

Contents

PART I: AN INTRODUCTION TO THE FARMER FIELD SCHOOL FOR INTEGRATED CROP MANAGEMENT

1	<i>Background</i>	I-1
2	<i>Objectives</i>	I-4
3	<i>ICM Farmer Field School design</i>	I-5
3.1	What is an ICM Farmer Field School?	I-5
3.2	Farmer Field School activities	I-6
3.2.1	Field observation	I-7
3.2.2	Charting the growth and development of the crop	I-7
3.2.3	Agroecosystem analysis	I-8
3.2.4	Presentation of results and discussion	I-9
3.2.5	Economic analysis	I-9
3.2.6	Observing insect behavior	I-10
3.2.7	Group dynamics	I-10
3.2.8	Special topic	I-11
3.3	A basic sweetpotato ICM Farmer Field School schedule	I-11
3.4	Scheduling the time of the FFS meeting	I-13
4	<i>ICM Farmer Field School preparation</i>	I-14
4.1	Preliminary meetings	I-14
4.2	Participant selection	I-17
4.3	ICM Farmer Field School requirements	I-18
5	<i>ICM Farmer Field School implementation</i>	I-20
5.1	ICM Farmer Field School facilitation	I-20
5.2	Pre- and post-tests	I-22
5.3	Assignment to workgroups	I-23
5.4	Experimentation in the Farmer Field School field	I-23
6	<i>ICM Farmer Field School evaluation</i>	I-24
6.1	Evaluation of results	I-24
6.2	Evaluation of process	I-26
6.3	Evaluation of impact	I-26
7	<i>Farmer Field School follow-up and sustained ICM implementation</i>	I-27

PART II: FIELD GUIDES FOR SWEETPOTATO ICM FARMER FIELD SCHOOL ACTIVITIES

1	<i>Introduction to the sweetpotato ICM farmer field school</i>	11-1
2	<i>A healthy soil</i>	11-5
3	<i>Experimental methodology</i>	11-13
4	<i>Healthy seed</i>	11-17
5	<i>Observing the crop and its environment</i>	11-23
6	<i>Economic analysis of the sweetpotato enterprise</i>	11-27
7	<i>A healthy crop</i>	11-31
8	<i>Natural enemies: the farmers' friends</i>	11-37
9	<i>Sweetpotato pests</i>	11-43
10	<i>Defoliation experiment</i>	11-47
11	<i>Sweetpotato diseases</i>	11-51
12	<i>Weeds: friends or foes?</i>	11-57
13	<i>Aphids and other tiny insects</i>	11-59
14	<i>Pesticides: medicine or poison?</i>	11-63
15	<i>Fertilization</i>	11-69
16	<i>Vine lifting</i>	11-75
17	<i>Field area measurement</i>	11-77
18	<i>Sweetpotato stemborer</i>	11-81
19	<i>Sweetpotato weevil</i>	11-85
20	<i>Cropping pattern</i>	11-91
21	<i>Variety selection</i>	11-93
22	<i>Harvesting and marketing</i>	11-95
23	<i>Storage</i>	11-101
24	<i>Sweetpotato utilization</i>	11-105
25	<i>Evaluation of the sweetpotato ICM farmer field school</i>	11-107
	<i>Appendix I: Group dynamics exercises</i>	11-111
	<i>Appendix II: Forms for sweetpotato ICM FFS activities</i>	11-137

PART III: SWEETPOTATO ICM TECHNICAL MANUAL

1	<i>Introduction to Integrated Crop Management</i> _____	III-1
2	<i>Crop health</i> _____	III-3
2.1	Introduction _____	III-3
2.2	A healthy soil _____	III-3
2.2.1	Soil nutrients _____	III-4
2.2.2	Availability of nutrients for uptake _____	III-6
2.2.3	Maintaining soil health _____	III-7
2.2.4	Enhancing soil fertility _____	III-8
2.3	Healthy seed _____	III-8
2.3.1	Diseases _____	III-9
2.3.2	Insect pests _____	III-9
2.3.3	Production of healthy seed _____	III-10
2.3.4	Seed selection _____	III-12
2.3.5	Seed storage _____	III-12
2.3.6	Planting of cuttings _____	III-13
2.4	A healthy crop _____	III-15
2.4.1	The development of sweetpotato _____	III-15
2.4.2	Sweetpotato requirements _____	III-16
2.4.3	N, P and K deficiencies _____	III-18
2.4.4	Other nutrient deficiencies _____	III-23
2.4.5	Water deficiency _____	III-23
2.4.6	Nutrient toxicity _____	III-23
2.4.7	Symptoms of virus infection _____	III-23
2.5	The regenerative capacity of plants _____	III-24
2.5.1	Leaf damaging agents _____	III-24
2.5.2	When can plants compensate for damage? _____	III-24
2.6	Plant nutrition _____	III-25
2.6.1	Types, composition and prices of fertilizers _____	III-26
2.6.2	Amount of nutrients needed by sweetpotato _____	III-27
2.6.3	Time of nutrient application _____	III-29
2.6.4	Sweetpotato fertilization guidelines _____	III-29
2.7	Vine lifting _____	III-30
3	<i>The agroecosystem</i> _____	III-33
3.1	Introduction _____	III-33
3.2	Biodiversity _____	III-34
3.3	Observing the crop and its environment _____	III-35
3.3.1	Why should we do routine observation? _____	III-35
3.3.2	Observation of the environment _____	III-36

	3.3.3 Crop observation	III-36
4	<i>Natural enemies</i> _____	III-39
4.1	Introduction _____	III-39
4.2	What is a natural enemy? _____	III-40
	4.2.1 Predators	III-40
	4.2.2 Parasites	III-40
	4.2.3 Pathogens	III-41
4.3	Common natural enemies in sweetpotato fields _____	III-41
4.4	Natural enemies and pesticides _____	III-45
	4.4.1 What are pesticides	III-45
	4.4.2 Pesticides, natural enemies and pests	III-46
	4.4.3 Pesticides and human health	III-47
5	<i>Sweetpotato pests</i> _____	III-49
5.1	Introduction _____	III-49
5.2	Chewing and sucking pests _____	III-51
	5.2.1 Sweetpotato weevil	III-52
	5.2.2 Sweetpotato stemborer	III-57
	5.2.3 Sucking insects	III-61
	5.2.4 Leafrollers	III-67
	5.2.5 Hornworms	III-68
	5.2.6 Armyworms	III-69
	5.2.7 Tortoiseshell beetles	III-70
5.3	Diseases _____	III-71
	5.3.1 Types of diseases	III-71
	5.3.2 Common sweetpotato diseases	III-75
	5.3.3 Where do diseases come from?	III-77
	5.3.4 Sweetpotato disease control	III-77
5.4	Weeds _____	III-78
6	<i>The sweetpotato enterprise</i> _____	III-81
6.1	Introduction _____	III-81
6.2	Experimentation _____	III-81
6.3	Field area measurement _____	III-83
	6.3.1 Standard units	III-84
	6.3.2 How to measure the field and calculate the area?	III-84
6.4	Economic analysis of the sweetpotato enterprise _____	III-86
6.5	Cropping pattern _____	III-87
	6.5.1 Season, soil and water conditions	III-87
	6.5.2 Market conditions	III-88
6.6	Variety selection _____	III-89
	6.6.1 An experiment	III-89

6.6.2 Preferred sweetpotato characteristics	III-90
6.6.3 Variety selection	III-91

6.7	Harvesting, marketing and storage_____	III-91
	6.7.1 Determining the time of harvest	III-91
	6.7.2 Assessment of yield and crop value	III-92
	6.7.3 Storage of sweetpotato	III-94
6.8	Sweetpotato utilization _____	III-96
	6.8.1 Sweetpotato as animal feed	III-96
	6.8.2 Sweetpotato starch	III-98
	6.8.3 Sweetpotato flour	III-99
	6.8.4 Sweetpotato snacks	III-101