted also that through the developed IT tools, modelers will be able to download datasets directly into the format they need, be it DSSAT or APSIM.
- 3. The functioning of data node was explained to each of the research teams. The Regional Coordination Team has expressed interest for hosting all the datasets of the region initially at ICRISAT. Data will be tagged depending on whether it is freely accessible or restricted. Different license types will be used as applicable. Also, standard formats for data arrangements are prepared for uploading climate, crop, and economic datasets into the database.
- 4. Since not all IT tools for data conversions are ready (climate tools, crop model data translation tools, web and desktop interfaces for modeling tools), teams will be informed as to when the IT tools are developed. Similarly, teams are encouraged to share training protocols and other methodologies if they develop any.
- 5. Revised timelines were requested due to the delayed program funding. Important reporting periods were determined (including March 2013 and February 2014). These will be enforced even if there is a project extension. Teams are requested to prepare the report as per the AgMIP protocols. The reporting will be more of methodologies, protocols, and abstracts.
- 6. For connections within projects (Climate-IT-Crop-Economics), tools are being developed for reporting in a standardized way. This is to ensure that data from each discipline are easily understood and usable by the other disciplines.
- 7. Plans for upcoming workshops were noted: all the proposed workshops will be organized in a common place which is mutually agreeable to all the teams. Nepal and Sri Lanka are identified as the potential places for future workshops.

8. Connections with the coordination team and AgMIP resource persons were explained in terms of communication and training workshops. For communication, each RRT will maintain communication within its members while the coordination team will ensure communication across teams. A number of listserves will be maintained for communicating with different groups. Each team is suggested to identify an individual as a point of contact for each domain (climate, crop, and economic modeling). The coordination team plans to send out updates every two weeks to the teams.

#### Round-robin on Economic Data, Modeling and RAPs

In this round-robin session, the economists in each RRT had detailed discussion with the AgMIP economic team consisting of John Antle, Roberto Valdivia, and S. Nedumaran (Regional expert in TOA\_MD).

Each RRT selected one or two economists and they underwent a basic online training on TOA\_MD model to understand the structure and the basic data requirement to construct the TOA model. Some RRTs are well versed with the TOA and some RRTs like the Pakistan, Sri Lanka, and Nepal economists were just introduced to the TAO\_MD model training and they need still more hands-on training to start working in the TOA model.

The economists in each RRT explained the household survey data availability in each study site and discussed about the agricultural system and parameters needed to build the systems. The team discussed on the selection of crops and system for each of the study sites for the "fast track" study and the data required for running the crop model was discussed in detail.

In the round-robin discussion, the economists discussed how the crop model simulations can be used in TOA\_MD to implement assessment of climate change impacts. The steps involved in characterizing the System 2 using the crop model simulation for climate change assessment was also explained. The household survey data in study regions does not have sufficient weather and soil data to run the crop model for each farm in the study region. For this unmatched data case, the minimum data required to extract from the farm survey was discussed with economists. The economists agreed to develop this minimum data from the survey information and share with the crop modelers to run the crop simulation for the representative farms.

The teams discussed and selected the site for constructing the fast track integrated assessment exercise. The economists will provided the necessary information like location of the farm site, crop management (date of sowing, fertilizer applied, irrigation, etc.), and farm yields to the crop modelers to run the simulation.

The rationale was to demonstrate the process of developing scenarios, get an understanding of the economics modeling and their data needs, and of how to develop representative agricultural pathways (RAPs). The reason for developing RAPs was explained as the need to look at socio-economic variables that influence climate change. In developing RAPs, stakeholders need to be involved. RAPs were defined as having qualitative story lines while scenarios have quantitative story lines. Participants expressed the need to distinguish between scenario analysis and RAPs, and also spend a lot more time on the TOA-Model.

#### **Round-robin on Crop Data and Modeling**

Dr. Ken Boote delivered a talk on "Scaling up Crop Model simulations to districts for use in Integrated Assessments: Case Study of Anantapur District in India". During his presentation, he explained the activities needed to be done by each regional crop modeling team. In summary, he explained how to calibrate the Sentinel Site Experimental Data, the prediction of district level yields, and how to do bias adjustment and the various steps for Scaling up Crop Model Simulations for Region.

- Collect district-level historical yields and de-trend.
- Determine range of distribution of soils, weather stations, sowing dates, fertilization, and soil organic carbon for the region.
- Simulate district-level yields over the range of distributed inputs and compute simulated mean yield per year.
- Aggregate and plot observed district-level yields (per year) versus simulated mean annual yields. Compute bias (ratio or slope with zero intercept).
- Simulate with baseline and climate scenarios, using distribution of weather sites, soils, and management inputs.
- Crop model outputs to economic models to simulate for same regions, with management inputs and economic cost inputs.

The Parallel Breakout Round-Robin Sessions were organized separately for crop modeling, climate and economic teams from each regional project team. The crop modeling breakout sessions were represented by K. Boote, J. Hargreaves, C. Porter, P. Singh, and Dr. Nedu as resource persons and they met crop modeling experts of each team. They discussed the crop models they are using, level of expertise, and training requirements. Each team explained in detail their proposed activities, crops they are going to study, and training requirements. The kind of data needed was explained; this included planting date, planting density, and fertilizer application. A detailed account of data requirements for modeling is contained in a DSSAT book that was provided to crop modelers (through RRT PIs) during the workshop.

Fast track calibrations for selected regions/sub-regions suggested using 2-3 varieties, days to anthesis and days to maturity as the most important. Absolute yield comes out in the <u>bias correction</u> (further studies required). Varieties differ from local to OPV to hybrids, and variety trial datasets are important for the calibrations. For coarse calibrations, weather and soil may have more influence than the variety.

The role of local experts (e.g. agronomists & soil scientists) in helping to make good assumptions on soil initial conditions, soil characteristics, fertilizer use, irrigation, etc. was emphasized. All assumptions should be clearly and rigorously documented—both to identify weaknesses in exercise, and so that if additional data are obtained, they can be used to replace the assumptions and improve the exercise.

Many of the crop modelers required an understanding of what RAPs really are and whether they need to work with economists to produce crop-modeling output for the RAPs. There are problems in getting survey data and many groups expressed survey data lacks information required to run crop model, which requires a lot of assumptions. Many centers even have problems with quality weather data. There is no systematic approach for filling gaps beyond expert opinion. AgMIP's climate team assured they would fill the missing data based on their models. For fast track analysis all the teams should send the study areas with available weather data, so that the climate team will be able to do the gap filling and also send the one scenario data for future climate. Dr. Jones delivered a lecture on bias correction for comparing model output and actual yield data.

#### Round-Robin on Climate Data, Modeling and Scenarios

Teams expressed the challenge in acquisition of climatic data from Agro-Meteorological Stations in host countries. The climate team within AgMIP (led by Alex Ruane) can generate weather data if longitudes and latitudes data are provided for specific sites, but usually this data is not as good as that obtained from the stations directly. Other aspects discussed in this round-robin session are highlighted below:

- Coordinates of locations selected for simulation and for which no reliable climate data is available should be sent to Alex Ruane in order to obtain a climate dataset in the AgMIP format.
- Baseline (historical data) weather information is needed for each of the sentinel sites for the period of 1980–2010 (i.e. for each region, identification of historical time series is needed).
- The quality of data (including that from station observations) needs to be checked for biases. Procedures to follow are well elaborated in the draft Guide for Regional Integrated Assessments. Different approaches to data quality control and how to fill in missing data were discussed. This includes adjusting and correcting for:
  - Number of rainy days.
  - Rainfall distribution.
  - Rainfall and temperature means to match the observed data records.
- Use of other data sources like IMD data to supplement for the missing data.
- Conversion of the climate data into DSSAT and APSIM compatible formats.
- Highlight of production of future scenarios for each crop modeling.

## Day 3 and 4: AgMIP Protocols and Integrated Assessments

The teams were grateful for the round-robins as these provided a lot of insight and provided answers to issues within and across the teams. Areas needing further attention/elaboration were suggested and include:

- Emphasis should be on capacity building in crop models and each team is expecting only one model. Scenarios and their development since this is a new topic. Materials/supportive documents on this topic are needed.
- Need for practical sessions on the use of R for climate data analysis.
- Regular meetings with the stake holders to identify the actual requirements.
- Clarity on some concepts including the many acronyms employed in AgMIP protocols such as SSPs and their association with RCPs and RAPs.
- Examples with climate, crop, and economic modeling applications.
- As most of the teams are working on rice crop, a separate DOME for rice needs to be prepared immediately.

There were discussions about importing and translating crop model data and AgMIP's harmonized data bases with examples. Also discussed about the need to address

broader issues associated with climate change at regional/global scales, regional scale impact and adaptation research, and scaling from point/field to regional scale.

#### **Climate and IT Team Activities**

Alex Ruane presented AgMIP climate team activities for regional integrated assessments. The team described their tasks in support of AgMIP RRT which include characterization of the climate in the region (to identify the unique characteristics or climate zones), and baseline climate series for each crop-modeling location. The IT team provided an overview of their tools for importing and translating crop model data including finished products and those in the works. This included information of how to access the tools and data sets online. Steps to data preparation and translation were demonstrated as well as different ways to input/upload and download data into the database. Participants were also provided with a newly developed user interface (QuadUI) for use as desktop application for data conversions.

#### **Crop Modeling Team Activities**

On the 3<sup>rd</sup> day, the crop modeling team had a hands-on exercise on integrated assessment tools, use of QuadUI, DOME, etc. Machakos Centre data was used for the hands-on exercise and also had a lecture from Dr. Jones on bias correction and related topics. Dr. Cheryl Porter explained importing and translating crop model data using data translators. After the exercise, each regional team presented their proposal for fast track analysis.

On the 4<sup>th</sup> day after a successful breakout session, each team presented their integrated assessment plans for the fast track analysis:

<u>South India Team</u> Crops- Rice (Tamil Nadu, Maize- Andhra Pradesh) Require training in APSIM

<u>Sri Lanka</u> Crops- Rice, Sugarcane Require training in DSSAT and APSIM

<u>Indo-Gangetic</u> Crops- Wheat Require training in DSSAT

Pakistan Crops-Rice Require training in DSSAT and APSIM The South Asia Region Coordination, Capacity Building and Knowledge Sharing team assured to arrange required capacity building activities in the crop modeling aspects to the required regional teams. The team also suggested the regional team to aim for few

#### **Economic Modeling Team Activities**

publications in peer reviewed journals.

The global economic group explained the step-wise process involved in the development of RAPs using the inputs from relevant stakeholders including those from

the crop model and climate teams. They also explained how to translate the story line which include qualitative and quantitative information into plausible ranges of quantitative values for the parameters in the TOA-MD model. The team also explained to RRTs the Excel sheet tool called **DevRAP**, which is used to facilitate the development of RAPs. This tool provides a structure to guide the RAPs development process and to record and document the information systematically during the RAPs meeting with stakeholders. The economists also got a hands-on training to construct the RAPs using the tool. The economists from each RRT did an exercise in developing RAPs for a particular case study region by involving the other team members and they presented and discussed with the global economic team members.

#### Day 5: Planning Work within Project Teams and Timelines

Each of the project teams had enough time to sit together and plan their work especially for fast track activities. The activities were planned with the agreed timelines in mind. The research plans for each of the teams are already uploaded in the <u>AgMIP CONNECT</u> <u>website</u>.

#### **Timelines**

The agreed timelines towards the delivery of the proof of concept and other SA-wide activities is shown below. It was cautioned that fast track should not be a reason to slow down on other aspects of the outputs by the RRTs. The following are the revised timelines.

Teels	2012			2013								2014					
Task	N	D	1	F	M	A	M	3	J	A	s	0	N	p	4	F	M
Kickoff workshop - Colombo					1												
Stakeholder interaction		67				6 -					1		1			1	
Fast-track – Climate		Int															
Fast-track – Crop model calibration	1																
Fast-track – Economic survey and model calibration	15 1																
Fast-track – Crop model simulations																	Γ
Fast-track – Analysis				100		1											
Calibration of additional integrated assessment sites		-			-												
Calibration of additional sentinel sites for crop models		1			1	10	1.0	1		1							
Economic Model Training Workshop							1							1			
2 <sup>nd</sup> South Asia Projects Workshop														(1)			
Simulations and analysis of all sites											101						
Quality control and revised simulations													1				
4th AgMIP Global Workshop																	
Connecting analyses across sentinel sites and assessments																13	
Final report preparation													1				
Final South Asia Projects Workshop Writing														1		1	-

## Appendix I: AgMIP-SA: Identified Issues Relevant Across the Different Project Teams

AgMIP project teams provide unique opportunities for:

- 1. Enhancing the capacities in the areas of climate, crops, and economics modeling of South Asia Teams.
- 2. Adding value to available data and information. No field experimentation, no farmer surveys for data collection, etc. are envisaged.
- 3. Drawing valuable conclusions by using already available datasets.
- 4. Providing a platform to interact and work in close collaboration with global experts.
- 5. Bringing visibility to the work in the region through sharing of experiences nationally, regionally, and globally.
- 6. Enhancing regional capacity through improved skills in use of tools.
- 7. Helping policy makers in understanding the climate change impacts by preparing farming community to face climate change challenges.
- 8. Developing adaptive strategies based on the results obtained in this project for sustaining crop yields.

#### **Common challenges**

- 1. Availability and access to data, especially climate data (temperature and radiation). Farm survey data needed for economic models.
- 2. Interactions among groups: thematic teams must work in close collaboration. Inter-country interactions are needed. This could point to a need for development of clear intra-project communication strategies. Each team comprised of individuals already engaged in various other activities. So regular contact is a big challenge. Communication problems with some countries because of Visa issues.
- 3. Reliance on existing datasets. Cannot conduct new experiments to acquire data as required for calibration and validation. Accessing already available datasets such as crop yields and genetic co-efficient is a big challenge because it needs formal permission from the authors/agricultural universities/ICAR. Even getting climate datasets from IMD is difficult and requires a lot of ground work and is time consuming. For generation of climate datasets including filling in missing data, it may be best to use similar/consistent approaches across teams.
- 4. Need for clear information strategy for data sharing within and across teams. ICRISAT has promised to work out a common platform for storing data of Regional Research Teams of South Asia.

#### **Capacity building needed**

- 5. Training on new AgMIP tools for all the regional teams, as the training given during this workshop was not sufficient. Also, training in R for climate data analysis, suggested by all regional research teams.
- 6. IGB, Pakistan, and Sri Lanka teams require immediate training on DSSAT model and South India and Sri Lanka teams require APSIM training.
- 7. South India (AP) and Sri Lankan teams need refresher on TOA-MD Model.

## **Opportunities for reaching stake holders**

8. Initial ideas for publications to reach out different target groups have been identified and planned as shown below:

Target groups	Mode				
Farmers	Stakeholder's workshop, Focus group meetings, Publication in regional languages.				
Fellow Researchers / Students	Scientific publications in peer reviewed journals, Arranging capacity building workshops.				
Policy makers	Status reports, Fact sheets				

## Target crops

Sri Lanka	South India	IGB	Pakistan
Rice	Rice	Wheat	Wheat
Sugarcane	Maize	Rice	Rice (Fine)
	Groundnut	Maize	Cotton
	Sorghum		

## Suggested models

Most teams mentioned DSSAT, APSIM, Info-Crop and TOA-MD.

	Sri Lanka	South India	IGB	Pakistan
Crop	DSSAT and APSIM	DSSAT, APSIM	DSSAT,	DSSAT
		and INFOCROP	APSIM and	and
			INFOCROP	APSIM
Economics	ToA-MD	ToA-MD	ToA-MD	ToA-MD

#### Appendix II. Workshop Agenda and Detailed Program



## AgMIP Sub Saharan Regional Workshop November 12-16, 2012 Colombo, Sri Lanka

Day/Date/Time	Session	Facilitator
Day 1 Monday 12 November	Introduce AgMIP and South Asian Regional Research Team Projects Plenary with stakeholders and media (am) then interactive breakout discussions (pm)	
0800-0830	Registration	
0830-0930	Welcome; Goals; Introductions	
0020 1020	<ul> <li>Brief Welcomes from AgMIP PIs and Leaders, Workshop Organizers, Host Country Project Leader</li> <li>Overview of Workshop Goals</li> <li>Brief Introductions of Stakeholders</li> <li>Brief Introductions of Participants</li> <li>Welcome to representatives from Media</li> </ul>	Dileepkumar Guntuku and Cynthia Rosenzweig
0930-1030	Overview of Regional Project Plans (20 min, 10 min discussion)	
	<ul> <li>Sri Lanka Regional Project Plan</li> <li>Southern India Regional Project Plan</li> </ul>	L Zubair P Paramasivam
1030-1100	Tea/Coffee Break	
1100-1230	Continue Overview of Regional Project Plans	
	<ul> <li>Indo-Gangetic Basin Regional Project Plan</li> <li>Pakistan Regional Project Plan</li> <li>AgMIP Regional Coordination Plan</li> </ul>	B Gangwar A Ashfaq D Guntuku
1230-1300	Facilitated Discussion: Stakeholder inputs	J Jones
1300-1430	Workshop Photo, Lunch	
1430-1515	Presentation: Integrated Assessments	

	<ul> <li>Methods, outputs, framework for integrating across climate, crop, economic, and IT teams, scaling up, etc.</li> </ul>	J. Antle
1515-1530	Anticipated Challenges and Charge to Research Team Breakouts	Cynthia Rosenzweig
1530-1600	Tea/Coffee break	
1600-1715	Regional Research Team Breakouts	
	<ul> <li>Responding to Stakeholder inputs</li> <li>Anticipating Challenges</li> <li>Areas of Concentration and/or Additional Training</li> <li>Synergies with other programs</li> </ul>	
1715-1745	Regional Team Report Back and Discussion	Cynthia
1745-1800	Wrap-up Day 1; Anticipate Day 2	Rosenzweig
1830	Welcome Dinner	
Day 2 Tuesday 13 November	Focus on specific project activities with guidance from AgMIP Team Leaders. Early plenary and then full-team round-robin breakouts with interactive discussions focusing on each disciplinary activity and	
	overall project integration	
0830-0930	overall project integration           Plenary Session	
0830-0930	<ul> <li>overall project integration</li> <li>Plenary Session         <ul> <li>Goals for Day 2</li> <li>Scaling up Crop Model simulations to districts for use in Integrated Assessments: Case Study of Anantapur District in India</li> <li>Methods for developing RAPs for regions</li> <li>Intent of Breakout 'Round Robin' Sessions</li> </ul> </li> </ul>	Rosenzweig, Jones K. Boote J. Antle Guntuku, Jones
0830-0930 0930-1100	overall project integration         Plenary Session <ul> <li>Goals for Day 2</li> <li>Scaling up Crop Model simulations to districts for use in Integrated Assessments: Case Study of Anantapur District in India</li> <li>Methods for developing RAPs for regions</li> <li>Intent of Breakout 'Round Robin' Sessions</li> </ul> <li>Parallel Breakout 'Round Robin' Sessions</li>	Rosenzweig, Jones K. Boote J. Antle Guntuku, Jones
0830-0930 0930-1100	<ul> <li>overall project integration</li> <li>Plenary Session <ul> <li>Goals for Day 2</li> <li>Scaling up Crop Model simulations to districts for use in Integrated Assessments: Case Study of Anantapur District in India</li> <li>Methods for developing RAPs for regions</li> <li>Intent of Breakout 'Round Robin' Sessions</li> </ul> </li> <li>Parallel Breakout 'Round Robin' Sessions</li> <li>Crop data, modeling, and IT – Pakistan</li> <li>Climate data, modeling and scenarios – Sri Lanka</li> <li>Economic data, modeling and RAPS – Southern India</li> <li>Collaboration, management and outputs – Indo-Gangetic Basin</li> </ul>	Rosenzweig, Jones K. Boote J. Antle Guntuku, Jones K. Boote, J. Hargreaves, C. Porter, P. Singh, Nedu A. Ruane, D. Murthy, P. Craufurd J. Antle, R. Valdivia, C. Bantilan C. Rosenzweig, J. Jones, D. Guntuku, C. Mutter
0830-0930 0930-1100 1100-1130	overall project integration         Plenary Session <ul> <li>Goals for Day 2</li> <li>Scaling up Crop Model simulations to districts for use in Integrated Assessments: Case Study of Anantapur District in India</li> <li>Methods for developing RAPs for regions</li> <li>Intent of Breakout 'Round Robin' Sessions</li> </ul> <li>Parallel Breakout 'Round Robin' Sessions</li> <li>Crop data, modeling, and IT – Pakistan</li> <li>Climate data, modeling and scenarios – Sri Lanka</li> <li>Economic data, modeling and RAPS – Southern India</li> <li>Collaboration, management and outputs – Indo-Gangetic Basin</li> <li>Tea/Coffee Break</li>	Rosenzweig, Jones K. Boote J. Antle Guntuku, Jones K. Boote, J. Hargreaves, C. Porter, P. Singh, Nedu A. Ruane, D. Murthy, P. Craufurd J. Antle, R. Valdivia, C. Bantilan C. Rosenzweig, J. Jones, D. Guntuku, C. Mutter

	$\circ$ Crop data, modeling, and IT – Sri Lanka	K. Boote,
	<ul> <li>Climate data, modeling and scenarios – Southern India</li> </ul>	J. Hargreaves, C. Porter, P. Singh, Nedu,
	<ul> <li>Economic data, modeling and RAPS – Indo-Gangetic Basin</li> </ul>	D. Murthy
1300-1400	<ul> <li>Collaboration, management and outputs - Pakistan</li> </ul>	J. Antle, R. Valdivia, C. Bantilan, P. Craufurd C. Rosenzweig, J. Jones, D. Guntuku, C. Mutter
1300-1400		
1400-1530	Parallel Breakout Sessions (Continued)	
	<ul> <li>Crop data, modeling, and IT – Southern India</li> <li>Climate data, modeling and scenarios – Indo-Gangetic Basin</li> <li>Economic data, modeling and RAPS – Pakistan</li> <li>Collaboration, management and outputs – Sri Lanka</li> </ul>	K. Boote, J. Hargreaves, C. Porter, P. Singh, Nedu, P. Craufurd A. Ruane, D. Murthy J. Antle, R. Valdivia, C. Bantilan
	Sh Lanka	C. Rosenzweig, J. Jones, D. Guntuku, C. Mutter
1530-1600	Tea/Coffee break	
1600-1730	Parallel Breakout Sessions (Continued)	
	<ul> <li>Crop data, modeling, and IT – Indo-Gangetic Basin</li> <li>Climate data, modeling and scenarios – Pakistan</li> <li>Economic data, modeling and RAPS – Sri Lanka</li> <li>Collaboration, management and outputs – Southern India</li> </ul>	K. Boote, J. Hargreaves, C. Porter, P. Singh, Nedu A. Ruane, D. Murthy, P. Craufurd J. Antle, R. Valdivia, C. Bantilan C. Rosenzweig, J. Jones, D. Guntuku, C. Mutter
1730-1800	Plenary	
	<ul> <li>Discussion, Wrap-up Day 2, Anticipate Day 3</li> </ul>	

Day 3 Wednesday 14 November	Integrated assessments Morning Plenary and then interactive breakout discussions with a focus on integrated assessment methodologies for the fast-track integrated assessment and beyond	
0830-1030	Plenary Session	
	<ul> <li>Goals for Day 3</li> <li>Highlights of Day 2 breakout sessions (10 min each)</li> <li>✓ Sri Lanka</li> <li>✓ Southern India</li> <li>✓ Indo-Gangetic Basin</li> <li>✓ Pakistan</li> <li>✓ Regional Collaboration</li> </ul>	Rosenzweig, Jones Sri Lanka Team Southern India Team Indo-Gangetic Basin Team Pakistan Team Coordination Team
1030-1100	Tea/Coffee Break	
1100-1300	Breakout Sessions (climate, crop modeling, economic modeling, and IT)	
1300-1400	<ul> <li>Simulating regional crop productivity – methods and tools for modeling and assessment (combined crops, climate, IT teams)</li> <li>Crop modeling</li> <li>Climate</li> <li>IT</li> <li>Economic</li> <li>Coordination planning</li> </ul>	K. Boote, J. Hargreaves (A. Ruane; for first hour, then meeting individually) C. Porter J. Antle, R. Valdivia Jim, C. Rosenzweig, D Guntuku, C. Mutter, P. Craufurd, C. Bantilan,
1400-1530	Continue each breakout group	
1530-1600	Tea/Coffee break	
1600-1630	Plenary	
	<ul> <li>Preliminary feedback Wrap-up Day 3, Anticipate Day 4</li> </ul>	
1630-1700	Web tools and resources	C Porter and D Guntuku

Day 4	Continued focus on integrated assessments
Thursday	and other team activities Morning Plenary and
15 November	then breakout discussions on integrated
	assessment methodologies and disciplinary

	methodologies	
0830-0900	Plenary	
	<ul> <li>Goals for Day 4</li> <li>Charge to Breakout Groups</li> </ul>	Rosenzweig, Jones
0900-1045	Parallel Breakout Sessions (Integrated Assessment Emphasis)	
	<ul> <li>Crop productivity (Crop modeling and IT teams)</li> <li>Economic</li> <li>Climate</li> </ul>	
1045-1115	Tea/Coffee Break	
1115-1300	Parallel Breakout Sessions Continue	
1300-1400	Lunch	
1400-1530	Breakout Sessions by disciplinary team	
	<ul> <li>Crop modeling</li> <li>Climate</li> <li>Economic</li> <li>IT</li> </ul>	K. Boote, J. Hargreaves A. Ruane J. Antle, R. Valdivia
1530-1600	Tea/Coffee break	C. Poner
1600-1730 1730-1800	<ul> <li>Breakouts by AgMIP Regional Project Teams <ul> <li>Assessment of progress</li> <li>Adjustment of research plans to address requirements of integrated assessments, etc.</li> <li>Summary of outstanding team needs for RCT synthesis among all teams</li> <li>Targeted publications and other outputs</li> <li>Preparation of research presentation for Day 5 morning Plenary</li> </ul> </li> <li>Plenary Session <ul> <li>Discussion, Wrap-up Day 4, Anticipate Day 5</li> </ul> </li> </ul>	
Devis	Opensions of WARAN Finalize where and ware	
Friday 16 November	forward Morning Plenary followed by Regional Research Team Breakouts and Regional Research Team Reports	
0745	Depart Cinnamon Hotel to IWMI	
830-0900	Arrival and Welcome to IWMI	

0900-0915	Plenary ○ Goals for Day 5	Rosenzweig, Jones
0915-1030	Breakouts by AgMIP Regional Project Teams o Completion of research presentation for Day 5	Guotuku
1030-1100	<ul> <li>Plenary - Regional Coordination Feedback</li> <li>Synthesis of team needs</li> <li>Provisional outline and timeline for SSA special publication or book</li> <li>Discussion</li> </ul>	Guntaku
1100-1200	IWMI Walkabout	
1200-1300	Working Lunch	
1300-1430	Regional Research Team Synthesis and Report- back Pakistan Indo-Gangetic Basin Southern India Sri Lanka Regional Collaboration	Pakistan Team Indo-Gangetic Basin Team Southern India Team Sri Lanka Team Coordination Team
1430-1530	<ul> <li>Concluding Session</li> <li>General discussion – what worked, what didn't; recommendations</li> <li>Next steps</li> <li>Wrap- up</li> </ul>	
1530	Adjourn	
	Transportation to Cinnamon Lakeside Hotel	

# Appendix III. Participants for the First AgMIP South Asia Workshop on Integrated Regional Coordination in Colombo, Sri Lanka, 12-16<sup>th</sup> November 2012.

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