

# PRODUCTION EFFICIENCY OF IRRIGATION LOWLAND ORGANIC PADDY FARMING SYSTEM AT BAROKAH FARMER'S GROUP IN SEMARANG REGION

*by* Titik Ekowati

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"Small and Medium-sized  
Enterprises Competitiveness"

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Agribusiness Development for Human Welfare



Organized by:

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# PROCEEDING INTERNATIONAL CONFERENCE

AGRIBUSINESS  
DEVELOPMENT FOR  
HUMAN WELFARE

*“Small and Medium-sized  
Enterprises Competitiveness”*



Agribusiness Development  
for Human Welfare

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## EDITOR FOREWORD

The economic integrations by ASEAN certainly have given a major influence on Small and Medium-sized Enterprises (SMEs). Beside economic integration in the form of free trade area (FTA) that has been going on since the early 2000s, economic integration in the form of ASEAN Economic Community (AEC) has been ongoing since the beginning of 2016. Through this integration, SMEs have opportunity to expand access to markets, technology, and capital. But at the same time SMEs are required to improve their competitiveness in order to survive in the market.

In order to explore ideas, concept, and innovations related to the competitiveness of SMEs, International Conference on Agribusiness Development for Human Welfare (ADHW 2016) was held in Yogyakarta on May 14, 2016. The conference organized by Department of Agribusiness Universitas Muhammadiyah Yogyakarta, in collaboration with Department of Agribusiness and Information System Universiti Putra Malaysia, Department of Agro-Industrial Technology Kasetsart University, Department of Agriculture Socio-Economics Universitas Gadjah Mada, Department of Agriculture Socio-Economics of Universitas Brawijaya, Indonesian Society of Agriculture Economics, Agribusiness Association of Indonesia. Hopefully proceedings of ADHW 2016 provide stimulus for increasing competitiveness of SMEs in ASEAN, especially in Indonesia.

Furthermore, we are grateful to Allah, the Sustainer of all word, who always makes it easy for our affairs. We would like to acknowledge with thanks to all the institution and individual who joined with resources and efforts in organizing the conference that resulted in the papers which are published in this proceeding. Special thanks to all authors and discussants who contributed with their intellectual capital and responded to our call papers. Thanks and acknowledgment are also due to all reviewers of the conference who helped in evaluating submitted papers; and to the members of the Organization Committee, who ensured smooth execution of the event.

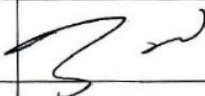
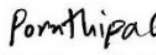


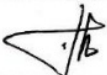

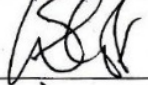
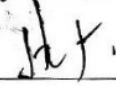


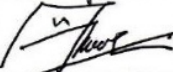
May 30, 2016

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## PREFACE

Assalaamualaikum, Warahmatullaahi., Wabarakaatuh.  
Dear Honorable Governor of Yogyakarta Special Province  
Dear respectable Prof. Dr. Zainal Abidin Mohamed  
Dear respectable Asist. Prof. Pornthipa Ongkunaruk  
Dear respectable Rector of UMY Prof. Dr. Bambang Cipto, MA.  
Dear all invited Guests, Speakers, and Participants of International seminar of ADHW  
2016.

Alhamdulillah, all praise be to the Almighty God, so that we can be gathering here today  
at Muhammadiyah University of Yogyakarta in order to attend the Conference on  
Agribusiness Development for Human Welfare (ADHW) 2016.

Ladies and Gentlemen,

On behalf of the committee, I would like to say welcome to this International Conference  
on ADHW 2016 and thank you for attending our invitation.

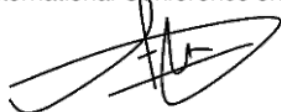
Especially, we are grateful to invited speakers, Prof. Zainal Abidin Mohamed and Asist.  
Prof. Pornthipa Ongkunaruk, for their willingness to share information and thoughts in  
this conference. As a bit report, that this conference has been attended by 85 speakers  
coming from five countries.

This conference entitled "Small and Medium-sized Enterprise Competitiveness". ASEAN  
Economic Community is the largest economic integration that is going to be implemented  
at the beginning of 2016 (December 31, 2015). Through this integration, SMEs will have  
opportunity to expand access to markets, technology, and capital. But at the same time  
SMEs are required to improve their competitiveness in order to survive in the market.  
We expect that this seminar is capable of producing thoughts building SMEs within  
ASEAN, especially Indonesia, to face the free trade.

This event can be done by support and efforts from all sides. Therefore, I would like to  
say thank you to all committee members having worked hard to conduct this event. We,  
as the organizer committee, do apologize when there is a shortage in conducting this  
event.

Wassalamualaikum, Warahmatullaahi., Wabarakaatuh.

Chairman  
International Conference on ADHW 2016



Dr. Aris Slamet Widodo, SP., MSc.

## WORDS OF WELCOME

Assalamu'alaikum warahmatullahi wabarakatuh

Alhamdulillah, all praise be to Allah SWT, who has given us His blessings so that this International Seminar of Agribusiness Development for Human Welfare (ADHW) 2016 entitled "Small and Medium-sized Enterprises Competitiveness" can be conducted. This International Conference is held in cooperation among Agribusiness Study Program of Muhammadiyah University of Yogyakarta with Putra University of Malaysia (UPM), Kasetsart University (KU), Association of Indonesian Agricultural Economy (PERHEPI), and Agribusiness Association of Indonesia (AAI), Universitas Gadjah Mada (UGM) and Universitas Brawijaya (UB).

Countries of ASEAN members like Indonesia, Malaysia, and Thailand have more than 90% Small and Medium-sized Enterprises (SMEs). In general, SMEs play important role in economic developments such as in terms of employment, added value, improve foreign exchange, and economic growth. For Indonesia, the role of SMEs is limited to employment and added value, while the foreign exchange from SMEs is still low. According to the General Director of SMEs of Industrial Ministry, in 2013 the total SMEs being able to pass through export market is just under 5 percent. For that required many breakthrough and innovation so that the role of SMEs becomes real economic development, especially in Indonesia, and generally in ASEAN countries.

On behalf of Agribusiness Department of Universitas Muhammadiyah Yogyakarta, we would like to express our gratitude Putra University of Malaysia (UPM), Kasetsart University (KU), Association of Indonesian Agricultural Economy (PERHEPI), Agribusiness Association of Indonesia (AAI), Universitas Gadjah Mada (UGM) and Universitas Brawijaya (UB) for all supports, sponsors, and all committee members having worked so hard that this International Conference can be conducted.

Hopefully, these synergies coming from various parties can provide contribution for developing SMEs in Indonesia and other ASEAN countries as well.

Wassalamu'alaikum warahmatullahi wabarakatuh

Head of Agribusiness Department  
Universitas Muhammadiyah Yogyakarta



Ir. Eni Istiyanti, MP.





**Gubernur**

**Daerah Istimewa Yogyakarta**

**Sambutan**  
**KONFERENSI INTERNASIONAL**  
**“AGRIBUSINESS DEVELOPMENT FOR HUMAN WELFARE”**  
**Yogyakarta, 14 Mei 2016**

Assalamu'alaikum Wr. Wb.

Salam sejahtera untuk kita semua.

Yang Saya hormati :

- Rektor Universitas Muhammadiyah Yogyakarta;
- Para Narasumber;
- Hadirin dan Para Peserta yang berbahagia,

Puji dan syukur marilah kita panjatkan kehadirat Allah SWT karena hanya atas limpahan rahmat serta karunia-Nya, kita dapat hadir pada kesempatan acara **Konferensi Internasional “Agribusiness Development For Human Welfare”** ini dalam keadaan sehat wal'afiat.

Pada kesempatan kali ini, secara ringkas Saya akan menyampaikan mengenai industri kecil menengah nasional yang menjadi tema pada pembukaan Seminar Internasional “Agribusiness Development For Human Welfare” ini.

**Hadirin dan Saudara-saudara sekalian yang Saya hormati,**

Berdasarkan data BPS, pertumbuhan industri pengolahan nonmigas pada tahun 2015 secara kumulatif sebesar 5,04%; lebih tinggi dari pertumbuhan ekonomi (PDB) pada periode yang sama sebesar 4,79%. Pada periode Januari-Desember 2015, nilai ekspor produk industri pengolahan nonmigas mencapai USD 106,63 Milyar, dan nilai impor mencapai USD 108,95 milyar, sehingga neraca perdagangan industri pengolahan nonmigas pada periode yang sama sebesar USD 2,32 milyar (neraca defisit).

Usaha pemerintah untuk memperkecil defisit di atas, salah satunya dengan cara memberdayakan Industri Kecil dan Menengah (IKM) yang merupakan bagian penting dalam perkembangan industri nasional. Sampai saat ini, Insutri Kecil dan Menengah

telah berkontribusi sebesar 34,82% terhadap pertumbuhan industri pengolahan nonmigas secara keseluruhan.

Angka ini dapat tercapai karena dukungan lebih kurang 3,6 juta unit usaha, yang merupakan 90 persen dari total unit usaha insutri nasional. Jumlah unit usaha tersebut telah mampu menyerap tenaga kerja sebesar 8,7 juta orang, yang tentunya berdampak pada meningkatnya ekonomi nasional serta mengurangi kemiskinan.

<sup>3</sup> Industri Kecil dan Menengah (IKM) memiliki peran yang strategis dalam perekonomian nasional. Hal ini sejalan dengan Visi Pemerintah dalam Rencana Pembangunan Nasional Jangka Menengah (RPJMN) 2015-2019 yaitu *“Terwujudnya Indonesia yang berdaulat, mandiri, dan berkepribadian berlandaskan gotong royong”*.

<sup>3</sup> Untuk lebih meningkatkan peran tersebut, Penumbuhan dan Pengembangan Industri Kecil dan Menengah diarahkan untuk memiliki tujuan jangka menengah guna mewujudkan industri kecil dan industri menengah yang berdaya saing, berperan signifikan dalam penguatan struktur industri nasional, pengentasan kemiskinan dan perluasan kesempatan kerja, serta menghasilkan barang dan/atau jasa Industri untuk keperluan ekspor.

#### **Hadirin dan Saudara-saudara sekalian,**

Awal tahun ini, kita telah memasuki era Masyarakat Ekonomi ASEAN (MEA). Dengan demikian, perekonomian nasional akan langsung bersaing dengan para pelaku pasar di kawasan ASEAN. Produk dan jasa termasuk investasi negara-negara anggota telas bebas memasuki pasar di kawasan ASEAN.

Dalam rangka menghadapi hal tersebut, Pemerintah mengambil langkah-langkah strategis berupa peningkatan daya saing industri dan mendorong investasi di sektor industri; di mana peningkatan daya saing industri itu sendiri dilakukan melalui penguatan struktur industri dengan melengkapi struktur industri yang masih kosong serta menyiapkan strategi ofensif dan defensif dalam akses pasar.

Pemerintah telah melakukan Penguatan Sektor IKM dengan strategi ofensif dan defensifnya melalui beberapa program pelaksanaan, diantaranya antara lain: Penumbuhan Wirausaha Baru; Pengembangan IKM melalui Pengembangan Produk IKM serta Peningkatan Kemampuan Sentra dan UPT; Pemberian Bantuan Mesin dan Peralatan Produksi; Perluasan Akses Pasar melalui Promosi dan Pameran; Fasilitasi Pendaftaran Hak Kekayaan Intelektual; Fasilitasi Sertifikasi Mutu Produk dan Kemasan; serta Fasilitasi Pembiayaan melalui Skema Kredit Usaha Rakyat (KUR).

Saya berharap agar berbagai program-program pemerintah tersebut dapat didukung secara sinergis oleh seluruh komponen masyarakat. Untuk itu, Saya berpesan kepada Saudara-saudara sekalian agar semua program pemerintah dalam bidang

Industri, khususnya dalam program pemberdayaan Industri Kecil dan Menengah, didukung dengan sepenuh hati, agar dapat lebih bermanfaat bagi masyarakat dalam rangka pengembangan industri kecil menengah.

**Hadirin dan Saudara-saudara sekalian yang Saya hormati,**

Demikian beberapa hal yang dapat Saya sampaikan. Akhirnya dengan memohon ridho Allah Subhanahu Wata'ala, seraya mengucapkan "*Bismilahirrahmanirrahim*", **Konferensi Internasional "Agribusiness Development For Human Welfare"** dengan ini secara resmi Saya nyatakan dibuka. Semoga Allah SWT memberikan petunjuk, bimbingan, perlindungan dan kemudahan dalam setiap langkah dan upaya kita. Amien.

Sekian dan terima kasih.

Wassalamu'alaikum Wr. Wb.

Yogyakarta, 14 Mei 2016  
GUBERNUR  
DAERAH ISTIMEWA YOGYAKARTA



**HAMENGKU BUWONO X**

## TABLE OF CONTENTS

|   |    |
|---|----|
| EDITOR FOREWORD .....   | i  |
| LIST OF REVIEWERS .....   | ii |
| PREFACE .....   | iv |
| WORDS OF WELCOME .....  | v  |
| WELCOME FROM GOVERNOR OF YOGYAKARTA .....   | vi |
| TABLE OF CONTENTS .....   | ix |
| RICE SELF-SUFFICIENCY IN INDONESIA: AN ANALYSIS ON BUDGET<br>ALLOCATION AND THE ACHIEVEMENT .....   | 1  |
| <i>Sri Nuryanti</i>   |    |
| MODELING OF COOPERATION TO IMPROVE RURAL ECONOMIC IN LANGKAT ...  | 8  |
| <i>Muhammad Buchari Sibuea</i>  |    |
| GRANARY GROUP PERFORMANCE IMPACT TO THE PRICE AND FOOD SELF-<br>SUFFICIENCY ON THE FARM HOUSEHOLDS .....  | 20 |
| <i>Sri Mardiyati, Jamhari, Jangkung Handoyo Mulyo Dwidjono Hadi Darwanto</i>  |    |
| ANALYSIS OF AGRIBUSINESS SYSTEM AND COMPETITIVENESS OF GROUPE<br>FISH IN INDONESIA.....   | 28 |
| <i>Grace Maharani Putri, Venty F. Nurunisa</i>  |    |
| ANALYSIS OF COMPETITIVENESS ASEAN RICE TRADE IN THE ERA OF ASEAN<br>ECONOMIC COMMUNITY.....   | 36 |
| <i>Mohammad Natsir, Sri Mardiyati</i>   |    |
| PARTICIPATORY EXTENSION AND FARMERS ATTITUDE CHANGE (CASE<br>PASSION FRUIT FARMERS IN THE VILLAGE BATU BELERANG SINJAI DISTRICT)<br>.....                 | 42 |
| <i>Muh. Arifin Fattah and Amruddin</i>  |    |
| THE RELATIONSHIP BETWEEN EMPOWERMENT OF FARMER GROUP<br>ASSOCIATION (GAPOKTAN) AND MANGO FARM INCOME .....  | 47 |
| <i>Achmad Faqih, Nurul Atikah Fauzi Siti Aisyah</i>   |    |
| EFFECTIVENESS OF TRAINING MODEL ON CRAFTSMEN CALLIGRAPHY GOAT<br>LEATHER IN AN ATTEMPT TO STRENGTHEN THE COMPETITIVENESS IN<br>SUKOHARJO, INDONESIA ..... | 57 |
| <i>Shanti Emawati, Endang Siti Rahayu, Sutrisno Hadi Purnomo, Ayu Intan Sari</i>  |    |
| EFFORTS TO IMPROVE COMPETITIVENESS OF WOMEN FARMERS GROUP<br>"MELATI" IN SENDANGSARI VILLAGE, PENGASIH DISTRICT, KULON PROGO<br>REGENCY .....             | 62 |
| <i>Siti Hamidah, Indah Widowati</i>   |    |
| INSTITUTIONAL CHANGE AND ITS EFFECT TO PERFORMANCE OF WATER<br>USAGE ASSOCIATION IN IRRIGATION WATER MANAGERMENTS .....                                   | 68 |
| <i>Mohammad Rondhi, Yasuhiro Mori, Takumi Kondo</i>   |    |
| FOOD PROCESSING INDUSTRY EMPOWERMENT EFFECTIVENESS IN<br>BANGUNTAPAN SUB-DISTRICT, BANTUL, YOGYAKARTA SPECIAL REGION .....                                | 76 |
| <i>Sapto Husodo, Amie Sulastiyah, Galuh H.E. Akoso</i>  |    |
| URBAN DWELLER PERCEPTION TOWARDS URBAN AGRICULTURE.....   | 85 |
| <i>Ida Naziera Ngahdiman, Rika Terano, Zainal Abidin Mohamed</i>  |    |

---

|  |     |
|--|-----|
| EFFECTIVENESS OF WELFARE DEVELOPMENT SCHEME ON QUALITY OF LIFE TO RURAL POOR COMMUNITY IN MALAYSIA.....  | 93  |
| <i>Mohd Nizam Abdul Aziz, Fazlin Ali, Zainal Abidin Mohamed and Hanina Halimatusaadia Hamsan</i>   |     |
| ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC CHARACTERISTICS WITH PINEAPPLE FARMER'S KNOWLEDGE, SKILLS AND PRACTICES IN MALAYSIA.                               | 106 |
| <i>Melissa Alina Yusoff, Norsida Man, Nollila Mohd Nawawi, Khadijat Jaji</i>   |     |
| MARKET STRUCTURE AND ANALYSIS OF SEA FISH MARKETING AT DISTRICT OF JEMBER.....   | 112 |
| <i>Syamsul Hadi, Edy Sutiarso, dan Henik Prayuginingsih</i>  |     |
| MARKET STRUCTURE, EFFECTIVENESS, AND EFFICIENCY OF THE RUBBER RAW MATERIALS MARKETING IN MUSI RAWAS DISTRICT .....                                       | 121 |
| <i>May Shiska Puspitasari</i>  |     |
| ANALYSIS OF BEEF SUPPLY CHAIN MANAGEMENT AT AGRIBUSINESS BASED SLAUGHTERHOUSE IN UPTD OF ANIMAL SLAUGHTERHOUSE OF PALU .....                             | 129 |
| <i>Muh Zulfadhli Prasetyo, Yulianti Kalaba, Lien Damayanti, dan Erny</i>   |     |
| ANALYSIS OF INFLUENCE OF MARKETING MIX AGAINST PURCHASE DECISION OF GROWING UP MILK ON THREE SOCIO-ECONOMIC CLASS IN MALANG .....                        | 139 |
| <i>Sunardi, Jabal Tarik Ibrahim, Anas Tain</i>   |     |
| TRANSACTION COST ANALYSIS ON CARDAMOM MARKETING IN PADASARI VILLAGE, CIMALAKA DISTRICT, SUMEDANG REGENCY .....   | 152 |
| <i>Ermalinda Zebua, Juarini, and Nanik Dara Senjawati</i>  |     |
| RICE SEEDS MARKET STRUCTURE IN EAST JAVA .....   | 161 |
| <i>Rini Dwiastuti, Riyanti Isaskar, Nur Baladina, Tri Wahyu Nugroho</i>  |     |
| NUTMEG'S ( <i>MYRISTICA FRAGGAN HAITT</i> ) ANALYZE MARKETING MARGIN AND EFFICIENCY OF TANJUNG SANI VILLAGE TANJUNG RAYA SUBDISTRICT AGAM DISTRICT ..... | 177 |
| <i>Devi Analia, Faidil Tanjung, Syofyan Fairuzi dan Ramita Sari Pimura</i>   |     |
| THE EFFICIENCY OF SUPPLY CHAIN EMPING MELINJO IN BANTUL REGENCY YOGYAKARTA .....   | 183 |
| <i>Eni Istiyanti, Diah Rina Kamardiani</i>   |     |
| VALUE CHAIN OF PINEAPPLE IN MALAYSIA.....  | 191 |
| <i>Norsida Man, Nollila Mohd Nawawi, Khadijat Jaji, Melissa Alina Yusoff</i>   |     |
| DYNAMIC SYSTEM OF INDONESIAN HALAL MEAT INDUSTRY: SUSTAINABLE SUPPLY CHAIN MANAGEMENT PERSPECTIVE .....  | 206 |
| <i>Akhmad Mahbubi, Pita Merdeka</i>  |     |
| ANALYSIS OF THE PROFITABILITY OF DAIRY FARMERS BASED ON THE SCALE OF LIVESTOCK OWNERSHIP IN DISTRICT SEMARANG .....                                      | 216 |
| <i>Mukson, S.I.Santoso, H.I.Nisa, H. Setiyawan and M. Handayani</i>  |     |
| DEVELOPMENT STRATEGY OF LEADING COMMODITY THROUGH COMMUNITY-BASED ENTERPRISE IN INDONESIA-MALAYSIA BORDER AREA .....                                     | 223 |
| <i>Jangkung Handoyo Mulyo, Irham, Hani Perwitasari, Fatkhiyah Rohmah</i>   |     |
| BUSINESS DEVELOPMENT STRATEGY SOYBEAN SAUCE PRODUCTION IN CAP BAWANG SOY SAUCE COMPANY AT NGAWI REGENCY .....  | 230 |
| <i>Feti Munika Sakti, Mohamad Harisudin, Raden Rara Aulia Qonita</i>   |     |
| FOREIGN LABOR RECRUITMENT IN OIL PALM PLANTATION IN MALAYSIA .....   | 241 |
| <i>Marlia Musa, Amin Mahir Abdullah, Mohd Mansor Ismail</i>  |     |



|  |     |
|--|-----|
| MICRO ENTREPRENEURS' INTENTION TO BECOME MEMBER OF MICROCREDIT SCHEME WITH EDUCATIONAL TRAINING AND MOTIVATIONAL PROGRAM.....  | 250 |
| <i>Rika Terano, Zainalabidin Mohamed and Fatin Najiha Mohd Tammili</i>   |     |
| FARMING INCOME ANALISYS OF DRY LAND IN THE GUNUNGKIDUL DISTRICT .....  | 257 |
| <i>Aris Slamet Widodo, Retno Wulandari</i>   |     |
| ANALISYS OF FACTOR THAT INFLUENCE THE DEMAND FOR ORGANIC VEGETABLES IN MEDAN .....   | 264 |
| <i>Sasmita Siregar, Hadriman Khair, Yudha Andriansyah Putra</i>  |     |
| RICE CONSUMER BEHAVIOR IN THE MUSI RAWAS DISTRICT .....  | 272 |
| <i>Zaini Amin</i>  |     |
| ANALYSIS OF CONSUMER PERCEPTIONS AGAINST LOCAL AND IMPORT FRUITS IN MEDAN.....   | 280 |
| <i>Hadriman Khair</i>  |     |
| CONSUMERS'INTENTION TO PURCHASE GENETICALLY- MODIFIED SOYBEAN PRODUCTS IN MALAYSIA.....  | 288 |
| <i>Welson Chin Vui Son, Kelly Wong Kai Seng, and Juwaidah Sharifuddin</i>  |     |
| CONSUMER PREFERENCE TOWARDS ORGANIC VEGETABLES AT SUPER INDO SULTAN AGUNG YOGYAKARTA.....                                      | 299 |
| <i>Nisa Murty Andari, Widodo, Sriyadi</i>  |     |
| STRENGTHENING THE ECONOMIC OF FOREST FRINGES COMMUNITY THROUGH MODEL FOR ENHANCING LOCAL CATTLE COMPETITIVENESS .....          | 306 |
| <i>Teguh Hari Santosa, Toni Herlambang, Nurul Qomariah, dan Oktarina</i>   |     |
| FACTORS AFFECTING THE PRODUCTION AND BENEFIT ON THE PLANTING SYSTEM OF JAJAR LEGOWO AND TEGEL IN THE DISTRICT MUSI RAWAS ..... | 317 |
| <i>Nila Suryati</i>  |     |
| PLANTING DISTANCE AND DOSE OF ORGANIC MANURE ON THE SOIL CHEMICAL PROPERTIES AND YIELD OF LOWLAND RICE .....                   | 324 |
| <i>Abdul Azis and Damasus Riyanto</i>  |     |
| TECHNOLOGY ADOPTION OF HIGH QUALITY GREENBEANS SEED BY FARMERS' HOUSEHOLD IN CENTRAL JAVA.....                                 | 334 |
| <i>Wiludjeng Roessali, Wahyu Dyah Prastiwi, Tutik Dalmiyatun</i>   |     |
| PRODUCTION EFFICIENCY OF IRRIGATION LOWLAND ORGANIC PADDY FARMING SYSTEM AT BAROKAH FARMER'S GROUP IN SEMARANG REGION.         | 340 |
| <i>Titik Ekowati, Edy Prasetyo, and Bambang Trisetoyo Eddy</i>   |     |
| THE FARMER'S KNOWLEDGE AND ATTITUDES FOR ENVIRONMENTAL FRIENDLY OF SHALLOT CULTIVATION IN BALI .....                           | 346 |
| <i>Nyoman Ngurah Arya, I Ketut Mahaputra, Suharyanto, Jemmy Rinaldi</i>  |     |
| THE ANALYSIS OF A VERTICALLY INTEGRATED ORGANIC RICE COMPANY: A CASE STUDY IN THAILAND .....                                   | 354 |
| <i>Yaniga Prasertwattanakul and Pornthipa Ongkunaruk</i>   |     |
| EFFECTIVENESS AND GROUP COMMUNICATION NETWORK.....   | 361 |
| <i>Indardi</i>   |     |
| THE INSTITUTIONAL ROLE IN DISSEMINATING SITE-SPECIFIC AGRICULTURAL INNOVATION IN ACEH .....                                    | 368 |
| <i>Abdul Azis, Basri AB and Sugeng Widodo</i>  |     |





|   |     |
|---|-----|
| INCREASE RICE PRODUCTIVITY THROUGH MODELS OF CROPPING SYSTEMS<br>AND THE USE OF HYBRID VARIETIES .....  | 379 |
| <i>Suharno, Rika Nalinda</i>  |     |
| THE FARMER'S PERCEPTION TO THE USING OF TECHNOLOGY AFTER PADDY'S<br>HARVEST IN SOUTH SULAWESI .....   | 386 |
| <i>Irmayani, Hariyono, Nur Rahmah Safarina Hamzah</i>   |     |
| VALUATION IRRIGATION OF RICE FARMING AT UPSTREAM AND DOWNSTREAM<br>AREAS IN SPECIAL REGION OF YOGYAKARTA .....  | 392 |
| <i>Habibullah, Triyono, Aris Slamet Widodo</i>  |     |
| RICE FARMER'S PERCEPTION AND ITS EFFECT TOWARD INTENTION TO<br>ADOPT ORGANIC FARMING .....  | 399 |
| <i>Ashari, Juwaidah Sharifuddin, Zainal Abidin Mohammed, Rika Terano</i>  |     |
| FACTORS INFLUENCING THE ATTITUDES OF VEGETABLE FARMERS TOWARD<br>THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN<br>PENINSULAR MALAYSIA..... | 411 |
| <i>Nor Haslina Nor Rizan, Amin Mahir Abdullah, Norsida Man, and Noliila Mohd Nawi</i>   |     |

## PRODUCTION EFFICIENCY OF IRRIGATION LOWLAND ORGANIC PADDY FARMING SYSTEM AT BAROKAH FARMER'S GROUP IN SEMARANG REGION

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### ABSTRACT

Product efficiency of irrigation lowland organic paddy farming system research had been conducted in November – December 2015 at Barokah Farmer's Group in Semarang Region. Purposive sampling was used to choose location based on Organic Agro Ecological Zone. This research aimed to analyze farmer's rationality in using production factor. Multiple regression linear was used to analysis the factors influencing production and was continued by allocate efficiency test. The result showed that organic paddy farm was profitable and farm scale, seed, manure, labor and irrigation have positive effect and significant on production factors. Then, to find maximum benefit, farmer needed reduce the use of seed, fertilizer and labor. Therefore, to reach both optimum production and advantage need to extend planting area.

**Keywords:** efficiency farmer's group, irrigation, organic paddy

### INTRODUCTION

The program of increasing food security is purposed to fulfill community food need based on national food. There are many efforts that have been done by Government to secure and increase of wet rice, intensification, and optimizing and agriculture land expansion. That is relation to basic food for most people in Indonesian, namely rice. Paddy farm have a strategic function and role in term of food security, labor reserve and source of income.

Organic farming is a farm which utilize organic resources, wish and holistic as a production factors without inorganic factors in term of to fulfill food security. Organic farming is developed in respect of local wisdom in order to keep the balance of environmental, economic and social culture and to push the reality of sustainability fair trade for farmers (Sutanto, 2002). The concept and implementation of organic farming have been initiated by many institutions as a philosophy of holistic and sustainability farming system.

The function of organic agriculture basic principle is a guidance, program and standard (IFOAM, 2006) for four principle, namely health, ecology, righteousness and respectiveness. That principle was composed to realize the organic agricultural vision.

Wet land of paddy tends to increase relation to rice consumption as a population increasing. Therefore, main point of wet land paddy resources improvement is increasing productivity.

Productivity can be increased by increasing efficiency of paddy farm in term of output and input usage (Mubyarto, 1986). The efficiency of farming system is an input usage lower than output (Benu, 2002). Besides that, productivity of wet land paddy also depend on acceptability of water as irrigation.

Land resources in Semarang Region are still potential for agricultural development. In 2015, there was 37,173 ha wet land of paddy with 213,120 ton production, productivity of paddy was 5.733 ton/ha. All of that area is wet paddy field irrigation. Rice productivity in

Semarang Region is still low than Idris *et al.* (2004) result research, namely average 6 ton/ha. That productivity can be improved by using on farm technology as fertilizer, the right time of planting and prime seed and irrigation as well. The differences productivity among research result and farmer's productivity can be caused by differences of seed usage and the technology does not meet the recommendation and the limitation of land, namely land fertility (Mustaha, *et al.*, 2002).

Nowadays many farmers in Ketapang Village, Susukan District, Semarang Region tend to manage organic paddy. The reasons are sustainability of the environment, optimizing local resources usage besides local food security. To operate that program they are joint in group, with the upstream to downstream activities. However, the farmer faces to the technology and resources limitation. This is the reason that the research relation to evaluate efficiency of production factors of organic paddy is done.

### Aim of Research

This research aimed to analyze farmer's rationality in using production factor in term of efficiency and calculate the farmer's income.

### METHOD

The study was focused on organic paddy farm, and the elementary units were farmers who planted organic paddy in Ketapang Village. It was needed to collect empirical data from primary and secondary sources, so the result of study can represent real condition. Then, data processing, data analyzing, and discussion could be conducted. The study was conducted using survey methods, and the farmers as respondents (Singarimbun and Effendi, 1995). Primary data were a cross section data collected using questioner. Purposive sampling was used to choose location based on Organic Agro Ecological Zone, namely Ketapang Village, Susukan District, Semarang

Region while farmers were selected by random sampling. The time dimension was cross-sectional research as research was done in November - December 2015. The reasons of choosing the research location are:

- 1) Ketapang Village, Susukan District, Semarang Region is a one of villages that have implemented organic paddy and there is an organic paddy farmers community.
- 2) Organic farming has been done by farmers in 1998. So, the ecology and economic sustainability can be described.

The number of respondents were 60 farmers. Data were analyzed by Multiple Linear Regression. The dependent variable is production, while inputs and irrigation are the independent variables.

The regression function is : (Soekartawi, 2003)

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + \varepsilon$$

Note:

- Y = production of paddy (kg)  
 X1 = farm scale (ha)  
 X2 = number of seed (kg)  
 X3 = organic fertilizer (kg)  
 X4 = labor (ML)  
 X5 = years farm (year)  
 X6 = irrigation  
 0 = without irrigation  
 1 = with irrigation

Allocative efficiency or price efficiency is an analysis which used to analyze the efficiency of production factors usage, Malian *et al.* (1989), when  $MVP_{xi} = P_{xi}$  or  $MVP_{xi}/P_{xi} = 1 = k_i$ . If  $k_i = 1$  it means that the usage of input is efficient,  $k_i > 1$  the usage of input is not efficient yet, while  $k_i < 1$  the usage of input is not efficient.

## RESULT AND DISCUSSION

### Ketapang Village

Ketapang village is located at Susukan District, Semarang Region with temperature  $27^{\circ} - 29^{\circ}$  and the average of rain fall is 21mm per year. Ketapang

village has spacious 327ha; with the usage of wet rice field is 160ha or 48.9%.

#### AI-Barokah Group Profile

AI-Barokah Farmer's Group is an organization of village community which is basic of organic paddy wet land. AI-Barokah was operated in September 6, 1999 by farmers in Ketapang Village. That group actually had been initiated by some organic farmer's initiator since 1989.

Nowadays, AI-Barokah has a legal aspect based on the notary public official document at September 14, 2004. There is organic farmers group in AI-Barokah with a leader and 372 members. The wider of wet organic paddy is 63ha and still have chance to develop. The operational of AI-Barokah has implemented by democratic approach which strategic planning initially to get the organization master plan and every year there is a group meeting to choose a leader and arranging the program.

#### Characteristic of Respondent

Based on the characteristic of farmer's household it was known that paddy farm is a main job for 60 respondents. Level of education was vary from elementary school, secondary school, high school and bachelor program, namely 10 respondents (16.67%), 17 respondents (28.33%); 26 respondents (43.33%) and 7 respondents (11.67%) respectively. The year old of the respondents is productive years old with the average is 43.78 years old, its means that physically respondents can support paddy farm activity. Besides that, farm experience is 13.47 years. The average number of family member is 3.2 persons (4 persons/household). The family member actually is a capital labor for each family, while the number of it is not enough for paddy farm activities.

#### Production Factors Utilization of Organic Paddy and Farmer's Income

Farm production factors consist of four factors namely land, labor, capital and management. All factors have same position on farm (Hemanto, 1988). Meanwhile, labor – farmer is one of

important factors that can manage the farm activity. Labor at the first side is a production factors, another side is a human capital. It means that labor or farmer is leader to manage the usage of all production factors. Land is another production factors that will influence the production especially relation with farm scale. The wider of land the higher of production and vice versa. The usage of prime seed can increase the production. Usually farmer use local seed variety. The utilization of paddy seed varieties by farmer are "mentik susu", "rojo langit" and "merah mandel". Fertilization commonly is done two times with the local fertilizer as liquid fertilizer and manure. Besides that, production of organic paddy need irrigation as well. In Susukan, the irrigation actually is not the limitation for farmers. Most of wet land had been irrigated by tertier irrigation and simple irrigation. The usage of production factors is described on Table 1.

Table 1. The Utilization of Organic Paddy Production Factors

| Production Factor         | Number |
|---------------------------|--------|
| Farm scale (ha)           | 0.26   |
| Seed (kg/ha)              | 45.44  |
| Manure (kg/ha)            | 312.74 |
| Natural pesticide (lt/ha) | 10.17  |
| Labor (mwt/ha)            | 210.08 |

Source: Primary Data Analysis

Note: mwt : man of working time

Table 1. showed the utilization of production factors i.e. farm scale, seed, manure pesticide and labor were 0.26ha; 45.44 kg/ha; 312 kg/ha; 10 lt/ha and 210 labor/ha respectively. The usage of labor starts to land processing to harvesting. The number of labor which needed was 210.08 man works, which is consisting of family labor and non family number. The number of family labor is calculated as an economic input.

The consequence of production factors utilization is cost production. All of production factors utilization at the AI-Barokah Farmer's Group calculated as a cost production. So the number of cost production will depict the ability for



farmers to manage the organic paddy farm. Analysis of production cost and farmer's income is presented at Table 2.

Table 2. Production, Value Product, Cost Production and Income of Organic Paddy Farm

| Item                  | Number        |
|-----------------------|---------------|
| Production (Ton/ha)   | 6.413         |
| Price (IDR/Kg)        | 9,000.00      |
| Revenue (IDR)         | 57,717,000.00 |
| Production Cost (IDR) |               |
| - Seed                | 395,817.00    |
| - Manure              | 156,369.00    |
| - Natural pesticide   | 122,117.00    |
| - Labor               | 5,926,498.00  |
| - Another cost        | 206,907.00    |
| - Depreciation        | 512,360.58    |
| - Land Tax            | 100,792.14    |
| - Rent of land        | 253,485.42    |
| Income (IDR)          | 50,042,653.86 |

The average of paddy organic productivity harvested was 6.413 ton/ha, this productivity is a good production. While the average of farmer's income was IDR 50,042,653.86/year/ha or IDR 4,170,221.15/month/ha. Based on the farmer's income indicated that organic paddy farm was profitable and the farmers can fulfill the daily need of household. It is prove from the autonomy of farmers to controlled farm management.

**The Analysis of Organic Paddy Production Factors**

The result of regression analysis was known that the determination coefficient (R<sup>2</sup>) was 0.948 and Adjusted R<sup>2</sup> was 0.942. It is mean that 94.2% organic paddy production was influenced by farm scale, seed, manure, labor, farm years and irrigation, while 5.8% was influenced by another factors. The result of analysis is described on Table 3.

Based on the analysis, the Regression Model is:

$$Y = 111.359 + 0.687X_1 + 0.295X_2 + 0.097X_3 + 0.099X_4 + 0.076X_5 + 0.079X_6$$

Based on the regression analysis can be known that farm scale, seed, manure, labor, farm years and irrigation influenced organic paddy production. The irrigation influenced paddy production met

with the research of Akmal *et al.*, 2014 that irrigation water has an important role in improving food production, especially rice. However, because of the increasingly limited water availability, it is important to conduct the procedure of irrigation water distribution more efficiently. Irrigation is an attempt to provide water for rice farming is done by regular on rice plots.

Table 3. Production Factors of Organic Paddy Farm

| Model      | Standardized Coefficient | Sig.     |
|------------|--------------------------|----------|
| Constant   | 111.359                  |          |
| Farm scale | 0.687                    | 0.000*** |
| Seed       | 0.295                    | 0.000*** |
| Manure     | 0.097                    | 0.029**  |
| Labor      | 0.099                    | 0.021**  |
| Farm Years | 0.076                    | 0.047**  |
| Irrigation | 0.079                    | 0.046**  |

Note:

\*\*\* significant at < 1% and

\*\* significant at < 5%

The value of all the coefficients were positive, it mean that the increasing of input will increase organic paddy production. Besides that, the coefficient of regression model represent an elasticity of each production factors. The estimation coefficient of seed was 0.295; it means that the increasing of seed by 1%, the production will increase by 0.258% and vice versa. It happens to all production factors. The average of seed usage is 45.44 kg/ha which is more than average seed needed, namely 25-30 kg/ha.

**Efficiency of Organic Production Factors Utilization**

Paddy farm activities usually do by the habit and experience, so the rationality of production factors usage is ignored. It can be happened cause by capital and limited to get production factors. In order to see the rationality of farmer to increase the production, so allocative efficiency test of production factors should be done.

8

Based on Table 3 can be known that the value of all production factors regression coefficient was 1.288. It means that organic paddy farm in Ketapang Village especially at Al-Barokah Farmers Group had met to increasing return to scale. In other word, the addition of every fixed production factors in long term will go along with the increasing paddy production.

In term of organic paddy farm management, the important thing should be pay attention is the efficiency of production factors usage to get the optimum production. The analysis of production factors is important and it will be influence to the production and profit. The higher of economic analysis reach at  $MVP_{xi}/P_{x1} = 1$

The result of efficiency of production analysis showed that the ratio between Marginal Value Product and input price for farm scale, seed, fertilizer, labor were 10.687; 0.81; 0.79; 0.099 respectively. Based on that result it can be described that the usage of production factors is less than 1, so the utilization of seed, fertilizer and labor production factors should be reduced. Meanwhile the farmscale should be increased as the value is 10.687.

## CONCLUSION

The farmer's income of organic paddy was profitable with the IDR 50,398,590/ year or IDR 4,199,882.5/ month. The production factors of farm scale, seed, manure, labor and irrigation have positive effect and significant on production factors. The result of economic analysis showed that the ratio between Marginal Value Product and input price for farm scale, seed, fertilizer and labor were 10.687; 0.81; 0.79; and 0.099 respectively. Then, to find maximum benefit, farmer needed reduce the use of seed, fertilizer and labor. Therefore, to reach both optimum production and advantage need to extend planting area.

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**DISCUSSION OF PARALLEL SESSION**

|                    |  |
|--------------------|--|
| <b>PAPER TITLE</b> | PRODUCT EFFICIENCY OF IRRIGATION LOWLAND ORGANIC PADDY FARMING SYSTEM AT BAROKAH FARMER'S GROUP IN SEMARANG REGION   |
| <b>AUTHOR</b>      | Titik Ekowati, Edy Prasetyo, Bambang Trisetoyo Eddy  |
| <b>DISCUSSION</b>  |  |
| <b>QUESTION</b>    | <ol style="list-style-type: none"><li>1. Is the utilization of pesticide in farm still rarely organic? How about natural pesticide?</li><li>2. Irrigation is not a problem?</li><li>3. What is the conclusion?</li></ol> |
| <b>ANSWER</b>      | <ol style="list-style-type: none"><li>1. Actually it using herbal pesticide</li><li>2. Education of irrigation still needed</li></ol>  |
| <b>SUGGESTION</b>  | <ol style="list-style-type: none"><li>1. What are the conclusion mean, or implication of the conclusion</li><li>2. Need to write "the consequences" of the finding</li></ol>   |

## THE FARMER'S KNOWLEDGE AND ATTITUDES FOR ENVIRONMENTAL FRIENDLY OF SHALLOT CULTIVATION IN BALI

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### ABSTRACT

Bali Provincial Government has committed for developing environmental friendly agriculture, including shallot cultivation, however, at the field level using of synthetic pesticides control pests and diseases was very intensive and less wise. It can be thought to have a negative impact on health and the environment. This study aimed to analyze the farmer's knowledge and attitudes on environmental friendly of shallot cultivation technology. The study was conducted in Kintamani District, Bangli Regency in March to December, 2015. The location and 65 farmers as samples are determined by purposive with considerations: (1) Kintamani district as a location of the shallot area development program, (2) Kintamani district as a center for the production of shallot in Bali, and (3) the farmers who as samples are executor of the program. Data were collected before and after assistance providing by questionnaires. The analysis showed that the farmer's knowledge and attitude on environmental friendly of shallot cultivation technology increased after assistance providing.

**Keywords:** knowledge, attitude, shallot cultivation, environmental friendly

### INTRODUCTION

Shallot (*Allium ascalonicum* L.) is a vegetable crop that has a high economic value and can be planted in the lowlands and highlands. This commodity is always needed by the consumer households, restaurants, hotels, and food processing industries as complementary spices. Shallot farming development aimed for improving the quantity and quality of production and the increase in income and welfare of farmers. Bangli Regency, Kintamani District in particular, is the largest shallot producer area in Bali. Its contribution to the total production of shallot in Bali 93.70% per year (BPS Bali, 2015). Shallot cultivation is done almost throughout the year with diversified patterns with tomatoes, red chili, and cabbage.

The pests and diseases of shallot quite numerous and varied (Basuki et al. 1997; Udiarto et al., 2005; Setiawati et al. 2007; Sumarni and Hidayat, 2005; and Anonymous, 2014) as a very serious constraints faced by farmers. The pests and diseases can lead to loss about 30-

100% of shallot production (Kardinan, 2002 and Udiarto, 2005). Generally, farmers control with synthetic pesticides, which tend to be excessive, is not exactly of the type, dose, and time of application. The using of synthetic pesticides are ineffective, wasteful and high production cost, the pests have become resistant to pest attack can cause an explosion at a later, the destruction of natural enemies, also have an impact on farmer's health, environmental pollution, and shallot product unhealthy because they contain pesticide residues.

Bali province was established as one of the provinces who implementation the Shallot Area Development Program, since 2015. Related of the program, then the Assessment of Institute for Agricultural Technology of Bali has been doing assistance to the shallot farmers. Bali Province Government has committed to develop environmental friendly of shallot cultivation with integrated pest management approach that oriented aspects of high productivity, efficiency, safety, and conservation of natural

resources and the environment. According Pasetriyani (2010), integrated pest control is a concept of environmental friendly pest control which is trying to encourage the involvement of the natural enemies. The approach includes technical culture, which include: the type and nature of the soil, timing of planting, use of resistant varieties, use of tuber quality seeds, well tillage, balanced fertilization, spacing, control of plant pests, and harvest and postharvest. This study aimed to analyze the farmer's knowledge and attitudes towards technology of environmental friendly shallot cultivation with integrated pest management approach.

## METHOD

This research was conducted in March to December 2015 in the district of Kintamani, Bangli regency, with consideration of: (1) Kintamani District is a center for the production of shallot, and (2) Kintamani District has been designated as Area Development Shallot Program. The number of respondents 65 farmers are determined by purposive, because they are implementing the program.

Data were collected by a pre-test and post-test using a list of questions in each field of school operations and regular meetings. The list of questions includes: (1) land preparation and tillage, (2) the using of tuber quality seed, (3) fertilization, (4) the pest control, (5) field sanitation well, (6) irrigation/watering, and (7) harvest and post-harvest. Analysis of data by simple statistics, scoring and qualitative interpretation of the answers raised by the respondents. Measuring the farmer's knowledge used the data rate in the range of 0-100. The type of question is a multiple choice questionnaire as many as 25 pieces. If any question is answered correctly the value 4, but if either the value 0. If all of questions answered correctly value is 100, whereas if all the wrong value is 0. The level of farmer's knowledge can be divided into five categories, namely: (1) grades 0-20 = very low; (2) 21-40 = low; (3) 41-60 = moderate; (4) 61-80 = high; and (5) 81-100 = very high. The

measurement of farmer' attitude did by scoring. Number of questions/statements contained in the questionnaire as many as 25 pieces. Answers are provided on each question / statement are: a. disagree; b. doubtful; and c. agree. Answer "disagree" = 1; "doubtful" = 2; and "agree" = 3, so that the total score ranges from 25-75. Scores earned on each item the question /statement summed to obtain a total score which is categorized into three classes, using the formula interval (Dajan, 1996):

$$I = \frac{J}{K}$$

Where:

I = Interval class; J = distance score of minimum and maximum; and K = Number of classes used

## RESULTS AND DISCUSSION

### The Farmer's Knowledge

Knowledge is the result of the sensing to a particular object. Most of human's knowledge is obtained by the eyes and ears. Knowledge is very important domain to give perceptions which in turn form the attitudes and behavior/actions. One's knowledge of an object consists of two aspects, positive and negative aspects which will determine the attitude and actions. The more positive aspects of an object is known, it will cause more positive attitude towards the object.

The analysis results shows (Table 1) that, before having assistance most of farmers (49.23%) had knowledge of the technology of environmental friendly of shallot cultivation in medium category, with an average value of 53.74. After assistance the majority of farmers (73.85%) have a high knowledge, with an average value of 71.35 and nothing farmer who has low knowledge. The number of farmers who have very high knowledge after the assistance providing also increased by six-times, from one person before assistance providing to seven people after assistance providing.

Table 1. The results of Pre and Post Test of Farmer's Knowledge on Environmental Friendly of Shallot Cultivation

| Classification/scores | Before the assistance |                  |            | After the assistance |                  |            |
|-----------------------|-----------------------|------------------|------------|----------------------|------------------|------------|
|                       | Average               | Number of farmer | Percentage | Average              | Number of farmer | Percentage |
| Very low (0 - 20)     | 16,00                 | 2                | 3,08       | -                    | 0                | 0,00       |
| Low (21 - 40)         | 39,33                 | 5                | 7,69       | -                    | 0                | 0,00       |
| Moderate (41 - 60)    | 53,74                 | 32               | 49,23      | 56,31                | 10               | 15,38      |
| High (61 - 80)        | 70,65                 | 25               | 38,46      | 71,35                | 48               | 73,85      |
| Very high (81 - 100)  | 82,00                 | 1                | 1,54       | 89,44                | 7                | 10,77      |
| Amount                |                       | 65               | 100,00     |                      | 65               | 100,00     |

Source: Primary Data (analyzed)

The pre-test results indicated that, farmers in the location of assistance have enough knowledge about environmental friendly of shallot cultivation. The site selecting of shallot planting is the most understandable aspects by the farmers well. All of the farmers have understood that shallot requires maximum sunlight during in the crop. They have tried to clean the parts that may block the incoming sunlight to planting shallot. There are some things that have not been well understood by farmers can be in onion cultivation, namely:

1. The using of seed tubers

Selection of bulbs that will be used as seed, farmers are already doing quite well with the selection, choose bulbs are solid, medium-sized, healthy, no wrinkles, no defects. However, farmers do not understand the shelf life of the bulbs are good for seedlings. Most of the farmers use seed tubers are stored for 30-50 days after harvesting. At the age of its shelf, shallot shoots candidates still in the inside of the bulb, is not at the end of the bulb, so the emergence of shoots in the crop relatively long. These conditions will also affect many tubers rot before sprout, especially farmers almost never cut the tip of seed tubers. Sumarni and Hidayat (2005) and Setiawati et al. (2007) suggest using seed tubers that have been stored 2-4 months and shoots already at the end of the tuber.

2. Tillage

Farmers have made quite a good seedbed, from the aspect of lanes

(Eastern-Western) or according to the conditions of each area, the width (100-120 cm), height (30-40 cm), and width of trench about 40 cm. Farmers are already anticipating the occurrence of tuber rot due to waterlogging. The aspect that has not understood by farmers is the time gap tillage and planting shallot bulbs. The farmers are not doing tillage well and properly. They usually do tillage approximately seven days before planting. Some things that might happen if tillage is not perfect, namely: less fertile soil, good drainage and aeration less, and yet clean of weeds and plant debris. All of the farmers have not used dolomite, because they are not known yet. Planting paddy and vegetables an intensive that will trigger soil becomes acidic (low pH). The results showed, the soil at the site assistance has a pH of 4-5 (sour). These conditions will have an impact on growth, and productivity of shallot is not optimal. Sumarni and Hidayat (2005) and Setiawati et al. (2007) suggest tillage should be performed 3-4 weeks before planting to obtain good soil conditions for planting. Acidic soils (pH <5.6) to be given the dolomite of 1 - 1.5 tons/ha to increase the availability of nutrients Ca and Mg as well as the impact on the increase in fresh and dry tuber weight.

3. Setting a spacing

Farmers applying shallot plant spacing of 25 cm x 25 cm, so the relatively small populations of plants on a unit area. This could have an impact on

production gained not maximum. They assume that the wider spacing impact to bigger tuber and shallot production higher per unit area. The optimal spacing for shallot crop is recommended 15cm x 15cm or 20cm x 15cm (Hidayat and Rosliani 2003 and Sumarni et al., 2012).

#### 4. Fertilization

Knowledge of farmers on fertilizer shallot crop is still relatively low. Fertilization using chicken manure, urea, ZA, and NPK. Its composition is not as recommended, is dominated by nitrogen (N). The using of fresh chicken manure have caused air pollution and trigger an increase in the fly population. That can have a negative impact on comfort and health.

#### 5. Controlling of pests and diseases

It seems that the use of synthetic pesticides is the only way that farmers in controlling pests and plant diseases of shallot. Its use is very intensive and less precise in terms of aspects dose, type, timing, and frequency of application. Almost all of the farmers did not make observations prior to pest and disease control. They also cannot distinguish between insecticides and fungicides. In use, the two types of pesticides are often blended into one. Control of pests by pesticides carried out 2-3 times a week, regardless of the symptoms and the level of attack, with the dose, type, timing, and the target is not appropriate. This reflects the ineffective control and avoid waste impacting the high production costs, health, and environmental pollution.

#### 6. Watering

Watering shallot crop has done fairly well by the farmers, but has not as recommended. Watering is done one times every day. At the rainy season, farmers are not doing the watering because they think do not need watering. According Sumarna (1992), a way of watering the shallot crop are (1) at the age of 0-5 days after planting watering is done 2 times a day (morning and afternoon), so that the

soil moist enough to stimulate the growth of shoots, (2) at the age of 26-50 days after planting (tuber formation phase), shallot plants require a lot of water, so watering is done two times in the morning and evening, and (3) at the age of 51- 60 days after planting (tuber maturation phase) watering only once a day, at noon to speed up harvesting. Setiawati et al. (2007) state that, in the rainy season also watering to clean the leaves of plants, from splashing soil attached to the leaves of shallot. Watering in the morning is aimed to clean plant of moisture and suppress disease.

#### 7. Harvest and postharvest

Technically, harvest and post-harvest handling is quite good, but there are still some deficiencies. There are still many farmers who harvest shallot is not timely, the leaves of the plant are still mostly green, especially at times when onion prices are quite high. This condition affects the quality and quantity of shallot production, because the tuber formation is not maximized. Post-harvest handling is quite good, but there are still shortcomings, which have not done drying by sunlight. Generally, shallot recently completed harvest, tied the leaves, and directly in place in the warehouse. This condition can also affect tuber infection of pests and diseases is still attached to the tubers. Sumarni and Hidayat (2005) and Setiawati et al. (2007) suggest, shallot tubers freshly harvested should be dried in the sun before being stored in the warehouse. Its goal is to minimize pests and diseases attached to the leaves and shallot bulbs that will be stored in the warehouse.

The post-test results (Table 1) shows the farmer's knowledge towards the environmental friendly of shallot cultivation increases after assistance providing. It reflects that, environmental friendly of shallot cultivation technology which are given on assistance providing have been able to be understood by farmers. Based on the test statistics with paired t-test indicated there is a very real



difference between the average value of pre-test and post-test, showed by the t-count = 12.804, while the t-table = 2.655. (t-count > t-table), with  $p = 0.008$  ( $p < 0.01$ ). These values reflect that, there are differences in the level of knowledge that is very real to each farmer before and after having assistance. The analysis result reflects the assistance providing is important to improve the knowledge of farmers.

### The Farmer's Attitude

Attitude is a response to someone who is still closed to a stimulus or object (Notoatmojo, 1997). Purwanto (1998) states that, the attitude of the views or feelings of individuals with a tendency to act upon the nature/stimulus received from an object. Azwar (2000) argues that, the attitude of the general evaluation made man against himself, another person, an object or issues. The various of restrictions on the attitude it can be concluded that, the manifestation of attitudes cannot be seen directly, but can only be interpreted in advance of behaviors that are closed. Attitude clearly shows their suitability connotation reaction to a stimulus. The analysis results of the farmer's attitude is presented in Table 2.

The results of the pre-test of the farmer's attitude on environmental friendly of shallot cultivation technology (Table 2) shows that, before the assistance providing most of the farmers have a neutral attitude on environmental friendly of shallot cultivation technology that will be introduced in their territories. Only a small proportion of farmers who are positive attitude. That indicates, they have no qualms about applying environmental friendly of shallot cultivation technology as a whole, particularly with respect to the technology component of pests and diseases controlling. The type and number of shallot pests and diseases are very diverse and difficult to control. The farmers assumed that, the use of synthetic pesticides is the one way to control the pest and diseases to get yield. The presumption is expected as a result

of habit or experience that has been done over the years and the lack of adequate extension and assistance. One solution that can be taken to convince farmers of the importance for environmental friendly of shallot cultivation technology is through the field study and intensive assistance.

Based on the post-test results (Table 2) were performed at the end of assistance providing shows that, the total number of farmers who are positively toward environmental friendly of shallot cultivation technology increased by 266.67%, from 6 to 22 people. The number of farmers who have negatively attitude decreased by 46.67% from 15 people to 8 people, but remains dominated (53.85%) by farmers who remain neutral, although the number decreased from 67.69% before having assistance. It can be concluded that, despite the establishment of assistance providing the most of them still have doubts as to apply the environmental friendly of shallot cultivation technology. If it is related with the results of the post-test the farmer's knowledge (Table 1), ideally dominated by a positive attitude, because according Notoatmojo (1997) and Walgito (2003) that, someone who has a good knowledge of an object tends to have a positive attitude towards the object. Based on analysis of farmer's attitude can be stated that, in order to convince the farmers to the environmental friendly of shallot cultivation technology seems insufficient from the aspect of knowledge, but by Azwar (2011) there are other factors that influence a person's attitude, for example: emotional factors, experience personally, the influence of others that are considered important, local customs, etc. Shallot cultivation is done 3-4 times a year by farmers in Kintamani. The high production is acquired by a package of cultivation technology on a particular planting season is not necessarily the same as the production in the next planting season. A technology can be said to be reliable if it can obtain high yields consistently in various situations and conditions.



Table 2. Results of Pre and Post-test Farmer's Attitudes about Environmental Friendly of Shallot Cultivation Technology in The Assistance Location in 2015

| Classification/score     | Before the assistance |                  |            | After the assistance |                  |            |
|--------------------------|-----------------------|------------------|------------|----------------------|------------------|------------|
|                          | Average score         | Number of farmer | Percentage | Average score        | Number of farmer | Percentage |
| Negative (25,00 – 41,66) | 33,61                 | 15               | 23,08      | 40,39                | 8                | 12,31      |
| Neutral (41,67 – 58,32)  | 49,81                 | 44               | 67,69      | 51,18                | 35               | 53,84      |
| Positive (58,33 – 75,00) | 62,72                 | 6                | 9,23       | 67,30                | 22               | 33,85      |
| Amount                   |                       | 65               | 100,00     |                      | 65               | 100,00     |

Source: Primary Data (analyzed)

This perception is thought to be one that underlies the differences between farmers who have good knowledge with the attitude of farmers who are still in doubt. Therefore, the procurement of demonstration plots and more intensive assistance in a longer time so require.

### CONCLUSION

The farmer's knowledge on environmental friendly of shallot cultivation technology increased after assistance providing. The farmer's attitude on environmental friendly of shallot cultivation after assistance providing in generally increased, but still dominated by farmers who had neutral attitude.

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**DISCUSSION FROM PARALLEL SESSION**

|                     |  |
|---------------------|--|
| <b>PAPER TITTLE</b> | Productivity Improvement and Income Efforts of Rice Farming Through The Use new Superior Variety (Case Study)  |
| <b>AUTHOR</b>       | Nyoman Ngurah A, I Ketut Mahaputra, Suharyanto, and Jemmy Renaldi  |
| <b>DISCUSSION</b>   |  |
| <b>QUESTION</b>     | <ol style="list-style-type: none"><li>1. Object, productivity, revenue, efficiency should be consistent with method of analysis and result</li><li>2. R/C analysis is not measure of efficiency there should be another method to measure</li><li>3. How to measure productivity should be defined in method of analysis</li><li>4. To compare the productivity among variety need a table</li><li>5. No cost of depreciation, no family labor cost, no cost of land rent ( those cost should be</li></ol> |
| <b>ANSWER</b>       |  |
| <b>SUGGESTION</b>   | <ol style="list-style-type: none"><li>1. Native check of English is badly needed</li><li>2. Productivity measurement should be convinient, using table will be useful</li><li>3. Using income analysis is more appropriate for this paper instead of using profit analysis</li></ol>   |



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