



UNITED NATIONS  
UNIVERSITY

**UNU-IAS**

Institute for the Advanced Study  
of Sustainability

The 6<sup>th</sup> International Conference on Environmental and Rural Development  
Bohol, Philippines, 7-8 March 2015

and

The 8<sup>th</sup> Asia-Pacific Regional Centre of Expertise Meeting  
Cebu-Bohol, Philippines, 5-8 March 2015

*THEME: Approaches to Sustainable Rural Development*

# Book of Abstracts

## **Organized by**

International Society of Environmental and Rural Development  
Bohol Island State University, Philippines  
Institute of Environmental Rehabilitation and Conservation, Japan

## **Co-Organized by**

United Nations University, Institute for the Advance Study of Sustainability

## **Collaborated with**

Tokyo University of Agriculture, Japan  
Royal University of Agriculture, Cambodia  
Khon Kaen University, Thailand  
Association of Environmental and Rural Development, Thailand





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	Prof. Dr. Regucivilla A. Pobar	

### Chairmanship

#### Oral Presentation

Room 1	Room 2	Room 3	Room 4
1st session, 10:30-12:00 Education for Sustainable Rural Development (Ed)	1st session, 10:30-12:00 Rural Development (Ru)	1st session, 10:30-12:00 Environmental Management (En)	1st session, 10:30-12:00 Infrastructural and Information Systems (In)
Chair Dr. Tomas D. Reyes, Jr.	Prof. Dr. Dieter Trautz	Dr. Lalita Siriwattananon	Dr. Sri Wahyuni Binti Kadir
Co-chair Dr. Marina A. Labonite	Dr. Samuel J. Gulayan	Dr. Ambar Kusumandari	Dr. Corazon P. Machachor
2nd session, 13:00-14:30 Rural Development (Ru)	2nd session, 13:00-14:30 Rural Development (Ru)	2nd session, 13:00-14:30 Environmental Management (En)	2nd session, 13:00-14:30 Agricultural Systems (Ag)
Chair Dr. Sinisa Berjan	Dr. Junaid Alam Memon	Dr. Krisana Rungrojwanich	Prof. Dr. Barry N. Noller
Co-chair Dr. Tadao Yamamoto	Dr. Maria Danesa S. Rabia	Dr. Joanne V. Serrano	Dr. Jeeranuch Sakkhamduang
3rd session, 15:00-16:30 Rural Development (Ru)	3rd session, 15:00-16:30 Environmental Management (En)	3rd session, 15:00-16:30 Agricultural Systems (Ag)	3rd session, 15:00-16:30 Agricultural Systems (Ag)
Chair Prof. Dr. Anan Polthanee	Dr. Marina S. Apilado	Dr. Kingshuk Roy	Dr. Chuleemas Boonthai Iwai
Co-chair Dr. Luz O. Morena	Dr. Hiromu Okazawa	Prof. Judith Ty-Pelobello	Prof. Jose T. Traverro

#### Poster Presentation

Chair Prof. Dr. Elpidio T. Magante and Prof. Dr. Regucivilla A. Pobar			
Education for Sustainable Rural Development (Ed)	Rural Development (Ru)	Environmental Management (En)	Agricultural Systems (Ag)
Co-chair: Dr. Haji Masudi Dr. Takahiko Kubodera Dr. Merrian P. Soliva Prof. Mario P. Rebusas	Co-chair: Dr. Anucha Wittayakorn-Puripunpinyoo Dr. Atty Tri Juniarti ✓ Dr. Kiichiro Hayashi Dr. Mardy Serey Dr. Muhammad Luqman Dr. Saisakul Fungmul Dr. Sunday Ogunjimi Idowu Dr. Hari Shanker Gupta Dr. Baromey Neth Dr. Mumtaz Ali Baloch Prof. Anabel T. Pantaleon Dr. Cecilio S. Baga Dr. Christeodoffor A. Ramos Assoc. Prof. Dennis Jomoc Prof. Erma S. Capuno Dr. Jean F. Nebrea Prof. Marcial D. Sosas Prof. Maria Luisa T. Jopia	Co-chair: Dr. Duangrat Thongpak Dr. Makoto Ooba Dr. Phrueksa Lawongsa Dr. Somporn Pleanjai Dr. Takashi Kume Dr. Yuta Ishikawa Dr. Aquilino M. Enriquez	Co-chair: Dr. Intira Lichanporn Dr. Kanita Thanacharoenchanaphas Dr. Kanlaya Kongngern Dr. Kiriya Sungthongwises Dr. Kittima Vanichkul Dr. Nunchanok Nanthachai Dr. Patcharin Krutmuang Dr. Phanida Busaparoeck Dr. Orose Rugechati Dr. Rungkan Klahan Dr. Tran Van Dung Dr. Udai Pratap Singh Dr. Boontarika Thongdonphum Dr. Arunee Promkhambut

Ans  
7/15

## Program of the 6<sup>th</sup> International Conference on Environmental and Rural Development

March 6, 2015 (Friday)

16:00-18:00 Registration at Bohol Island State University, Main Campus

March 7, 2015 (Saturday)

Part I: Opening Program

07:30-08:30 Registration

08:30-10:00 Opening ceremony

1. Invocation: **Ms. Shane Tumampos**
2. Singing of Hymns: *Philippine National Hymn*  
*Bohol Hymn*
3. Welcome address: **Hon. Edgar M. Chatto**  
*Governor, Province of Bohol, Tagbilaran City, Bohol*  
**Hon. John Geesnell L. Yap II**  
*City Mayor, Tagbilaran City, Bohol*  
**Prof. Dr. Elpidio T. Magante**  
*ISERD Regional Vice President for the Philippines*  
*University President, Bohol Island State University,*  
*Tagbilaran City, Bohol*
4. Recognition of Participants: **Dr. Julian E. Torillo, Jr.**  
*Managing Editor, IJERD*  
*Focal Person, Regional Centre of Expertise - Bohol*  
*Bohol Island State University, Tagbilaran City, Bohol*
5. Message IJERD and ISERD Awards  
**Prof. Dr. Eiji Yamaji**  
*Chair of Excellent Paper Award, 6<sup>th</sup> ICERD*  
*Deputy President, ISERD*  
*Graduate School of Frontier Science, The University of Tokyo,*  
*Japan*
6. Message on ISERD Concerns  
**Prof. Dr. Machito Mihara**  
*Executive Secretariat of ISERD and Editor-in-chief of IJERD*  
*Faculty of Regional Environment Science, Tokyo University of*  
*Agriculture, Japan*
7. Introduction of the Keynote Speaker  
**Prof. Dr. Regucivilla A. Pobar**  
*University Vice President for Academic and Related Affairs*  
*Bohol Island State University, Tagbilaran City, Bohol*
8. Keynote Address  
*'Education for Sustainable Development: Progress and Prospects'*  
**Prof. Dr. Mario T. Tabucanon**  
*President of ISERD,*  
*United Nations University, Institute for the Advanced Study of*  
*Sustainability, Japan*
9. Presentation of Plaque of Appreciation to the Keynote Speaker and other Resource Persons
10. Closing Remarks: **Prof. Dr. Nelson M. Pateña**  
*Campus Director, Bohol Island State University Main Campus*  
*Tagbilaran City, Bohol*
11. Bohol Island State University Hymn



**Part II: Poster Presentation and Parallel Sessions**

10:00-10:30	Poster presentation & coffee break
10:30-12:00	Session 1 of oral presentation (6 presentations: Rooms 1, 2, 3, 4)
12:00-13:00	Lunch and ISERD Council Meeting
13:00-14:30	Session 2 of oral presentation (6 presentations: Rooms 1, 2, 3, 4)
14:30-15:00	Poster presentation & coffee break
15:00-16:30	Session 3 of oral presentation (6 presentations: Rooms 1, 2, 3, 4)

**Part III: Banquet & Awarding Cerememony**

16:30-17:30	Preparation for Banquet (Venue: Activity Center)
17:30-20:00	Banquet & Awarding Ceremony
	Cultural Presentation

March 8, 2015 (Saturday)

07:30-17:00	Excursion
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**Presentation Program**

**Oral presentation**

Chair of Excellent Paper Award: Prof. Dr. Eiji Yamaji

**Room 1**

Education for Sustainable Rural Development (Ed)  
Rural Development (Ru)

**Room 2**

Rural Development (Ru)  
Environmental Management (En)

**1st session**

Time	Chair:	Dr. Tomas D. Reyes, Jr.	p. no.	Chair:	Prof. Dr. Dieter Trautz	p. no.
	Co-chair:	Dr. Marina A. Labonite		Co-chair:	Dr. Samuel J. Gulayan	
10:30-10:45	Bernabe M. Mijares, Jr. and Regucivilla A. Pobar	<i>Installing Religious Icons in the Seawaters of Bien Unido, Bohol: A Saving Act or a Sacrilege?</i>	1	Hisashi Mori, Awadh Kishor Sah, Bhuwadeshwar Prasad Sah, Minami Yamaya and Senthil Selvaraj	<i>An Approach for Monitoring the Reforestation and Conservation Efforts by Local Communities</i>	7
10:45-11:00	Haji Mashudi	<i>The authority conflict Placement and Protection of Indonesian Workers Abroad Based Employment Law</i>	2	Kiichiro Hayashi, Makoto Ooba and Yasuhiro Hasegawa	<i>Cultural Ecosystem Service Assessment in a Semi-Mountainous Area of Japan - Case in Toyota City</i>	8
11:00-11:15	Joane Serrano and Sherry B. Marasigan	<i>Application of Environmental Education: The Case of a Philippine Village</i>	3	Saisakul Fongmul and Kangsadan Kanokhong	<i>A Comparative Study on Agricultural Labor Management of Longan Farmers in Chiang Mai and Chantaburi Provinces, Thailand</i>	9
11:15-11:30	Marina S. Apilado and Estelita D. Calvo	<i>Climate Change Awareness of College Students of ESSU Salcedo</i>	4	Larry M. Pamugas	<i>Perceptual Assessment of Countryside Development Program through the Purok Power Movement Focusing on the KaABAG experience</i>	10
11:30-11:45	Sinisa Berjan, Hamid El Bilali, Snezana Jankovic, Huanita Milutinovic, Aleksandar Stojanovic and Vedran Tomic	<i>Agricultural Extension and Advisory Services in Bosnia, Montenegro and Serbia: An Overview</i>	5	Renissa S. Quiñones, Corazon P. Macachor and Hubert G. Quiñones	<i>Development of Calcium-enriched Gluten-free Cookies</i>	11
11:45-12:00	Tadao Yamamoto	<i>Educational Influence of the Green Tourism School Trip</i>	6	Maria Danesa, S. Rabia, F. L. Pedroso, Terou Azuma, Takuro Shibuno and Ernesto C. Rulida	<i>Resource Stock Enhancement of Napoleon Wrasse Sightings in the Province of Bohol</i>	12

**2nd session**

Time	Chair:	Dr. Sinisa Berjan	p. no.	Chair:	Dr. Junaid Alam Memon	p. no.
	Co-chair:	Dr. Tadao Yamamoto		Co-chair:	Dr. Maria Danesa S. Rabia	
13:00-13:15	Takahiko Kubodera, Hiromu Okazawa, Masahiro Tasumi, Yoshiharu Hosokawa, Katsuhiro Sasada, Eiji Matsuo and Machito Mihara	<i>Circumstances of Survey Education Conducted in Japanese Universities</i>	13	Muhammad Luqman, Babar Shahbaz and Tanvir Ali	<i>Impact of Agricultural Services Provided by Non-state Actors on Livelihoods of Rural Poor in North-West Region of Pakistan</i>	19



13:15-13:30	Mario P. Rebutas, Jr. <i>Instructional Delivery of Integrated Management System at Cebu Technological University: Proposed Course Syllabus</i>	14	Lalita Siriwattananon <i>Effects of Drying Methods on Utilization of Dietary Fiber from Pineapple Wastes</i>	20
13:31-13:45	Anucha Wittayakorn-Puripunpinoyoo, Aomjai Traesang <i>An Analysis of Off-Season Rice Production Efficiency of Mueng Suphan Buri Agricultural Cooperatives Ltd. Members in 2012/2013 Crop Year, Thailand</i>	15	Hari Shanker Gupta <i>Sustainable Enterprise Development, by Indigenous Women Groups – Building Up from Effective Water Management</i>	21
13:45-14:00	Atty Tri Juniarti <i>External Environment Influence on Operation Strategy and Corporate Performance at Garment Industries in Indonesia</i>	16	Sri Wahyuni Binti Kader <i>The Role of Sumatra Ecoregion in the Socialization of Environmental Information System's Development</i>	22
14:00-14:15	Anabel T. Pantaleon, Corazon P. Macachor, Cecilio S. Baga and Rebecca A. Rivas <i>Citrus microcarpa Peel Extract as Active Reagent for Liquid</i>	17	Jose T. Traverero and Machito Mihara <i>Impacts of Pyroigneous Acid to Biological and Chemical Properties of Depleted Soil in Bohol, Philippines</i>	23
14:16-14:30	Corazon P. Macachor, Jean F. Nebrea and Cecilio S. Baga <i>Detection of Staphylococcus Aureus from Packed Dried Siganids</i>	18	Chuleemas Boonthai Iwai and Mongkon Ta-oun <i>Reuse of Wastewater from Cassava Industry for Napier Grass Production</i>	24

3rd session

Time	Chair: Prof. Dr. Anan Polthanee Co-chair: Dr. Luz O. Morena	p. no.	Chair: Dr. Marina S. Apilado Co-chair: Dr. Hiromu Okazawa	p. no.
15:00-15:15	Darran Erica Newman <i>Community Public-Private Partnerships – 35 Years of Rural Development Through the Basic Needs Trust Fund in the Caribbean</i>	25	Aquilino M. Enriquez, Corazon P. Macachor, Cecilio S. Baga, Cristodoflor A. Ramos, and Kathleen S. Camaongay <i>Environmental Protection Practices of Danao City Beach Resorts</i>	31
15:15-15:30	Dieter Trautz, Frederik Langsenkamp and Maik Kohlbrecher <i>Remote Farming. I: Web-based Interactive Crop Farming at the Example of Robotic Weed Control in Carrots</i>	26	Machito Mihara, Yuta Ishikawa and Sergio Azael May Cuevas <i>Mitigating Splash Erosion with Applying Bacillus Subtilis Natto</i>	32
15:31-15:45	Epifania H. Migueles, Chermin T. Tacgos, Rowena P. Mira, Jannel L. Manila and Vilmalyn C. Bonaos <i>Clients' Satisfaction with the Office Services of the Municipal Local Government Unit (MLGU) of Batuan, Bohol, Philippines</i>	27	Baromey Neth, Sam Ol Rith, and Socheata Tao <i>Moving Beyond Agriculture and Ecotourism: Analysis of Agro-Ecotourism Potential for Sustainable Development in Northeastern Cambodia</i>	33
15:45-16:00	Paul K. Zabala, Cecilio S. Baga, Mario P. Rebutas Jr., Romeo Montecillo and Marcial Sosas <i>GIZ/CTU-AREC Solar Lantern</i>	28	Josefina T. Dizon and Manuel L. Castillo <i>Threats Assessment and Management of the Baua-Wangag Watershed Forest Reserve in Gonzaga, Cagayan</i>	34
16:01-16:15	Hannie T. Martin <i>Comparison of Indigenous Knowledge and Scientific Knowledge on Land Use Selection of Farmers in Imugan, Sa Fe, Nueva Vizcaya</i>	29	Junaid Alam Memon and Gopal Bahadur Thapa <i>Social and Ecological Factors Governing Mangroves Cover Change in the Indus Delta of Pakistan</i>	35
16:15-16:30	Sinisa Berjan, Hamid El Bilali, Aleksandra Despotovic, Snezana Jankovic, Adriana Radosavac and Vesna Milic <i>Problems in Rural Areas of Bosnia, Montenegro and Serbia: A Comparative Analysis</i>	30	Makoto Ooba, K. Hayashi, T. Suzuki and R. Li <i>Analysis About Urban Ecosystem Services for Ecosystem Offset</i>	36

Room 3

Environmental Management (En)  
Agricultural Systems (Ag)

Room 4

Agricultural Systems (Ag)  
Infrastructural and Information Systems (In)

1<sup>st</sup> session

Time	Chair: Dr. Lalita Siriwattananon Co-chair: Dr. Ambar Kasumandari	p. no.	Chair: Dr. Sri Wahyuni Binti Kadir Co-chair: Dr. Corazon P. Machachor	p. no.
10:30-10:45	Kingshuk Roy, Toshiharu Shimowatari and Zhang Wei <i>Site-specific Soil Conservation Approaches in Desertification-prone Areas in the Inner Mongolia Region, China</i>	37	Kanita Thanacharoenchanaphas and Orose Rugchati <i>Impacts of Atmospheric Temperature-Moisture Change on Yield of Thai Soybean Cultivar</i>	43
10:45-11:00	Rumila C. Bullecer and Daryl Paul Adlaon <i>Faunal Diversity Trends at the Rajah Sikatuna Protected Landscape, Bohol, Philippines</i>	38	Judith B. Ty-Pelobello, Ma. Christine Aubrey F. Miguel, Marina S. Macasil, Christopher A. Duran and Luz B. Chua <i>Perceived Socio-Economic and Environmental Effects of Chromite Mining in Salcedo, Eastern Samar</i>	44
11:01-11:15	Sergio Azael May Cuevas and Machito Mihara <i>Effects of Natural Mulching on Soil Physical Properties, for Mitigating Surface Runoff Erosion</i>	39	Kiriya Sunghongwises <i>Efficiency of Vermicompost on Growth and Nutrients Content of Rubber Seedling (Hevea brasiliensis)</i>	45



11:15-11:30	Tatiana Komarova, Nguyen Thanh Hien, Phan Thi Cong, Khanok-on Amprayn, Chuleemas Boonthai Iwai, Atcharaporn Sompam, Natsima Tokhun, Jochen Mueller, Ivan Kennedy and Barry Noller <i>Pesticide Distribution in the Namphong River NE Thailand and Land Use and Other Practices</i>	40	Luz O. Moreno, Felix L. Ocon and Meriam S. Binongo <i>Genetic Diversity of Abaca Germplasm Collection at the Visayas State University, Baybay City, Leyte</i>	46
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2<sup>nd</sup> session

Time	Chair: Dr. Krisana Rungrojwanich Co-chair: Dr. Joanne Serrano	p. no.	Chair: Prof. Dr. Barry N. Noller Co-chair: Dr. Jeeranuch Sakkhamduang	p. no.
13:01-13:15	Samuel J. Gulayan, Jesrell Jane Aaron-Amper and Edlin Rene B. Handugan <i>Mangrove Rehabilitation Using <i>Rhizophora</i> sp. in Northeastern Bohol, Philippines</i>	49	Noel T. Lomosbog and Noel S. Gamil <i>Characterization of Potential <i>Molave</i> (<i>Vitex parviflora</i> juss.) Mother Trees in Lila, Bohol, Philippines</i>	55
13:15-13:30	Tomas D. Reyes, Jr., Jeralyn B. Abadingo, Shiela G. Tabuno, Eunice Kenee L. Serifo, Joecel B. Mabanag, Rizaldy Mercadal, Arnulfo C. Olandria and Elpidio T. Magante <i>Floristic Inventory of the Proposed Site for Tarsier Tourism Center in Villa Aurora, Bilar, Bohol, Philippines</i>	50	Marina A. Labonite, S. McDougall, G. Rogers, J. Labonite, D. Jomoc, M. Otara, J.C. Estellore <i>Utilization of Coconut Fronds in Weed and Insect Pest Management in Organic Tomato Production</i>	56
13:31-13:45	Toshimi Muneoka, Yuri Yamazaki, Sachiyo Wakou, Masato Kimura and Osamu Tsuji <i>Evaluation of River Water Quality in Agricultural Watershed with the Environmental Standards</i>	51	Phanida Busaparook and Unchalee Sanguanpong <i>Mung Bean Size Reduction for Using as Scrub Material in Spa Salt Product</i>	57
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3<sup>rd</sup> session

Time	Chair: Dr. Kingshuk Roy Co-chair: Prof. Judith Ty-Pelobello	p. no.	Chair: Dr. Chuleemas Boonthai Iwai Co-chair: Prof. Jose T. Traverro	p. no.
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15:30-15:45	Arunee Promkhambut, Pikul Manuta, Anucha Laoken, Kiriya Sunghongwiset and Anan Polthanee <i>Effect of Stake Storage Methods on Germination, Growth and Yield of Cassava (<i>Manihot esculenta</i> Crantz.)</i>	63	Rumila C. Bullecer, Annafe Ones, Mary Joy Baydal, Noel Bonso, Ciriaco Halina, Alrie Boncales, Juliet Toliparma, Jenalyn Halina <i>Impacts of a 7.2 Magnitude Earthquake in the Uplands of Bohol, Central Philippines</i>	69
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16:01- 16:15	Marina A. Labonite and Dennis Jomoc <i>Farm Machineries and Equipment Needs Assessment of the Corn Block Farming in Dagohoy, Bohol, Central Philippines Basis for Financial and Support Services</i>	65	Catherine C. Napiñas, Virgilia D. Tejada, Ryan Batingal and Fatima Chatto <i>Bohol Watersheds Flora and Fauna Database Management System</i>	71
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**Poster presentation**

Chair of Poster Presentation and Excellent Poster Award: Prof. Dr. Elpidio T. Magante and Prof. Dr. Regucivilla A. Pobar  
Education for Sustainable Rural Development (Ed)

Co-chair: <b>Dr. Haji Masudi</b>		<b>Dr. Merrian P. Soliva</b>		
<b>Dr. Takahiko Kubodera</b>		<b>Prof. Mario P. Rebutas</b>		
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Ed 4	Le Trang, Le Hoang Van Trang and Philippe Doneys <i>Tra Cu District to Ho Chi Minh City: Migration, and Empowerment of Khmer Women in Vietnam</i>			76
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Ed 6	Phem Menghak, Thim S., Theng K. and Seng M. <i>Working with Ethnic Group: A Case Study of Introducing Pig Fattening to Garay Ethnicity in Ouyadav District, Ratanakiri Province</i>			78
Ed 7	Samreth Naro, Proeurng Sarat, Chev Makara, Tieng Morin and Sarot Senghai <i>Perception of Grade Twelve Students on Quality of Higher Education</i>			79
Ed 8	Sherry Marasigan and Joanne V. Serrano <i>Project K3 Towards Community Empowerment</i>			80
Ed 9	Takahiko Kubodera, Hiromu Okazawa, Masahiro Tasumi, Yoshiharu Hosokawa, Katsuhiko Sasada, Eiji Matsuo and Machito Mihara <i>Circumstances of Surveyor License Acquisition System in Japan</i>			81

**Rural Development (Ru)**

Co-chair: <b>Dr. Anucha Wittayakorn-Puripunpinyoo</b>		<b>Dr. Mumtaz Ali Baloch</b>		
<b>Dr. Atty Tri Juniarti</b>		<b>Prof. Anabel T. Pantaleon</b>		
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<b>Dr. Mardy Serey</b>		<b>Dr. Christeodoflor A. Ramos</b>		
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<b>Dr. Saisakul Fungmul</b>		<b>Prof. Erma S. Capuno</b>		
<b>Dr. Sunday Ogunjimi Idowu</b>		<b>Dr. Jean F. Nebrea</b>		
<b>Dr. Hari Shanker Gupta</b>		<b>Prof. Marcial D. Sosas</b>		
<b>Dr. Baromey Neth</b>		<b>Prof. Maria Luisa T. Jopia</b>		
Ru 1	Anucha Wittayakorn-Puripunpinyoo <i>The Sustainable Development of Community Economic: A case Study of Kalasin Province, Thailand</i>			82
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## *External Environment Influence on Operation Strategy and Corporate Performance at Garment Industries in Indonesia*

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Indonesian garment products are not competitive in the international markets even until now Indonesia has not been included in the community of Trans-Pacific Partnership that provides a reduction in import duties for its members. Additionally, the quality of garment products did not meet international quality standards, even though the garment industry in Indonesia has been more than 50 years but still didn't show significant progress. The purposes of this study is to describe and analyze 1). The external environment, operation strategy and corporate performance at garment industry in Indonesia. 2). The influence of external environment toward operation strategy and 3). The influence of operation strategy toward the corporate performance. The study use management approach and integrating the strategic management, operation management and marketing management. Research methods is using both descriptive and explanatory survey, data collection using interviews and questionnaire and then analyzed using descriptive analysis and path analysis method. The result of this study shows: The external environment that include supplier, technology and consumer at garment industry in Indonesia is already good enough, but the operation strategy is only using flexibility and quality strategy. While the corporate performance is good. External environment have significant influence simultaneously on operation strategy, and partially the supplier, technology and consumer has significant influence on operation strategy. External environment (supplier, technology and consumer) and operation strategy have positive influence on corporate performance. While operation strategy have had significant influence partially and simultaneously on corporate performance.

**Keywords:** external environment, operation strategy and corporate performance