WORLD BANK ENVIRONMENT PAPER NUMBER 14

Costs, Benefits, and Farmer Adoption of Agroforestry

Project Experience in Central America and the Caribbean

A CATIE-IFPRI-World Bank Project Funded by UNDP

Dean Current, Ernst Lutz, and Sara Scherr, editors



The World Bank Washington, D.C.

CONTENTS

FOREWORD IX

ABSTRACT XI

ACKNOWLEDGMENTS XV

CONTRIBUTORS XVI

ABBREVIATIONS AND ACRONYMS XVII

GLOSSARY/ XVIII

1. ADOPTION OF AGROFORESTRY 1

Dean Current, Ernst Lutz, and Sara J. Scherr

Evolution of Agroforestry in Central America and the Caribbean2Methodology for the Study4Characteristics of Projects Reviewed5Household Benefits from Agroforestry8Agroforestry Adoption Patterns and Implications for Extension15Conclusions19Annex to Chapter 122

2. ECONOMIC ANALYSIS OF AGROFORESTRY SYSTEMS: THE FARMERS' PERSPECTIVE 28

Sara J. Scherr

Introduction28Methodological Challenges for Economic Analysis of Agroforestry28Economic Factors Influencing Farmers' Decisions To Practice Agroforestry31Methods Used in the Case Studies36Suggested Directions for Future Work43

iii

3. ECONOMIC AND INSTITUTIONAL ANALYSIS OF PROJECTS PROMOTING ON-FARM TREE PLANTING IN COSTA RICA 45

Dean Current

Agroforestry Efforts in Costa Rica 46 Description of Projects Selected for Analysis 48 Analysis of Projects' Agroforestry Systems 49 Appendix to Chapter 3: Financial Analysis of Traditional Agroforestry Systems on Farms in the Humid Tropics of Costa Rica, by Hernández Auerbach 71

4. ECONOMIC AND INSTITUTIONAL ANALYSIS OF AGROFORESTRY PROJECTS IN EL SALVADOR 81

Carlos Reiche C.

Agroforestry Support Project to Rural Communities with Scarce Resources 82 Community and Family Nursery Project 87 Conclusions 92

5. ECONOMIC AND INSTITUTIONAL ANALYSIS OF AGROFORESTRY PROJECTS IN GUATEMALA 96

Otto Samayoa Urrea

Overview of Agroforestry Efforts97Analysis of Two Projects99Objectives of the Agroforestry Systems101Patterns of Farmer Adoption of Agroforestry102Economic Analysis of Agroforestry Systems106Financial Analysis of Agroforestry Systems108Conclusions111

6. ECONOMIC AND INSTITUTIONAL ANALYSIS OF AGROFORESTRY PROJECTS IN HONDURAS 114

Carlos Rodríguez Estrada

Overview of Agroforestry Efforts 114 Broad-Leaved Forestry Development Project 117 COHASA: I Rural Project 122 LUPE Project 126 General Findings 131

7. AN ECONOMIC AND INSTITUTIONAL ANALYSIS OF AGROFORESTRY PROJECTS IN NICARAGUA 132

Rodolfo Jesús Vieto Morales

Agroforestry Efforts In Nicaragua 133

Erosion Control Project in the Western Region and Reforestation of the Maribios Mountain Ranges 134

Support Project to Farm Forestry Activity in León and Rehabilitation of the Windbreak System 136

La Esperancita Farm Project 140

iv

8. ECONOMIC AND INSTITUTIONAL ANALYSIS OF AGROFORESTRY PROJECTS IN 146 PANAMA

Manuel Gómez

Summary of Agroforestry Efforts 146 The INRENARE/CARE Project 149 The MIDA/WFP Project 153 Key Findings from the Projects 161

9. ECONOMIC AND INSTITUTIONAL ANALYSIS OF AGROFORESTRY PROJECTS IN THE DOMINICAN REPUBLIC 163

Abel Hernández

Agroforestry Systems 163 **Enda-Caribe Project** 164 The Floresta Project 171

10. ECONOMIC AND INSTITUTIONAL ANALYSIS OF AGROFORESTRY PROJECTS IN HAITI 176

Jon L. Jickling and Thomas A. White

Policy Context for Agroforestry 176 Agroforestry Practices 178 Pan American Development Foundation (PADF) Project Save the Children Federation/Maissade Project 185 Conclusions 190

182

210

BIBLIOGRAPHY 195

APPENDIX: LIST OF PARTICIPANTS AT REGIONAL WORKSHOP (FUNDED BY UNDP'S SPECIAL COOPERATION PLAN FOR

CENTRAL AMERICA [PEC] PROGRAM)

LIST OF TABLES

2.1	Economic Analysis of Agroforestry from the Farmers' Perspective 32
2.2	Data Collection Methods Used in the Case Studies 38
2.3	Summary of Analysis of PRODAF Project in Puriscal, Costa Rica 40
3.1	Agroforestry Projects and Activities in Costa Rica 47
3.2	Major Agroforestry Systems Found in Costa Rica 48
3.3	Description of the Study Areas and Projects 50
3.4	Opportunities for Improving Agroforestry Systems in Hojancha 52
3.5	Benefit-Cost Analysis of Selected Tree-Planting Systems in Centro Agricola Cantonal of Hojancha 54
3.6	Sensitivity and Risk Analysis for Centro Agrícola de Hojancha 55
3.7	Characteristics of Participating Farms and Plantings 56
3.8	Opportunities for Improving Agroforestry Systems in the Cantons of Tilarán and Abangares 58

v

3.9	Financial Indicators for Windbreak Systems in Tilarán 60
3.10	Sensitivity and Risk Analysis for Tilarán/COOPELDOS 61
3.11	Characteristics of Participating Farms 62
3.12	Characteristics of Farms Surveyed in Puriscal 63
3.13	Opportunities for Improving Agroforestry Systems in Puriscal 64
3.14	Financial Indicators for the PRODAF Project in Puriscal 67
3.15	Financial Analysis of Agrosilvopastoral System 67
3.16	Sensitivity and Risk Analysis for Projects in Puriscal 68
3.17	Characteristics of Adopting Farms 69
A3.1	Average Plot Sizes and Distribution Among Agrosilvopastoral Activities 74
A3.2	Financial Indicators for Traditional and Introduced Systems in Baja Talamanca 78
A3.3	Sensitivity and Risk Analysis for Agroforestry Systems in Baja Talamanca 79
4.1	Agroforestry Projects in El Salvador, 1985-96 83
4.2	Summary of the Agroforestry Project Profile for Communities with Scarce Resources 85
4.3	Financial Indicators for the CENREN/FAO/UNDP Project 88
4.4	Sensitivity and Risk Analysis of the CENREN/FAO/UNDP Project 89
4.5	Summary of the Project Profile for Community and Family Nurseries 90
4.6	Financial Indicators for Community Nurseries Project 93
4.7	Sensitivity and Risk Analysis for Community Nurseries Project 94
5.1	Overview of Selected Agroforestry Projects 98
5.2	Summary of the Study Projects 100
5.3	Main Agroforestry Systems Identified 103
5.4	Primary and Secondary Objectives for Adoption of Agroforestry Systems 104
5.5	Benefits of Agroforestry Systems as Indicated by Farmers 108
5.6	Financial Indicators of DIGEBOS/CARE/Peace Corps and Mandeleña Projects 110
5.7	Sensitivity and Risk Analysis 111
6.1	Honduras — The Most Important Agroforestry Projects 116
6.2	Comparative Data on the Projects Studied 118
6.3	Agroforestry Systems Found on the Farms Studied 119
6.4	Rates of the Adoption of Agroforestry Technologies in the Broad-Leaved Forest
	Development Project 122
6.5	Financial Indicators for the Broad- Leaved Forest Development Project 123
6.6	Sensitivity and Risk Analysis 126
6.7	Financial Indicators for the COHASA and LUPE Projects 128
6.8	Sensitivity and Risk Analysis for COHASA and LUPE Projects 129
7.1	Project Summaries 134
7.2	Financial Indicators of Windbreak Rehabilitation Project 139
7.3	Sensitivity and Risk Analysis for PROCAFOR 140
7.4	Financial Indicators for La Esperancita 143
7.5	Sensitivity and Risk Analysis for La Esperancita 144
7.6	Financial Indicators for La Esperancita 2 144
7.7	Sensitivity and Risk Analysis for La Esperancita 2 145
8.1	Principal Forestry and Agroforestry Projects in Panama, 1992 148
8.2	Characteristics of the Two Selected Study Projects 149
8.3	Agroforestry Systems Promoted in the INRENARE/CARE Project 150
8.4	Direct Effects of the INRENARE/CARE Project at the Farm Level 153
8.5	Financial Indicators for the INRENARE/CARE Agroforestry Project 154

.

- 8.6 Sensitivity and Risk Analysis for the INRENARE/CARE Agroforestry Project 155
- 8.7 Agroforestry Systems Proposed by the MIDA/WFP Project 156
- 8.8 Direct Effects of the MIDA/WFP Project at the Farm Level 158
- 8.9 Financial Indicators for the MIDA/WFP Aquaculture Project 160
- 8.10 Sensitivity and Risk Analysis for MIDA/WFP Project 161
- 9.1 Principal NGOs Supporting Agroforestry Activities in the Dominican Republic 165
- 9.2 Financial Indicators for the Enda Caribe Project 170
- 9.3 Sensitivity and Risk Analysis for the Enda Caribe Project 171
- 9.4 Financial Indicators for the Floresta Project 174
- 9.5 Sensitivity and Risk Analysis for the Floresta Project 175
- 10.1 Profitability of Different Land Use Options 184
- 10.2 Profitability of Different Land Use Options 189

8

LIST OF MAPS

Location of Selected Agroforesty Projects in:

- 1.1 Central America
- 3.1 Costa Rica 46
- 4.1 El Salvador 82
- 5.1 Guatemala 97
- 6.1 Honduras 115
- 7.1 Nicaragua 133
- 8.1 Panama 147
- 9.1 The Dominican Republic 164
- 10.1 Háiti 177