INTEGRATING ROOT CROP RESEARCH AND EXTENSION FOR SUBSISTENCE HOUSEHOLDS IN THE PHILIPPINES: AN INDEPTH INQUIRY

PERFECTO URDANETA BARTOLINI

FPP 1999 75
INTEGRATING ROOT CROP RESEARCH AND EXTENSION
FOR SUBSISTENCE HOUSEHOLDS IN THE
PHILIPPINES: AN INDEPTH INQUIRY

By

PERFECTO URDANETA BARTOLINI

Thesis Submitted in Partial Fulfilment of the
Requirements for the Degree of Doctor of Philosophy
in the Faculty of Educational Studies
Universiti Putra Malaysia

March 1999
DEDICATION

For Carla Evelyn

This piece of work is dedicated.
ACKNOWLEDGEMENTS

I'd be remiss in my duties if I would fail to express my indebtedness to the following people, institutions, friends and families whose kind support and help made the actual realisation of this piece of work possible:

The International Development Research Centre (IDRC) Ottawa, Canada for providing the scholarship grant to complete my doctoral studies. Specifically to Dr. Anne K. Bernard, Dr. Pedro V. Flores, Miss June Tan and the Programme Officers and staff of IDRC, Singapore, who were all very instrumental in providing assistance.

The Visayas State College of Agriculture (ViSCA) through the Scholarship Committee and my home office unit, the Philippine Root Crop Research and Training Centre through Dr. Manuel K. Palomar, for granting my leave and approval of my studies.
My thesis supervisory committee: Assoc. Prof. Dr. Hj. Azimi Hj. Hamzah, major supervisor; and members, Assoc. Prof. Dr. Saidin Teh, Dr. Md. Salleh Hj Hassan and Dr. Raja Ahmad Tajuddin Abdul Rashid Sha for their kind support, assistance and expert guidance in accomplishing this work to its final form.

My indebtedness to Prof. Dr. Alang Perang Abdul Rahman Zainuddin and Assoc. Prof. Dr. Rahim Md. Sail for some insights in my research topic.

The staff of the Faculty of Educational Studies who were always ready to extend a helping hand in times of my predicament and need of assistance: Centre Director and Assoc. Prof. Dato' Dr. Mohd. Nasir Ismail, Mrs. Junainah A. Manan and Mrs. Fatimah Sham Binte Saad.

All my beloved friends whose sincere assistance and encouragement made my life bearable and enduring through difficulties.
Mr. Paul and Mrs. Enya Concepcion Manalo and children who afforded me the comforts of home away from home and whose generosity sparked my enthusiasm to persevere in my work. My indebtedness to Mr. Paul Manalo for editing my manuscript.

My steadfast friends: Linda A. Lumayag, Nerissa D. Salayo, Zenaida R. Reyes and Juan D. Albaladejo, whose beautiful friendship, fun and togetherness helped me overcome my extreme boredom.

My wife Evelyn, whose love, patience and understanding has given me courage and strong determination to pursue this dream.

My children, Imelda and Perfecto, Jr. who are always my joy and constant inspiration to go on this life’s journey.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGEMENTS</th>
<th>iii</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>xvi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xvii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xviii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>xx</td>
</tr>
<tr>
<td>ABSTRAK</td>
<td>xxiv</td>
</tr>
</tbody>
</table>

## CHAPTER

### I  INTRODUCTION

- Poverty Among Subsistence Households in the Philippines ........................................ 1
- Towards Poverty Redressal in the Philippines Land for the Landless ...................... 4
- Land reform in Other Countries............................................................................
  - Japan .............................................................................................................. 8
  - China ............................................................................................................ 9
  - Israel .......................................................................................................... 10
  - Mexico ........................................................................................................ 11
- Socio-economic Development in the Rural Areas.................................................. 17
- Reorienting Research-Extension for Small Farmer Development ........................... 19
- The Context of the Study .................................................................................. 21
  - Importance of Root Crops in the Country .................................................... 21
  - The Establishment of the Root Crop research Institute (RCRI) .................... 22
- Project Background .......................................................................................... 24
- Statement of the Problem ................................................................................... 25
- Objectives ......................................................................................................... 27
- Significance of the Study .................................................................................... 28

### II  LITERATURE REVIEW

- Who are Subsistence Farmers? ........................................................................... 30
- Subsistence Farmers in the Philippines ............................................................... 31
- Subsistence Farmers in Other Countries............................................................ 33
  - Cairo, Egypt ..................................................................................................... 38
  - Korem Ethiopia .............................................................................................. 38
  - Varanasi, India ............................................................................................... 41
  - San Martin, Guatemala .................................................................................... 43
  - Caribbean ........................................................................................................ 45
- Subsistence Farmers Constraints to Agricultural Production ............................ 49
Reaching Out and Assisting the Subsistence Farmers

Research and Technology Development:
Focus on the Subsistence Farmers
Farmer Participation in Research and Development
Diagnosing and Establishing a Common Definition of Problems
On-farm Research Analysis
Technology Evaluation and Adoption by Subsistence Farmers
Farmer First-and-Last Models
Primary Elements and Distinct Features of Different Farmer-First-and-Last Methodologies

On-farm Research Methodology
CIMMYT Approach
Farming Systems Research
Sondeo Approach
Farmer-Back-to-Farmer Model
ICRAF’s Diagnosis and Design (D and D for Agro-forestry)
Farmer First-and-Last Model
Farmer Participatory Research

Summary of Methodological Features of Farmer First-and-Last Models
Research-Extension Integration, Coordination Linkage and Cooperation
Concepts of Integration, Coordination and Linkage

As Applied and Tested in the Integrated Root Crop Programme (IRCP)

Conceptual Framework
Research-Extension-Farmer Linkage
Research-Farmer Linkage
Research-Extension Linkage
Extension-Farmer Linkage
Empowerment Role
Human Resource Development Role
Problem-solving and Education Role
Some Valuable Lessons Learned from Extension

III RESEARCH METHODOLOGY
Methodological Background
Appropriateness of Research Design
Approaches in Data Gathering
Focus of the Study........................................................................ 114
Selection of Informants/Respondents........................................ 115
Data Collection........................................................................... 117
  Indepth Interviews................................................................. 118
  Document Analysis.................................................................. 122
  Participant Observation......................................................... 127
Data Analysis and Interpretation............................................... 129
  Data Categorisation.............................................................. 131
  Open Coding ........................................................................ 133
  Axial Coding......................................................................... 133
  Selective Coding................................................................... 137
Explicating the Story Line.......................................................... 141
Entering a New World: My Reflections in Doing Qualitative Study ............ 143
Indepth Interviews.................................................................... 147
Transcribing.............................................................................. 152
Organisation of the Chapters.................................................... 153

IV THE INTEGRATED ROOT CROP PROGRAMME:
ITS BEGINNINGS........................................................................ 157
The Beginning of the Integrated Root Crop Programme (IRCP).................. 157
The Original Integrated Root Crop Programme Proposals.......................... 159
  Component I: Integration, Evaluation and Training.......................... 160
  Component II: Production, Animal Breeding, and Processing.............. 164
  Component II: Enhancing Access to Appropriate Root Crop Technologies.. 165
The Proposed Integrated Root Crop Extension Model............................ 166
  Inventory or Assessment and Selection of Root Crop Technologies..... 168
  Unified Pre-project Survey/Socio-Economic Survey........................ 169
  Consumer Study..................................................................... 170
  Regional Socio-Economic Data Bases......................................... 170
  Identification of Target Groups.............................................. 172
  Development of Communication Plan and Extension Support Materials.... 172
  Design and Development of Extension Training Programmes.............. 173
  Piloting................................................................................. 174
Production and Dissemination of
Extension Support Materials for
Pilot Regions........................................ 174
Feedback Mechanism and Process
Documentation........................................ 176
Continuation of Information Services
to Scientists and Researchers and
Regional Networking................................. 177
Integrated Root Crop Programme (IRCP)
Objectives................................................. 178
Pre-Implementation Workshop........................ 179
The Pre-Project Implementation and Planning
Workshop at the Far Eastern Hotel .................. 180
Project Plans and Outputs of the
Pre-Project Implementation and Planning
Workshop at the Far Eastern Hotel ............... 183
IRDC Review Meeting Report ......................... 190
Integrated Root Crop Programme Components.... 191
Research Extension Relevance of Root
Crops for Subsistence Households in
the Philippines......................................... 196
Findings.................................................. 199

V IMPLEMENTATION OF THE INTEGRATED ROOT CROP
PROGRAMME (IRCP) ........................................ 202
Integration... "could have made a difference
in project implementation.".......................... 202
Concept of Integration.................................. 206
Problems of Integration................................ 207
Projects Started at the Same Time.................. 207
The Human Factor and the Background
of the Researchers..................................... 208
Basic Researchers Were Included in the
Programme............................................... 209
Old and Continuing Projects......................... 212
Integration as Applied in the Projects............. 212
Functional Integration.................................. 213
Vertical Integration.................................... 213
Horizontal Integration.................................. 214
Integration Should Be Planned....................... 215
Integration in the Technical Field................... 216
Effectivity of Integration in the Programme.. 217
Coordination... "was to mechanical"............... 218
Linkages.................................................. 224
Linkages with the Department of
Agriculture (DA)......................................... 224
Selection of the Secondary Pilot Site ..... 296
Communication Strategy ........................................... 296
Farmers’ Field Day ........................................... 297
Farmer Participation ........................................... 297
Sagbon: Technically Was a Non-site .......... 298
Sagbon Was a Sweet Potato Growing Area . . . . 299
The Pilot Sites: Similarities and Differences . . 301
At Palembao, the Primary Pilot Site ..... 301
At Sagbon, the Secondary Pilot Site .... 310
Findings ...................................................................... 312

VII TECHNOLOGY TRANSFER STRATEGIES ...................... 315
Fielding the Field Team ........................................... 315
Selection of the Field Team ...................................... 316
Field Team Orientation ........................................... 317
Field Team Assignment ........................................... 317
Feedbacks .................................................................... 318
Extension Methods ................................................... 320
Meetings.................................................................... 322
Choice of the Demonstration Farm Site ........ 323
The Staff House and Training Hall ............ 324
Termination of Field Extension Staff ......... 324
Activities of the Field Team ............................... 327
Established Demonstration Farm ............... 327
Production Area ...................................................... 327
Propagation Area .................................................... 328
Community Organising ......................................... 328
The Community Organiser ................. 329
Conducted Organisational Meetings ......... 330
Registration of Farmers Associations ....... 332
Conduct of On-Farm Research ................. 333
Objectives of On-Farm Research .......... 333
Selection of Farmer Cooperator ............. 334
Appropriate Technologies for On-Farm Research . 337
Monitoring and Evaluation ....................... 339
Conduct of Trainings and Meetings .......... 340
Farmers Classes ..................................................... 341
Field Trip .............................................................. 342
Farmer Cooperators’ Visit to Santiago Southern Lumar Province .... 343
Conduct of Farmers’ Needs Assessment .... 344
Farmers Dialogue ................................................... 346
Distribute Root Crop Planting Materials 348
Established Community Newsboard.................... 349
Farmers Training Conducted.............................. 351
Sponsored Contests and Awards.......................... 359
Reorganisation of the Field Team........................ 364
Reactions of Cooperators to the New Field Team........ 364
Feedback About OFR Implementation.................... 365
Farmers Association Activities.......................... 365
Barangay Pahangdon Farmers Association................. 365
Barangay Natad Farmers Association..................... 375
Barangay Lagbason Farmers Association.................. 378
Barangay Nadaginot Farmers Association.................. 379
Barangay Pandan Farmers Association..................... 379
Barangay Laksa Farmers Association..................... 385
Farmers Poor Attendance in Meetings
Trainings, Farmers Classes and Pintakasi.............. 394
The Field Team and Technology Transfer Strategies........ 396
Creation of the Field Team............................... 396
Orientation and Briefing of the Field Team.............. 396
Duties and responsibilities............................. 397
Stress and Strife.......................................... 398
Field team Strategy Not Cost Effective.................. 400
Strong Linkage and Collaboration with the Department of Agriculture (DA)........ 401
Benefits of Farmers from Trainings..................... 402
Termination of the Extension Staff...................... 406
Farmers Attitude.......................................... 407
Findings................................................................ 408

VIII MANAGEMENT, ISSUES AND PROBLEMS IN IRCP.... 411
Management of IRCP........................................ 411
General Programme Manager.............................. 411
Technical Programme Manager............................ 412
The Programme Management Committee (PMC)............ 413
Personnel Management...................................... 414
Programme Coordination and Integration............... 414
Shortcomings of Management.............................. 415
Over-extension of Responsibility....................... 415
No Consultation with Research Staff.................... 416
Characteristics of the IRCP Leadership.................. 416
IRCP Management Given Poor Ratings.................... 418
Biased on Fund Allocation................................ 418
There Must Be Transparent Management.................. 419

xii
Major Constraints in Programme Implementation 420

“Don’t Put Into Our Mouths More Than
What we Can Chew” ............................................. 420

Withholding of Technological
Information.................................................................... 423

Problems in the Production of
Communication Materials ............................................ 425

Could Not Produce Extension Support
Materials on Time.......................................................... 426

Difficulty in Getting Assistance from
Subject Matter Specialists ........................................... 427

Delayed Publication of Communication
Materials........................................................................ 428

Problem of Working with so Many People... 429

Heavy Academic Load ................................................. 429

Use of IRCP Vehicles.................................................... 429

Issues and Problems ....................................................... 430

Problems with Research Staff......................................... 430

Very Slow Progress of IRCP........................................... 430

IRCP Is Heavily Staffed.................................................. 431

Linkage with the Department of
Agriculture........................................................................ 433

Feedback System on Dissemination
and Adoption.................................................................. 434

Dissemination and Transfer of
Processing Technology.................................................. 435

Internal Evaluation System............................................. 435

Poor Attendance and Schedules
of Meetings.................................................................. 437

Issues Discussed During Meetings....................... 438

Staff Participation in the Discussions......................... 438

Changing Report Format................................................. 439

Phasing........................................................................... 440

Monitoring and Evaluation.............................................. 440

IRCP: It Is Beyond Root Crops........................................ 440

Use of IRCP Vehicle: Mitsubishi L-300....................... 442

Leadership in IRCP......................................................... 443

Distribution of Planting Materials................................. 445

Lack of Planting Material................................................ 445

Weaknesses of the Integrated Root Crops
Programme Model.......................................................... 446

Problems in Integration................................................. 447

Inclusion of Past Projects............................................... 448

Phasing........................................................................... 448

Weakness in Leadership.................................................. 449

Pre-Implementation Workshop........................................ 450

xiii
Project Implementation ............................................. 450
People are Individualistic ........................................... 451
IRCP Is Too Big .......................................................... 452
The Complexity of IRCP ................................................. 452
The Implementation of IRCP ............................................ 453
Findings ........................................................................ 459

IX  BENEFITS, LESSONS AND INSIGHTS DERIVED FROM THE INTEGRATED ROOT CROP PROGRAMME ............................................. 462
Major Benefits from the Integrated Root Crop Programme ................................................................. 462
Change in Working Attitude of Researchers ................................................................. 462
Strengthening of ESCAAS as an Institution ............................................................... 463
Acquisition of Vehicles and Laboratory Equipment ....................................................... 464
Training ...................................................................... 464
Impact of IRCP on the Farmers .................................................................. 465
Lessons and Insights by IRCP Staff Derived from the Programme ....................................................... 465
IRCP: “a big learning experience” ........................................... 465
Participatory Planning .......................................................... 465
The Value of Constant Communication ......................................................... 466
Compartmentalized Research Hindered Integration ............................................................... 466
The Importance of Sound Management ............................................................ 467
Good Planning Was a Must ........................................................................ 468
IRCP Needed a Full Time Management ..................................................................... 469
Good Experience for Individual Researchers ........................................................................ 471
Integration as a New Experience ...................................................................... 472
Farmers Experimentation with the Technology ................................................................ 473
Conditions Contributing to Success in IRCP ................................................................. 474
Suggestions for Effective Implementation of the Integrated Root Crop Programme ............................................. 475
Participatory Management .................................................................................... 476
Transparency in Management .................................................................................. 476
Good Planning ........................................................................ 477
Clear Goal Setting ...................................................................... 478
Importance and Significance of the IRCP ..................................................................... 479
Findings ........................................................................ 485

xiv
<table>
<thead>
<tr>
<th>X</th>
<th>SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS</th>
<th>487</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Summary....................................................................</td>
<td>487</td>
</tr>
<tr>
<td></td>
<td>The Study ..................................................................</td>
<td>487</td>
</tr>
<tr>
<td></td>
<td>The Objectives ...................................................</td>
<td>488</td>
</tr>
<tr>
<td></td>
<td>The Methodology ..................................................</td>
<td>489</td>
</tr>
<tr>
<td></td>
<td>The Context of the Study .......................................</td>
<td>490</td>
</tr>
<tr>
<td></td>
<td>The Findings .......................................................</td>
<td>490</td>
</tr>
<tr>
<td>Conclusions</td>
<td>The Operations, Functions, Processes and Consequences of the Integrated Root Crop Programme (IRCP)</td>
<td>495</td>
</tr>
<tr>
<td></td>
<td>Appropriateness of the Integrated Approach in Research and Extension</td>
<td>503</td>
</tr>
<tr>
<td></td>
<td>The Components and/or Elements and Objectives of the Integrated Research and Extension Programme</td>
<td>508</td>
</tr>
<tr>
<td></td>
<td>The Nature of the Integrated Root Crop Programme: Its Strengths and Weaknesses</td>
<td>512</td>
</tr>
<tr>
<td></td>
<td>Insights and Lessons from the Integrated Root Crop Programme</td>
<td>514</td>
</tr>
<tr>
<td>Implications</td>
<td>Recommendations ..................................................</td>
<td>518</td>
</tr>
<tr>
<td></td>
<td>A Unified Theme and a Common Focus or Goal ................</td>
<td>521</td>
</tr>
<tr>
<td></td>
<td>Common Commodity and Framework ................................</td>
<td>522</td>
</tr>
<tr>
<td></td>
<td>Objectives, Strategies Schedules and Activities ..........</td>
<td>524</td>
</tr>
<tr>
<td></td>
<td>An Integrated Project Implementation, Monitoring and Evaluation Plan</td>
<td>525</td>
</tr>
<tr>
<td></td>
<td>Proper Phasing of Projects and Activities ....................</td>
<td>527</td>
</tr>
<tr>
<td></td>
<td>A Democratic, Transparent and Participatory Management ....</td>
<td>529</td>
</tr>
</tbody>
</table>

GLOSSARY................................................................................................................. 530

BIBLIOGRAPHY........................................................................................................... 532

APPENDICES.............................................................................................................. 542

BIOGRAPHICAL SKETCH .......................................................................................... 559
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Distinctive Features and Elements of Farmer-First-and-Last Models</td>
</tr>
<tr>
<td>2</td>
<td>Summary on the Number of Programmes, Projects and Studies of the Integrated Root Crop Programme</td>
</tr>
<tr>
<td>3</td>
<td>Categorisation of <em>Palembao</em> Landholders</td>
</tr>
<tr>
<td>4</td>
<td>Number of Years in Sweet Potato Farming</td>
</tr>
<tr>
<td>5</td>
<td>Project Phases and Sequence of Implementation of the Integrated Root Crop Research and Extension Programme</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Conceptual Framework of an Integrated Research-Extension-Farmer Linkage</td>
<td>98</td>
</tr>
<tr>
<td>2</td>
<td>Diagram on the Functional Relationships of the Core Categories</td>
<td>126</td>
</tr>
<tr>
<td>3</td>
<td>A Proposed Integrated Root Crop Extension Model</td>
<td>149</td>
</tr>
<tr>
<td>4</td>
<td>Schematic Diagram on Technology Transfer.</td>
<td>171</td>
</tr>
<tr>
<td>5</td>
<td>Schematic Diagram of Extension Support and Linkages</td>
<td>173</td>
</tr>
<tr>
<td>6</td>
<td>Schematic Diagram of Unified Survey</td>
<td>213</td>
</tr>
<tr>
<td>7</td>
<td>Causal Diagram of Farmers’ Problems in Pilot Barangays at Palembao, Saram</td>
<td>252</td>
</tr>
<tr>
<td>8</td>
<td>An Integrated Root Crop Research and Extension Programme Model</td>
<td>477</td>
</tr>
</tbody>
</table>
LIST OF ABBREVIATIONS

ESCAAS - Eastern State College of Agriculture and Applied Sciences

RCRI - Root Crop Research Institute

RC-ISC - Root Crop Information Centre

AT - Agricultural Technician

BAR - Bureau of Agricultural Research

BARC - Barangay Agrarian Reform Officer

CARL - Comprehensive Agrarian Reform Law

CARP - Comprehensive Agrarian Reform Programme

CIAT - Centro Internacional de Agricultura Tropical

CLOA - Certificate of Land Owner Award

CIP - Centro Internacional de la Papa

CO - Community Organiser

DA - Department of Agriculture

DAR - Department of Agrarian Reform

DBP - Development Bank of the Philippines

DOLE - Department of Labour and Employment

DTI - Department of Trade and Industry

EP - Emancipation Patent

xviii
FA  - Farmers Association

FAO  - Food and Agriculture Organisation

IDRC  - International Development Research Centre

IRCP  - Integrated Root Crop Programme

MAO  - Municipal Agricultural Officer

MARO  - Municipal Agrarian Reform Officer

NPA  - New Peoples’ Army

OFR  - On-Farm Research

PCT  - Programme Core Officer

PIT  - Project Implementation Team

PMC  - Programme Management Committee

PAGASA  - Philippine Atmospheric Geophysical Astronomic Services Administration

PAO  - Provincial Agricultural Officer

RC-FAC  - Root Crop Farmers Advisory Council

SALT  - Sloping Agricultural Land Technology

UPLB  - University of the Philippines at Los Banos
The establishment of the Root Crop Research Institute (RCRI) at Eastern State College of Agriculture and Applied Sciences (ESCAAS), at Bucgay, Lemar Province (All names of persons, places and institutions in italics are fictitious.) triggered the impetus for root crop research and extension. The major programme of RCRI is the Integrated Root Crop Programme (IRCP). This study focused on the IRCP’s operations, functions, processes and consequences as an integrated research and extension programme for the subsistence farmers and their households in the
Philippines. The methodological approaches employed were indepth interviews, document analysis and participant observation under the umbrella of qualitative research.

The study revealed that the researchers and project implementers of IRCP faced the dilemma and confusion on how to operate a large scale integrated project that consist of four programmes, 11 projects and 32 studies. Integration was found to be effective in management but there was a shortfall in the interaction among researchers, extension workers and farmers. However, they did experience a form of teamwork. The findings indicated that there was an attempted linkage among projects, staff and institutions. The linkage between the Department of Agriculture and IRCP was not fully realised. The respondents perceived an autocratic leadership style as a weakness in management. The components/elements in IRCP was found to fall short of their expected outcomes.
The pilot barangays (villages) at Palembao, Saram were not appropriate for sweet potato technology transfer because the farmers were gabi (taro) and cassava growers. Although, IRCP embarked on vigorous root crop technology transfer strategies but the subsistence farmers were reluctant to adopt these technologies. Subsistence farmers planted watermelons instead because of high income. All the farmers associations were engaged in sari-sari (variety) stores because these were profitable.

Among the major conclusions are: (1) a compartmentalised research system hampers integration; (2) accommodating more projects and researchers expanded the programme and gave rise to competition of resources; (3) integration was partial and incomplete; (4) IRCP’s strength is teamwork; (5) the lack of organisational mechanism for check and balance in management fosters an autocratic style of management; (6) programme components/elements have achieved shortfalls vis-a-vis specific objectives; (7) subsistence farmers adopt a technology that will increase their income; and (8) members of farmers
associations tended to be suspicious to fellow farmers and even to outsiders.

The study recommends a modified Integrated Root Crop Research and Extension model with a unified focus and goal.
Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi syarat untuk memperolehi Ijazah Doktor Falsafah

PENYELIDIKAN DAN PENGEMBANGAN BERSEPADU BAGI TANAMAN RENEK UNTUK KELUARGA MISKIN DI FILIPINA: SATU PENELITIAN TERPERINCI

Oleh

PERFECTO U. BARTOLINI

Mac 1999

Pengerusi: Prof. Madya Dr. Haji Azimi Haji Hamzah

Fakulti: Pengajian Pendidikan

Penubuhan Root Crop Research Institute (ICRI) di Eastern State College of Agriculture and Applied Sciences (ESCAAS), di Bucgay, Lemar Province (semua nama responden, tempat dan institusi dalam bentuk italik adalah rekaan) menjadi penggerak kepada kegiatan penyelidikan dan pengembangan teknologi tanaman berumbi di Filipina. Program utama RCRI ialah Integrated Root Crop Programme (IRCP). Kajian ini memberi tumpuan terhadap operasi IRCP, fungsi, proses dan kesan sebagai program pengembangan dan penyelidikan yang bersepadu untuk petani sara hidup di