

Integrated Crop Management

Vol.18 – 2013

Forest Management and
Conservation Agriculture
*Experiences of smallholder farmers
in the Eastern Region of Paraguay*



CONTENTS

iii	Foreword
iv	Acknowledgements
xii	Acronyms and Abbreviations
xv	Summary
	CHAPTER 1
1	Historical outline of the Project
4	1.1 Description of the PMRN packets and changes to the packets
6	1.2 Adjustments to the packets
8	1.3 Financing
10	1.4 Technical assistance
12	1.5 Monitoring system
	CHAPTER 2
15	The farmer as a businessman: from the farm towards strategic alliances
17	2.1 Concept of the committee
19	2.2 Preconditions to become a beneficiary of the Project
20	2.3 Legal arrangements of the committees
23	2.4 Product diversification and commercialization
31	2.5 Alliances and interactions with the public-private sector
	CHAPTER 3
39	Conservation Agriculture
40	3.1 Green manures
51	3.2 Use of tools and machinery
58	3.3 Agricultural lime
60	3.4 Crop rotations
64	3.5 Organic production
	CHAPTER 4
69	Animal production
69	4.1 Small animals
72	4.2 Cattle
	CHAPTER 5
77	Forestry plantations
77	5.1 Forestry nursery
80	5.2 Reforestation

83	5.3 Species, sites and spacing
85	5.4 Planting and management
86	5.5 Pruning and thinning
91	5.6 Growth
	CHAPTER 6
95	Management of native forest
95	6.1 Introduction
97	6.2 Logging and extraction paths
97	6.3 Forest inventory
98	6.4 Trees of the future and their liberation
99	6.5 Low impact exploitation
101	6.6 Management and natural regeneration
101	6.7 Pruning
102	6.8 Enrichment
104	6.9 Actual situation of the forests and their management options
105	6.10 Fires and other forest damages
106	6.11 Growth rate and economic analysis
	CHAPTER 7
109	Agroforestry management
110	7.1 The agroforestry system
110	7.2 Agro-fruit-forestry
116	7.3 Agro-silvo-pastoral
120	7.4 Mixed farming, windbreaks and living fences
	CHAPTER 8
121	Forest products
121	8.1 Firewood and charcoal
123	8.2 Timber in logs and sawn
126	8.3 Non-timber products
	CHAPTER 9
129	Economic, social and ecological impacts
129	9.1 Yield and labour
141	9.2 Area under no-till
141	9.3 Green manure species
142	9.4 Diversification
144	9.5 Farmers' perceptions
146	9.6 Adoption, adaptation and innovation
155	9.7 Adoption by non-beneficiaries
156	9.8 Income
160	9.9 Gender
161	9.10 Environmental impacts

163	CHAPTER 10 Lessons learnt
177	CHAPTER 11 Factors of success and failure
183	ANNEXES Annex 1. List of common and scientific names of trees, green manures and weeds
187	Annex 2. Bibliography
189	Annex 3. List of relevant literature