



A Training Program on DSSAT v4.5 and MWCropDSS tool

*International Training Program
Decision Support System for Agrotechnology Transfer*

**Assessing Food Security, Crop Production, Nutrient Management, Climatic Risk
and Environmental Sustainability with Simulation Models and GIS tools**

February 10 - 21, 2014

Chiang Mai University, Chiang Mai, Thailand

*DSSAT Foundation
&
Thailand International Development Cooperation Agency, Thailand*

Chiang Mai University
Washington State University
Thailand Rice Department
International Consortium for Agricultural Systems Applications





Introduction & Installation

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Monday			
Feb 10	0830	Registration	J. Onpraphai/Somjit
	0900	Welcome	A. Jintrawet
	0905	Report to the CMU's President	Prof. Dr. Sanchai Jaturasitha, Associate Dean for Research, Academic service and International Affairs
	0915	Opening Ceremony	Prof. Niwes Nanthachit, CMU President
	0930	Group Picture CARSR Lawn	Tewin
	1000	Break	
	1030	Goals, Course Outline, Schedule Introduction of Participants and Faculty	A. Jintrawet/G. Hoogenboom
	1100	History and Overview of DSSAT Example applications	G. Hoogenboom
		<i>Reading/Reference: Uehara and Tsuji Chapter in Kluwer book, pp. 1-7 Jones et al. Chapter in Kluwer book, pp. 157-178</i>	
	1200	Lunch, CARSR Terrace	
	1300	Installation of DSSAT Version 4.5 Software	G. Hoogenboom/ A. Jintrawet C. Buddhaboon/ C. Samranpong
		Overview of DSSAT <i>Reading/Reference: DSSAT V4 Volume 1 Readme and Install files</i>	G. Hoogenboom/



<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Monday Feb 10		Continuation	
	1345	Exercises: Running Crop Models	G. Hoogenboom/ A. Jintrawet/ C.Buddhaboon/
	1400	Simulating Phenological Development	G. Hoogenboom
<i>Reading/Reference</i>		<i>Boote et al. chapter in Kluwer book, pp. 99-128</i>	
	1500	Break	
	1530	Introduction to Sensitivity Analysis Tool	G. Hoogenboom
	1545	Exercises: Sensitivity Analysis Tools	G. Hoogenboom/A. Jintrawet C.Buddhaboon/
	1700	Reception, CARSR Lawn	Juthamat Onpraphai
	1900	Adjourn	



Crop Growth & Potential Production

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Tuesday			
Feb 11	0830	Access to library facilities and other resources	CMU Librarian
	0845	Simulating Basic Growth Processes	G. Hoogenboom
<i>Reading/Reference</i>		<i>Jones et al., Eur. J. Agron. 18(2003):235-265</i> <i>Boote et al. chapter in Kluwer book, pp. 99-128</i> <i>Ritchie et al. chapter in Kluwer book, pp. 79-98</i>	
	1030	Creating FileX: Potential Production	A. Jintrawet/ G. Hoogenboom
<i>Reading/Reference</i>		<i>DSSAT V3.5 Volume 2-1, pp. 1-93</i> <i>DSSAT V3.5 Volume 1-4, pp. 111-143</i> <i>DSSAT V4.0 Volume 2, XBuild User's Guide</i>	
	1100	Exercises: Simulating Potential Production	A. Jintrawet/ G. Hoogenboom/ C. Buddhaboon
	1200	Lunch, CARSR Terrace	

Weather & Genetic Coefficients

	1300	Weather Data Inputs and Utilities	G. Hoogenboom
<i>Reading/Reference</i>		<i>DSSAT v3.5 Volume 3-3</i>	
	1315	Exercises: Weather Data Files	G. Hoogenboom/ A. Jintrawet C. Buddhaboon
	1430	Minimum Data Set Concept	G. Hoogenboom
<i>Reading/Reference</i>		<i>Hunt and Boote chapter in Kluwer book, pp. 9-40</i>	
	1500	Break	



<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Tuesday Feb 11		Continuation	
	1530	Learning the DSSAT File System	G. Hoogenboom
		<i>Reading/Reference</i> DSSAT V3.5 Volume 2, Chapter 1	
	1600	Concept of Genetic Coefficients Species vs. Ecotype vs. Cultivar Coefficients	G. Hoogenboom
		<i>Reading/Reference</i> CERES-Maize Species & CERES-Rice Species Definitions CROPGRO Species & CROPGRO Cultivar Definition files Boote et al. chapter in Kluwer book, pp. 99-128 Ritchie et al. chapter in Kluwer book, pp. 79-98	
	1730	Adjourn	



Genetic Coefficients

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Wednesday			
Feb 12	0830	Feedback on exercises and software	A. Jintrawet/G.Hoogenboom
	0900	Genetic Coefficients – CROPGRO & CERES	G. Hoogenboom
	1000	Break	
	1030	Estimating Genetic Coefficients, Concepts	G. Hoogenboom
<i>Reading/Reference</i>		<i>Mavromatis et al., Crop Science 42(2002):76-89</i> <i>Pathak et al., Trans ASABE 50(2007):2295-2302</i>	
	1130	Exercises: Cultivar Sensitivity Analyses	G. Hoogenboom/A.Jintrawet C.Buddhaboon
<i>Reading/Reference</i>		<i>DSSAT V3.5 Volume 3-4, pp. 201-233</i> <i>Boote et al., Agric. Systems 70(2001):395-420.</i>	
	1200	Lunch, CARSR Terrace	
	1300	Tools to Estimate Cultivar Coefficients	G. Hoogenboom
<i>Reading/Reference</i>		<i>Hunt et al. Agron. J. 85(1993):1090-1094</i> <i>Hoogenboom et al., Field Crops Research 90(2004):145-163</i> <i>Anothai et al., Field Crops Research 108(2008):169-178</i> <i>He et al., Agric. Systems 103(2010) :256-264</i> <i>Jones et al. Advances in Ag. Systems Modeling 2(2011):365-393</i>	
	1330	Exercises: Cultivar Coefficient Calibration	G. Hoogenboom/A.Jintrawet C.Buddhaboon
	1500	Break	
	1530	Exercises: Cultivar Coefficient Calibration (Continue)	
	1730	Adjourn	



Water Limited Production, Soils & Experimental Data

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Thursday			
Feb 13	0830	Feedback on Exercises and Software	A. Jintrawet
	0900	Simulating Water Limited Production Soil and Flood Water Balance in Rice	G. Hoogenboom
<i>Reading/Reference</i>		<i>Ritchie chapter in Kluwer book, pp. 41-54</i> <i>DSSAT V3.5 Volume 2-1, pp. 1-93</i> <i>DSSAT V3.5 Volume 1-4, pp. 111-143</i> <i>DSSAT V4.0 Volume 2, XBuild User's Guide</i>	
	1000	Break	
	1030	Soil Data Inputs and Utilities	G. Hoogenboom
<i>Reading/Reference</i>		<i>DSSAT V3.5 Volume 1-3, pp. 49-90</i> <i>DSSAT V4.0 Volume 2</i> <i>Gijsman et al., Eur. J. Agron. 18(2002):75-105</i> <i>Gijsman et al., Comp and Electronics in Agric 56(2007):85-100</i>	
	1100	Exercises: Soil Data Files	G. Hoogenboom/A. Jintrawet C.Buddhaboon
	1200	Lunch, CARSR Terrace	
	1300	Creating FileX: Water Balance On	A. Jintrawet/G. Hoogenboom
	1330	Exercises: Water Limited Production	G. Hoogenboom/A. Jintrawet C.Buddhaboon
	1500	Break	
	1530	Experimental Data Collection - Model Evaluation	G. Hoogenboom
<i>Reading/Reference</i>		<i>DSSAT V3.5 Volume 4-7 & 4-8, pp. 203-233</i>	



<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Thursday Feb 13		Continuation	
	1615	Experimental Data Files and Utilities	G. Hoogenboom
	<i>Reading/Reference</i>	<i>Bostick et al., Agron. J. 96(2004):853-856</i> <i>Hunt et al., Agric. Systems 70(2001):477-492</i>	
	1630	Exercises: Experimental Data Files	G. Hoogenboom/A. Jintrawet C.Buddhaboon
		Exercises: Model Calibration	G. Hoogenboom/A. Jintrawet C.Buddhaboon
	1730	Adjourn	



Nitrogen Limited Production

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Friday Feb 14	0830	Feedback on Exercises and Software	A. Jintrawet
	0900	Simulating Nitrogen Limited Production Processes in the Soil	G. Hoogenboom
<i>Reading/Reference</i>		<i>Godwin and Singh chapter in Kluwer book, pp. 55-78</i> <i>Gijsman et al., Agron. J. 94(2002):462-474</i>	
	1000	Simulating Nitrogen Limited Production Processes in the Plant	G. Hoogenboom
<i>Reading/Reference</i>		<i>Bowen et al. chapter in Kluwer book, pp. 189-204</i>	
	1030	Break	
	1100	Creating FileX: Water and N Balance On	G. Hoogenboom
<i>Reading/Reference</i>		<i>DSSAT V3.5 Volume 2-1, pp. 1-93</i> <i>DSSAT V3.5 Volume 1-4, pp. 111-143</i> <i>DSSAT V4.0 Volume 2, XBuild User's Guide</i>	
	1200	Lunch, CARSR Terrace	
	1300	Exercises: Nitrogen Limited Production	G. Hoogenboom/A.Jintrawet C.Buddhaboon
	1500	Break	
	1530	Importance of Soil Inputs in Computer Simulation	G. Hoogenboom
<i>Reading/Reference</i>		<i>Gijsman et al., Computers and Electronics in Agric. 56(2007):85-100</i> <i>Dardanelli et al., Trans. ASABE 46(2003):1265-1275</i>	
	1600	Exercises: Continue	A. Jintrawet/G. Hoogenboom C.Buddhaboon
	1730	Adjourn	



Break or Optional Tour to Mae Sai in Chiang Rai Province organized by Eurosia Holidays

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Saturday Feb 15		<i>Lao-Thai Border Tour</i>	Group
Sunday Feb 16		<i>Lao-Thai Border Tour</i>	Group



Evaluating Risk and Sustainability

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Monday			
Feb 17	0830	Feedback on Exercises and Software	A. Jintrawet
	0900	Uncertainty, Risk, BMPs, and Sustainability	G. Hoogenboom
<i>Reading/Reference</i>		<i>DSSATV3.5 Volume 3-1, pp. 1-66</i> <i>Thornton and Wilkens chapter in Kluwer book, pp. 329-345</i> <i>Bowen et al. chapter in Kluwer book, pp. 313-327</i> <i>Tojo Soler et al., Eur. J. Agronomy 27(2007):165-177</i>	
	1000	Break	
	1030	Creating FileX: Seasonal Analysis	G. Hoogenboom/A. Jintrawet
<i>Reading/Reference</i>		<i>DSSAT V3.5 Volume 2-1, pp. 1-93</i> <i>DSSAT V3.5 Volume 1-4, pp. 111-143</i>	
	1100	Exercises: Seasonal Analysis	G. Hoogenboom/A. Jintrawet/ C. Buddhaboon
	1200	Lunch, CARSR Terrace	
	1330	Exercises: Continued Seasonal Analysis Work with your Personal Experimental Data	
	1500	Break	
	1530	Cropping Systems – Simulating Crop Rotations	G. Hoogenboom/A. Jintrawet
	1630	Creating FileX: Rotation/Sequence Analysis	G. Hoogenboom/A. Jintrawet
<i>Reading/Reference</i>		<i>DSSAT V3.5 Volume 2-1, pp. 1-93</i> <i>DSSAT V3.5 Volume 1-4, pp. 111-143</i>	
	1700	Exercises: Rotation/Sequence Analysis	A. Jintrawet/G. Hoogenboom C. Buddhaboon
<i>Reading/Reference</i>		<i>DSSAT V3.5 Volume 3-2, pp. 67-127</i>	
	1730	Adjourn	



Model Applications

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Tuesday			
Feb 18	0830	Feedback on Exercises and Software	A. Jintrawet
	0900	Key Findings of the IPCC WG1 Fifth Assessment Report (AR5) and their relevance to the Southeast Asia region	Fredolin Tangang, PhD, FASc IPCC Working Group I Vice-Chair
<i>Reading/Reference</i>		<i>IPCC WG 1 Report</i>	
	1000	Break	
	1030	Key Findings (Con't)	Fredolin Tangang
	1200	Lunch, CARSR Terrace	
	1300	Climate Change and Climate Variability AgMIP Project	G. Hoogenboom
<i>Reading/Reference</i>		<i>Rosenzweig and Iglesias chapter in Kluwer book, pp. 267-292</i> <i>Hammer et al., Agric. Systems 70(2001):515-553</i> <i>Hoogenboom, Agric. For. Met. 103(2000):137-157</i> <i>Hillel & Rosenzweig: Handbook of Climate Change and Agroecosystems</i> <i>White et al., Field Crops Research 124(2011):357-368</i>	
	1400	Exercises: Simulating Climate Change Impact	G. Hoogenboom/A. Jintrawet C. Buddhaboon
	1430	Decision Support Systems for Farmer Applications Demonstration: SECC: Yield and Climate Tools AgWeatherNet & Automated Environmental Monitoring Network	G. Hoogenboom
	1500	Break	
	1530	Exercises: Continue	
	1630	Adjourn	
	1800	Dinner @ Local Restaurant	Juthamat Onphraphai



Model Applications

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Wednesday Feb 19	0830	Feedback on Exercises and Software	A. Jintrawet/G. Hoogenboom
	0900	Simulating Spatial Variability <i>DSSAT Volume 4-2</i> <i>Beinroth et al. chapter in Kluwer book, pp. 293-311</i>	A. Jintrawet
		<i>Reading/Reference</i>	
	1000	Break	
	1030	Exercises: Spatial Analysis with MWCropDSS	Attachai/Chitnucha/Tewin
	1200	Lunch	
	1300	Group Discussion of Applications and Needs	G. Hoogenboom/A. Jintrawet C. Buddhaboon
	1500	Break	
	1530	Certificates	G. Hoogenboom/A.Jintrawet
	1730	Adjourn	



***Participant Presentation: Country or Agency Reports
(15 minutes talk with 5 minutes Q&A)***

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Thursday			
Feb 20			

<u>Day</u>	<u>Hour</u>	<u>Activity</u>	<u>Responsibility</u>
Friday			
Feb 21			

		Evaluation/Final remarks	Participants
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1500	Break		
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1630	Adjourn		
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