ICAEM2016

The 8th International Conference on Agribusiness Economics and Management

Every year, the International Conference on Agribusiness Economics and Management (ICAEM) brings together scholars working in the field of agribusiness from various parts of the world. Organized by the University of the Philippines Mindanao, in partnership with the UP School of Management, the conference provides a venue for scholars to present researches that deal with economic or management issues affecting the entirety or specific nodes within the agri-food chains, specifically those within the crops, fisheries, and livestock and poultry subsectors.

Resilience is the ability to cope with change. Specifically, this means the ability to withstand, manage, or mitigate environmental, economic, and socio-political challenges. For industries, resilience is the key to surviving and prospering in an ever-changing environmental and economic context. This is especially true for agribusiness industries, which are affected by phenomena such as climate change, disease spread in agriculture, and fluctuations in the world market.

This year’s conference, with the theme “Building Resilience: Agribusiness in Times of Flux,” will explore different ways to address the various gaps that will allow agribusiness industries and the sector to compete in the market.

This conference is financially supported by the UP Office of International Linkages and endorsed by the Commission on Higher Education, Philippines.

Organizing Committee

Dr. Larry N. Digal
Conference Chair &
Dean, School of Management
University of the Philippines Mindanao

Dr. Emma Ruth V. Bayogan
Director for Research
University of the Philippines Mindanao

Mr. Michael Noel R. Bonghanoy
Conference Coordinator

Ms. Mitchiko A. Lopez
Head of Secretariat

Ms. Frances May F. Baldoza
Secretariat

Ms. Marie Grace Aponte
Secretariat

Ms. Miko Mariz C. Castro
Technical Assistant

Ms. Kasmira Blaise S. Sigue
Technical Assistant

Ms. Jennifer Doromal
Finance, UP Mindanao Foundation Inc.
ABOUT THE CONFERENCE

Scientific Program Committee

Dr. Juma Novie A. Alviola  
Department of Food Science and Chemistry  
University of the Philippines Mindanao

Dr. Pedro A. Alviola IV  
School of Management  
University of the Philippines Mindanao

Dr. Emma Ruth V. Bayogan  
Department of Biological Sciences and Environmental Studies  
University of the Philippines Mindanao

Dr. Dinah Pura T. Depositario  
Department of Agribusiness Management and Entrepreneurship  
University of the Philippines Los Baños

Prof. Rowena Paz L. Gelvezon  
College of Management  
University of the Philippines Visayas

Dr. Joy Lizada  
College of Management  
University of the Philippines Visayas

Prof. Jeanette Angeline B. Madamba  
Department of Agribusiness Management and Entrepreneurship  
University of the Philippines Los Baños

Dr. Virginia P. Obsioma  
Department of Food Science and Chemistry  
University of the Philippines Mindanao

Dr. Helen B. Pondevida  
Research Division  
University of Southeastern Philippines

Prof. Karen P. Quilloy  
Institute of Cooperatives and Bio-Enterprise Development  
University of the Philippines Los Baños

Prof. Glory Dee A. Romo  
School of Management  
University of the Philippines Mindanao

Prof. Zenaida M. Sumalde  
Institute of Cooperatives and Bio-Enterprise Development  
University of the Philippines Los Baños

Prof. Reynold D. Tan  
College of Management  
University of the Philippines Visayas

Partner Institutions

UP School of Management  
University of the Philippines Mindanao

UP Mindanao Foundation Inc. (UPMFI)
Dr. Sietze Vellema

Dr. Sietze Vellema is associate professor at the Knowledge, Technology and Innovation group, Wageningen University, and senior researcher at the Partnerships Resource Centre, Rotterdam School of Management, the Netherlands. His interest is to understand why and how different actors collaborate in solving organizational, managerial, and technical problems related to inclusive development and sustainable food provision. He studies partnerships, certification, and institutional arrangements in agri-food chains and supervises PhD candidates in different fields: collective action in oil palm, shea, and sesame in West Africa; trading practices in East and West Africa; food safety and consumer practices in Southeast Asia; labels, governance and service delivery in global commodity trade; and coordination and diversity in banana production in Asia. Dr. Vellema leads action research focusing on value chains, partnerships, poverty, and food security in Africa. He is an integrative thinker and as editor-in-chief of NJAS, the *Wageningen Journal of Life Sciences*, he enables a scientific platform for interdisciplinary and transdisciplinary research on complex and persistent problems in agricultural production, food and nutrition security, and natural resource management.
Dr. Agustin B. Molina Jr.

Dr. Agustin ‘Gus’ B. Molina Jr. joined Bioversity International in 1998 as Senior Scientist and Regional Coordinator for Asia and the Pacific. He led Bioversity’s banana research programs in the Asia Pacific region, primarily by bringing together research and development (R&D) collaborations from the academe, government, nongovernment organizations, and the private industry through the Banana Asia-Pacific Network (BAPNET). With the institute mandatory-retirement age he retired in 2014. Gus is appointed as Honorary Research Fellow and acting as Bioversity’s Regional Coordinator for Asia and the Pacific continuing his global leadership in addressing the challenges facing the banana industry today. After obtaining his Bachelor (1973) and Masteral (1979) degrees from the University of the Philippines Los Banos, Dr. Molina continued his graduate studies at Pennsylvania State University where he obtained his PhD in Plant Pathology in 1983. His career began in the hallowed halls of the academia. From 1973 to 1985 he served in ascending positions as researcher and professor in the College of Agriculture, UPLB. His career continued into the practical fields of the private sector when he joined Chiquita Brands International Inc. in 1985. He started as a research plant pathologist and rose to become the corporate director of research. He was the top Chiquita scientist who developed and implemented an efficient corporate standard of Black Sigatoka management in 7 countries in Latin America. In recognition of his significant contributions, Chiquita Brands Inc. accorded him with the prestigious Presidential Award.
Dr. Reiner Wassmann

Dr. Reiner Wassmann has worked for more than 25 years on climate change, of which he has spent 18 years at the International Rice Research Institute (IRRI). He has led extensive field experiments in several Asian countries on mitigating methane emissions from rice. More recently, the projects on climate change at IRRI address comprehensive approaches on Climate-smart Agriculture including upscaling through “Climate-smart Villages.” He received his MSc (1982) and PhD (1987) in Biology (graduating magna cum laude) from the University of Goettingen, Germany. Before his stint at IRRI, he was a scientific staff member at the Fraunhofer Institute for Atmospheric Environmental Research and the Institute for Meteorology and Climate Research of Karlsruhe Institute of Technology (at outpost Garmisch-Partenkirchen) from 1987 to 2009. He has published more than 100 peer-reviewed articles on emissions and has co-authored the International Panel on Climate Change 2006 guidelines on greenhouse gas inventories. He is also a member of the Editorial Board of *Nutrient Cycling in Agroecosystems* since 2005.
<table>
<thead>
<tr>
<th>Room &amp; Chairperson</th>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ballroom B</strong></td>
<td>8:00</td>
<td>Registration</td>
</tr>
<tr>
<td></td>
<td>9:00</td>
<td>Opening Program</td>
</tr>
<tr>
<td></td>
<td>9:10</td>
<td>WELCOME MESSAGE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DR. SYLVIA B. CONCEPCION</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chancellor, University of the Philippines Mindanao</td>
</tr>
<tr>
<td></td>
<td>9:30</td>
<td>KEYNOTE ADDRESS (001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Making of Socio-ecological Resilience: Requisite Variety as a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Condition for Addressing a Global Banana Disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DR. SIETZE VELLEMA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Knowledge, Technology, and Innovation Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wageningen University, The Netherlands</td>
</tr>
<tr>
<td></td>
<td>10:45</td>
<td>Coffee break</td>
</tr>
<tr>
<td><strong>Ballroom B</strong></td>
<td>11:00</td>
<td>PLENARY LECTURE (002)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Status of Epidemics and Management of <em>Fusarium Wilt</em> Tropical Race 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in the Philippines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DR. AGUSTIN B. MOLINA JR.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regional Coordinator for Asia and the Pacific</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bioversity International</td>
</tr>
<tr>
<td></td>
<td>12:00</td>
<td>Luncheon</td>
</tr>
<tr>
<td><strong>Ballroom B</strong></td>
<td>1:00</td>
<td>PLENARY PANEL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Threat of Panama Disease to the Philippine Banana Industry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DR. LORNA E. HERRADURA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Center Chief, Davao National Crop Research and Development Center</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bureau of Plant Industry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DR. SUSAN RAZO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chief, Integrated Laboratory Division</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Department of Agriculture, Region XI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ATTY. KORONADO APUZEN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Executive Director</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foundation for Agrarian Reform Cooperatives in Mindanao (FARMCOOP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DR. BENNY M. CORCOLON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vice President for Research, Information, and Compliance Division</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tagum Agricultural Development Company Inc. (TADECO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MODERATOR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DR. LARRY N. DIGAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dean, School of Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University of the Philippines Mindanao</td>
</tr>
<tr>
<td></td>
<td>2:30</td>
<td>Coffee break</td>
</tr>
</tbody>
</table>

Thursday, 27 October
## Thursday, 27 October continued

<table>
<thead>
<tr>
<th>Room &amp; Chairperson</th>
<th>Time</th>
<th>PROGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ballroom B</strong></td>
<td>2:45</td>
<td>PARALLEL SESSION A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In Focus: The Banana Industry</td>
</tr>
<tr>
<td></td>
<td>2:45</td>
<td>004 J. DELA CRUZ  Public-Private Collaborations amidst an Emergency Plant Disease Outbreak: The Australian Experience with Panama Disease</td>
</tr>
<tr>
<td></td>
<td>3:00</td>
<td>005 M.O. MONTIFLOR  Coordination and Risk in the Philippine Banana Industry: Conditions for Responding to Panama Disease</td>
</tr>
<tr>
<td></td>
<td>3:15</td>
<td>006 R.J. BASAN  Consumer Traits’ Effect on Table Banana Quality Choice in the Philippines: A Multinomial Logistic Analysis</td>
</tr>
<tr>
<td></td>
<td>3:30</td>
<td>007 L.N. DIGAL  Analysis of the Employment Generation Potential of the Cavendish Banana Value Chain in Mindanao, Philippines</td>
</tr>
<tr>
<td></td>
<td>3:45</td>
<td>Open forum</td>
</tr>
<tr>
<td><strong>Catleya Room</strong></td>
<td>2:45</td>
<td>PARALLEL SESSION A2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agri-product Development</td>
</tr>
<tr>
<td></td>
<td>2:45</td>
<td>008 M.B. MENDOZA  Effect of Sago Flour Substitution on Loaf Bread Quality</td>
</tr>
<tr>
<td></td>
<td>3:00</td>
<td>009 J.N.A. ALVIOLA  Increasing Fiber and Protein Content of Baked Products Using Local Produce</td>
</tr>
<tr>
<td></td>
<td>3:15</td>
<td>010 V.P. OBSIOMA  Development of Chicken Burger Patty from Native and Culled Breeder Chicken</td>
</tr>
<tr>
<td></td>
<td>3:30</td>
<td>011 W.C. NABUA  Potentials of Panguil Bay Shells as Animal Feed Ingredient</td>
</tr>
<tr>
<td></td>
<td>3:45</td>
<td>Open forum</td>
</tr>
<tr>
<td><strong>Vanda Room</strong></td>
<td>2:45</td>
<td>PARALLEL SESSION A3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Issues and Opportunities in Agricultural Production</td>
</tr>
<tr>
<td></td>
<td>3:00</td>
<td>013 M.L.L. LOYOLA, C.G. CASIPLE  Sustainable Selection, Breeding, and Hatchery Operation for Darag Native Chicken Production in Western Visayas, Philippines</td>
</tr>
<tr>
<td></td>
<td>3:15</td>
<td>014 J.A.B. MADAMBA  Lanzones Production and Marketing in Laguna, Philippines</td>
</tr>
<tr>
<td></td>
<td>3:30</td>
<td>015 N.A. AQUINO  The Effects of Dry Spell on Eggplant Production in Batangas City, Philippines</td>
</tr>
<tr>
<td></td>
<td>3:45</td>
<td>Open forum</td>
</tr>
<tr>
<td><strong>Ballroom B</strong></td>
<td>4:00</td>
<td>PARALLEL SESSION B1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improving Livelihoods and Welfare of Smallholder Producers</td>
</tr>
<tr>
<td></td>
<td>4:15</td>
<td>016 E.E. ASENCE III  Entrepreneurial Competencies of Farmers and Its Impact on the Performance of the SARIG Program of Naga City, Philippines</td>
</tr>
<tr>
<td></td>
<td>4:30</td>
<td>017 N.A. BUISAN  Feasibility and Acceptability of Sharia-based Microfinance among Farmers in Maguindanao, Southern Philippines</td>
</tr>
<tr>
<td></td>
<td>4:45</td>
<td>018 P.A. ALVIOLA IV  The Effect of Soil Erosion on Rice Productivity and Its Impact on Household Welfare Levels</td>
</tr>
<tr>
<td></td>
<td>5:00</td>
<td>Open forum</td>
</tr>
</tbody>
</table>
### Thursday, 27 October continued

<table>
<thead>
<tr>
<th>Room &amp; Chairperson</th>
<th>Time</th>
<th>Abstracts</th>
</tr>
</thead>
</table>
| **Catleya Room**    | 4:00 | **PARALLEL SESSION B2**  
Towards Social and Economic Impacts: Community Interventions  
| 4:15 | **019**  
W.C. BATION  
Impact of the “Utan sa Tugkaran” Vegetable Garden Project for Identified Communities in Cagayan de Oro, Southern Philippines  
| 4:30 | **020**  
V.A. SHUCK  
Factors Affecting the Perception of Farmer-Beneficiaries on the Implementation of CARP Support Services: The Case of Macarimbang Agrarian Reform Cooperative in Maguindanao, Southern Philippines  
| 4:45 | **021**  
C.M.D. HERNANDO  
Production and Marketing Operations of Nongovernment Organization-Assisted Grassroots Enterprises in Iloilo Province, Central Philippines  
| 5:00 | Open forum |
| **Vanda Room**      | 4:00 | **PARALLEL SESSION B3**  
Improving Production Processes  
| 4:15 | **022**  
C.S. SILVOSA-MILLADO  
Exploring Explant Sources for Callus Induction of Nipa Palms  
| 4:30 | **023**  
J.A. MANTIQUILLA  
Infructescence Development and Seed Characterization of Nipa from Different Semi-Wild Stands of Davao Region, Philippines  
| 4:45 | **024**  
L.M.B. ESTAÑA  
Sago Palm Flour Weight in Different Environmental Conditions: A Mathematical Model  
| 5:00 | **025**  
J.E. ACOSTA  
Starch Yield Based on Physical Dimension and Age of Sago Palm: A Mathematical Model  
| 5:15 | Open forum |

**End of day 1**
## Program

### Friday, 28 October

<table>
<thead>
<tr>
<th>Room &amp; Chairperson</th>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ballroom B</td>
<td>8:00</td>
<td>Registration</td>
</tr>
<tr>
<td></td>
<td>9:00</td>
<td>Synthesis of day 1</td>
</tr>
<tr>
<td></td>
<td>9:15</td>
<td><strong>PLENARY LECTURE (003)</strong> Climate-smart Rice Production for Combining Adaptation and Mitigation: Technological Options within the Context of Southeast Asia</td>
</tr>
</tbody>
</table>
|                    |        | DR. REINER WASSMANN  
|                    |        | Climate Change Research  
|                    |        | International Rice Research Institute                                |
|                    | 10:15  | Coffee break                                                          |
| Ballroom B         | 10:30  | **PARALLEL SESSION C1** In Focus: The Rice Industry                   |
|                    | 10:30  | **026**  
|                    |        | H.A. HIDALGO  
|                    | 10:45  | **027**  
|                    |        | V.L. BERSAMIRA  
|                    |        | Assessing the Rice Industry of La Union, Northern Philippines         |
|                    | 11:00  | **028**  
|                    |        | D.DM. DACERA  
|                    |        | Effect of Temperature, Rainfall, and Relative Humidity on the Yield and Quality of Rice in Two Areas in Davao City, Philippines |
|                    | 11:15  | **029**  
|                    |        | M.A.A. LIMPOCO  
|                    |        | Economic Impact of Climate Determinants on Rice Farmlands in Davao Region, Southern Philippines |
|                    | 11:30  | **030**  
|                    |        | C.Q. BALGOS  
|                    |        | Potential for Jobs Generation of the Rice Value Chain in Mindanao, Southern Philippines |
|                    | 11:45  | Open forum                                                            |
| Catleya Room       | 10:30  | **PARALLEL SESSION C2** Supply and Value Chains: Opportunities and Challenges |
|                    | 10:30  | **031**  
|                    |        | R.T. AGUINALDO  
|                    |        | The Roles of Vegetable Value Chain Actors in the Changing Agri-Food System: The Case of Davao City, Philippines |
|                    | 10:45  | **032**  
|                    |        | R.C. SANSANO, J.A. CHUA  
|                    |        | Value Chain Analysis of Red Bulb Onion in Cagayan Valley, Northern Luzon |
|                    | 11:00  | **033**  
|                    |        | N.L. LAORDEN  
|                    |        | Supply Chain Analysis of Mango in Samal Island: An Organizational Theoretic Approach |
|                    | 11:15  | **034**  
|                    |        | G.M. GUIQUE  
|                    |        | Supply Chain Analysis of Prawn in Misamis Occidental, Philippines      |
|                    | 11:30  | **035**  
|                    |        | V.A. SHUCK  
|                    |        | Supply Chain and Cost-Benefit Analyses of the Community-Based Sea Cucumber Hatchery in Davao del Sur, Philippines |
|                    | 11:45  | Open forum                                                            |
| Vanda Room         | 10:30  | **PARALLEL SESSION C3** Improving Agribusiness through Marketing       |
|                    | 10:30  | **036**  
|                    |        | F. VILLANUEVA  
<p>|                    |        | Marketing Channel Choice Decisions of Agricultural Producers Using the Transactions Cost Approach: A Review |</p>
<table>
<thead>
<tr>
<th>Room &amp; Chairperson</th>
<th>Time</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanda Room</td>
<td>10:45</td>
<td>037 J.A.B. MADAMBA  Distribution Chain Analysis of Aquaculture Products in Lanao del Norte, Southern Philippines</td>
</tr>
<tr>
<td></td>
<td>11:00</td>
<td>038 J.A.D. ALCALA  Analyzing Market-based Opportunities in the Mango Supply Chain of Davao City: A Rapid Market Assessment</td>
</tr>
<tr>
<td></td>
<td>11:15</td>
<td>039 K.V. FLORENTINO  Feasibility Assessment of Direct Marketing Strategies: The Case of Vegetable Farmer Clusters in Marilog, Davao City, Philippines</td>
</tr>
<tr>
<td></td>
<td>11:30</td>
<td>040 K.P. VILLA  Economic Valuation of Tourism Services in Lake Holon, South Cotabato, Philippines</td>
</tr>
<tr>
<td></td>
<td>11:45</td>
<td>Open forum</td>
</tr>
<tr>
<td></td>
<td>12:00</td>
<td>Luncheon</td>
</tr>
<tr>
<td>Ballroom B</td>
<td>1:00</td>
<td>PARALLEL SESSION D1  Social Dimensions of Agriculture and Resource Management</td>
</tr>
<tr>
<td></td>
<td>1:00</td>
<td>041 M.R.Y. TEVES  Governance and Food Security in Sub-Saharan Africa</td>
</tr>
<tr>
<td></td>
<td>1:15</td>
<td>042 M.A. LOPEZ  Towards Embedding Gender Dimensions in Philippine Agricultural Value Chains: A Critical Review</td>
</tr>
<tr>
<td></td>
<td>1:30</td>
<td>043 D.P.T. DEPOSITARIO  Motivating Factors, Barriers, and Success Factors among Agri-based Micro- and Small-scale Women Entrepreneurs in Isabela, Philippines</td>
</tr>
<tr>
<td></td>
<td>1:45</td>
<td>Open forum</td>
</tr>
<tr>
<td></td>
<td>2:00</td>
<td>044 C.J.J. FERNANDEZ  Kontento nga pangabuhi kag panimalay: Local Notions of Well-being for Natural Resource Management</td>
</tr>
<tr>
<td></td>
<td>2:15</td>
<td>045 R. SUBONG  Coastal Urban Centers and Disaster Management in Iloilo, Philippines</td>
</tr>
<tr>
<td></td>
<td>2:30</td>
<td>046 M.A.O. SABINES  Jobs Value Chain Analysis for Selected Highland Vegetables Value Chains in Northern Mindanao, Philippines</td>
</tr>
<tr>
<td></td>
<td>2:45</td>
<td>Open forum</td>
</tr>
<tr>
<td>Catleya Room</td>
<td>1:00</td>
<td>PARALLEL SESSION D2  Technologies for Agribusiness</td>
</tr>
<tr>
<td></td>
<td>1:00</td>
<td>047 D.Z. DUMPIT  Social Media Usage Behavior: An Application of a Modified Technology Acceptance Model</td>
</tr>
<tr>
<td></td>
<td>1:15</td>
<td>048 M.J.F. TRONDILLO, D.G.C. BACALTOS  Geographic Information System for Upscaling the Seaweed Industry Operation in Two Areas in Mindanao, Southern Philippines</td>
</tr>
<tr>
<td></td>
<td>1:30</td>
<td>049 A.T. DEMETILLO  A Wireless Sensor Network (WSN)–Based Water Quality Monitoring for the Characterization of Fishing Grounds Near the Mining Areas of Tubay, Agusan del Norte, Philippines</td>
</tr>
<tr>
<td></td>
<td>1:45</td>
<td>Open forum</td>
</tr>
<tr>
<td></td>
<td>2:00</td>
<td>050 E.M. QUERIKIOL  Solar Energy Production and CO$_2$ Avoidance of a 5.0 kW Solar Power Generator Integrated in a Mango Processing Facility</td>
</tr>
<tr>
<td>Room &amp; Chairperson</td>
<td>Time</td>
<td>Title</td>
</tr>
<tr>
<td>--------------------</td>
<td>------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Catleya Room</strong></td>
<td>2:15</td>
<td><strong>051</strong> E.M. QUERIKIOL  <em>Drying Kinetics of Mango Seeds in a Greenhouse-Type Solar Dryer</em></td>
</tr>
<tr>
<td></td>
<td>2:30</td>
<td><strong>052</strong> A.P. MALINIS  <em>Innovating Technologies for Abaca Biomass Wastes Recovery and Value-adding in Catanduanes, Bicol, Philippines</em></td>
</tr>
<tr>
<td></td>
<td>2:45</td>
<td>Open forum</td>
</tr>
</tbody>
</table>

| **Vanda Room**     | 1:00 | **PARALLEL SESSION D3** Enhancing Agri-Produce Quality through Postharvest Technologies |
|                    | 1:00 | **053** M.A.M. SUDARIA  *Growth, Yield, and Postharvest Characteristics of Grafted Ampalaya Using Different Patola Rootstocks* |
|                    | 1:15 | **054** M. BENITEZ  *Effects of Packaging Systems on Eggplant Quality During Transport* |
|                    | 1:30 | **055** E.R.V. BAYOGAN  *Response of 'Carabao' Mangoes to Various Ripening Agents* |
|                    | 1:45 | **056** A. VALIDA  *Postharvest Quality of Wood Vinegar–Treated Eggplants under Various Storage Conditions* |
|                    | 2:00 | Open forum                                                            |
|                    | 2:15 | **057** A.M.C. MAJOMOT  *Short-term Evaporative Cooling Extends Shelf Life of Sweet Pepper cvs. Sweet Cayenne and Sultan* |
|                    | 2:30 | **058** M.A. SUDARIA  *Fruit Quality of Grafted Bitter Melon with Different Sponge Gourd Rootstocks Stored Under Evaporative Cooling Conditions* |
|                    | 2:45 | **059** M.R.P. MOSQUEDA  *Potential of Dehydrated Vegetable Production in Strengthening the Sustainability of Smallholder Vegetable Supply Chains in Northern Mindanao, Philippines* |
|                    | 3:00 | Open forum                                                            |
|                    | 3:15 | **3:15** Coffee Break                                                 |

| **Ballroom B**     | 3:30 | **PARALLEL SESSION E1** Consumer Studies for Agribusiness 1          |
|                    | 3:45 | **060** G.D. BUENCILLO  *Consumers’ Rights Awareness among Selected Municipalities in Malita, Davao Occidental* |
|                    | 4:00 | **061** P.A. ROBLEDO  *Awareness, Attitude, and Behavior Towards Genetically Modified Crops: The Case of Consumers in Iloilo City, Central Philippines* |
|                    | 4:15 | **062** N.T. LONGAY  *Awareness and Perception on Organic Vegetables by Consumers in Baguio City and La Trinidad, Benguet, Northern Philippines* |
|                    | 4:30 | Open forum                                                            |
## PROGRAM

**Friday, 28 October  continued**

<table>
<thead>
<tr>
<th>Room &amp; Chairperson</th>
<th>Time</th>
<th>PARALLEL SESSION E2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catleya Room</td>
<td>3:30</td>
<td>Consumer Studies for Agribusiness 2</td>
</tr>
<tr>
<td></td>
<td>3:45</td>
<td>063 J. GUTO Buying Intention and Consumption of Chicken Meat: The Case of Consumers in Iloilo City, Central Philippines</td>
</tr>
<tr>
<td></td>
<td>4:00</td>
<td>064 K.J.M. BALOGBOG Consumer Purchase Behavior for Meat Products in General Santos City</td>
</tr>
<tr>
<td></td>
<td>4:15</td>
<td>065 K.J.C. DAVID Exploring Opportunities for Food Service Marketing in Condominiums: A Conjoint Analysis Approach</td>
</tr>
<tr>
<td></td>
<td>4:30</td>
<td>Open forum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vanda Room</th>
<th>3:30</th>
<th>PARALLEL SESSION E3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3:30</td>
<td>Economic Models for Agricultural Inquiries</td>
</tr>
<tr>
<td></td>
<td>3:45</td>
<td>066 P.A. ALVIOLA IV The Effect of Soil Erosion to Calorie Intakes of Children among Corn-Producing Households</td>
</tr>
<tr>
<td></td>
<td>4:00</td>
<td>067 K.M.C. CARAMUGAN Price Bubble in Selected ASEAN Agricultural Exports: An Application of the Generalized Supremum Augmented Dickey Fuller</td>
</tr>
<tr>
<td></td>
<td>4:15</td>
<td>068 L.M.B. ESTAÑA A Forecast for Cocoa Bean Farm Gate Prices in Davao Region, Southern Philippines</td>
</tr>
<tr>
<td></td>
<td>4:30</td>
<td>Open forum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ballroom B</th>
<th>4:45</th>
<th>Closing Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4:45</td>
<td>CLOSING REMARKS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DR. EMMA RUTH V. BAYOGAN Director for Research, University of the Philippines Mindanao</td>
</tr>
</tbody>
</table>

End of conference proper
ABSTRACTS FROM ICAEM 2016
The 8th International Conference on Agribusiness Economics and Management
The Making of Socio-ecological Resilience  
Requisite Variety as a Condition for Addressing a Global Banana Disease

Sietze Vellema  
Knowledge, Management, and Innovation Group  
Wageningen University, The Netherlands

Abstract

The spread of Panama disease, caused by the soil-borne fungus *Fusarium oxysporum* f. sp. *cubense* (Foc), threatens banana production in plantations, smallholder farms, or backyards in the Philippines. This threat cuts across organizational boundaries and urges different actors to respond. Most likely, different organisational actors will first act in line with their own logics, preferred solutions, or management styles. However, the threat posed by boundary-crossing plant diseases also has a systemic dimension and the scale makes it relevant to identify places to intervene in the system. The notion of socio-ecological resilience asks the question whether the system, connecting distinct organizational actors with biological properties of the disease, has the ability to cope with change and continue to develop. This translates into an interest in understanding whether such a threat catalyses renewal and innovation or whether institutional rigidity obstructs this. The use of business system thinking, connecting rules and practices in private and public realms, and innovation system thinking, exposing mediating, feedback and selection mechanisms, supports an integrative approach to identifying institutional conditions under which socio-ecological resilience is made or obstructed. This discussion is rooted in co-evolutionary thinking, which emphasises requisite variety of organisational actors and pathways as a condition for making resilience and deviating from locked-in R&D processes. Therefore, it seems relevant to determine whether the required variety of pathways, interests, and perspectives is in place for constituting socio-ecological resilience and human capacity to manage diseases, especially when export-oriented plantations operate adjacent to neighbouring small-scale farms producing for export or domestic markets and backyard gardens producing banana as food crop.
Status of Epidemics and Management of *Fusarium* Wilt Tropical Race 4 in the Philippines

**Agustin B. Molina Jr.**
Honorary Research Fellow and Regional Coordinator for Asia and the Pacific
Commodities System and Genetic Resources Programme
Bioversity International

**Correspondence**
Bioversity International
Asia Pacific Office
3rd Floor Khush Hall
c/o IRRI, Los Banos, Laguna, Philippines

**T** +63 49 536 0532  
**E** a.molina@cgiar.org

**Keywords**
- Cavendish banana
- *Fusarium* wilt
- Philippines

**Abstract**

Epidemics caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 (Foc TR4) in Cavendish plantations in the Philippines is a serious threat to the country’s banana industry. The Philippines is the major banana exporter in Asia, with its peak recorded export value of US$ 1.2 billion in 2014. A general disease management approach involves disease scouting and eradication, as well as prevention of spread measures such as quarantine and disinfestations. Such approach, however, is not enough to contain epidemics, especially for small growers, resulting to severe epidemics and abandoned farms. Some shifted to other low-income crops. Resistant Cavendish has been a long-sought strategy to manage Foc TR4. In partnership with government institutions and banana growers, Bioversity International conducted a series of field evaluations of resistant Cavendish somaclones developed and shared by the Taiwan Banana Research Institute. GCTCV 218 and GCTCV 219 proved the most suitable options. In commercial trials, they remained resistant even after 4 ratoons. GCTV 218 (moderate resistance) has bigger bunches and good fruit quality and is thus preferred by growers. GCTCV 219 (high resistance) is recommended for the rehabilitation of severely affected farms, especially for small growers. GCTCV 219 has a sweet fruit, but its agronomic characteristics are inferior to GCTCV 218. GCTCV 218 is now widely commercially adopted. Using the GCTCV resistant variety is a breakthrough in mitigating the threat of TR4, allaying the fatalistic predictions of Western scientists that the traded Cavendish will soon disappear in the market because of Foc TR4. In the absence of varieties from other breeding programs, the GCTCVs seem to be the best options farmers could have to save their livelihoods.
Climate-smart Rice Production for Combining Adaptation and Mitigation: Technological Options within the Context of Southeast Asia

Reiner Wassmann
Coordinator, Climate Change Research
International Rice Research Institute

Abstract

Adaptation to changing climatic condition is imperative to forestall dramatic threats to food security, but agriculture is also a source of greenhouse gases (GHG). For most countries in Southeast Asia, rice farming represents a major component in their national GHG budget which is attributed to the emission of methane from (predominantly flooded) rice fields. ASEAN member states have committed, as one community, to improve their capacity to reduce emissions in their respective countries. Climate-smart agriculture denotes a concept to merge adaptation (adjusting to climate change) and mitigation (reducing emissions) into one comprehensive approach. In the case of rice production, improved varieties are the key for coping with climatic stresses such as floods and droughts. In addition to more resilient rice plants, short-maturing varieties can be used to avoid climate stresses by adjusted cropping calendars and also reduce methane emissions due to shorter flooding periods. Crop and water management practices offer many options for CSA. “Alternate Wetting and Drying (AWD)” is an irrigation technique originally developed for saving water and coping with water scarcity, e.g., in El Nino years. This practice also reduces emissions by 30%–70% as has been shown in several field studies in the Philippines and other countries in Southeast Asia. Mechanization has several climate-smart components such as laser leveling and direct seeding that reduce water needs and emissions. This illustrates that the principles of climate-smart agriculture can be aligned with socio-economic drivers.
Public-Private Collaborations amidst an Emergency Plant Disease Outbreak: The Australian Experience with Panama Disease

Jaye de la Cruz
Wageningen University, The Netherlands

Abstract

The past decade has seen a steady transition from a framework where the state has been the provider of production-oriented agricultural services to a “user pays” philosophy that emphasises the role of the private sector in the provision of these services—even in agricultural biosecurity, which has been historically considered a public good. This paper analyzes the contours of public-private collaborations in agricultural biosecurity services in the context of an emergency outbreak of Panama disease Tropical Race 4. Does the transition to a market- and industry-led approach shift perceptions on who should bear the burden of addressing risks of Panama disease and to what extent does it influences risk decisions taken by the different actors and stakeholders during an agricultural biosecurity emergency? Using data from field work carried out primarily in Brisbane, Australia, in July 2015, as well as a review and content analysis of documents (e.g., policy briefs) obtained from the Australian government instrumentalities and research organizations, some themes emerge. First, while Australia’s plant disease strategy clearly shows coordination, there are still gaps in service delivery such as delayed response time. Second, the industry-driven R&D system still navigates tensions between responding to the direct and immediate needs of the industry and supporting more long-term and explorative research trajectories. Third, while there appears to be a greater trust in industry than in government in rapid emergency response, both the growers and the peak industry body want more, not less, government biosecurity regulation.

Keywords
• Australia
• biosecurity
• Panama Disease
• public good
SESSION A1

Coordination and Risk in the Philippine Banana Industry: Conditions for Responding to Panama Disease

Marilou O. Montiflor\textsuperscript{1,2,*}, Sietze Vellema\textsuperscript{1}, Sylvia B. Concepcion\textsuperscript{2}, and Larry N. Digal\textsuperscript{2}

\textsuperscript{1} Wageningen University, The Netherlands
\textsuperscript{2} University of the Philippines Mindanao

*Correspondence
Knowledge, Technology, and Innovation Group
Wageningen University
6700 EW Wageningen
The Netherlands
E marilou.montiflor@wur.nl

Abstract

\textit{Fusarium oxysporum} f.sp. \textit{cubense} Tropical Race 4 is a disease that traverses political, economic, geographical, and social boundaries and confronts the fragmented and highly polarized banana industry. Furthermore, the nature of TR4 has many uncertainties and unknowns. This paper investigated conditions for coordination in responding to TR4 risk. A qualitative case study of two villages in Davao del Norte, a major producing area in the Philippines with TR4 occurrence, was done to provide a contextual and in-depth analysis. Results showed that there was coordination between actors with longer working or personal relationships. They shared a common language for identifying problems and defining risks and communicate beyond the boundaries of their own organizations. There were visible signs of alliances between private and public domains in their handling of TR4 uncertainties. Actors have an urgency to react to TR4 impacts by accommodating multiple solutions. The enabling conditions for coordination identified were long-term relations forged outside the organizations/industry alliances and examination and the recognition of unknown TR4 characteristics, thus forging emerging research and information sharing. The constraints included polarization rooted from unequal access to land, blaming, and the isolated experiments and advocacy for single solutions. In conclusion, there was low coordination in responding to disease risk because of the blaming and diversities in solutions. However, there was an emerging coordination that built on social relations and deliberate efforts to bring parties together from the public and private sectors. The industry has to adapt, settle, and manage its differences to collectively address the banana disease risk.

Keywords
\begin{itemize}
\item banana disease risk
\item blame
\item coordination
\item uncertainties
\end{itemize}
Consumer Traits’ Effect on Table Banana Quality Choice in the Philippines: A Multinomial Logistic Analysis

Romiel John Pepe-Basan
University of Southern Mindanao, Philippines

Abstract
Banana (Musa spp.) is one of the fruits that most consumers buy in the Philippines as part of daily diets. Its high demand is owed to the fruit’s nutritive value and affordable price. The Philippines has been growing 80 cultivars for domestic and international markets. Among these are ‘Lakatan’ and ‘Latundan.’ Production-related researches on banana have been well established, but little is known about the banana’s marketability and consumer preferences in the local market. The aim of this paper is to examine the effect of consumer traits on the choice of table banana quality in the Philippines. A survey was conducted with 400 consumer-respondents: 146 came from a producing area (Davao City) and 254 were from consuming markets (Manila and Cebu City). Multinomial logistic regression was applied in carrying out the objective of the study. Results reveal that the consumer’s traits—i.e., age, marital status, education, occupation, and gender—significantly affect the likelihood of choosing banana based on particular qualities (i.e., skin color, fruit size, cluster size, fruit length, degree of ripeness, softness and surface blemish) in a producing market. The result is similar in consuming markets. However, none among the consumer traits significantly affected the likelihood of choosing banana in consideration of its fruit length. In addition, price consumer index in consuming markets affect the likelihood of choosing banana quality. Therefore, consumer traits are important consideration in consumers’ buying decision vis-à-vis fruit quality. This suggests that proper market segmentation should be studied to develop sound marketing strategies and profit opportunities.
Analysis of the Employment Generation Potential of the Cavendish Banana Value Chain in Mindanao, Southern Philippines

Larry N. Digal
University of the Philippines Mindanao

Correspondence
School of Management,
University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines
E Indigal@up.edu.ph

Keywords
- Cavendish banana
- contract growing
- labor
- lease arrangement
- Mindanao
- small producers
- value chain

Abstract
The labor generation potential in value chain analysis has not been well studied in the value chain literature. This paper aims to examine labor generation potential of the Cavendish value chain. A value chain framework was used and covered the municipality of Sto. Tomas, Davao del Norte, as the study area. Total jobs generated were estimated based on full-time jobs (i.e., 8 hours per day, 26 days a month or 312 days a year). With the use of case approach, key informants interviews and focus group discussions were conducted covering 30 informants coming from different types of growers, laborers, and other stakeholders. Data from a survey conducted in Sto. Tomas in 2014 was also used to supplement primary data. The chain contributes significantly in terms of job generation particularly in the production node. Corporate and multinational growers contribute about 71% of the jobs generated in Sto. Tomas while the corporate grower with leaseback arrangement, cooperatives, independent growers, and individual contract growers contribute about 7%, 7%, 4%, and 11%, respectively. Using the estimate of 2.3 workers per hectare from the jobs value chain analysis, total full-time jobs estimated for the province of Davao del Norte reached more than 77,000 and about 183,000 for the entire island of Mindanao. However, there are issues that limit opportunities for job creation along the chain. If the key issues in the chain are addressed and strategies are implemented, employment in Mindanao is estimated to increase by 28%.
Abstract

Sago flour is locally available and reported to have relatively higher fiber and antioxidant contents and lower digestibility than wheat flour. Despite this, sago is still underutilized. This study aimed to compare wheat and sago flours and evaluate the effect of different sago substitution rates (0% to 50%) on bread quality. Physicochemical properties of the flours were determined together with bread density, texture, color, and consumer preference. Results show that sago flour had significantly higher crude ash, fiber, and amylose contents than wheat flour. It also had higher peak viscosity or water-holding capacity upon heating, but less ability to withstand heating and shear stress. Substitution of wheat flour with sago flour significantly decreased loaf volume (from 615 to 404 mL) and made them denser (from 0.242 to 0.371 g/mL). Except at 10% level of substitution, bread samples with sago flour were significantly firmer than the control. Sago flour is light brown in color; hence, as the substitution level increased, the bread crumb became darker in color. However, this trend was not observed in the color of the bread crust, with the control having a significantly darker crust. Bread samples with more than 10% sago flour had significantly lower preference scores than the control. Using the current formulation for loaf breads, 10% sago substitution is the maximum level before quality significantly decreases. However, future studies can investigate the use of dough improvers with higher substitution rates for bread, as well as trying sago flour on products that do not rely heavily on leavening like crackers or cookies.

*Correspondence

Department of Food Science and Chemistry, College of Science and Mathematics, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines

T +63 82 293 0302
E jaalviola@up.edu.ph

Keywords

• bread flour
• bread quality
• loaf bread
• sago flour

Effect of Sago Flour Substitution on Loaf Bread Quality

Juma Novie A. Alviola* and Melanie B. Mendoza
University of the Philippines Mindanao
SESSION A2

Increasing Fiber and Protein Contents of Baked Products Using Local Produce

Juma Novie A. Alviola*, Jessvelle E. Banaybanay, and Czarina Patrice H. Mauleon
University of the Philippines Mindanao

Abstract

Consumers are increasingly opting for healthier food products, and two current trends are high fiber and high protein options. Using locally available produce or their manufacturing by-products may lower ingredient cost when making these products. Durian rind, which is generally thrown away, comprises 60% of a durian fruit and has about 27% crude fiber. Mung bean has about 23% protein and is relatively inexpensive. In this study, durian rind was cleaned, dried, ground, and added to muffins while mung beans were oven-roasted, ground, and added to crackers. Quality and acceptability of the products were evaluated. Among the ratios tested, the most preferred formulation for muffins had 10% durian rind powder, while that of crackers had 50% mung bean flour. Consumer acceptability of the products was tested using a 9-point hedonic scale. The control and fiber-fortified muffins had similar mean consumer acceptability scores of 8 (liked highly) for color, texture, taste, and overall acceptability. Crackers with mung bean flour had significantly higher mean scores than the control (7.5–8.0 vs. 6.8–7.4) for appearance, texture, flavor, and overall acceptability. The fiber-fortified muffin had 6.26% crude fiber while the mung bean crackers had 9.98% crude protein. The addition of durian rind powder and mung bean flour to baked products may adversely affect some quality parameters like texture, but there are ways to lessen these effects. The improvement in nutrition profile of the products shows the market potential of durian rind powder and mung bean flour.

*Correspondence

Department of Food Science and Chemistry, College of Science and Mathematics, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines
T +63 82 293 0302
E jaalviola@up.edu.ph

Keywords

- durian rind powder
- high fiber
- high protein
- mung bean flour
Abstract

Good poultry management practices include culling of birds that have become less productive. These birds are sold at a lower price because many consider their meat to be of poorer quality. Native chicken, on the other hand, is gaining popularity because some consider them as healthier alternative to commercially grown poultry. However, because of its toughness, cooking is limited to soup recipes. A highly acceptable chicken burger patty was developed from culled and native chicken. Though significantly higher percentages of fat, protein, and ash were found in native chicken as compared to culled chicken meat, highly acceptable burger patties were prepared from both raw materials. The values for the proximate composition of the two chickens were significantly different except for the moisture content. The meat obtained were processed into chicken burger patty and analyzed for cooking characteristics. Results show that chicken burger patty made from the two types of poultry meat differed significantly in cooking losses and cooking yield but not in terms of dripping losses. Consumer test was done to determine the overall acceptability of the product, and results show that burger patties made from culled and native chicken had no significant difference from that made from broiler chicken (control). All samples got the mode of 9 (like extremely) with broiler having the highest frequency, followed by native, then culled. Hence, this study was able to open ways of value adding to culled chicken and provide alternative use of native chicken for health-conscious individuals.
Potentials of Panguil Bay Shells as Animal Feed Ingredient

John Mark F. Malalis, Arnolge G. Maghanoy, and Wilson C. Nabua*
Northwestern Mindanao State College of Science and Technology, Philippines

*Correspondence
Department of Agriculture,
Northwestern Mindanao State College of Science and Technology,
Labuyo, Tangub City 7214, Misamis Occidental, Philippines
E wilsonnabua@gmail.com

Abstract
Panguil Bay in Northern Mindanao is rich with the supply of shells, and many people depend on these shells for their livelihoods. However, the consumption of shells is not solely for human beings but for animals as well. This study aimed to determine the process of developing a shell ingredient to animal feeds, to analyze the nutrient contents of the ingredients, and to formulate various feeds based on the nutrient analysis. Three indigenous shells found in Panguil Bay were used in the study: agiihis shells (Donax gouldii), window-pane (Placuna placenta), and Philippine green mussels (Perna viridis). The shells were dried and powdered using a grinding machine. The powdered shells samples were then submitted to the Department of Science and Technology in Cagayan de Oro City for analysis. After the analysis, different types of broiler feeds using the ingredients were formulated. The results revealed that the window-pane and Philippine green mussels had high protein content at 44.94% and 34.92%, respectively. On the other hand, the ground agiihis shells had the highest calcium content at 3.70%. The window-pane has the highest crude fat and phosphorus contents. The window-pane and Philippine green mussels appear to be the most important sources of protein in booster, starter, and finisher feeds for broiler while agiihis shell is the most important source of calcium in egg production. However, the projected cost of producing the organic feeds broiler, particularly the window-pane and Philippine green mussels shell meals, were more expensive than the commercial feeds. The actual costs can be validated through conducting experiments in the field.

Esterlita D. Bation¹, Neilson D. Bation¹, Wilson C. Bation², and Herson S. Bation³

¹ Pilgrim Christian College, Philippines
² Xavier University–Ateneo de Cagayan, Philippines
³ Department of Social Welfare and Development, Republic of the Philippines

*Correspondence

Business Administration Department, School of Business and Management, Xavier University, Corrales Avenue, Cagayan de Oro City 9000, Philippines

E wbation@xu.edu.ph

Keywords

• livestock
• Philippines
• poultry
• production

Abstract

Livestock provides a variety of food products. This study examined the inventory and volume of production of Philippine agricultural livestock and poultry: cattle, carabao, dairy, goat, swine, chicken, and duck. The study used the descriptive method, and primary data were collected through interviews. Findings revealed total cattle inventory stood at 2.553 million heads in 2016, which is 0.75% higher than the 2.534 million heads recorded in 2015. Production of cattle was 266,900 mt liveweight in 2015, which is 2.13% higher than last year's production of 261,320 mt liveweight. The total carabao inventory in the country was 2.88 million heads in 2016, which is 0.78% higher than last year's level; and the total production was at 142,040 mt liveweight in 2015, which contracted by 0.69% percent against the 2014's record of 143,030 mt liveweight. The total carabao inventory in the country was 2.88 million heads in 2016, which is 0.78% higher than last year's level; and the total production was at 142,040 mt liveweight in 2015, which contracted by 0.69% percent against the 2014's record of 143,030 mt liveweight. Goat showed a total inventory of 3.66 million heads in 2016, and it dropped by 0.30% from the previous year's inventory of 2.67 million heads, with total production for 2015 at 77,480 mt liveweight. Chicken population was at 178.77 million birds and duck population at 10.52 million birds. Annual volume of duck production for 2015 was 33,940 mt. Economic contribution of livestock production extend further to downstream industry (i.e., butchers, milk processors, wholesalers, and food services) and in upstream industry (i.e., feed producers, feed transport, equipment manufacturers, and seed companies) of the country. The recommendation include close monitoring of livestock in the country to ensure adequate supply of livestock and poultry in the country.
SESSION A3

Sustainable Selection, Breeding and Hatchery Operation for Darag Native Chicken Production in Western Visayas, Philippines

Evelyn D. Tomambo¹, Ma. Lulu L. Loyola¹*, Celma G. Casiple¹, Helen G. Genandoy¹, Jacob G. Casiple¹, Jonnie F. Huervana¹, Sylvia I. Ozaraga², Bede P. Ozaraga², and Elsa I. Abayon³

¹ West Visayas State University, Philippines
² Capiz State University, Philippines
³ Aklan State University, Philippines

Abstract

Farmers in Panay Island raise Philippine native chickens known as Darag. However, raisers encounter problems on low fertility and hatchability, including high chick mortality when reared in high population densities. To address these concerns, this study aimed to establish a free range breeder flock, collect data on breeding and reproductive performance of Darag breeders, and develop protocols on culling and selection of breeders, hatchery, and range management. A 100-hen Darag nucleus farm and three 200-hen commercial Darag breeder flocks were established. Heritability estimates, reproductive, feed supplementation, and weights were computed. Results showed the following: heritability estimates for Darag plumage ($h^2=0.835$), brown egg color ($h^2=0.534$), yellow skin color ($h^2=0.452$), gray shank color ($h^2=0.493$), and pale-red earlobes ($h^2=0.524$). Other results are as follows: Age at point of lay, 19–24 weeks; egg produced per hen per year, 96–110; age when productive, 24–36 months; mean daily feed consumption, 50–75 g per bird; mean weight of eggs, 43.04 g; egg breakage, 0.5%–3.5%; viable eggs, 90%–99%; and egg fertility rate, 80.0%–96%. The mortality rates of the chickens at different stages: brooding stage, 4.17%; hardening stage, 5.68%; and growing stage, 7.5%. The cost to production is as follows: egg, PhP 4.17–6.25; day-old chicks, PhP 39.25–47.01; and ready-to-lay pullet/ready-to-breed cockerel, PhP 137.24–143.65. Our calculations reveal a production cost of PhP 796,530.00 for a 100-hen nucleus farm in 42 months and total sales of PhP 998,840.00, with a profit of PhP 202,310.00 and return on investment of 25.40%. A ranging area of 10 m² per breeder and 1:5 male-female ratio family units are stocking recommendation. Protocols on culling and selection of breeders, hatchery, and range management were developed.

Jerace P. Espinola, Nanette A. Aquino, Dinah Pura T. Depositario, and Jeanette Angeline B. Madamba*

University of the Philippines Los Baños

*Correspondence
Department of Agribusiness Management and Entrepreneurship, College of Economics and Management, University of the Philippines Los Baños, College, Laguna 4031, Philippines

T +63 49 536 2846
E jbmadamba@up.edu.ph

Abstract

The province of Laguna in the Philippines has been a major producer of lanzones. The study was conducted to present the profile of the players in the lanzones industry, describe and assess the current performance of the industry, identify problems as well as investment opportunities and recommend possible solutions for the local lanzones industry. Data gathering involved conducting interviews via a survey of 172 lanzones farmers and 30 lanzones traders selected using stratified random sampling and secondary data collection. Results showed that lanzones farmers practice intercropping in view of the crop’s seasonality and better profitability. Challenges include the onslaught of typhoons, fluctuating temperature and pests and diseases. Prospects include the presence of hardy foreign varieties such as ‘duku’ or ‘longkong’ and macrosomatic cloning to boost production. Using new technologies, farmer participation in seminars, intercropping with rambutan and putting up a demo farm for macrosomatic cloning are among the proposed recommendations.

Keywords
• lanzones
• marketing
• production
The Effects of Dry Spell on Eggplant Production in Batangas City, Philippines

Jericho Aaron E. Biñar, Normito R. Zapata Jr., Dinah Pura T. Depositario, and Nanette A. Aquino*

University of the Philippines Los Baños

Abstract

According to the Food and Agriculture Organisation of the United Nations, there is an unclear understanding as to the extent to which natural disasters cause significant impacts to the agriculture sector, especially on its subsectors. Most studies holistically focus on the agriculture sector as a whole and fail to address sector-specific industries. This research was conducted to identify the nature and extent of effects of dry spell on a specific sector, eggplant production, in Batangas City in the Philippines. To determine the effects of the dry spell, 71 eggplant farmers situated in the barangays (villages) of Tabangao Dao, Pinamucan East, and Sto. Niño in Batangas City were interviewed. The data was analyzed using frequency and mean analysis as well as cost and return analysis. The respondents reported that the dry spell delayed their transplanting activity, which led to delays in fertilizer application. The dry spell also decreased the quality of the eggplants, as well as increased the number of twisted-shaped eggplants, fruits with brown streaks and lesions on the skin, and fruits which were stunted and thin. Consequently, there was a decrease of good-graded eggplants and the increase in semi-good and rejected eggplants. Lastly, on the average, there was a 105 kg per harvest per hectare decrease in eggplant production in Batangas City, which resulted to a PhP14,880.85 reduction in the expected income of the farmers. It is recommended that the government provide a communal water source, subsidize the costs of some production inputs, and link the farmers to technology developers and agriculture experts who can help develop appropriate coping mechanisms against dry spells. Further, the eggplant farmers must be encouraged to practice mulching, contour farming, and crop rotation to minimize possible production losses from dry spells.

*Correspondence

Department of Agribusiness Management and Entrepreneurship, College of Economics and Management, University of the Philippines Los Baños, College, Laguna 4031, Philippines

T +63 49 536 2846

E naaquinop@up.edu.ph

Keywords

• dry spell
• eggplant production
• coping mechanisms
Abstracts from ICAEM 2016

SESSION B1

ENTREPRENEURIAL COMPETENCIES OF FARMERS AND ITS IMPACT ON THE PERFORMANCE OF THE SUSTAINABLE AGRICULTURE FOR RURAL INCOME GROWTH PROGRAM OF NAGA CITY, PHILIPPINES

Ernesto E. Asence III
City Agriculture Office, Naga City, Philippines

Correspondence
City Government of Naga,
City Agriculture Office,
J. Miranda Ave., Concepcion Pequena, Naga City 4400,
Philippines
E ernest.asence@gmail.com

Keywords
- agricultural credit
- agripreneurship
- entrepreneurial competencies
- Sustainable Agriculture for Rural Income Growth

Abstract
This study investigated farmers’ entrepreneurial competencies and their effect on the performance of the Sustainable Agriculture for Rural Income Growth (SARIG) Program implemented by local government unit of Naga City. The respondents of the study were 95 farmers growing rice, corn, and high-value crops who availed of agricultural loans in 2013. Multiple regression analysis was used to measure the entrepreneurial skills of the farmers and its relationship with SARIG’s repayment rate. Results of the study showed that the respondents growing different crops have varying strong and weak entrepreneurial skills. Cutflower growers had the highest score (2.87) for all entrepreneurial competencies, followed by corn farmers (2.73), rice farmers (2.64), and vegetable growers (2.60). The results showed that the SARIG repayment rate was 52%. Of the entrepreneurial competencies, there was a significant relationship between goal setting and repayment rate. Other competencies such as opportunity seeking, persistence, demand for quality and efficiency, risk-taking, information seeking, and self-confidence did not show significant relationship. This means that the program’s repayment rate was not entirely dependent on farmers’ entrepreneurial competencies, recognizing the fact that the way the program was implemented also affected how effective it was. The following interventions were recommended: the City Agriculture Office can implement a sustainable agripreneurship development program, carry out effective repayment schemes, and perform constant monitoring and evaluation.

Ernesto E. Asence III
City Agriculture Office, Naga City, Philippines
Feasibility and Acceptability of Shariah-based Microfinance among Farmers in Maguindanao, Southern Philippines

Nasrudin Abdulkadir Buisan
Cotabato City State Polytechnic College, Philippines

Correspondence
Agribusiness Department, College of Agriculture and Fisheries, Cotabato City State Polytechnic College, Sinsuat Avenue, Cotabato City 9600, Philippines
E nazppy39@gmail.com

Abstract
Limited cash for farm inputs and labor is one of the main problems of small farmers, and a good financing program is essential to increase both farm productivity and profitability. This is true in Maguindanao, a Muslim-dominated area, where only few farmers have access to formal microfinance. Local traders who have very high lending interest rates are usually the only source of cash and farm inputs. There have been several financial assistance programs both from government and non-government institutions. However, most were not sustained. In this paper, 53 rice and corn farmers from the six towns of the province were interviewed and were invited to participate in focus group discussions. Its purpose is to determine the feasibility and acceptability of Shariah-based microfinance (SMF) as an option for small farmers. SMF is a micro-lending approach following Islamic principles while retaining some aspects of commercial microfinancing. Results show that farmer acceptance of Shariah-based microfinancing system is high. It is preferred over the current local financing practice in the community. The acceptance and preference indicate demand of the service. SMF is a viable alternative to conventional microfinance. Wide advocacy work, however, is still needed to have a more understanding on how SMF works among farmers. It is recommended that a financing institution offering SMF shall be established to cater the financing needs of the farmers. Pilot communities shall be chosen where initial introduction of SMF can be done.

Keywords
• acceptability
• farmers
• feasibility
• Shariah-based microfinance
The Effects of Soil Erosion on Rice Productivity and Its Impact on Household Welfare Levels

Sitti Hairol, Pedro A. Alviola IV*, Harvey M. Niere, Nikko L. Laorden, Jon Marx P. Sarmiento, and Nilo B. Oponda

University of the Philippines Mindanao

Abstract

Soil erosion is one of the major problems of agriculture, especially in rice production. With the critical role of irrigated rice production in the country’s supply of rice and the negative effects of soil erosion on rice farming, there is a need to measure the effect of soil erosion on the productivity as well as its impact on household welfare levels. We compared farm productivity, household income and expenditure levels, and children’s food and nutritional intakes of irrigated rice farming in areas with no and slight erosion in General Santos City. Utilizing the Bureau of Agricultural Research geo-coordinates of Mindanao’s soil erosion areas, we used the geographic information system to identify irrigated rice areas with varying erosion levels. The results of the Cobb-Douglas production estimates show that the presence of slight erosion in irrigated rice farms has no statistically significant effect on farm productivity relative to the farms in no erosion areas. Comparison of yield, income, expenditure, and food and nutritional intakes of children showed no statistical difference as well. Thus, the presence of slight erosion is not a threat to the household rice production, income, and consumption relative to no erosion irrigated rice farms. However, in this context, varying erosion levels (i.e., high erosion versus no erosion) must be investigated further in order to provide more comprehensive information regarding the effect of soil erosion on productivity, expenditure, and food and nutritional intakes in irrigated rice farming.

*Correspondence

School of Management,
University of the Philippines
Mindanao, Mintal, Tugbok District,
Davao City 8022, Philippines

T +63 82 295 2188
E paalviola1@up.edu.ph

Keywords

• child nutrition intake
• geographic information system
• household expenditure
• rice productivity
• soil erosion
SESSION B2

Impact of the “Utan sa Tugkaran” Vegetable Garden Project for Identified Communities in Cagayan de Oro City, Southern Philippines

Milbert P. Dialogo, Wilson C. Bation*, Rustum D. Gevero, and Tracy June C. Dy
Xavier University–Ateneo de Cagayan, Philippines

*Correspondence

Business Administration
Department, School of
Business and Management,
Xavier University,
Corrales Avenue,
Cagayan de Oro City 9000,
Philippines
E wbation@xu.edu.ph

Keywords
- economic impact
- food security
- social impact
- vegetable gardening

Abstract

Community-based gardening projects contribute toward food security as gardens provide fresh vegetables and income. This study assessed the social and economic impacts of the “Utan sa Tugkaran” (vegetable garden) project for three locations in Cagayan de Oro City, Southern Philippines. Primary data was gathered using in-depth interviews and focus group discussions (FGDs). The social impacts included creating safe places, access to area, community development, building social capital, and education opportunities. The economic impacts covered job creation, training, business incubation, market expansion, savings for food, and increased home values. Results show that majority of the respondents were female (92.12%), aged 46 and above (44.12%), married (61.77%), and with an average of four children in the family. Interviews revealed that 60% engaged in community development, 30% availed the educational opportunities, and 10% practiced building social capital. In economic impacts, 15% of the respondents were provided jobs, 70% joined the training and cultivated vegetable gardens, 10% engaged in business incubation, and 5% experienced market expansion. FGDs reveal that 40% of the beneficiaries were able to save money at the rural and cooperative banks in the city due to sufficient fresh food vegetables for their family, and 50% of them received additional income from vegetable gardens. Recommendations include educating beneficiaries on new ways of cultivating home gardens in vacant lots in their areas and assisting them in establishing a cooperative for gardeners.
Factors Affecting the Perception of Farmer-Beneficiaries on the Implementation of CARP Support Services: The Case of Macarimbang Agrarian Reform Cooperative in Maguindanao, Southern Philippines

Farhana Jane S. Linso, Vlademir A. Shuck*, Harvey M. Niere, and Roxanne T. Aguinaldo
University of the Philippines Mindanao

Abstract

Several impact assessment studies were done to evaluate the Comprehensive Agrarian Reform Program (CARP) where they reported positive socio-economic outcome. However, some experts claim that the program, despite its gains, has a backward effect. This study evaluates the implementation of CARP support services based on the perception of the farmer-beneficiaries in Macarimbang Agrarian Reform Cooperative of Maguindanao, Southern Philippines. A total of 73 farmers who are beneficiaries of the CARP projects were selected through random sampling and interviewed. Tobit model was used to analyze the relationship between the socio-economic characteristics of the farmer-beneficiaries and their perception on the implementation of the programs’ usefulness, which was measured using a 5-point Likert scale, under each project component of CARP: Social Infrastructure Local Capacity Building (SILCAB), Sustainable Area-based Rural Enterprise Development (SARED), and Access Facilitation and Access Enhancement (AFAE). Results revealed that the socio-economic factors significantly affect the perception of the respondents towards CARP support services. Farmers with larger household size, farm size, and farm income tend to be more satisfied of the said programs while the opposite is true for respondents who are members of an organization. By substituting the mean of each variable to the Tobit model, it generated a result of 4.271, 4.400, and 0.604 for SILCAB, AFAES, and SARED, respectively. The farmer-beneficiaries believe that SILCAB and AFAES programs are useful to them, while SARED is not. Hence, SILCAB and SARED, whose main objectives are to capacitate and empower the farmer-beneficiaries and to introduce various alternative livelihood activities, respectively, should be given priority by CARP.
Production and Marketing Operations of Nongovernment Organization–Assisted Grassroots Enterprises in Iloilo Province, Central Philippines

Christine Mae D. Hernando* and Rebecca J. Tagamolila
University of the Philippines Visayas

*Correspondence
Department of Management,
University of the Philippines Visayas, Gen. Luna St.,
Iloilo City 5000, Philippines
T +63 33 336 5559
E christinamaehernando@yahoo.com

Keywords
• community development
• grassroots enterprises
• marketing
• production

Abstract
This paper is based on a case study that focused on the production and marketing operations, problems, and concerns of grassroots enterprises in Iloilo Province, Central Philippines, viewed through the perspective of the entrepreneurs themselves. These enterprises were assisted by the Taytay Sang Kauswagan Inc. (TSKI), a nongovernment organization, through its microfinance development project. Using a descriptive research design, primary data was generated through focused group discussions with the management of these enterprises as well as face-to-face interviews with members of the enterprises. Data and information were analyzed using descriptive statistics. The grassroots enterprises are engaged in the production of native chickens, goats, carabaos, milkfish, and other types of fish. Non-agricultural products are the hablon (handwoven) bed and table runners, sarong, patadyong, placemats, buon-buon, bags, shawl, and textile. Production and marketing systems operate with a steady stream of demands and orders coming from individual as well institutional buyers primarily within the province. Production problems include the lack of health benefits for workers, lack of quality control, calamities hitting the region, and shortage of materials. Rising prices, transportation expenses at trade fairs, and lack of local showroom and facilities for displaying products are among the major marketing concerns of the assisted entrepreneurs. In order to address production and marketing concerns of these entrepreneurs, the study recommends that TSKI should link the enterprises with business development services of their local government units, concerned national government agencies, and other relevant societal organizations.
Exploring Explant Sources for Callus Induction of the Nipa Palm

Cyrose Suzie Silvosa-Millado\textsuperscript{1,*}, Cecirly G. Puig\textsuperscript{2}, Georgianna Kae E. Oguis\textsuperscript{3}, and Gilda C. Rivero\textsuperscript{4}

\textsuperscript{1} University of the Philippines Mindanao  
\textsuperscript{2} University of Southeastern Philippines-Mabini Campus  
\textsuperscript{3} University of Queensland, Australia  
\textsuperscript{4} University of the Philippines Diliman

Abstract

Nipa palm (\textit{Nypa fruticans}) is an unexplored renewable alcohol resource that does not compete with agricultural production as it may be cultivated in estuarine and coastal areas. This sturdy palm produces a higher alcohol yield even without fertilizer input compared to other ethanol sources such as sugar cane or cassava. At present, nipa is allowed to naturally propagate itself, which leads to non-uniform plants with different volumes of alcohol produced annually. The study explored tissue culture for nipa palm using various explants as a benchmark study on the possibility of producing uniform high-yielding plants with superior breeding traits compared with propagules found in situ. Callus induction was attempted on mature zygotic embryos, plumules, immature leaf, and ovary explants. Contrary to various studies suggesting that monocots are recalcitrant to tissue culture methods, successful callus induction was observed on immature leaf explants, mature zygotic embryos, and plumule explants under Euwens or MS culture medium supplemented with various concentrations of 2,4-D synthetic plant hormone. Furthermore, callus formation was observed at higher 2,4-D concentrations than with 60 \textmu m concentration.

\*Correspondence

Department of Biological Sciences and Environmental Studies, College of Science and Mathematics, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines

\textbf{T} +62 83 293 0312  
\textbf{E} csmillado@up.edu.ph

Keywords

- callus induction
- Euwens medium
- MS medium
- nipa palm (\textit{Nypa fruticans})
Infructescence Development and Seed Characterization of Nipa Palm from Different Semi-Wild Stands of Davao Region, Southern Philippines

Junaldo A. Mantiquilla¹, Katia Charmaine B. Ponce¹, Klarissa C. Concepcion¹, Reynaldo G. Abad¹, Gilda C. Rivero², and Cyrose Suzie S. Millado¹

¹ University of the Philippines Mindanao
² University of the Philippines Diliman

Abstract

The versatility of nipa even under unstable environmental conditions and its potential use as source of bioethanol underscore the importance of understanding the fruit development of the palm. Female anthesis served as the reference point for determining the age of infructescence (fruit head). Weekly observations categorized according to morphological changes showed that Stage 1 is distinguished by a hard brown seed with dark brown tips. Stage 2 is characterized by seeds of even brown hue with some carpels fused forming bigger seed. At Stage 3, the infructescence began to bend owing to its weight with seeds having brown color with darker hue. At 21 weeks from female anthesis, the fruit head reaches its peak of rapid growth, which may also level off photosynthate demand. This suggests a halt to being a ‘sink’ in the succeeding stages. At Stage 4, the infructescence was already bending halfway the ground level. At Stage 5, the fruit head finally touched the ground. This indicates full maturity at 25 weeks from onset of female anthesis. In a separate study, environmental variability did not show statistical differences on seed morphometrics. However, position of seeds in the infructescence significantly affected viability. Seeds, if spherical, are considered viable and were located in the polar end opposite the peduncle and in the equatorial region. Dark brown seeds indicate full maturity. This study would be of value in the future as reference for seed maturity index, variability tests, and description of different stages for timing sap collection during tapping.

Keywords
- environmental conditions
- infructescence development
- nipa palm (*Nypa fruticans*)
- seed morphometrics

*Correspondence

Department of Biological Sciences and Environmental Studies, College of Science and Mathematics, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines

T +62 83 293 0312
E junaldo2003@yahoo.com
Sago Palm Flour Weight in Different Environmental Conditions: A Mathematical Model

Leo Manuel B. Estaña*, Dianna Rose A. Enad, Joseph E. Acosta, and Kimberly Hazel B. Camino
University of the Philippines Mindanao

*Correspondence

Department of Mathematics, Physics and Computer Science, College of Science and Mathematics, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines
T +63 82 293 0312
E lbestana@up.edu.ph

Keywords
• ecological condition
• flour weight
• mean absolute percentage error
• potential starch yield
• sago palm (*Metroxylon sagu*)

Abstract

For the past decades, the demand for starch from the sago palm (*Metroxylon sagu* Rottb.) from the starch industry is increasing because of the palm's high starch yield and low cost of production. This study presented a model which illustrates the relationship of sago palm flour weight with respect to its age depending on sago palm environmental condition (i.e., dry, wet, or submerged). Five different growth models were considered in this study, namely, the quadratic, cubic, quartic, power, and logarithmic models, which were run using a metaheuristic approach, specifically genetic algorithm (GA), in order to estimate the weights associated with the independent variable age and to generate an estimate for the dependent variable flour weight. GA performance was measured using sum of squared residuals (SSR) as the fitness function while the accuracy of the models were measured using the mean absolute percentage error (MAPE). The results show that the best fit model models for dry, wet, and submerged environmental conditions are cubic, cubic, and quartic models, respectively. The best fit models generated SSR values closer to the tolerance value of 0.000001 and have MAPE values of 2.820, 1.366, and 4.316, respectively, which indicate high accuracy. These models will help aide potential investors or land owners to identify the maximum potential starch yield of sago palm in areas where data with respect to growth stages are only available.
Starch Yield Based on Physical Dimensions and Age of Sago Palm: A Mathematical Model

Joseph E. Acosta*, Leo Manuel B. Estaña, Danna Krizza L. Cabahug, and Kimberly Hazel B. Camino
University of the Philippines Mindanao

Abstract
This study employed firefly algorithm (FA) to generate a mathematical model of sago palm’s potential starch yield based on the physical dimensions, namely, diameter breast height (DBH), palm height, and age. Three environmental conditions (i.e., dry, wet, and submerged) were taken into consideration in the modelling process using the general linear and nonlinear models. Moreover, the resulting models were assessed using sum of squared residuals (SSR) as FA’s fitness function and mean absolute percentage error (MAPE) for the models’ accuracy. Results show that general linear models are the best fit models for the sago palms growing in the three different environmental conditions with respect to the considered parameters. These models were used to quantitatively describe the underlying relationships between the starch yield with respect to the physical dimensions and age in order to determine the maximum potential starch yield of sago palm for the different environmental conditions. The models estimate that the maximum potential starch yield for dry, wet, and submerged environmental conditions are as follows: 0.75 m, 0.35 m, and 0.75 m for DBH, respectively; 10.5 m for palm height for all three; and 11.5 years, 15.5 years, and 15.5 years for age, respectively. These results will be able to aid farmers and potential investors in maximizing their sago starch produce. This will also help them as a guide for identifying harvestable sago palms which can be incorporated in their harvest plan.

*Correspondence
Department of Mathematics, Physics and Computer Science, College of Science and Mathematics, University of the Philippines Mindanao, Mintal, Tubuok District, Davao City 8022, Philippines
T +63 82 293 0312
E jeacosta@up.edu.ph

Keywords
• linear model
• mean absolute percentage error
• nonlinear model
• physical dimensions
• starch yield
Is Organic Farming Worthwhile? 
Productivity and Profitability of Organic Rice Farming 
in Camarines Sur, Philippines

Hanilyn A. Hidalgo¹* and Keith Eduard S. Hidalgo²

¹ Central Bicol State University, Philippines
² Bangko Sentral ng Pilipinas, Naga City, Philippines

*Correspondence
Department of Agribusiness, 
Central Bicol State 
University of Agriculture, 
Pili, Camarines Sur 4418, 
Philippines

E hanilyn77@gmail.com

Abstract

The popularity of organic food consumption has attracted many Filipino farmers to organic production. In the province of Camarines Sur, organic rice dominates the organic food industry since it is produced and traded on a commercial scale. However, organic rice production only accounts for 1% of the total rice production in the province. Shifting from conventional to organic farming is still an issue for many rice farmers. The study was conducted to determine the level of productivity and profitability of organic rice farms in the province. The study surveyed the 60 certified organic rice farms active in the province. Results showed that 53% of the certified organic rice farms reported high to very high farm productivity (i.e., 54 to 88 cavans) while 27% generated high to very high farm profitability (>37% return on sales). The average yield of an organic rice farming is 53 cavans per hectare with an average net income of PhP 35,000 per cropping season. The average profit is way above the household poverty threshold at PhP 8,022 per month. Profitability does not entirely depend on the productivity of organic rice farms. It can also be attributed to its premium pricing. The farmers can look into ways of maximizing gains on sale price per unit through value addition and strict implementation of organic rice production protocol to minimize input costs. Despite the need to improve the industry’s productivity and profitability, organic rice farming has the potential to reduce poverty in rural areas in the country.
Assessing the Rice Industry of La Union, Northern Philippines

Venelyn L. Bersamira* and Geralyn S. Sung-ag
Don Mariano Marcos Memorial State University, Philippines

*Correspondence
Agribusiness Management Department,
Don Mariano Marcos Memorial State University,
Bacnotan, La Union 2515, Philippines

E venelynbersamira@yahoo.com

Abstract
Focused on rice, this study was designed to assess the trend of local production, consumption, and marketing practices and analyze the demand and supply situation in La Union. The data, drawn from 75 consumers, 75 sellers, and 75 farmers who were randomly selected from the top-producing municipalities using the stratified proportionate random sampling, were statistically analyzed using frequency counts, percentages, ranking, weighted mean, and regression analysis. The study found that the volume and value of rice production were on upward trend. The consumers preferred local regular milled and whole rice. The per capita consumption (PCC) of rice in Region 1 was higher than the national level by 8.54 kg. Majority of the farmers had 0.75 ha farm size and practiced cropping system. They preferred to sell their products directly to wholesalers using tricycle, milled and on a per-kilo basis. Majority of the rice traders sourced their products from the wholesaler, on pakyaw basis, delivered in the market and paid on cash basis. Texture, nutritional value, and general appearance were the foremost considerations in the consumption pattern of consumer while pest and diseases and limited suitable display area was the most serious problems of rice farmers and traders. Based on market supply and demand analysis, there is a huge market surplus of this rice by 2016 onwards. This suggests the need to provide support systems in the form of trainings and seminars, as well as marketing and financial assistance, and to strengthen product development for the utilization of the local market.

Keywords
• consumption
• marketing practices
• market surplus
• rice industry
Effects of Temperature, Rainfall and Relative Humidity on the Yield and Quality of Rice in Two Areas in Davao City, Southern Philippines

Dominica del Mundo Dacera* and Leslie Bernolo
University of the Philippines Mindanao

Abstract
Climate inconsistency can be a major threat to food manufacturing and sustainability of environmental resources. Changing pattern, for instance, of weather parameters such as temperature, rainfall, and relative humidity can affect rice yield and quality. In this study, we utilized data from automated weather stations (AWS) installed in Tamugan, Calinan, and in Marilog, Davao City, to assess the effect of weather parameters on the yield and quality of rain-fed rice. Time series data taken from 1987 to 2013 from the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA) weather stations were also used to predict the yield of rice crop in Davao City using Cobb Douglas production function having rainfed rice yield as dependent variable and weather parameters as independent variables. Results showed that a positive change in temperature and relative humidity favorably affected rice yield. As the temperature increased by 1.70 °C, rice yield also increased by 0.27%; and as relative humidity increased by 5%, rice yield also increased by 0.78%, although change in rainfall did not seem to affect rice yield. Studies on the effect of the three weather parameters on the physico-chemical properties of rice revealed that temperature directly affected the physical properties of rice such as length, width, thickness, and thousand grain weight. There was also noticeable effect on the gelatinization temperature but not the amylose content of rice. With sufficient rainfall, increased temperature can yield rice variety with better physical properties and gelatinization temperature. The results implied that close monitoring of weather parameters is crucial to sustainable rice production.

*Correspondence
Department of Food Science and Chemistry,
College of Science and Mathematics,
University of the Philippines Mindanao, Mindal, Tugbok District, Davao City 8022, Philippines
T +63 82 293 0312
E dddacera@up.edu.ph

Keywords
automated weather stations
rainfall
relative humidity
rice
temperature
Economic Impact of Climate Determinants on Rice Farmlands in Davao Region, Philippines

Pedro A. Alviola IV*, Marie Analiz April A. Limpoco, Shem Rufus Q. Sentones, Jon Marx P. Sarmiento, and Annabelle U. Novero
University of the Philippines Mindanao

Abstract

Agriculture contributes largely to the economic growth of developing countries such as the Philippines. However, it is highly dependent on climate. The impending changes in climatic variables thus pose questions about its economic impacts on agricultural crops such as rice. There has been no study yet on the quantified positive or negative impact of changing weather patterns on the rice farmlands of Davao Region, Southern Philippines. Thus, this study used the Ricardian model in estimating the marginal effect of significant weather variables on the net revenue per hectare of rice farmlands in Davao Region. Farm net revenue per hectare was regressed on socio-demographic variables and on weather variables that affect rice growth, namely: rainfall, air temperature, air humidity, and wind speed. Primary survey on 44 rice farm households was conducted in 2015 for the socio-demographic variables and the computation of the farm net revenue per hectare, while secondary data for 2015 on the weather variables were obtained from the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) website. Results showed that air temperature and air humidity significantly affect the net revenue per hectare. Specifically, when air temperature increases beyond 27.03 °C, farm net revenue per hectare decreases. Farm net revenue also decreases when air humidity goes lower than 84.66%. Currently, the average air temperature and air humidity in the Davao Region are 26.75 °C and 85.18%, respectively. A unit increase in air temperature from the current average value reduces farm net revenue by PhP 116,420.50 per hectare, while a unit increase in air humidity raises farm net income by PhP 8,168.00 per hectare. This study recommends further educating people, particularly rice farmers, on mitigating the effects of changing weather conditions. Strategies and policies are crucial in order for farmers to adapt to these changing conditions.

*Correspondence

School of Management,
University of the Philippines Mindanao, Mintal, Tugbok District,
Davao City 8022, Philippines

T +63 82 295 2188
E paalviola1@up.edu.ph

Keywords

- air humidity
- air temperature
- net revenue per hectare
- Ricardian model
Abstract

Rice is an important crop not only because it is a staple in the Philippines but also because it plays an important role in Mindanao by providing employment, with value of annual wages of more than PhP 42 billion, and food security for landless and poor farmers, particularly in regions and provinces where poverty incidences and prevalence of conflict are high. This study aims to examine the jobs generation potential of rice value chain in Mindanao. A value chain framework was used to analyze the issues and the job creation potential of the chain using the case of M’lang, North Cotabato. Key informant interviews, focus group discussions, and rice farmer surveys were done in Mindanao. Total jobs generated in the rice value chain for North Cotabato is estimated at 23,011 jobs from a total area of 125,731 ha, and 221,796 jobs for Mindanao from a total area of 1,189,266 ha in 2014. Access to better seeds, sufficiency of irrigation, access to credit, and high labor cost are issues that affect the performance of the rice value chain from production to marketing. By addressing the issues and implementing these strategies, it is estimated that additional jobs of 36,672 will be generated.
The Roles of Vegetable Value Chain Actors in the Changing Agri-food System: The Case of Davao City, Philippines

University of the Philippines Mindanao

Abstract
Several studies have shown that the retail food industry has been expanding and that consumers have changed their purchase patterns and preferences over time. These challenge vegetable value chain actors to respond to such trends. Hence, this study seeks to examine how players in the chain respond to the changes in the agri-food system, document the changes in the roles of vegetable value chain actors, and identify implications for smallholder producers. One to three interviews were conducted for each of the 15 types of vegetable value chain actors in Davao City, Southern Philippines, which totals 37 key informant interviews. The respondents were asked regarding vegetable industry trends, their roles and functions, their volume and quality requirements, and their willingness to source directly from farmer groups. A survey was also conducted among 60 vegetable farmers in Davao City to assess their roles in the chain. Farmers’ socio-demographic profiles and production and marketing practices were gathered. This study reveals that the layers in the chains have reduced because wholesalers have started to perform forward integration by producing vegetables, moving closer to the production sites, financing vegetable production to establish a strong supply base, and strengthening relationship with suppliers and buyers. Smallholder producers, on the other hand, remain to be heavily dependent on financiers. There are, however, opportunities for smallholder producers, such as organizing themselves into groups to market collectively, share risks, and take advantage of economies of scale and improving production to ensure that they produce better quality vegetables and become more competitive.

*Correspondence
School of Management,
University of the Philippines Mindanao,
Mintal, Tugbok District,
Davao City 8022, Philippines
T +63 82 295 2188
E rtaguinaldo@up.edu.ph

Keywords
• agri-food system
• transformation
• vegetable value chains
Abstract

This value chain analysis was conducted from April to September 2014 to provide a development framework for growth and competitiveness of the red bulb onion industry in Cagayan Valley region, which will be the basis for the Nueva Vizcaya commodity investment plan under the Philippine Rural Development Program (PRDP). For the study, 126 respondents (i.e., 105 farmers, 4 barangay [village] agents, 14 wholesaler-retailers, 2 assemblers, and 1 configurator) were selected through tracer methodology. Onion production in the region is concentrated in the province of Nueva Vizcaya, specifically in the towns of Aritao, Bambang, and Dupax del Sur, where about 450 ha of rice land are planted with onions from October to March. The value chain map included five functions: input provision, production, transformation, marketing, and consumption. Three chains, one for each province, were studied to calculate the valued added by the different players in the chain. In general, the farmer got the highest share at 41% net profit margin of the valued added, followed by the assembler/shipper (13%), wholesaler-retailer (7%), configurator (6%), then the agent (5.35%). The value chains identified were either configurator-led, farmer-led, or trader-led. Several constraints threaten the industry: (1) high cost of imported seeds, (2) decreasing onion farmland; and (3) the combined effects of ASEAN Integration, onion smuggling, and importation. The red bulb onion industry in the region can only prosper if the organized farmers will be empowered to integrate backward and forward along the value chain.

Keywords

• Cagayan Valley
• red bulb onion
• Philippine Rural Development Program
• value chain analysis
Supply Chain Analysis of Mango in Samal Island: An Organizational Theoretic Approach

Nikko L. Laorden*, Shemaiah Gail P. Placencia, and Mary Jane T. Bachanicha
University of the Philippines Mindanao

Abstract
Organizational theories provide management insights that can help explain organizational behaviors, designs, or structures. In this paper, we applied two organizational theories, transaction cost economics and social network analysis, to better understand the relationships amongst actors in the supply chain of mango in Davao City and how these relationships affect chain performance. Transaction cost economics was employed to investigate focal buyer opportunism while social network analysis was used to analyze how social networks affect chain performance. A total of 34 mango contractors and 7 farmers were interviewed using a structured survey questionnaire. Results show that opportunism is not rampant among focal buyers of mango. Asset specific investments significantly increase supplier dependency and supplier dependency increases the frequency of transaction. However, supplier dependency and focal buyer dependency do not significantly affect focal buyer opportunism. On the other hand, buyer’s uncertainty is almost significant in increasing the level of focal buyer opportunism. In assessing supply chain performance, social network analysis revealed that farmers with direct support from buyers (directed ties) have higher net margins compared to farmers that are self-financing (undirected ties). However, most farmer-buyer relationships were observed to have undirected ties. Lastly, farmers with high degree centrality (connected to many buyers) were observed to be more productive and profitable than farmers with low degree centrality (only one buyer). These findings suggest two practical insights: (1) controlling focal buyer opportunism through chain governance, and (2) improving the social network between mango farmers/contractors and a variety of downstream buyers through market linkage.

*Correspondence
School of Management,
University of the Philippines Mindanao, Mintal, Tugbok District,
Davao City 8022, Philippines

T +63 82 295 2188
E nlaorden@up.edu.ph

Keywords
• social network analysis
• supply chain
• transaction cost economics
Supply Chain Analysis of Prawn in Misamis Occidental, Philippines

Gemma M. Guigue
Northwestern Mindanao State College of Science and Technology, Philippines

Abstract

This study analyses the existing supply chains of the prawn industry in Misamis Occidental, Philippines. Specifically, the study sought to provide an overview of the situation of prawn growers and traders in the province for a better government support and to enable sustainability in the supply chain. A tracer methodology was carried out using the structured survey questionnaire among the respondents supplemented with focus group discussion (FGD) among local officials in the community. Major players were in Bonifacio, Tangub, and Ozamis. The supply chain of Bonifacio was identified as the most profitable while that of Ozamis City was found to be the most efficient chain. Prawn traders were rated high in flexibility, responsiveness, and concern on product and process quality compared to prawn growers. Traders reap also greater profitability. However, both prawn growers and traders shared similar critical logistics issues on environmental concerns. Certain inefficiencies were also identified in the study, such as poor farm-to-market road, lack or absence of market weight standards, asymmetric market information, high transaction cost, and determination of the selling price based on average body weight which may not be accurate and may prove disadvantageous to prawn growers. The following recommendations are formulated: (1) producers shall be empowered to push for standardized price determination; (2) employ more labor solely for sorting; (3) strengthen government program through agri-fishery infrastructure; (4) provide trainings and financial and technical assistance on water pollution management; (5) promote and support green-technology by integrating saline-tolerant tilapia/bangus in prawn culture; (6) organize cooperative; (7) have market-oriented framework of development; and (8) strongly rationalize fisheries ordinances with implementation of FAO 166.
SESSION C2

Supply Chain and Cost-Benefit Analyses of the Community-Based Sea Cucumber Hatchery in Davao del Sur, Philippines

Lorenz Daniel P. Lumen, Vlademir A. Shuck*, Thaddeus R. Acuña, and Ruth U. Gamboa
University of the Philippines Mindanao

Abstract

Sea cucumbers provide an important contribution to the livelihoods of some coastal communities in the Philippines. Due to high and increasing demand in the export market, which led to the depletion of wild stocks, increased hatchery efforts are done to restore production. In Brgy. Bato, Sta. Cruz, Davao del Sur, a community-based sea cucumber hatchery was established. This study aims to determine the status of sea cucumber trade in the area through supply chain analysis. Moreover, to identify the sustainability of its operation and for a potential scale-up, cost-benefit analysis was employed. Cost of production is based on the projected cost by the hatchery operation and not the actual financial support provided by the funding agencies to eliminate the issue of over-compensation. Results of the study revealed that sea cucumbers are marketed in two forms: wet (unprocessed) and dried (processed). The study also identified and described the actors involved in the supply chain, namely, gleaners, divers, fishers, middlemen, traders, exporters, and consumers. The cost-benefit analysis showed that the profit per production cycle is PhP 62,355. From an initial investment cost amounting to PhP 171,405, the return on investment was at 36.38%. The break-even point in terms of revenue is at PhP 10,997, having a safety margin of 87%. The study shows that community-based sea cucumber hatchery is a viable option especially for smallholder fishers. However, it may only work with proper management and adequate support from relevant government agencies, private stakeholders, and non-government organizations.

*Correspondence

School of Management, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines

T +63 82 295 2188
E vashuck@up.edu.ph

Keywords

• community-based project
• cost-benefit analysis
• sea cucumber hatchery
• supply chain analysis
Marketing Channel Choice Decisions of Agricultural Producers using the Transaction Cost Approach: A Review

Fredeliz Villanueva\textsuperscript{1,*}, Richel Lamadrid\textsuperscript{1}, Darlyn Tagarino\textsuperscript{2}, Andrew Del-ong\textsuperscript{2}, Jovita Sim\textsuperscript{2}, and David Joseph Bognadon\textsuperscript{2}

\textsuperscript{1} Saint Louis University, Philippines
\textsuperscript{2} Benguet State University, Philippines

*Correspondence

Saint Louis University, Bonifacio St., Baguio City 2600, Philippines

Email fredeliz@ymail.com

Keywords

- agricultural producers
- market choice
- marketing
- transaction cost

Abstract

In the context of the development of policies and programs to improve the lives of farmers, there is a growing recognition in identifying transaction cost as a policy base for the development of agribusiness. This paper reviewed studies about the associated transaction costs incurred in relation to the distribution and channel management of agricultural produce, particularly on the decision to directly sell to the market, to enter into an agreement with an intermediary, and to become a member in a marketing cooperative. Common themes regarding the marketing channel choice decisions identified in the different studies are the following: (1) farmers who have knowledge about the price of the good in the market are more inclined to sell directly to the market; (2) farmers who trust intermediaries and the workers of marketing cooperatives are more inclined to sell their produce through intermediaries and marketing cooperatives; (3) farmers perceived an increase in their bargaining power and income risk; and (4) institutional arrangements with intermediaries and credit cooperatives require trust and proper implementation of contracts in order for such arrangements to be sustainable. Such common themes reveal that transaction costs are significant in the decision-making process of farmers in the marketing of their produce. Interventions should be undertaken in order to ensure the proper implementation of such arrangements and prevention of abuse of intermediaries and workers of marketing cooperatives.
Distribution Chain Analysis of Aquaculture Products in Lanao del Norte, Southern Philippines

Vivian Mae C. Bacala, Dia Noelle F. Velasco, Mar B. Cruz, and Jeanette Angeline B. Madamba*

University of Philippines Los Baños

*Correspondence

Department of Agribusiness Management and Entrepreneurship, College of Economics and Management, University of the Philippines Los Baños, College 4031, Laguna, Philippines

T +63 49 536 2846
E jbmadamba@up.edu.ph

Keywords

• aquaculture
• distribution chain
• Lanao del Norte
• transportation system

Abstract

According to extant literature, the current supply of captured fisheries is inadequate to feed a fast-growing global population; thus, it is up to aquaculture to fill this gap. Because of aquaculture’s potential in uplifting the lives of impoverished Filipinos, a study was conducted to assess the distribution chain of aquaculture products (i.e., crab, prawn, and milkfish) in Lanao del Norte, one of the top producing provinces of aquaculture products in the Northern Mindanao region where poverty is also prevalent. Primary data gathering involved personal interviews with 40 fishpond operators, 1 fishpond-trader, 11 traders, 4 truckers, 9 wholesalers-retailers, and 1 retailer. The overall distribution and transportation system was evaluated based on volume of product spoilage, travelling time, and the transportation cost incurred. In addition, value chain analysis was utilized to trace the different chains and the costs incurred by each player. Findings reveal an inefficient transportation and distribution system of aquaculture because of potential high alternative transportation costs if shipped to Manila (PhP 200/kg) coupled with huge economic losses along the current distribution chain (PhP 100,000 to 40 million per year) from spoilage alone plus annual estimated losses due to corruption (PhP 329,550). Moreover, the hours spent transporting products on unpaved roads was longer by one hour compared to paved roads. Last, the transportation cost incurred ranges from 4% to 6.3% relative to its selling price, which falls within the acceptable range. Technology and product development, improvement of postharvest facilities as well as road and transport infrastructure, enforcement of tighter security due to the presence of rebels in the highways, provision of timely and accurate market information, and swift release of transport permits are recommended.
Abstract

Products and services become meaningful when available and positioned from the customer’s perspective. Exploring the supply chain of mango in Davao City, Southern Philippines, unveils different nodes having different characteristics and buying requirements. We analyzed market-based opportunities in the mango supply chain to inform mango producers which attractive markets they should prioritize as well as identified opportunities for improvement in production and marketing. We utilized a rapid market assessment (RMA) approach to identify the different market nodes and their characteristics. Snowball sampling was used to determine the respondents for this study. A total of 28 face-to-face interviews were done using a semi-structured questionnaire. From the producers’ point of view, we assess the relative attractiveness of the nodes by employing a simple scoring method on the data on volume of requirement, buying price (at the time of interview), support services provided to farmers, and stage of node life cycle. Results show that the exporters’ node has the highest attractiveness score followed by direct wholesalers, primary wholesalers, and processors. We recommend the following practical suggestions for producer groups to target these attractive markets: (1) improve overall quality of mangoes; (2) perform sorting and grading; (3) adopt cost-effective postharvest technology; and (4) develop cost-effective off-season production farming system.
Feasibility Assessment of Direct Marketing Strategies: The Case of Vegetable Farmer Clusters in Marilog, Davao City, Philippines

Vlademir A. Shuck*, Kestrel Ve F. Florentino, Roxanne T. Aguinaldo, Luis Antonio T. Hualda, and Nikko L. Laorden
University of the Philippines Mindanao

Abstract

In the Philippines, majority of the vegetable farmers are categorized as small and are often disconnected from markets, which lessen their opportunities to sell at a profit. This study focused on the feasibility assessment of direct marketing strategies, specifically the farmers’ market and direct sales to institutional users. A random survey was conducted on 110 residents of the first district of Davao City where consumers’ willingness to shop at farmers’ markets was analyzed using Probit regression. On the other hand, case study analyses were conducted to assess the farmers’ market event in a university and the direct sales strategy to institutional user, the food service provider of a government agency. Costs and benefits of each direct marketing channel were also determined. The farmer groups PAFA and SAFE are the producers and sellers of vegetables for this research. The study revealed that majority of the respondents are willing to participate in a farmers’ market if one exists and they perceived it as a source of fresh yet affordable vegetables. Moreover, most of them believed that participating in a farmers’ market is a form of social responsibility. The institutional buyer mainly benefited through significant reduction in marketing costs. Alternatively, the farmers perceived direct marketing as opportunities for learning and maximizing economic gains through diversifying its market portfolio and securing a market for their produce. The results of the study indicate the feasibility of direct marketing strategies to be carried out by the vegetable farmer clusters, which are PAFA and SAFE.

*Correspondence
School of Management, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines
T +62 83 295 2188
E vashuck@up.edu.ph

Keywords
- direct marketing
- farmer clusters
- farmers’ market
- institutional markets
- vegetables
Economic Valuation of Tourism Services of Lake Holon, South Cotabato

Katrina P. Villa*, Harvey M. Niere, Nikko L. Laorden, and Thaddeus R. Acuña

University of the Philippines Mindanao

*Correspondence
School of Management, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines
T +62 83 295 2188
E kpvilla@m.up.edu.ph

Abstract
The tourism potential of the municipality of T’boli, South Cotabato, is highlighted by the presence of Lake Holon. The study aims to measure the economic value of tourism services of the lake. Since no market exist for a natural resource, this study used a surrogate market based method which is the zonal travel cost method (ZTCM) in quantifying its value. ZTCM uses the number of visitors to the site coming from different places which were then grouped into zones. The visitation rate from each zone can then be estimated as a function of its corresponding travel cost. The demand function that will be generated is used to extract the economic value of tourism services of the lake. Data were obtained from 224 respondents of which 80% were from South Cotabato and the rest were from other regions of the Philippines. Information on respondents’ place of origin, travel expenses, travel time, visit duration, and income were collected. The place of origins were categorized into four zones based on their distance from the lake. The findings reveal that the economic value of tourism services of Lake Holon is estimated to be around PhP 224 million annually. This information will aid the local government planners and policy makers in drawing up a tourism development plans and related legislations around the lake.

Keywords
• economic valuation
• tourism
• travel cost method
Governance and Food Security in Sub-Saharan Africa

Maria Rizalia Y. Teves
Mindanao State University–Iligan Institute of Technology, Philippines

Abstract

The global initiatives to reduce hunger are at the fore and center-stage in international fora such as the World Food Summit in 1996 and the UN Summit for the Declaration of the Millennium Development Goals in 2000. Despite all efforts to end hunger, many countries remain seriously challenged with undernourishment. Latest estimates reveal that Sub-Saharan Africa has the highest prevalence of undernourishment in the world. This paper analyzes food security (insecurity) using the lens of governance and institutions, without losing sight on the importance of the market indicators. Covering a sample of 27 countries of Sub-Saharan Africa for the period 2000–2013, an unbalanced panel analysis was employed to determine if the quality of governance and institutions (using the World Governance Index) helps explain country performance in promoting food security (using the Global Hunger Index) overtime. The empirical model estimation was done using pooled ordinary least squares, panel corrected standard errors, and panel instrumental variables techniques. Controlling for market variables, the empirical investigation finds strong evidence of a negative relationship between governance quality and food insecurity. The governance dimensions that significantly drive food security in Sub-Saharan Africa include voice and accountability, government effectiveness, regulatory quality, and rule of law. The study concludes that institutional policy reforms are of utmost importance if countries are committed to end hunger. Therefore, efforts, strategies, and resources for institutional reforms must be focused on the governance dimensions that are identified as critical drivers of food security or binding constraint in hunger reduction efforts in the region.
Towards Embedding Gender Dimension in Philippine Agricultural Value Chains: A Critical Review

Mitchiko A. Lopez\textsuperscript{1,2}
\textsuperscript{1} University of the Philippines Mindanao
\textsuperscript{2} University of the Philippines Los Baños

Abstract
How does a gendered approach in value chains (VC) help ensure that critical concerns among women and children in relation to food security and prevailing poverty will be addressed? Globalized commodity chains have changed the landscape of production of goods and services, with emphasis on production segmentation and distribution. This paves the way for an increasing reliance on developing countries as sources of raw materials and labor. This holds true for Mindanao as producer of top agricultural products. In Mindanao, several programs towards pro-poor inclusive agricultural VC have been launched with the goal of promoting a more equitable sharing of economic and social benefits among players. However, the gender dimension is lacking in the VC literature, particularly in the Philippine setting, despite efforts toward inclusiveness. Integrating a localized gender dimension in agricultural VC studies offer a wealth of opportunities to fill in the literature gap and sustain gender discourse in agriculture. Theoretical perspectives, as well as empirical and case studies, will be examined, with the goal of developing a localized gendered agricultural value chain approach. It will explore future directions of gender studies in Philippine agricultural value chains and other related country experiences across commodities and cultural differences.
SESSION D1

Motivating Factors, Barriers, and Success Factors among Agri-based Micro- and Small-scale Women Entrepreneurs in Isabela, Philippines

Kristina Manaligod, Dinah Pura T. Depositario*, Arlene C. Gutierrez, and Juan Paulino S. Trespalacio Jr.
University of the Philippines Los Baños

*Correspondence
Department of Agribusiness Management and Entrepreneurship, College of Economics and Management, University of the Philippines Los Baños, College, Laguna 4031, Philippines
T +63 49 536 2846
E dtdepositario@up.edu.ph

Abstract
In recent years, a number of women have started agribusiness enterprises in Isabela, Philippines, such as the production and retailing of dominant agricultural products like rice and corn, livestock and poultry raising, and the processing of root crops into native delicacies. This study aims to examine the motivating factors, start-up barriers, and success factors among micro- and small-scale women entrepreneurs in selected areas in Isabela, Philippines. A survey was conducted among 46 women entrepreneurs whose businesses were based in the cities of Ilagan and Cauayan and the town of Roxas. Descriptive statistics, factor analysis, and chi-square analysis were employed to analyze the data. In terms of their personal entrepreneurial competency (PEC) profile, the women entrepreneurs were found to be moderate (i.e., scoring 16–18 out of a possible 25) in terms of opportunity-seeking, demand for quality and efficiency, systematic planning and monitoring, persuasion and networking and self-confidence and weak in the area of goal-setting. Women entrepreneurs were motivated to establish a business by the following factors: achievement, competence, affiliation factor, and job/financial security. On the other hand, the women entrepreneurs faced common start-up problems like lack of training education, unavailability of low-interest loans for capital, and career-family conflict. Meanwhile, two success factors were found to be associated to performance (i.e., micro vs. small-scale): if the entrepreneur had finished a business degree and if their business was the only source of family income. The study recommended that organizations should conduct action-oriented trainings to develop the PECs of Isabela women entrepreneurs. Future studies should consider having a larger sample size.

Keywords
• barriers
• micro and small-scale enterprises
• motivating factors
• success factors
• women entrepreneurs
CONTENTO NG A PANGABUHI KAG PANIMALAY:
Local Notions of Well-being for Natural Resource Management

Sanley S. Abila¹ and Cheryl Joy J. Fernandez²,³,*

¹ Cardiff University, Wales, United Kingdom
² University of the Philippines Visayas
³ James Cook University, Australia

Abstract

Social and cultural dimensions in natural resource management have been overlooked in assessing the potential for economic development for agricultural and coastal resources. Following this, sustainable management of resources requires better information on how people value these resources and whether these values reflect in their ‘well-being.’ This paper examines key aspects of the concept of ‘well-being’ that were self-reported by residents working in either agriculture and/or fisheries as well as by those working in non-agriculture/fisheries sectors. We were interested in a sample of participants who represent the variety of residents in terms of occupation, level of exposure/experience with regards to the environment, and socio-demographic characteristics. Snowball sampling was used to recruit participants in six focus group discussions (FGDs). Results from FGDs show that key aspects of ‘well-being’ include five general categories. These are natural capital (e.g., land), financial capital (e.g., work/employment), manufactured capital (e.g., marketplace), social capital (e.g., security in the community), and others (e.g., education). Respondents also rated the importance of these aspects, and resource-dependent households value the environment and bequest values as the most important aspects of their well-being. As expected, these factors reflect and coincide with the various types of capitals listed in the initial review of literature. The results present empirical evidence based on the voices and experiences of both fisheries and agriculture workers and their non-fisheries and non-agriculture counterparts. From these self-reported understanding of ‘well-being,’ policy makers and other key stakeholders like nongovernmental organizations working with fishing and agricultural communities could potentially base their conservation and development priorities in the Metro Iloilo-Guimaras region.

*Correspondence

Department of Management, College of Management, University of the Philippines Visayas, Gen. Luna St., Iloilo City 5000, Philippines
T +63 33 336 5559
E cjfernandez@up.edu.ph

Keywords

• culture
• regional priorities
• self-reported notions
• well-being
Coastal Urban Centers and Disaster Management in Iloilo, Philippines

Rhea Subong\textsuperscript{1,}\textsuperscript{*} and Cheryl Joy Fernandez\textsuperscript{1,2}

\textsuperscript{1} University of the Philippines Visayas
\textsuperscript{2} James Cook University, Australia

\textbf{Abstract}

Coastal areas play an important role in sustainable development. Subsistence and commercial fishing of marine resources have provided vital source of food, employment, and social stability in coastal communities. However, the fisheries sector is vulnerable to various development activities that dynamically interact with other sectors such as agriculture, forestry, and tourism. It is not yet clear if local governments in disaster risk-vulnerable countries incorporate environmental security components in their disaster risk reduction and management (DRRM) plans and recognize vulnerable groups, such as fishermen and farmers. This paper presents the case of a coastal municipality in Iloilo, Philippines. We examine its DRRM plans using a coastal resource management framework. A combination of household survey and secondary information were used to identify the gaps and examine municipality spending to address disasters, estimated household flood damages, and legislation relating to disasters. Results showed that the local government was not using the required disaster spending (i.e., 5\% of the internal revenue allotment) despite high and continued flood damages (estimated at PhP 1903 per household per year) in their municipality. General plans relating to environmental integrity were integrated but limited toward business expansion and solid waste management, with little emphasis on coastal sustainability. There are also evidences of well-structured and updated legislation relating to disaster, but they lack focus on marine environment and capacity building of fishing and farming households. Thus, the study recommends reassessing the DRRM plans of the municipality in order to improve the well-being of its residents.

\textit{*Correspondence}

Department of Management, College of Management, University of the Philippines Visayas, Gen. Luna St., Iloilo City 5000, Philippines

T +63 33 336 5559
E subong\_rhea@yahoo.com

\textbf{Keywords}

• coastal communities
• community well-being
• disaster risk reduction and management
Jobs Value Chain Analysis for Selected Highland Vegetables in Northern Mindanao, Philippines

Mark Alexis O. Sabines, Maria Rosario P Mosqueda*, Veneranda T. Larroza, Gyllen P. Sanchez
Xavier University–Ateneo de Cagayan, Philippines

*Correspondence
College of Agriculture, Xavier University, Corrales Avenue, Cagayan de Oro City 9000, Philippines
T +63 88 858 3116 local 3100
E mmosqueda@xu.edu.ph

Abstract
Poverty incidence in Bukidnon, the major vegetable-producing province in Northern Mindanao, is high. It is estimated that poverty incidence in Talakag, Lantapan, and Impasug-ong, which are key vegetable-producing municipalities, ranged from 49% to 62% of the population. Aimed toward improving the sustainability of the livelihood of smallholder vegetable farmers and their job creation potential, this study examined selected highland vegetable value chains originating from seven barangays (villages) surrounding the Mt. Kitanglad Range in Bukidnon up to the Bulua Vegetable Landing Area in Cagayan de Oro City. Using results from focus group discussions, face-to-face interviews, observation visits, and secondary data collection, the study described the various value chain players, and their geographical context and operations; quantified the number of jobs generated within the value chain; analyzed key constraints that hinder its job creation potential; and recommended actionable measures. Job generation in selected vegetable value chains is high but currently limited by production and market-related constraints. It is estimated, for example, that tomato, carrot, cabbage, and cauliflower production generates about 1.66, 1.11, 1.09, and 2.92 jobs (full-time equivalent) per hectare. Key constraints to job creation include unpredictable market price fluctuations, high postharvest losses, high production and postharvest expenditures, limited farmer knowledge and network, and inadequate support services. To improve the sustainability of these value chains, it is necessary to coordinate the provision of support infrastructures and services, ranging from farmer decision support tools, alternative markets, more responsive and accessible research and extension services, government credit programs, to strengthening farmers’ organizations.
Social Media Usage Behavior: 
An Application of a Modified Technology Acceptance Model

Duvince Zhalimar Dumpit* and Cheryl Joy Fernandez
University of the Philippines Visayas

Abstract

Spending on social media marketing has become increasingly important in today’s competitive and dynamic business environment. The use of social media (SM) has enhanced brand visibility and facilitated social engagement opportunities for various industries, such as agriculture and education. In the Philippines, however, research on SM usage has been generally descriptive, wherein inter-relationship between determinants of SM use are under-examined. This study recognizes this important gap and applies a modified technology acceptance model (TAM) to investigate the effects of perceived ease of use, perceived usefulness, subjective norm, and perceived playfulness on users’ intention to use SM. Since these motivation variables are perceived to be endogenous in the literature and are significantly correlated based on initial statistical tests, we used principal component analysis (PCA) and structural equation modeling (SEM) to control for endogeneity. Findings from a survey of 500 millennials reveal that all hypothesized determinants have significant influence on intention to use, with perceived ease of use as the strongest factor. These results provide significant insights to social media marketers and developers on how to maximize the potentials of SM as an effective marketing tool. A natural progression of this work is to analyze the usage of SM in agri-based industries. Possible areas of application include the use of SM platforms to establish a community of agri-entrepreneurs and other stakeholders from the agriculture industry, wherein they can share best practices, collaborate with (potential) farmer-entrepreneurs, and interact with diverse consumers.

*Correspondence

Department of Accountancy, 
College of Management, University of the Philippines Visayas 
Iloilo City, Philippines 5000

T +63 33 336 5559
E djdumpit@up.edu.ph

Keywords

• consumer behavior
• social media
• technology acceptance model
Geographic Information System for Upscaling the Seaweed Industry Operation In Two Areas in Mindanao, Southern Philippines

Mark Jude F. Trondillo*, Della Grace C. Bacaltos, and Irvin C. Generalao
Southern Philippines Agri-business and Marine and Aquatic School of Technology, Philippines

*Correspondence
Agricultural Engineering Department, Southern Philippines Agri-business and Marine and Aquatic School of Technology, Brgy. Matti, Digos City 8002, Davao del Sur, Philippines
E mtrondillo@gmail.com

Keywords
• geographic information system
• mapping
• seaweed industry
• sustainable farming

Abstract
This study used the geographic information system (GIS) in mapping cultured seaweed (Kappaphycus and Eucheuma) areas as production support system for sustainable farming and upscaling of seaweed industry operation. However, the current information on the aerial extent and spatial distribution of seaweeds farms in the Philippines has limited accuracy and reliability. To address this, the ArcGIS tool and spatial method was used in compiling bio-physical and socio-economic data, including the extent of seaweed production areas, the culture techniques and systems, and other relevant information on the various farming sites in the Davao Region and major production areas in Tawi-Tawi Province of Mindanao, Southern Philippines. The results show that major source of seaweeds in Davao Region comes from Davao del Sur while for Tawi-Tawi, the bulk of production is from Sitangkai. For seaweed extent, Davao Region reaches a total of 408.59 ha while Tawi-Tawi covers 47,802.18 ha. In terms of the salinity level, Davao Region ranges from 27 to 32 ppt and Tawi-Tawi from 31 to 32 ppt. Temperature level ranges from 26 to 27 °C in Davao Region and 27–30 °C in Tawi-Tawi. As to the socio-economic dimension, the most common farming method applied in both areas is the multiple floating long-line; however, several culture systems were recorded such as basket, monoline, and fix-off bottom methods. The product flow and value chain mapping suggest the absence of consolidators in some areas and the lack of coordination and complementation among seaweed industry enablers, which may have contributed setbacks to the industry on top of the prevailing problems on diseases and environment-related issues. The results of this study may assist decision making for seaweed farming operations and eventually upscale the seaweed industry in Mindanao and the whole country.
A Wireless Sensor Network (WSN)–Based Water Quality Monitoring for the Characterization of Fishing Grounds Near the Mining Areas of Tubay, Agusan Del Norte, Philippines

Alexander T. Demetillo¹*, Michelle V. Japitana¹, and Evelyn B. Taboada²
University of San Carlos, Philippines

*Correspondence
School of Engineering,
University of San Carlos–Talamban Campus,
Cebu City 6000, Philippines
E atdemetillo@gmail.com

Keywords
• environmental management
• fishing grounds
• mapping
• mining activities
• water quality
• wireless sensor network

Abstract
Water quality has an impact on the fishing and aquaculture industry of a community. Tubay Bay is one of the main sources of coastal products of nearby cities like Butuan and Cabadbaran and also serves as the navigation routes of hauling ships of mining companies. Of the Water Quality Index (WQI), the Environmental Management Bureau (EMB) water quality data shows that the pH levels exceeded the limit. This paper presents the initial outputs in the development of a low-cost wireless sensor network (WSN) system using open-source hardware platforms to monitor the pH of the water bodies at Tubay, Agusan del Norte, Philippines. The proposed system is devised to be highly scalable in terms of the type of sensors, the number of sensor nodes, and the technology applied for each node. This is well suited for a wider coverage of monitoring the WQIs of Tubay Bay. Results of this study showed a good transmission performance of real-time water quality data in any areas where GSM signal is present. The established platform and database of this study could provide valuable information that could support or contradict claims by the local government units (LGUs) on the effects of mining activities to the agro-fishing activities in the area and provide insights on which water quality parameters or water condition that are highly correlated to pH must be closely monitored. This demonstrates the use of WSN in establishing a low cost but effective monitoring tool that can be replicated in other areas that need extensive monitoring.
Solar Energy Production and \( \text{CO}_2 \) avoidance of a 5.0 kW Solar Power Generator Integrated in a Mango Processing Facility

Edward M. Querikiol* and Evelyn B. Taboada
University of San Carlos, Philippines

Abstract

An agri-based manufacturing facility that processes mango by-products into high-value commodities can reduce its electrical energy costs by installing an on-grid photovoltaic (pv) system. Three solar panel configurations were designed and a boost configuration consisting of 20 pv polycrystalline panels each with 250-W output and a maximum power point inverter with a 4000-W rating was installed. An online pv planner (Sunny Design Web) was used to calculate for the yield and the total investment. Results were compared with the actual data collected. On its first year of operation, it has generated a total of 7.3 MW of power, equivalent to a savings of PhP 73,000 for that year. On the other hand, the \( \text{CO}_2 \) mitigated by this system is measured at a total of 5.09 t \( \text{CO}_2 \) per year. The chosen configuration produced over 2% than what was theoretically calculated, considering that the boost configuration was computed using a continuous grid supply and neglecting all line losses. Furthermore, the solar energy harvested was greatest during sunny days compared to energy harvested during cloudy and rainy days. The daily energy harvested follows a bell-shape profile wherein energy peaks are usually observed during the middle of the day. The solar panel system works very well in the agri-processing facility as it generates energy to compensate for its needs and requires minimal maintenance. It reduces energy costs; hence, it is highly recommended for any processing factories that have high energy requirements.

*Correspondence

Department of Electrical and Electronics Engineering, College of Engineering, University of San Carlos, Talamban, Cebu City, 6000, Philippines
E emquerikiol@usc.edu.ph

Keywords

- \( \text{CO}_2 \) avoidance
- mango by-product processing
- on-grid photovoltaic system
- solar power generator
SESSION D2

Drying Kinetics of Mango Seeds in a Greenhouse-type Solar Dryer

Edward M. Querikiol* and Evelyn B. Taboada
University of San Carlos, Philippines

*Correspondence
Department of Electrical and Electronics Engineering, College of Engineering, University of San Carlos, Talamban, Cebu City, 6000, Philippines
E emquerikiol@usc.edu.ph

Abstract
A greenhouse-type solar dryer is employed in drying mango seeds, which are insignificant by-products in a mango processing facility. Wireless sensor networks (TelosB nodes) were used in monitoring process conditions such as temperature (T), relative humidity (RH), and illuminance (lux) inside the solar dryer. Moisture contents during the drying period were measured at different sample tray levels (tray 1, tray 3, and tray 5) and the drying kinetics were established. Drying curves of the sample for sunny, cloudy, and rainy conditions were compared. The drying rates and effective diffusivity were calculated and estimated for the different sample tray levels and for the three weather conditions during the nine-month experimental period. Results showed that the tray level has a significant effect on the drying rates and effective diffusivity of the samples wherein the drying rate is faster for higher tray levels. The same phenomenon is observed for the three weather conditions, and the fastest drying rates were observed during sunny periods. Curve fitting was done using the obtained drying kinetic data. Applying the 14 empirical thin-layer drying models, the drying of mango seeds in the greenhouse-type solar dryer can be best described by the approximation of the diffusion model. The drying kinetics for mango seeds established in this study is a first for a fully functioning industrial-scale greenhouse-type solar dryer. This study is found to be useful in the design and scale-up of a solar dryer wherein agricultural by-products can be dried more efficiently using solar energy, thereby reducing energy costs.
Innovating Technologies for Abaca Biomass Wastes Recovery and Value Adding in Catanduanes, Bicol, Philippines

Arnulfo P. Malinis
Bicol University, Philippines

Abstract
An innovative processing technology was designed and tested to recover biomass wastes for value adding based on the analysis of the present technology landscape for abaca postproduction and the profile of abaca biomass fiber and wastes in the different processing operations. The study showed that the technology landscape analysis for abaca postproduction is mainly on fiber processing and none for juice extraction and utilization. Manual and spindle methods of fiber extraction utilized 33.0% of the fresh weight of stalks with 67% unutilized or as wastes compared to the decorticator with 15% and 85%, respectively. Wastes from tuxying to include pith showed the highest recovery at 30.08% compared with topping at 16.39% and trimming at 14.57%. The three fiber extraction methods were significantly different in terms of fiber and waste recovery using three varieties of abaca from two locations in Catanduanes. The designed innovative processing method for wastes recovered 70% juice and 22% meal with 8% losses for tuxies, pith, pseudostem base, and stripping wastes, while 33.3% juice and 57.7% meal with 9% losses for leaves and petioles. The primary product for marketing is the juice at PhP 2.00 per liter production cost. The dried meal was made into abaca fiber pots and abaca “green” fuel. The process showed a return on investment of 52% with a payback period of 1.82 years at an investment cost of PhP 120,000. The innovation provides added value to abaca and shows positive prospects to abaca stakeholders and potential adopters.

Correspondence
Department of Development Management & Department of Agricultural Engineering, Bicol University, Polangui, Albay 4506, Philippines
E klinulmalinis@gmail.com

Keywords
• abaca biomass wastes
• innovative technologies
• technology landscape
• value adding
• waste recovery
Growth, Yield, and Postharvest Characteristics of Grafted Bitter Gourd using Different Sponge Gourd Rootstocks

Michael Adonis M. Sudaria* and Rosario A. Salas
Visayas State University, Philippines

Abstract

Grafting is an emerging technology that addresses adverse agricultural problems in both soil and climatic conditions. The study was conducted to evaluate the growth, yield, and fruit quality of bitter gourd or ampalaya (Momordica charantia L.) grafted with different sponge gourd or patola (Luffa cylindrica L.) rootstocks. The experiment was laid out in randomized complete block design with four treatments replicated thrice. The treatments were as follows: T0–Control (ungrafted), T1–Hybrid patola (var. Mutya), T2–Open-pollinated variety (var. Esmeralda), and T3–Bureau of Plant Industry bacterial wilt–resistant variety patola rootstock (BPI BW resistant var.). Results revealed that grafted ampalaya plants markedly produced female flowers first rather than male. Generally, nongrafted plants produced more laterals, longer vines on the early weeks from transplanting, more marketable fruits per plant, as well as higher total soluble solids (TSS) and electrical conductivity (EC). Nevertheless, nongrafted plants also exhibited more non-marketable fruits, greatest disease incidence, and lower percent free-radical scavenging activity (%FRSA). On the other hand, grafted ampalaya plants have lesser disease incidence, minimal percent weightloss, delayed color changes, firmness, and initial pH readings after the eighth harvest. Postharvest life or shelf life and visual quality rating of grafted ampalaya were extended but were not statistically different with the nongrafted fruits. However, grafted ampalaya fruits have higher chlorophyll a and b and carotenoid content and significantly had the highest %FRSA. These findings imply that improvement of ampalaya plant through grafting, specifically into different patola rootstocks, were compatible, reduced disease incidence, and have more nutritious fruits compared to nongrafted ampalaya plants.

*Correspondence

Postharvest Technology Division, Department of Horticulture, College of Agriculture and Food Science, Visayas State University, Visca, Baybay, Leyte 6521-A, Philippines
E michaelsudaria@gmail.com

Keywords
• bitter gourd (Momordica charantia)
• cucurbit grafting
• sponge gourd (Luffa cylindrica)
Effects of Packaging Systems on Eggplant Quality during Transport

Marilou Benitez¹*, Aljay Valida¹, Fatima Rose Rivera¹, Michael Adonis Sudaria¹, Analita Salabao¹, Eutiquio Sudaria¹, Antonio Acedo Jr.², Emma Winley³, and Jenny Ekman³

¹ Visayas State University, Philippines
² AVRDC-The World Vegetable Center, South Asia Regional Office, India
³ Applied Horticultural Research, Australia

Abstract

Eggplants (Solanum melongena) are extremely predisposed to injury during haulage, which considerably diminishes fruit value. The study aimed to develop packaging systems to maintain the market quality of ‘Morena’ eggplant during transport along the market continuum. A 6 × 2 factorial in completely randomized design was laid out using freshly harvested eggplant. Fruits with uniform maturity and size and were damage free were procured from Brgy. Butigan, Baybay, Leyte. Fruits were packed using six types of containers, namely, rattan basket, plastic crate, polyethylene plastic bag, and styrofoam cooler in which both rattan basket and plastic crates were with and without banana leaves as liners. Fruits were arranged together following the conventional practice of product loading by the traders. After transport, fruits from the different containers were stored in ambient (25–30 °C) or refrigerated (8–10 °C) conditions at a postharvest technology laboratory wherein storage behavior was monitored and evaluated. The results revealed that chemical quality attributes were not significantly affected by the kind of packing materials used. Quantitative physico-chemical attributes were affected by the type of storage condition. Storing the fruits at refrigerated condition prolonged the shelf life up to 8–10 days. The results provide valuable information for establishing a better transport scheme that could be utilized in both domestic and export markets.

*Correspondence

Postharvest Technology Division,
Department of Horticulture,
Visayas State University, Leyte,
Philippines

E benitezmarilou52@yahoo.com

Keywords

- eggplant (Solanum melongena)
- packaging
- postharvest quality
Response of ‘Carabao’ Mangoes to Various Ripening Agents

Emma Ruth V. Bayogan1, Leizel B. Secretaria1, Christine Diana S. Lubaton1, and Jenny Ekman2

1 University of the Philippines Mindanao
2 Applied Horticultural Research, Australia

Abstract

Mango (Mangifera indica), a climacteric fruit, undergoes ripening after harvest. Ripening alters the physicochemical characteristics of fruit that converts it into one that is edible and acceptable in the market. The ripening of mango consists of changes in color, firmness, texture, aroma, and taste. Ethylene gas ripens mangoes, but it is not readily available. The local market uses calcium carbide, which is no longer used in many mango-producing countries. The use of bioethylene or ethylene natural sources can be alternative ripening agents. In this study, various ripening agents were evaluated. ‘Carabao’ mangoes were treated with ethephon (2-chloroethylphosphonic acid, CEPA at 250, 500, 1000, and 1500 µL L⁻¹); calcium carbide (CaC² at 2.5, 5, and 7.5 g kg⁻¹); and bioethylene sources such as madre cacao or kakawate (Gliricidia sepium) at 10% and 20%; more green than yellow ‘Cardava’ banana (10%), and more green than yellow mango (10%). Bioethylene sources did not reduce the number of days to ripen the mango compared to calcium carbide and ethephon at 1500 µL L⁻¹. Calcium carbide treatment reduced the days to ripening or TRS (from 6.6 to 3 days) of mango fruit with better visual quality and lower weight loss at TRS. At TRS, untreated fruit had the highest weight loss at 9.6%. Fruit ripened with more yellow than green ‘Cardava’ banana and mango gave the least weight loss per day.

Keywords

• bioethylene
• calcium carbide
• ethephon
• Gliricidia sepium
• mango (Mangifera indica)
• visual quality

*Correspondence

Department of Biological Sciences and Environmental Studies, College of Science and Mathematics, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines

T +63 82 293 0312
E evbayogan@up.edu.ph
Abstract

Wood vinegar (pyroligneous acid or pyrolysis oil) is a liquid produced by means of natural carbonization from available plant refuse. It has been reported to have numerous potential benefits both to agriculture and human health and to enhance harvest and postharvest quality of various fruits and vegetables. In this study, evaluation of the effects of wood vinegar and storage conditions to enhance the postharvest quality of 'Morena' eggplant was evaluated. A $2 \times 3$ factorial experiment was laid out in completely randomized design with six treatments and three replications and each replication having 30 fruit samples. The highly perishable eggplant was treated with wood vinegar (10%) from citrus tree refuse as postharvest dip, while tap water served as control, for 2 minutes before storage at ambient (25–28 °C), refrigerated (7–10 °C), or evaporative cooling box-type (18–21 °C) condition with a relative humidity of 66%, 76%, and 96%, respectively. Samples were stored for a week. Results revealed that eggplants treated with 10% wood vinegar did not differ in terms of percent weight loss, shelf life (days), total soluble solids (°Brix), and titratable acidity (% malic acid) relative to the control. For storage conditions, ambient condition displayed the highest total soluble solids and percent weight loss. Titratable acidity and shelf life were not significantly affected among storage treatments, which ranged from 0.17% to 0.21% and 4.5 to 7.1 days, respectively. Chilling injury was evident on the eggplants in evaporative cooling condition. The preliminary results could serve as basis for further intervention studies to enhance the quality of eggplant.
SESSION D3

Short-term Evaporative Cooling Extends Shelf Life of Two Sweet Pepper Cultivars, ‘Sweet Cayene’ and ‘Sultan’

Emma Ruth V. Bayogan*, Roelene F. Salvilla, and Ana Maria Carmela C. Majomot

University of the Philippines Mindanao

*Correspondence
Department of Biological Sciences and Environmental Studies, College of Science and Mathematics, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines
T +63 82 293 0312
E evbayogan@up.edu.ph

Keywords
• evaporative cooler
• postharvest quality
• short-term storage
• sweet pepper

Abstract
In the Philippines, postharvest losses for vegetables are estimated to reach 40%, which can be attributed to improper handling and lack of adequate storage facilities. Although refrigeration is the best storage option, it is expensive and energy extensive. An alternative short-term non-refrigerated storage option is through the use of evaporative coolers. A 60 × 40 × 29–inch wood cabinet with outer framing and three shelves made of aluminum and two layers of jute sack for walls served as evaporative cooler for this study. Water flowed from a container placed on top of the cabinet wetting the walls. Two sweet pepper cultivars (‘Sweet Cayenne’ and ‘Sultan’) at mature green stage were stored under ambient (28.74±0.94 °C, 65.68±7.43% RH) and evaporative cooling (23.91±3.85 °C, 93.84±9.33% RH) conditions to assess their effects on the physico-chemical properties of the produce. Both cultivars stored in the evaporative cooler significantly showed reduced weight loss, slower decline in moisture content, longer retention of firmness, and better visual quality rating. On the other hand, rapid changes were observed in titratable acidity, total soluble solids, and ascorbic acid in both cultivars stored at ambient condition indicating a faster rate of ripening. Very slight decay with longer shelf life were observed in both cultivars stored in the evaporative cooler as ‘Smooth Cayenne’ and ‘Sultan’ reached its end of shelf life at days 18 and 15, respectively, while this was only at days 9 and 6 for those that were stored in ambient conditions.
Fruit Quality of Grafted Bitter Melon with Different Sponge Gourd Rootstocks Stored Under Evaporative Cooling Conditions

Michael Adonis Sudaria¹*, Marilou Benitez¹, Aljay Valida¹, Fatima Rose Rivera¹, Analita Salabao¹, Eutiquio Sudaria¹, Antonio Acedo Jr.², Emma Winley³, and Jenny Ekman³

¹ Visayas State University, Philippines
² AVRDC-The World Vegetable Center, South Asia Regional Office, India
³ Applied Horticultural Research, Australia

*Correspondence
Department of Horticulture, College of Agriculture and Food Science, Visayas State University, Visca, Baybay, Leyte 6521-A, Philippines
E michaelsudaria@gmail.com

Keywords
- bitter melon (Momordica charantia)
- evaporative cooler
- grafting
- shelf life
- sponge gourd (Luffa cylindrica)

Abstract
Evaporative cooling helps maintain quality of produce over a longer period of time. This condition slows metabolic processes and inhibits undesirable changes in quality due to biotic and abiotic factors. The study determined the fruit quality of bitter melon (Momordica charantia L.) grafted with sponge gourd (Luffa cylindrica L.) held at evaporative cooling condition (25–27 °C) with a relative humidity ranging from 85% to 96%. Bitter melon var. Galaxy was grafted to different sponge gourd rootstocks before establishment and regular maintenance in the field. Hybrid sponge gourd var. Mutya, open-pollinated variety (var. Esmeralda), and Bureau of Plant Industry bacterial wilt–resistant sponge gourd (BPI BW-resistant var.) were utilized as rootstocks. Nongrafted bitter melon served as the control. Commercially mature fruit samples were then harvested and brought to the laboratory for quality assessment and monitoring. A completely randomized design was used and treatments were replicated thrice. Results revealed that nongrafted bitter melon samples had higher weight loss and lower visual quality rating compared to the grafted sample fruits. Disease incidence and color change were also higher for the nongrafted bitter melon compared to the grafted bitter melon sample fruits suggesting reduced bacterial wilt activity resulting to better quality after storage. Bitter melon grafted into hybrid sponge gourd rootstock (var. Mutya) revealed the longest shelf life of 6 days. The shelf lives of OPV var. Esmeralda (5.57 days) and BPI BW-resistant var. (5.43 days) were comparable with hybrid sponge gourd var. Mutya. However, hybrid sponge gourd var. Mutya had significantly longer shelf life compared to the nongrafted bitter melon (4.33 days). The results could greatly contribute to addressing food security issues, which are often encountered during production.
Potential of Dehydrated Vegetable Production in Strengthening the Sustainability of Smallholder Vegetable Supply Chains in Northern Mindanao, Philippines

Maria Rosario P. Mosqueda*, Mark Alexis O. Sabines, Sylvia T. Aguhob, Gyllen P. Sanchez, Emily Joy P. Baugbog, and Reggie B. Tolinero
Xavier University–Ateneo de Cagayan, Philippines

Abstract

High postharvest losses and unpredictable price fluctuations continue to challenge the Northern Mindanao vegetable industry. This project proposed dehydration of selected vegetables as a means of minimizing these losses and providing farmers an alternative market for their fresh produce, particularly during peak production periods. It involved the development and evaluation of a prototype heat pump drying system, assessment of the physico-chemical characteristics of dehydrated vegetables, and development and evaluation of dehydrated vegetable-supplemented food products. In-depth interviews with selected food manufacturers were conducted to assess the market potential of dehydrated vegetables while consumer tests and focus group discussions were done to assess the acceptability of selected dehydrated vegetable-supplemented food products. Preliminary results demonstrated the feasibility of developing a vegetable drying system using locally available resources and indicated a potential market for dehydrated vegetables. Dehydrated cabbage, carrot, and squash, for example, can be used in noodle production as raw materials or as condiments. These dehydrated vegetables, however, need to be further tested to meet industry requirements. Dehydrated vegetable-supplemented food products, such as soups, cookies, bread, and instant noodles, were developed. Although further product enhancements need to be done, some of these products were evaluated as acceptable by selected institutional users and consumers.
Consumer Rights Awareness among Selected Municipalities in Malita, Davao Occidental, Philippines

Grace D. Buencillo
Southern Philippines Agribusiness Marine and Aquatic School of Technology

*Correspondence
Agribusiness Department, Southern Philippines Agribusiness Marine and Aquatic School of Technology, Malita 8012, Davao del Sur, Philippines
E gracedelute@gmail.com

Keywords
• awareness level
• consumer rights

Abstract

The study was an assessment of consumer rights awareness in selected municipalities of Davao Occidental, Philippines. The province has a dearth of literature on consumer rights awareness, and consumer education campaigns were seldom done. The study looks at the socio-economic background (SEB) of consumers, extent of awareness on consumer rights, consumer-related problems, and factors affecting consumer rights awareness. The study employed 1270 randomly chosen samples. Data were analyzed using mean, percentage, and chi-square. Results showed that the average age of respondents was 37.74 years old, mostly female, married, attained high school education, and earned a minimal average monthly income of PhP 2,994.75. Many consumers were aware of consumer rights. However, they had difficulty identifying RA7394 or “Consumer Act of the Philippines.” Top consumer-related problems identified were unreasonable price, poor service quality, lack of information about the product, and underweight products. Age, educational attainment, and income of consumers significantly affected consumer rights awareness. The findings reveal the need to further intensify the campaign on consumer rights awareness through regular conduct of a consumers’ forum.
Awareness, Attitude, and Behavior toward Genetically Modified Crops: The Case of Consumers in Iloilo City, Central Philippines

Portia Anne B. Robledo*, Christy Arboladora, Reymark Baguhin, Quenny Mae David, Hanna Lynne Gepana, Ivylan Iducos, Vonn Vincent Tanchuan, Rowena Paz Gelvezon, and Elfred John Abacan

University of the Philippines Visayas

Abstract

The Philippines was one of the first Asian countries to endorse commercialization of genetically modified (GM) crops such as corn, soybean, etc. To date, there has been great controversy over GM’s alleged negative impacts on human health and the environment. Using Icek Ajzen’s theory of planned behavior, this study aimed to determine the influence of attitude, subjective norms, and perceived behavioral control on the buying intention and consumption of GM crops of consumers. Level of awareness about GM crops was also measured. With the use of a structured questionnaire, primary data was collected from 246 randomly selected individuals in the seven districts of Iloilo City, Central Philippines. Descriptive statistics was used to describe consumers’ level of awareness and consumption of GM crops, and logistic regression was utilized to determine the influence of attitude, subjective norms, and perceived behavioral control with the intention and actual behavior of the consumer. Results indicated that 80% of the respondents had very low level of awareness about the consequences of consuming GM crops and the processes involved in growing the crops. Level of awareness did not vary across age, sex, income, and educational attainment. Logistic regression revealed that buying intention was statistically significant in predicting actual consumption. Among the three independent variables, only attitude significantly influenced buying intention. Policy implications of the results include instituting mandatory labeling of GM crops and information dissemination about the agricultural processes and effects of consuming GM crops.

*Correspondence

College of Management, University of the Philippines Visayas, Iloilo City 5000, Philippines
E pbrobledo@up.edu.ph

Keywords

• awareness level
• genetically modified crops
• theory of planned behavior
Consumer Awareness and Perception of Organic Vegetables in Baguio City and La Trinidad, Benguet, Northern Philippines

Jovita M. Sim, Normalyn T. Longay*, Samuel L. Duyan, and Evangeline B. Cungihan
Benguet State University, Philippines

Abstract

Food consumption patterns are changing as a result of health and environmental issues, especially in the Cordillera Region which is known as producer and supplier of conventionally produced vegetables. The study aimed to determine the awareness and perception of consumers regarding organic vegetables and determine the factors affecting purchase/consumption of organic products. The data for the study was gathered through a survey of 200 household respondents from the selected barangays (villages) in Baguio City and La Trinidad, Benguet. Result shows that 70% of the household respondents were aware about organic products. Among these, 68% are moderately aware, 28% have high awareness, and only 4% have low awareness on organic vegetables. The awareness of consumers is not a guarantee that they are consumers of organic vegetables. Out of the 141 respondents who are aware, only 115 are consumers. Perception about organic products is based on the information they acquired from their friends, neighbors, relatives, officemates, radio and TV programs, seminars, programs, and the internet. Factors affecting the purchase/consumption of organic vegetables are price, income, health benefits, nutrient contents, and safety of the product. Respondents perceived that organic vegetables are more nutritious, healthier, safe, clean, naturally grown, and free from poisonous chemicals. In order to create awareness and greater demand for organic products, there should be a massive information dissemination about organic products, the health benefits derived from consumption, and the benefit of organic production to the environment. This could be done through seminars, mothers’ classes in the barangay, and the use of media, flyers, and brochures.

*Correspondence

Department of Agricultural Economics and Agribusiness Management, College of Agriculture, Benguet State University, La Trinidad, Benguet 2601, Philippines

T +63 74 422 2402
E mtibao@yahoo.com

Keywords

• awareness level
• consumer studies
• organic vegetables
• perception level
SESSION E2

Buying Intention and Consumption of Chicken Meat: The Case of Consumers in Iloilo City, Central Philippines


University of the Philippines Visayas

Abstract

Despite studies showing that chicken meat has more health benefits compared to pork, the literature reveals that pork consumption is much higher than chicken meat. This study was conducted to identify factors affecting households’ buying intention and consumption of chicken meat using Icek Azjen’s theory of planned behavior (TPB). The actual consumption was the main dependent variable while buying intention, attitude, subjective norms (SN), and perceived behavioral control (PBC) were the independent variables. Primary data was collected by interviewing 270 randomly selected household heads using a structured questionnaire in seven districts of Iloilo City, Central Philippines. Descriptive statistics was used to describe respondents’ consumption of fresh chicken meat while Kruskal-Wallis, Mann-Whitney, ANOVA, and t-test were used to determine differences in attitude, SN, and PBC across demographic variables. Linear and multiple regression analyses were used to predict the effect of independent variables to buying intention and actual behavior. Significant findings include the following: buying intention was a reliable predictor for actual consumption of chicken meat; only attitude and PBC significantly influenced buying intention; there were no significant differences in attitude across age, sex, educational attainment, employment status, family size, religion, and household income; PBC significantly differed across age groups; key product attributes that respondents considered important were smell, color, price, government certification, and convenience of preparation; and the top 3 control factors that affect perceived behavioral control were accessibility, ease of cooking, and flexibility in preparation of variety of dishes. The results would be useful to marketers in devising marketing strategies designed to increase consumption of chicken meat.

*Correspondence

College of Management, University of the Philippines Visayas, Molo, Iloilo City 5000, Philippines
E jlguto@up.edu.ph

Keywords
• buying intention
• case study
• chicken meat
• consumption
• theory of planned behavior
Consumer Purchase Behavior for Meat Products in General Santos City, Philippines

Keno Jay M. Balogbog
Mindanao State University–General Santos, Philippines

Abstract

General Santos City is a top producer and exporter of quality livestock such as hogs (100,769 slaughtered), cattle (4,018), and poultry (10,659,413). Hence, this study identified the factors significantly affecting consumers’ purchase behavior, preferred meat, and place of purchase. In this study, 190 respondents were identified and data was gathered through a structured survey questionnaire. Results reveal that most of the consumers have sources of income to purchase meat products, they chose to consume chicken, and they purchase meat for household consumption. The respondents mostly buy beef and chicken at supermarkets and pork at meat shops. The study shows that for beef, the gender, age, household size, number of employed household members, number of children, and household income were significant factors affecting consumer purchase behavior. For chicken, age is the only variable that significantly affect the decision of the consumers. Lastly, for pork, religion is found to significantly affect the decision of the consumers. Hence, it is recommended that sellers of meat products should also offer meat products classified as Halal since there is a demand. Vendors must maintain the quality and freshness of their meat products and its sanitation.

Keywords
- consumer behavior
- General Santos City
- meat products

*Correspondence
Department of Animal Science and Agribusiness, Mindanao State University, Fatima, General Santos 9500, Philippines
E kjmb110191@gmail.com
Exploring Opportunities for Food Service Marketing in Condominiums: A Conjoint Analysis Approach

Karl Justeen C. David*, Nikko L. Laorden, Thaddeus R. Acuña, and Vlademir A. Shuck
University of the Philippines Mindanao

Abstract

Davao City, one of the fastest growing economies in the Philippines, has seen an increase in the development and demand for condominiums in recent years. Current trends in other major cities worldwide include the integration of food service and food distribution channels within condominium projects. This study explores the potential for food marketing within condominiums using conjoint analysis, cluster analysis, and logistic regression. The study gathered 200 responses for a survey encompassing socio-demographic profiles, consumer preferences, as well as 18 plan cards (unique condominium attribute combinations) that respondents were tasked to rate from 1 to 10. Results show that most potential condominium buyers are career-driven people within the age range of 20–40 who have relatively high monthly incomes. Of the 200 respondents, 90.50% preferred condominiums with in-house food services. The conjoint process shows that there is a positive relationship between a condominium’s marketability and presence of in-house food services (9.34%). However, it should be noted that primary attributes like furnishing level score higher importance values (26.03%). Cluster analysis reveals two distinct consumer groups: the “Unit-Focused” cluster that focuses largely on unit-specific attributes and the “Meticulous” cluster that pay relatively more attention to secondary attributes like integrated food services. A binary Logit analysis shows that respondents who are married, have relatively large households, and eat out because of better food quality are more likely to be “Meticulous” buyers, and these buyers pay more attention to a condominium’s in-house food channels and other amenities. Condominium developers and the food service sector may capitalize on this opportunity, but food-integrated condominium offerings should be tailored to married food-cautious buyers and those that live highly urban lifestyles.

*Correspondence
School of Management, University of the Philippines Mindanao, Mintal, Tugbok District, Davao City 8022, Philippines
T +63 82 295 2188
E justeen.david@gmail.com

Keywords
• condominium
• conjoint analysis
• consumer preference
• food services
The Effect of Soil Erosion to Calorie Intakes of Children among Corn-Producing Households in Davao Region, Philippines: Structural Equation Modelling

Pedro A. Alviola IV*, Ronaldo Tugay Jr., Yvonne Grace Alvarez, Jon Marx P. Sarmiento, Harvey M. Niere, Nikko L. Laorden, and Nilo B. Oponda

University of the Philippines Mindanao

Correspondence
School of Management,
University of the Philippines Mindanao, Mintal, Tugbok District,
Davao City 8022, Philippines
T +63 82 295 2188
E paalviola1@up.edu.ph

Keywords
• calorie intake of children
• food and nutrition
• geographic information system
• soil erosion
• structural equation modelling

Abstract
Soil erosion is a constant challenge to farm productivity and profitability. However, extending the effect to food expenditure and children’s nutrition is yet to be explored. In this research, we attempted to establish the path linking soil erosion to children’s calorie intake levels. Using the geo-coordinates of Mindanao soil erosion areas from the Department of Agriculture-Bureau of Agricultural Research (DA-BAR), we used geographic information system to identify the research sites for corn producing households in Davao Region. A total of 125 samples were analyzed. A 24-hour food-frequency recall survey was conducted, and conversion of food consumption to calorie equivalent was performed using the USDA National Nutrient Database for Standard Reference. An analysis of variance was used to compare the mean difference of varying degrees of soil erosion in terms of productivity, food expenditure, and calorie intake. To perform the path analysis, structural equation modelling was used. The results indicate that corn farms in severe and moderately eroded areas have lower yield relative to no apparent/low erosion level. The results also suggest direct and indirect negative effect of soil erosion to farm productivity, food expenditure, and children’s calorie intake. Finally, the effect of soil erosion can be mitigated through adoption of soil conservation practices, providing opportunity for nonfarm livelihood, and empowering women head of household to improve access to nutritious food.
Price Bubble in Selected ASEAN Agricultural Exports: An Application of the Generalized Supremum Augmented Dickey-Fuller

Karlo Martin C. Caramugan and Purisima G. Bayacag
University of Southeastern Philippines

Abstract

Typical economic theory suggests that price volatility, especially the upswings in food price in the commodity market, is driven by market fundamentals, i.e., the demand and supply for the commodity. The recent behavior of the world food commodity prices has experienced several large spikes with the 2007–2008 episodes as the most dramatic. The prolonged rise of global commodity prices, which peaked in mid-2008, had been seen to fall sharply and bottomed out in early 2009. This price increase, which strongly deviated from its intrinsic value, was characterized as explosive, indicating a price bubble. The study investigated the existence of a price bubble in selected key ASEAN exports, i.e., rice, coconut oil, rubber, and palm oil. Using the generalized supremum augmented Dickey-Fuller (GSADF), results reveal multiple bubbles from 1980 to 2015. Furthermore, through descriptive correlation, these price bubbles were observed to form with some important local and international economic and political scenarios at the backdrop. With these findings, it is recommended that key exporting countries cooperate in creating an international supply management system to ensure the sufficiency and sustainability of the supply of the key agricultural products. It is also recommended that the current market information systems should be improved to reduce price volatility. ASEAN countries can reduce the price transmission from international markets through the use of trade controls and buffer stocks. In the long run, exporting countries need to invest more in their agricultural sector to make it more productive and efficient. This will make food more affordable for the poor and reduce price volatility.

Keywords

• ASEAN
• fundamental price
• generalized supremum augmented Dickey-Fuller
• price bubble

*Correspondence

School of Applied Economics,
University of Southeastern Philippines, Bo. Obrero,
Davao City 8000, Philippines

T +63 82 227 8192 loc. 226
E karlocaramugan@gmail.com
A Forecast for Cocoa Bean Farm Gate Prices in Davao Region, Southern Philippines, Using Generalized Autoregressive Conditional Heteroscedasticity

Leo Manuel B. Estaña*, Eric B. Napoles, April Jane S. Sillada, Pedro A. Alviola IV, and Harvey M. Niere
University of the Philippines Mindanao

*Correspondence
Department of Mathematics, Physics and Computer Science, College of Science and Mathematics, University of the Philippines Mindanao, Davao City, 8022, Philippines
T +63 293 0312
E lbestana@up.edu.ph

Abstract
The Davao Region is one of the top cocoa producers in Southern Philippines. The region aims to invest in cocoa production by enticing cocoa bean farmers to increase their production of the said commodity. This is possible if their cocoa beans produced have a good farm-gate price. Thus, this study was done to forecast the cocoa bean farm-gate prices in the Davao Region. The data for monthly cocoa bean farm-gate prices in Davao Region for the period of January 1990 to December 2015 was used as an input to the generalized autoregressive conditional heteroscedasticity (GARCH) to come up with a time series model. Mean squared error (MSE), root mean squared error (RMSE), mean absolute error (MAE), and Theil’s inequality coefficient (U-statistics) were used as the forecasting accuracy criteria in identifying the best fit model. The results of the study revealed that the time series data was influenced by a positive linear trend factor and also indicates that no seasonal factor exists. Moreover, the best model is GARCH (1, 2). Furthermore, a ten-year forecast was done for fiscal years 2016–2025. By discovering the price movement of the cocoa beans in the next ten years, farmers should maximize their production and sell their produce when the prices are estimated to increase. In contrast, when the prices are estimated to decline, farmers should use storing techniques and employ timed planting decisions in order to lessen the reduction of their profits.

Keywords
• cocoa beans
• farm gate price
• forecast
• generalized autoregressive conditional heteroscedasticity