Report
Master Class on
Risk management and systems modelling

In collaboration with the Sustainable Intensification of Maize-Legume Farming Systems from Southern and Eastern Africa (SIMLESA) Program, funded by ACIAR

14 – 19 March 2011
The University of Queensland (QAAFI-UQ)
Agri-Sciences Queensland (DEEDI)

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Rationale

Worldwide hunger is concentrated in the east and southern regions of Africa where maize is a major component of food security. Due to its high potential productivity, maize is considered a strategic crop to mitigate recurring hunger and poverty. Maize is mostly grown by resource-poor farmers in complex risky farming-systems alongside legumes, oilseeds and livestock. With growth of population and incomes, the demand for maize is projected to increase by 50% over the next ten years. It is critical therefore to: (i) in the medium to longer term, increase the sustainable production of maize in the context of expected global changes in climate and food demand and quality, driven by population and wealth growth; and (ii) in the short to medium term, eliminate food shortages during poor seasons while maximising production and farmers profits during the good seasons.

The task is complex due to existing constraints i.e. an increasingly degraded natural resource base; shortages of labour; agronomic skills; poor value chains i.e. access to farm inputs and output markets; a high exposure to climate variability; and the uncertainties from climate change. In this background it is then imperative that SIMLESA partner countries and team members are capable of quickly and effectively identifying opportunities for significant and sustainable improvements in the resilience, adaptability, and productivity of these highly vulnerable farming systems.

When dealing with complex problems, farming systems thinking and farming systems modelling have been demonstrated to be important tools to: **better understand** potential impacts from new technologies and the allocation of limited resources at the field and whole farm level; **quantify** complex interactions, and provide analyses that identify best bet options for the sustainable intensification of farming systems; promote **co-learning** of best fit practices that enhance decision-making under risk and uncertainty.

The target

This training targeted African SIMLESA project members from the National Agricultural Research Systems, and aimed to (i) create understanding of the research benefits from combining participatory systems modelling and field experimentation; (ii) improve their capacity to collect quality soil, climate and crop data sets; and (iii) improve their skills to apply systems modelling techniques and analysis to design more resilient and profitable small holder farm practices, tactics and strategies to better manage investment uncertainty in rainfed cropping systems.

Training objectives

To skill up SIMLESA project members in the effective use of the APSIM software (www.apsim.info) to:
   A) Better inform climate risk management decisions;
   B) Produce ex-ante analyses to test experimental designs, and the potential impacts of practice interventions and practice change aiming at the sustainable intensification of maize-legume farming systems;

C) Support SIMLESA project activities in the application of systems modelling technologies to answer specific research questions in each of the agro-ecologies in the participating countries.

Participants

There were 26 participants in the Master Class – having a range of previous experience and use of systems modelling tools from a wide range of different developing countries: Ethiopia (7), Kenya (4), Tanzania (3), Malawi (3), Mozambique (3), Mali (1), Ghana (1), Cameroon (1), Burkina Faso (1), Colombia (1), and Zimbabwe (1) - together with four Australian trainers (Annex 1), and Eric Craswell who represented the Crawford Fund. Three of the participants were female. All the participants were working in African countries for National Research agencies or for the Consultative Group on International Agricultural Research (CGIAR), across a highly diverse range of farming systems i.e. maize, legumes, pastures, agroforestry and livestock systems.

Co-sponsorship

In addition to the Crawford Fund, co-sponsors of the Master Class were the Australian Centre for International Agricultural Research (ACIAR) through the SIMLESA program, and AusAid through the Central Africa Council for Agricultural Research and Development (CORAF).

Collaborating organizations

Participating African and international organisations include the Ethiopian Institute of Agricultural Research (EIAR); the Kenyan Agricultural Research Institute (KARI); the Agricultural Research and Technical Services (DARTS), Ministry of Agriculture and Food Security, Malawi; Faculdade de Agricultura, Instituto Superior Politécnico de Manica (ISPM); the Instituto de Investigacao Agraris de Mocambique (IIAM); the Ministry of Agriculture and Food Security (DRD) of Tanzania; the Centre for International Maize and Wheat Breeding (CIMMYT); the International Centre for Research in Agro Forestry (ICRAF); the University of Cameroon; the University of Ghana; and the Institute for the Environment and Agricultural Research of Burkina Faso (INERA). Australian participating agencies included The Queensland Alliance for Agriculture and Food Innovation (QAAFI) at the University of Queensland (UQ), Agri-Sciences Queensland from the Queensland Department of Employment, Economic Development and Innovation (DEEDI); and CSIRO.

Course contents

The topics of the training course included

- The role of cropping systems modelling in agricultural research and development.
- APSIM training as provided by the APSIM Unincorporated Joint Venture (www.apsim.info).
- Building minimum data sets for climate, crops and soils for ESA/Africa.
- Soil sampling and soil characterisation.
- Country specific modelling applications that support climate risky management using a range of climate information, climate tools, and systems modelling tools.

The workshop material, documentation and exercises can be accessed from:
http://www.apsim.info/Wiki/Training%20Manual%20(SIMLESA).ashx

Access the Power Point presentations from:

SIMLESA overview by Mulugetta Mekuria
http://dl.dropbox.com/u/20788757/APSIM%20Training/SIMLESA%20Highlights%20%202010%20%20March14%20ADDIS%20Presentation%202011.ppt

APSIM and APSRU slides by Daniel Rodriguez

http://dl.dropbox.com/u/20788757/APSIM%20Training/APSIM%20%26%20APSRU.ppt

APSIM water balance by John Dimes
http://dl.dropbox.com/u/20788757/APSIM%20Training/Apsim%20-%20Watbal%202010.PPT

Surface organic matter by John Hargraves
http://dl.dropbox.com/u/20788757/APSIM%20Training/SurfaceOM.ppt

APSIM plants by Daniel Rodriguez
http://dl.dropbox.com/u/20788757/APSIM%20Training/Apsim%20-%20Plants%202010.ppt

APSIM climate risk by Peter deVoil
http://dl.dropbox.com/u/20788757/APSIM%20Training/Climate%20risk.ppt

APSIM climate change by Peter deVoil
http://dl.dropbox.com/u/20788757/APSIM%20Training/Apsim%20-%20Climate%20change%202010.PPT

APSIM data requirements by John Dimes
http://dl.dropbox.com/u/20788757/APSIM%20Training/APSIM_data_requirements.ppt

A soil sampling demonstration was organised in a nearby field at the ILRI campus where participants exchanged experiences in regards to the use of soil auger for collecting soil samples for soil water and nutrient determinations and determinations of bulk density. Soil sampling in heterogeneous fields was also discussed. A minimum data collection data set was discussed and agreed by all participants (Annex 2).

Annex 3 shows the full program of presentations and activities.

Resource persons (see Annex 1)
- The major presenter was Dr John Dimes formerly Senior Researcher with ICRISAT and now Principal Scientist with DEEDI.
- Mr Peter deVoil from Agri-Science Queensland (DEEDI), Senior Researcher and member of the Software Engineering Group with the APSIM initiative.
- Mr John Hargraves, Senior Researcher previously with CSIRO Sustainable Ecosystems.
- Dr Daniel Rodriguez Senior Research Fellow with Queensland Alliance for Agriculture and Food Innovation, previously with Agri-Science Queensland (DEEDI).

Lessons Learned
1. We definitively underestimated the demand for climate risk and systems modelling training in Africa. This reflected in a large number of applicants we had to turn back. Obviously system modelling is been considered in Africa as a good complement to empirical experimentation and people are keen to develop the skills. Increasing the number of participants per training session is not possible given the intensity and trainer demand required. We therefore recommend running additional training opportunities probably at centres where APSIM modelling is already being adopted eg. Ethiopia.
2. Training would have to be provided in Africa in a way to reduce costs and avoid visa problems for the participants.
3. The mixing up of participants and breaking country groups occurred naturally. This demonstrated the will of people to exchange experiences and learn from each other irrespective of cultural or language barriers.
4. Additional training at a higher more specialized level would be highly advantageous to the participants running ahead of the pack. This should also be seen as a strategy to develop critical mass and functional networks of specialized skills at key places across Africa. For

example we were very impressed with the capabilities already developed in Ethiopia, Ghana, and Mozambique. This could be achieved by providing an advanced APSIM and APSFarm training course that more specifically addresses the needs of existing project activities across the region.

5. The Crawford Fund post-course survey was completed by 15 of the participants. The scores and comments from the survey forms are shown in Annex 4. The overall scores were remarkably high. Only two participants did not agree or strongly agree that the training was of high quality; and in this case they registered only a 'neutral' response to the question. Amongst all of the responses to the questionnaire, only one participant disagreed with a question and in this question the topic covered the issue of 'policy' which understandably some participants may not deal with on a regular basis.

The written comments are likewise generally positive and reflect the scores mentioned above. Some participants felt that more training should be organised and that Master Class could have been longer, whereas another was concerned that the laptop he/she used was not up to the task. The close association between this Master Class and the SIMLESA project, which is in its early stages, should provide a basis for addressing such concerns and following up the training. This reflects an important lesson learned – the use of the Master Class model to train participants who are already directly involved with the trainers in a well-funded project provides a level of focus for the course and the follow-up that ensures relevance and effective impact of the overall exercise.

Acknowledgements

Annex 1. Participants and trainers

	Name	Country	Location	Agency	Contact details	How do you expect to apply this training?
1	Bashir Makoko	Tanzania	Selian	DRD	Department of Research and De 6024 Arusha, Tanzania brmakoko@yahoo.com	*My expectation is to be able to use APSIM knowledge/tools for analysing whole-farm systems, including crop sequences and rotations, soil type and climate data. Thus I hope to use APSIM to plan and advice farmers on agronomic practices such as changes in planting dates, cultivar types, land management, fertilizer management etc. to cope with the climate changes for the purpose of increasing crop yield.*
2	George Ironga	Tanzania	Dakawa	DRD	P.O. Box 1892 ARI Dakawa, Morogoro tiranga2001@yahoo.co.uk +255 783 750909, + 255 718 024441	*The knowledge to be acquired through the training in APSIM, will help me understand more and in particularly cropping system modelling, collecting quality data and climatic risk managements. The training is expected to upgrade my knowledge to contribute to SIMLESA project.*
3	Abubakari Mzanda	Tanzania	Ilonga	DRD	Department of Research and Development P.O. Box 3 Ilonga, Tanzania. abuumzandah@yahoo.com	*I will use the learning in the project of which I am working with (SIMLESA) to address different issues on the risks which will come across the project, in collaboration with other project stakeholders.*
4	Donwel Kamalongo	Malawi	Chitedze	DARTS	Chitedze Agricultural Research Station P.O. Box 158, Lilongwe. Malawi dkamalongo@hotmail.com	*There is need to work out on crop management interventions like soil fertility to sustain productivity for improved housed-hold food security. The expertise will be instrumental in modelling and validating soil fertility status in maize based cropping systems where grain leguminous or green manure crops are used.*
5	Donald Siyeni	Malawi	Lilongwe	DARS	Donglad2@yahoo.co.uk	*To apply in maize-legume systems*
6	Grace Phiri (MSc, PhD student with B Bellotti)	Malawi	Chitedze	DARTS	Chitedze Agricultural Research Station P.O. Box 158, Lilongwe. Malawi gracechawezi@yahoo.com	*I would like to participate in the APSIM training in March as this will help me in advising our farmers on how to prepare in advance to mitigate the risks in times of drastic weather conditions especially now we are experiencing drought in most parts of the country. I will also be able to advise farmer of food availability in the coming season by predicting the yield then farmers will know how much to keep or sell so that they are food secure. I can also advise them on what crops to grow as well as what crops need insurance so that should they fail to harvest , they can be in a position to get money from insurance to recover from the risks.*
7	Nascimento Salomão Nhantumbo (MSc Wageningen)	Mozambique	Chimoio	ISPM	Faculdade de Agricultura, Instituto Superior Politécnico de Manica Postal Code: 417; Chimoio - Moçambique tonhantumbo@ispm.ac.mz tonhantumbo@yahoo.com	*Regarding application of the learning from this training, I'll use it on my teaching at the Faculty of Agriculture of Manica Higher Polytechnic Institute where i am based. Besides using it on teaching to build more awareness regarding system modeling on our graduates and partners, i am also planning to use APSIM and the knowledge i will gain as a tool to improve/increase the scope of our research at the Polytechnic and*

						also within the SIMLESA project.
8	Ms Alda Tomo	Mozambique	Maputo	IIAM	Mozambique Institute of Agricultural Research alda.tomo@gmail.com	*I expect to use the APSIM knowledge/tools to model biological and environmental aspects of small scale farmers production systems and incorporate them in the socio-economic research of climate change related issues in agriculture in general and, particularly within SIMLESA Project.*
9	Jose Domingos dos Santos Chiocho	Mozambique	Manica	IIAM	Mozambique Agricultural Research Institute IIAM CP 42 DPA Manica, Chimoio. Mozambique Chiochojose@yahoo.com.br	*I will apply the learning by helping the project SIMLESA to analyse data and also train other member of the project*
10	Alfred Micheni (MSc)	Kenya	Embu	KARI	Kenya Agricultural Research Institute, PO Box 27 Embu, Kenya micheni2005@yahoo.com	*The project's empirical results will therefore be interpreted using actual field data sets and modelling outputs from the APSIM model. In addition, the model will be used in the study to improve the scientists understanding of the impact of climate, soils and crop management on basis of changes in planting dates, cultivar types, fertilizer and other agronomic adaptations.*
11	John Achieng (MSc)	Kenya	Kakamega	KARI	Kenya Agricultural Research Institute (KARI), P.O. Box 169-50100, Kakamega, Kenya joachieng2004@yahoo.com	*The course will enable me to better understand potential impacts of conservation agriculture and further enable me to make better informed decisions on climate change risk management. The knowledge will be applied with the view of eliminating hunger and poverty among smallholder maize farmers in western Kenya*
12	Martin Odendo	Kenya	Kakamega	KARI	Kenya Agricultural Research Institute (KARI), P.O. Box 169-50100, Kakamega, Kenya odendos@yahoo.com	*To incorporate strategies for downsizing risk in the SIMLESA impact pathway; and to integrate analysis of biophysical and socioeconomic data generated from SIMLESA and other related projects.*
13	Tewodros Mesfin (MSc, PhD student with C Muller)	Ethiopia	Melkassa	EIAR	Melkassa Agricultural Research Center, P. O. Box 436, Nazareth, Ethiopia tewodrosmes2@yahoo.com	*APSIM as a robust and valuable system modelling tool, I believe the science-based knowledge and skill acquired from the training will help me to sufficiently understand the model capability and apply as most feasible solutions to test 'what-if' scenario and further identify the best-bet options for testing with farmers to effectively manage climate induced risk and uncertainty in Ethiopia.*
14	Abeya Temesgen (MSc, PhD student with D Rodriguez)	Ethiopia	Bako	EIAR	Bako Agricultural Research Center, W.Shoa, Bako-Tibe, PO Box 3 Oromia, Ethiopia abliya@gmail.com	*I strongly believe that my knowledge in APSIM, particularly in cropping system modelling , collecting quality data and climatic risk managements, is very much helpful to upgrade my knowledge to contribute to SIMLESA project for mid altitude sub humid of Western Ethiopia. In addition, I have no doubt that the training is a basic for my PhD research, which I will undertake through SIMLESA project.* *In my return, I will deliver the training for SIMLESA team members as well as for any interested researchers of Bako Agricultural Research Centre. This is believed to be equally important in contributing to SIMLESA project*
15	Legesse Hidoto	Ethiopia	Hawassa	EIAR	Ethiopian Institute of Agricultural Research, Hawassa	*The training will bring impact since directly related to cropping system*

					Research Sub-Center P.O Box 900, Hawassa, Ethiopia hidotog@yahoo.com	
16	Andualem Shimeles	Ethiopia	Meklassa	EIAR	andushime@gmail.com	
17	Solomon Jemal	Ethiopia	Melkassa	EIAR	Melkassa Agricultural Research Center, P. O. Box 436, Nazareth, Ethiopia yesol78@yahoo.com or yemelk80@gmail.com	*APSIM would be a great tool in testing and evaluating the potentials of different technological options and scenarios based on their likely productivity, associated risk and sustainability in maize-legume cropping system. It can also be used to simulate the long-term effects of technology options such as CA and intercropping on soil quality, disease, pest and weed dynamics, and system productivity in the target areas.* *I will contribute a lot to the fulfilment of the projects' objectives and aims.*
18	Isaiah Nyagumbo (PhD)	Zimbabwe	Harare	CIMMYT	CIMMYT - P.O. Box MP163, Harare, Zimbabwe i.nyagumbo@cgiar.org	*In this training I hope to gain skills in the application of APSIM to various scenarios that arise under CA and use these skills to model possible impacts of various management systems in Conservation Agriculture. It is also anticipated the training will enable me to fully understand the data requirements for effective APSIM modelling in biophysical systems.*
19	Menale Kassie (PhD)	Kenya	Nairobi	CIMMYT	CIMMYT - Kenya, ICRAF Campus, United Nations Avenue – Gigiri P.O. Box 1041, Village Market, 00621 Nairobi, Kenya m.kassie@cgiar.org	*To assess SIMLESA intervention impact we are going to apply bio-economic modeling. Some of the parameters needed for this model can be generated using APSIM model. So I want to link APSIM model with bio-economic model. Additionally, I have interest to asses climate change impact on production and food security. I think such kind of biophysical models are important to generate important variables that help us to assess climate change impact.*
20	Fred Kanampiu (PhD)	Kenya	Nairobi	CIMMYT	CIMMYT - Kenya, ICRAF Campus, United Nations Avenue – Gigiri P.O. Box 1041, Village Market, 00621 Nairobi, Kenya f.kanampiu@cgiar.org	*I have no skills in modeling. Hope this training will equip me with basics to enable me effectively discuss with colleagues on APSIM modeling. Gained skills should help me better understand the data requirements for effective APSIM modeling in biophysical systems. Training should highlight how skills can be used better understand CA management systems.*
21	Dr. Jules Bayala	Mali	Bamako	ICRAF	j.bayala@cgiar.org	
22	Eric Fotsing	Cameroon	Marona	University	efotsing@gmail.com	
23	Mathieu Ouedrago	Burkina Faso	Bobo-Dioulasso	INERA	oued_mathieu@yahoo.fr	
24	Dr Dyllis MacCarthy	Ghana	Kpong	Univ of Ghana	kponogor@yahoo.com	
25	Dr Diego Valbuena	Ethiopia	Addis	ILRI, Addis Ababa	d.valbuena@cgiar.org	
26	Dr Amare Hailesla-Ssie	Ethiopia	Addis	ILRI, Addis Ababa	a.haileslassie@cgiar.org	
1	Daniel Rodriguez	Australia		University of	PO Box 102, Toowoomba, Qld,	

	(Trainer and course coordinator)			Queensland	4350 , Australia +61 7 4688 1437 +61 434 075 094 d.rodriguez@uq.edu.au	
2	John Dimes (Trainer)	Australia		QDEEDI	PO Box 102, Toowoomba, Qld, 4350 , Australia +61 7 4688 XXXX John.Dimes@deedi.qld.gov.au	
3	Peter deVoil (Trainer)	Australia		QDEEDI	PO Box 102, Toowoomba, Qld, 4350 , Australia +61 7 4688 1241 +61 418 102 347 Peter.Devoil@deedi.qld.gov.au	
4	John Hargreaves (Trainer)	Australia		CSIRO	PO Box 102, Toowoomba, Qld, 4350 , Australia +61 7 4698 7448 John.hargreaves@csiro.au	

Annex 2. Minimum soil and climate

DESCRPTION	PARAMETERS	DEPTH (cm)									WHEN TO SAMPLE			REMARKS
											Daily	Trl estbl/ sowing	Monthly (incl. flower; harv)	
		0.-10	10-20	20-40	40-60	60-80	80-100	100-120	120-140	140-160	X	√	√	For Ethiopia, Malawi (On-farm= at establ, flower and harv, maximum depth=60cm; On-station= at establ, monthly, inc. flw & harv)
		0-15	15-30	30-60	60-90	90-120	120-150	150-180	X	X	X	√	√	Kenya, Mozambique, Tanzania (On-farm= at establ, flower and harv, maximum depth=60cm; On-station= at establ, monthly, inc. flw & harv)
Nitrogen	NO3-N	√	√	√	√	√	√	√	√		X	√	√	
	NH4-N	√	√	√	√	√	√	√	√		X	X	X	Optional
	Total N	√	√	√	√	√	√	√	√		X	√	X	
Carbon	OC	√	√	√	√	√	√	√	√		X	√	X	
	Total C	√	√	√	√	√	√	√	√		X	√	X	
Water	LL	√	√	√	√	√	√	√	√		X	√	X	at 15 bar (in the labs)
	DUL	√	√	√	√	√	√	√	√		X	√	X	Pond method
	SW	√	√	√	√	√	√	√	√		X	√	√	On-station monthly
Soil Type	Local (name)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		X	√	X	
	Soil Classsification name	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		X	√	X	
Other soil x-ristics	pH	√	√	√	√	√	√	√	√		X	√	√	
	BD (g/cm3)	√	√	√	√	√	√	√	√		X	√	x	Do it when soil is wet
	extrable P (ppm)	√	√	√	√	√	√	√	√		X	√	x	
	Total P	√	√	√	√	√	√	√	√		X	√	x	
	K (me%)	√	√	√	√	√	√	√	√		X	√	x	for other trial needs
	Ca (me%	√	√	√	√	√	√	√	√		X	√	x	for other trial needs
	Mg (me%)	√	√	√	√	√	√	√	√		X	√	x	for other trial needs
Weather	Rainfall	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		√	N/A	X	both on-farm and on-station
	Min-T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		√	N/A	X	2/agroeco
	Max-T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		√	N/A	X	
	Radiation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		√	N/A	X	onstn
	Evap.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		√	N/A	X	onstn
GPS Reading	Altitude	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		X	√	X	GPS
	Longitude	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		X	√	X	GPS
	Latitude	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		X	√	X	GPS

Annex 3: Program

Day 1: Monday, 14 March

08:30   Welcome and Introductions
                                    Eric Craswell (Crawford Fund – ACIAR)
                                    Mulugetta Mekuria (SIMLESA - CIMMYT)

09:00   Programme for the week
                               What/Who is APSRU?   (Daniel Rodriguez)

09:20   Check on status of APSIM licensing, installations and set-ups
                               Workshop databases and resources (Peter de Voil)

10:00   APSIM in Africa – background, capabilities, performance, applications
                               (John Dimes)

10:30   Morning Tea

11:00   APSIM - An overview   (Peter de Voil)
                             (i) APSIM User Interface
                                     (Menus, Toolboxes, Graphical tools)
                           (ii) Simulation Structure
                                     (Met, Soil, Management, Outputs, Special Capabilities)
                         (iii) Documentation and Support

12:30   Data input requirements   (John Hargreaves)

13:00   Lunch

14:00   Fallow Water Balance Exercise (Kakamega climate)

15:00   Soil Water Balance Science and Discussion   (John Dimes)

15:30   Afternoon Tea

16:00   Effects of Residues Exercise (Kakamega)

16:45   Surface Organic Matter Science/ Discussion (John Hargreaves)

Day 2: Tuesday, 15 Sept

08:30   Carryover/discussion points from Day 1

09:00   N Cycling Exercises (Melkassa climate)

10:00   Soil N Science and Discussion   (John Dimes)

10:30   Morning Tea

11:00   Plant Science   (Daniel Rodriguez)

11:20   Crop Simulation Exercises

                         Simulating Single Season Crop responses (Kakamega)
- (i)   Maize and cowpea water and N use
- (ii)   Maize response to organic and inorganic N inputs
- (iii)   Analyzing Observed and Predicted in APSIM

13:00   Lunch

                         Simulating Multiple Season Maize responses (Kakamega)
- (i)   Response to N, bi-modal climate, with re-sets
- (ii)   Risk analysis
- (iii)   P constraint effects

15:30   Afternoon Tea

                         Simulating Maize-Legume Systems (Embu climate)
- (i)   Maize-Groundnut Rotation (no re-sets)
- (ii)   Maize/Groundnut Intercrop (no re-sets)

17:00   General Discussion and close for the day

19:00   Training dinner

Day 3: Wednesday, 16 Mar

08:30	Carryovers/discussion points from Day 2
09:00	Seasonal climate forecast capabilities in APSIM (Peter de Voil)
09:30	Seasonal climate forecast Exercise (Kakamega Climate)
10:30	Morning Tea
11:00	Climate Change Capabilities in APSIM (Peter de Voil)
11:30	Analysis of Climate Change Effects
13:00	Lunch
14:00	Discussion on climate change and forecasting exercises.
14:30	Introduction to APSFARM
17:00	Closing

Day 4: Thursday, 17 Mar

08:30   Obtaining Soil Inputs for APSIM
                                          Soil sampling demonstration (within ILRI campus)
                                          Field equipment
                                          Sampling strategies
                                          Soil processing for analysis – SOC, water, N&P
                                          Techniques for obtaining soil water input parameters
                                          Soil Bulk Density
                                          Model sensitivity analysis

10:30   Morning Tea

11:00   Break-out into group activity

                Group 1 – Simulation of Conservation Agriculture in APSIM (John Dimes)
                Group 2 – APSFARM: use and applications (Daniel Rodriguez)
                Group 3 – Climate Change simulation and analysis techniques (Peter de Voil)
                Group 4 – West African cropping systems (John Hargraves)

                Groups discuss and design model applications within the above topics
                Group members were be assigned tasks (organize input data, do simulations, analyse outputs) and worked either as individuals or in teams to help reinforce learning from APSIM training and develop skills for cropping systems analysis.

Day 5: Friday, 18 Mar

08:30- 13:00   Continue group activity, prepare presentation of results, discuss and plan follow-up activities (scheduling APSIM applications into workplans, on-going APSIM support needs, expected outputs)

14:00   Certificates and address to the group by the Australian Ambassador to Ethiopia.

Day 6: Saturday, 19 Mar

08:30   Group presentations

10:30   Morning Tea

11:00   General discussion (all to participate)

12:00   Closing up (Eric Craswell)

Annex 4: Post-course Survey

A: SUMMARY OF SCORES

CRAWFORD FUND MASTER CLASS

TITLE: **Master class on: Risk management and systems modelling**

Post-training course participants' survey –

This part of the questionnaire relates to the knowledge/skills acquired during the Master Class, i.e. the relevance of the contents to your work situation; the quality of the contents; the adequacy of the structure of the program; and the quality of the presenters.

As a result of the Master Class:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Relevant
(1) The contents of the training were relevant to my work and I expect to be able to apply the skills/knowledge from the training to my work	9	6				
(2) The training material and the training course was of high quality.	8	5	2			
(3) The presenters were clear and well versed in their subject matters.	12	3				
(4) I feel that participating in this training has increasing my opportunities to deliver better outputs for my project activities	11	4				
(5) I would be interested to further increase my skills on the use and application of farming systems models for agriculture	12	3				
(6) The networks made during the training will enable me to produce better research outputs	10	4	1			
(7) The networks made during the training will enable me to produce better policy outputs	3	5	5	1		1

B: LIST OF COMMENTS

- The course enabled a good appreciation and hands on skills on the use of APSIM. However more practice may be required for one to confidently use the model. All the necessary tools and basics were however provided.

- Besides small corrections that should have been made before on some data on the exercises in the main training manual I think the training was really important and relevant for my current research interest. The next step for me would be on producing the datasets to calibrate the models which I think I can further work on with the trainers.

- I am very much impressed with the way this training was organized and also by the skills of the trainers.

- The training was of high standard and newly emerging science, which we have had less or no exposure in Africa.

- The participation of highly specialized and well experienced people makes the training very much useful from any training I have taken before.

- I really appreciate the Crawford for organizing and funding such a very useful training. I am also very much grateful for the kindness in covering all our expenses during the training.

- I have no doubt, because of the training, a significant breakthrough will be seen in some parts of Africa where SIMLESA project is being implemented.

- It will be good to have several of such training, first to understand the model better and its operations

- The trainers were very responsive to the demand of the trainees. They should be thanked and encouraged

- The support team (drivers, waiters, cashiers) did a wonderful job The extra-training event(s) were few but well arranged and set

- I wish the Master Class would have been eight days training program to sufficiently understand and to be an expert on some important element of system modelling

- During the training I observed that the system modelling under African condition can work better than any other world to the fact that there is variability's of climatic, edaphic and etc.

- The training was excellent, but we need more of such training programs in order to be conversant and understand the model better and its operations

- The trainers were very responsive to the demand of the trainees. They should be thanked and encouraged

- Some of our laptops were unable to handle the programs, we advise the project to put this in considerations for future planning

- The extra-training event(s) were few but well arranged and set

- The support team (drivers, waiters, cashiers) did a wonderful job not forgetting Madame Bekele, Aklilework in doing the bookings.

- The field practical was an opportunity for participants to have an equal understanding of sampling methods, minimum data required for each trial and sample handling.

- The course offered us a great opportunity to exchange ideas with partners from other countries.

- The network among participants so created is a great opportunity to collaborate.

- Found that the training is useful, but with limited time to cope with. Crawford should find the best way to do it in order to have the desired outputs as per wish

- This was an exciting course with great relevance to my professional work

- The training was very practical and it would be very useful in our projects well as other similar fields and projects we are engaged in. I hope the knowledge and skill acquired will be transferred to our colleagues.