FoSSA 2017

PROCEEDINGS

OF THE INTERNATIONAL CONFERENCE ON
FOOD SOVEREIGNTY AND SUSTAINABLE AGRICULTURE

BUILDING OF FOOD SOVEREIGNTY THROUGH A SUSTAINABLE AGRICULTURE
Challenges toward Climate Change and Global Economic Community

FoSSA 2017

held in
Jember, East Java, Indonesia
August 01 - 03, 2017

PROCEEDINGS

of The International Conference on
FOOD SOVEREIGNTY AND
SUSTAINABLE AGRICULTURE

BUILDING OF FOOD SOVEREIGNTY
THROUGH A SUSTAINABLE AGRICULTURE
Challengers toward Climate Change and
Global Economic Community

Anggota APPTI No. 036/KTA/APPT/2012
Anggota IKAPI No. 127/JTI/2015

ISBN: 978-602-61803-4-6

Jember University Press
Jl. Kalimantan 37 Jember 68121
Telp. 0331-330224, psw. 0319
E-mail: upt-penerbitan@unej.ac.id

Jointly Organized by

SAFE Network
Asia Pacific Network for Sustainable Agriculture, Food and Energy
Connect and educate the people for a better economy, ecology, and equity

PROCEEDING OF THE INTERNATIONAL CONFERENCE OF FOOD SOVEREIGNTY AND SUSTAINABLE AGRICULTURE (FoSSA 2017) : BUILDING OF FOOD SOVEREIGNTY THROUGH A SUSTAINABLE AGRICULTURE, CHALLENGES TOWARD CLIMATE CHANGE AND GLOBAL ECONOMIC COMMUNITY

Agriculture Faculty, Jember University, Indonesia

Agriculture Faculty, Jember University, Indonesia
Agriculture Faculty Building, Tegalboto Campus, Jember, Indonesia
Email: fossa2017@unej.ac.id
Website: www.fossa2017.org
Telp./Fax : (+622331)334054

ISBN: 978-602-61803-4-6

First Published in August 2017

Editor : Wen-Chi Huang, Nobutaka Ito, Nick Rose, Isnaini Jalil, Yuli Hariyati, Mohammad Rondhi, Tri Handoyo, Hari Purnomo, Didik Pudji Restanto,
Layout : Sukron Romadhona, Susan Barbara P. SM, Himmatul Khasanah, Nurul Pratiwi
Cover Design : Priyo Sugeng Winarto

COMMITTEE

Steering Committee
Rector of University of Jember
Vice Rector I of University of Jember
Dean of Agricultural Faculty Universityof Jember
Chairman of SAFE
Dean of Agricultural Faculty of Brawijaya University
Member of SAFE Network

Scientific Committee
Prof. Nobutaka Ito (Thailand)
Prof. Wen-Chi Huang (Taiwan)
Prof. Nguyen Hui Bich (Vietnam)
Dr. Dionisio G. Alvindia (Philippines)
Dr. Romualdo (Philippines)
Dr. Novizar Nazir (Indonesia)
Prof. Dr. Yuli Hariyati, M.S. (Indonesia)
Prof. Dr. Ir. Rudi Wibowo, M.S. (Indonesia)
Prof. Tri Agus Siswoyo, M.Agr., Ph.D. (Indonesia)
Prof. Dr. Bambang Sugiharto, M.Sc.Agr. (Indonesia)
Ir. Hari Purnomo, M.Si.,Ph.D., DIC. (Indonesia)
Hardian Susilo Addy, SP., MP. Ph.D. (Indonesia)

Organizing Committee
Chairperson :
Prof. Dr. Ir. Yuli Hariyati, M.S.

Secretary :
Dr. Ir. Slameto, M.P.

Treasurer :
Dr. Ir.Evita Soliha Hani, M.P.
F.M. Ratminiwati, S.H.

Secretarial :
Rena Yunita Rahman, S.P., M.Si.
Intan Kartika Setyawati, S.P., M.P.
Ahmad Zainuddin, S.P., M.Si.
Ayu Puspita Arum, S.TP., M.Sc.
Himmatul Khasanah, S.Pt., M.Si.
Nurul Pratiwi, S.Pt., M.Si.
Amam, SPt, MP.

PIC of International Conference :
Tri Handoyo, SP., M.Agr., Ph.D.
Hardian Susilo Addy, SP., MP. Ph.D.
Wahyu Indra Duwi Fanata SP., M.Sc., Ph.D.
Ir. Hari Purnomo, M.Si., Ph.D.,DIC.

PIC of FoSSA Network Meeting dan FoSSA Workshop :
M. Rondhi, S.P., MP., Ph.D.
Dr. Ir. Slameto, M.P.
Ir. Didik Pudji Restanto, MS., PhD.
Dr. Bambang Herry P., S.TP., M.Si.

PIC of Gala Dinner and Culture Event :
Dr. Ir. Evita Soliha Hani, M.P.
Dr. Suhartiningsih Dwi Nurcahyanti S.P., M.Sc.
Intan Kartika Setyawati, S.P., M.P.
Rena Yunita Rahman, S.P, M.Si.
F.M. Ratminiwati, S.H.

PIC of Fieldtrip :
Ir. Marga Mandala, MP., Ph.D.
Mohammad Ubaidillah S.Si., M.Agr., Ph.D.
Ahmad Zainuddin, S.P, M.Si.
Drs. Yagus Wijayanto, MA., Ph.D.
Illia Seldon Magfiroh, S.E, M.P.

WELCOMING SPEECH

Rector of University of Jember: Drs. Moh. Hasan, M.Sc., Ph.D.

One of the numerous challenges we face today to overcome the problem of uncontrolled human population growth is the imbalance between supply and demand for food and energy. These would impact in general to the environment and the quality of life. To respond these global challenges, the development of technologies for food and natural resources aiming to create sustainable agriculture will play a strategic role.

Efforts have been made by many researchers focusing on the development of technologies and management natural resources, which will lead to the application and improvement of agriculture systems to better provide human needs – especially in the context of food security. Producing adequate food becomes a common goal. However, such efforts to achieve food security have mainly focused on large scale corporate farming and industries. This can have regrettable impacts on small scale food producers as well as on the environment.

Hence, food sovereignty, a relatively new concept which refers to the rights of communities to choose their own policies regarding agricultural development and food production, is no less important than food security. Agricultural development therefore no longer exclusively focuses on producing enough amount of food for the human population. It now also aims to provide larger freedom for small producers and farmers.

We believe that achieving sustainable agriculture is essential in order to achieve food sovereignty. In line with the efforts to develop agricultural innovations, University of Jember has established many facilities and research centers, such as the Agrotechnopark and the Center for Development of Advanced Science and Technology (CDAST). Furthermore, University of Jember fully supports this conference as a medium for researchers to share their research results including technological innovations, and to engage research collaborations in the area of agriculture for the quality and welfare of mankind.

Lastly, I would like to give my warmest greeting to all presenters and participants of this conference. I appreciate your commitment for the successfull of this conference. Thank you.

Jember, August 1st, 2017
Rector,

Moh.Hasan

Dean of Faculty of Agriculture-University of Jember: Ir. Sigit Soeparjono, MS, Ph.D.

Assalamualaikum Wr. Wb.

Praise goes to the most merciful God Allah SWT for the blessings of life and knowledge for us to gather in this meaningful occasion.

To start with, I would like to warmly welcome the heads of both Indonesian and foreign universities to the Faculty of Agriculture, University of Jember, Indonesia. It is a great pleasure to have you with us today.

This event is a reflection of our faculty'scommitment to always improve the quality of our education and to accommodate more and more opportunities in academic collaborations. We have been working hard to refine our agricultural research facilities and to offer students increasingly more comprehensive and extensive methods of learning in the world of agriculture.

Today, the development of modern agricultural systems and techniques has brought us many benefits. However, these benefits have often come at a certain costs, such asnegative ecological impacts andthe decreasing quality of working conditions for farmers. Such negative consequences have made us realize that agriculture must also take into account the preservation of the environment and the rights and welfare of food producers themselves. This is what we know as sustainable agriculture.

Therefore I believe this international conference will be able to present an interesting discussion on the aforementioned topic, with prominent speakers from Indonesia, Australia, Japan, Sri Lanka, Malaysia, Taiwan, and Philippines, giving a contribution to the development of science, and hopefully encouraging more research on this area.

I would also like to congratulate the Faculty of Agriculture, University of Jemberas the main host of this international conference, along with four other co-hosts which include Brawijaya University, Andalas University, Warmadewa University and UPN Jatim. May it support efforts to become world-class universities in the near future.

I also wish to thank all the sponsors who have provided financial support for this event, and to everyone else who has helped make this event possible.

Finally, I would like to convey a warmest welcome to all the distinguished guests and participants of this international conference.We are truly grateful for your presence today. May we have a fruitful discussion and may we all gain new and valuable knowledge.

Wassalamuallaikum Wr. Wb.

Jember, August 1st 2017.

Dean,

Sigit Soeparjono

Message from Chairman: Prof. Dr. Ir. Yuli Hariyati, MS

Assalamualaikum Wr. Wb.

Ladies and gentlemen ...
First of all, I would like to expressed my gratitude to all of you .. for being present and participate in this FoSSA 2017 International Conference. This conference addresses all experts in food sovereignty from many different countries with the main theme of : "**Building of Food Sovereignty through a Sustainable Agriculture: Challenge of Climate Change and Global Economic Community**".
Lately, the concept of food-sovereignty and sustainable agriculture are still very attractive among government-officers ... activist ... academician and also grassroot-elements.
Food sovereignty is defined as the right of every person ... every society ... and every country in the world ... to determine its own food policy by prioritizing local food products for their own needs, and forbidding the practice of food trade by means of dumping.
In principle .... each country has their own right to determine and control its own food-production, distribution and consumption systems ... in accordance with local ecological, social, economic, and cultural conditions, as well as its own sovereignty.. no intervention of others.
Food Sovereignty term was first introduced by the international peasant organization La Via Campesina at the World Food Summit (WFS), in November 1996 in Rome, Italy.
Moreover.. Food Sovereignty has even been declared by 400 delegates of farmer organizations, indigenous-peoples, fishermen, NGOs, social activists, academician and researchers from 60 countries at the World Forum on Food Sovereignty in Havana ... September 2001.
Therefore ... currently ... collective bargaining for food sovereignty is a global issue.
FoSSA 2017 International Conference activities will cover four main activities, namely :

- FoSSA2017 International Seminar
- FoSSA Meeting and SAFE Workshop
- FoSSA Cultural-Event
- Bromo Tengger FoSSA-FieldTrip

The seminar covers 5 sub-topics ...
(1) Food Sovereignty dimensions in sustainable agriculture production systems, current situation, challenges and opportunities;
(2) Recent advances on the climate change information and mitigation systems in agriculture and its practical implications on small-scale mixed-farming operations;
(3) Sustainable agriculture production system on food, strategic-products and energy diversifications: policies and lesson learnt;
(4) Fostering / Building a global action for cooperation and policy development towards sustainable agriculture;
(5) The local resources utilization and the local-wisdom on sustainable agricultural production systems : with special emphasis on the global economic community.

At this moment ... we are now 258 participants from Myanmar, Japan, Thailand, Sri Lanka, Germany, VietNam, Bhutan, UK, Phillippine, Australia, Korea, Malaysia, and Indonesia... 205 oral presentations and 28 poster presentations and other would be performed..
FoSSA2017 seminar will present 15 speakers ... this morning we have Dr. Nur Masripatin (Director of PPI) ... Dr. Nick Rose (Executive Director of SUSTAIN: The Australian Food Network) ..... and also 13 speakers from Japan, Taiwan, Malaysia, Philippines, Sri Lanka, Australia, and Indonesia.

We would like to thank to The Directorate General of PPI, PTPN X, BRIA-Germany, and The Research Institute – University of Jember for sponsorships.
And also to UPN University .. Warmadewa University ... and Andalas University ... and The Asia-Pacific SAFE Network .. for collaborative-hosting this FoSSA2017 Conference..

Wassalamualaikum WRB

Jember, August 1st, 2017
Chairperson of FoSSA International Conference

Yuli Hariyati

DIFFUSION OF "LELANG SYSTEM" AND FARMER CHOICE ON IRRIGATION WATER MANAGEMENT MODEL

(Case Study in Klambu Wilalung Irrigation Area, Kedung Ombo Dam, Central Java)

Mohammad Rondhi[1], Yasuhiro Mori[2], Takumi Kondo[3]

The University of Jember, Indonesia.
[2] Graduate School of Agriculture, Hokkaido University, Japan.
[3] Research Faculty of Agriculture, Hokkaido University, Japan.

email: rondhi.faperta@unej.ac.id

ABSTRACT

In Indonesia irrigation water management in tertially canal is otonomusly organized by water usage assosicition (WUA). The management varies among areas and periods. In Klambu Wilalung irrigation area last four decades some WUAs has experienced some managements change, that are ulu-ulu system within 1980s, dharma tirta system within 1990s, "P3A-swakelola system" in 1990s-now, and recently "P3A-lelang system" that has first time being apllied since 2005. Nowdays the two latter systems are most applied systems in the area. The lelang system means WUA as water supplier has to provide some budget in advance in order to get a right in water management. This might have more benefit to farmer. However, the spreading of lelang system in the area is still unidentified. The aims of the research are (1) to know the spreading of the "lelang system" (2) to understand main factor of farmer choice in water management system, (3) to know correlation of area, contract period, and productivity to value of lelang. This research is conducted by cencus to 34 WUA in Klambu Wilalung irrigation area, Kedung Ombo dam, Central Java. This data is analysed by descriptive quantitaive method by Pearson corellation. The results show that from the WUA 67% is apllying lelang system and the rest applying swakelola system. The main reason applying lelang system is the budget availability to establish agriculture infrastructure (including irrigation infrastructure) in the initial period of geverning WUA. Then, reason applying swakelola system is the system accentuate working together (gotong royong) in managing irrigation water. Furthermore, area has positive and significant correllation to value of lelang, while contract duration and productivity don't have correlation to value of lelang. This research also find that some WUAs that applied contract system change to swakelola system. This research conclude that farmer choice to water irrigation system is depend on good governance of WUA.

Keywords: Swakelola system, lelang system, irrigation water management, tertially canal.

BACKGROUND

Irrigation is main supporting factor to boost food production. Booth (1977) and Norton (2004) mention that irrigation has been of much of the agricultural production and growth. Furthermore, Norton (2004) sited that in low income countries agriculture sector consumes 91% water, while in medium-income countries it consumes 69%. This figure shows that irrigation is important part of live to support food production.

Government in the rest of world has been massively developed irrigation system during 19th and 20th century. This effort proofed in improving agriculture growth (Booth, 1977). However some issues emerged related to this irrigation system. That are (1) some irrigation systems has been old therefore some canals has been deteriorated, (2) some conflicts emerge among water user (farmer) especially those who belong some plots in intake

area and those who belong some plots in tail area, (3) budget limitation to maintain and operate the canal. The third is main issue in irrigation management.

Water management in tertially canal is outonomusly organized by water usage association (WUA). The management varies among areas and periods. In Klambu Wilalung dam (Kedung Ombo system) last four decades some WUAs has experienced some managements change, that are ulu-ulu management within 1980s, dharma tirta management within 1990s (Duewel, 1984), "swakelola management" in 1990s-now, and recently "lelang management" that has first time being apllied since 2005 (Rondhi, 2016a). Nowdays the two latter systems are most applied systems in the area. The lelang management means WUA candidate as water supplier has to provide some budget in advance through "auction system" in order to get a right in water management. The budget is alocated to maintain canal and to operate irrigation. Then, swakelola management bases on discussion among representative farmer to manage irrigation water. The managements have its advanatages and disadvantages. However, the spreading of lelang system in the area is still unidentified. The aims of the research are (1) to know the spreading of the "lelang management" (2) to understand main factor of farmer choice in water management system, (3) to know correlation of area, contract period, and productivity to value of lelang.

THEORITICAL FRAMEWORK

In Indonesia, in technical irrigation system water flows from primary canal to secondary and tertially canals. Irrigation management in primary and secondary canals are responsibility of central government, whereas tertiary canal is otononomously governized by water usage association.

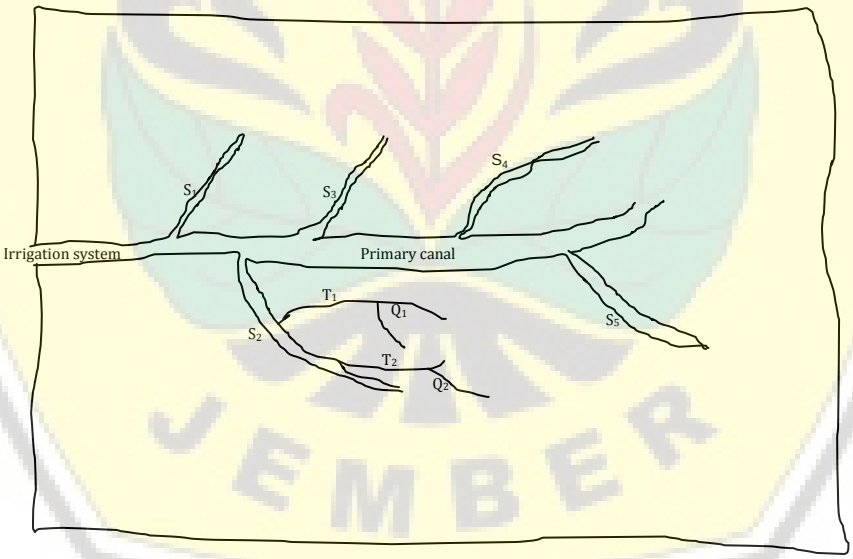

Figure 1. Illustration of Irrigation system
Notes: S=secondary canal; T=tertiary canal; Q: Quarterly canal
Source: Rondhi, 2016b

Irrigation water management varies around the world. The irrigation management form can be classified as fully governized by government, partly by government and farmer, and fully governized by farmer. In addition, in some countries there are several practices of local irrigation management form that are contract, lease, auction, and water supply companies (Norton, 2004). A contract means transfering some government duties to private agent to manage irrigation system including delivering water to farmer, maintaining and operating the irrigation system. A lease is a slight modification of contract system where the

infrastructure is in good conditions. The a auction model is appplied wehere there are several agencies which compete to manage the irrigation system.

Actually, the irrigiation system is belonging to government. However, due to limitation of budget to operation and mantaining cost (O&M) the management is delivered to the agency (contractor or other parties including farmer). Theoretically, main objectives of water management are efficiency, equity, and sustainability. Efficiency refer to technical meaning, reduction water losses, and increasing net economic returns (Norton, 2004). The equity means providing irrigation to all farmers along an irrigation system without any favoritism (FAO, 1999). Then sustainability points out that maintaining water and soil quality and correct balance of water resources.

In some areas in Indonesia, lelang model and swakelola model are major model that being aplicated. Lelang model is relatively the same with auction model. Lelang model means transfering some government duties in water delivering water to farmer and operating and maintaining the system (canal) to agent either farmer or other parties. Besides, the agent have to provide some budget in order to get right to manage the system. The budget is alocated to provide agriculture As compensation, the agent receives water fee from farmer. Swakelola model is relatively the some with contract model as mentioned above. The model does not require any budget to get right to manage irrigation system. Indeed, the agent may save money in order to establish agriculture infrastructure annually.

METHODS

This research focuses on diffusion of lelang management that being practiced by some WUA (Perkumpulan Petani Pemakai Air) that spreading out in Klambu Wilalung irrigation area, one of branch of Klambu dam (detail see picture 1). The area covers 20 villages within two subdistricts. The data collected by cencus to 34 P3A through observation and structured questionare. The objective 1 and 2 were analyzed by descriptive analysis, while objective 3 was analyzed by Pearson Corellation.

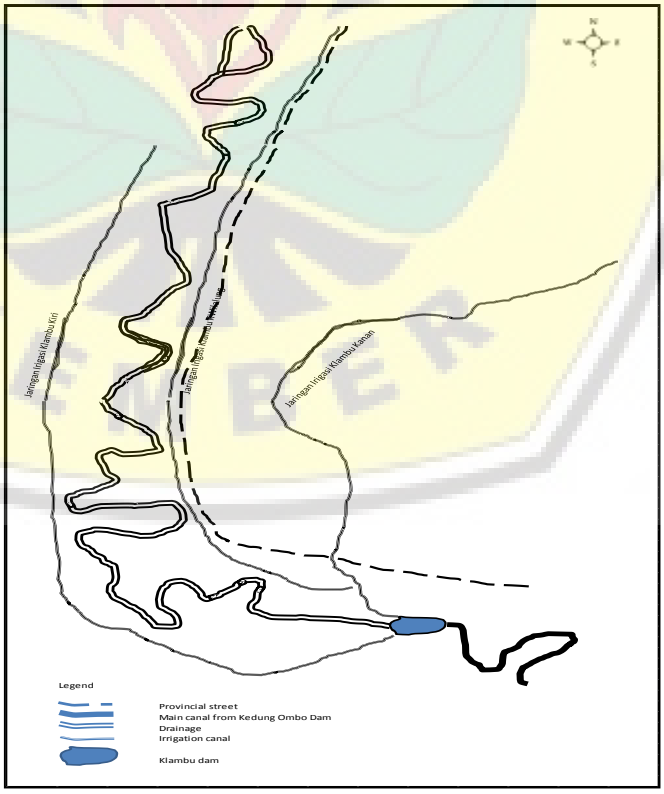

Figure 2. Research Site

RESULTS

Water management in tertially canal is autonomusly managed by water usage association. In the research site the distance between intake area to tail area is 40 km^2. Based on information from water officer (person in charge to flow water in Klambu dam) irrigation water flows during season 1 (Oktober to January) and season 2 (February to June), While July to September irrigation water is off, instead the water is adreesd to domestic usage. This water supply effects to time to start planting. While in intake area irrigation water is available a while after water flow from gate, in tail area water availability is up to a month after water flow from gate.

The number of WUA within a village varies 1-3 WUA depended on water source and farmer requirement. The number of board member of a WUA varies 3-20 person depended on area and farmer availability to manage WUA. The larger area has possibility to have more board member. Farmer availability to manage WUA may rely on economic insentive.

Institutionally, WUA board member is elected during general meeting. In swakelola system chairman is elected by discussion, whereas in lelang system the chairman is elected by auction sytem, where the highest bidding is autonomusly decided as chairman. Besides, the meeting also decides (1) water management system in the WUA, (2) what agricultural infrastructure should be establish, (3) how to maintain tertiary and quarterly canal, (4) how to control any crops enemies such as vermin attack, (5) water fee that being paid by farmer (Rondhi, 2016).

Table 1. General conditions in Klambu Wilalung Irrigation Area

	Unit	Min	Max	Average
Coverage of Irrigated area (per WUA)	(bahu ≈ ¾ ha)	60	717	235
Number of WUA each village	Unit	1	3	1
Number of board member each WUA	Person	3	20	8
Contract period to manage WUA	Year	2.5	23	4
Land productivty	(ton/bahu)	4.5	8	5.9

Source: Primary data, 2017

Diffusion of Lelang Management

Among the 34 WUA, 67% WUA is applying lelang management, while the rest is not. This means lelang system is well diffused during last ten years (it was introduced by 2005). The story behind the lelang system was farmer necessaty to improve irrigation infrastructure, especially during rainy season (end of season 1) where some coverage areas were stagnated by floaded water. To improved the infrastructure (drainage infrastructure) required a lot of money. While government fund was limited, the WUA initiated to collect money from board member. Besides, farmer also required agriculture road infrastructure to carry agriculture input and agriculture yield from farmer sites their plot. The availability of investment budget attract farmer along Klambu Wilalung irrigation area to aplly the lelang system.

Opposite of lelang system, swakelola system stresses on working together (gotong royong) among board member and ordinary member (farmer). Instead of providing investmernt budget to establish agriculture infrastructure, swakelola system save money from water fee collected from farmer in every season. Actually, the saved money in every season was also purposed to establish agriculture infrastucture. However, in some casess the money was not collected due to poor management.

Effecting Factors to Select Water Management

Selecting water management system (either swakelola or lelang system) is outonomusly depended on farmer choice. Farmer has right to evaluate previuos WUA's performance. If farmer is satisfied to the performance (good performance), farmer tend to choose the same system and same board member for the next period management. In another side, if farmer is not satisfied to WUA's performance (poor performance), farmer tend to choose different system and different board member.

WUA that applying lelang system responded that reasons in selecting lelang system are (1) WUA provides investment budget to establish agriculture infrastructure, (2) board member has more responsibility to manage WUA, (3) in some cases farmer follows village officer suggestion to apply the system. In lelang system board member has to pay in advance some amount of money to get right to manage WUA. Because board members pay in advance to get right in managing WUA, they will work hardly to manage it in order to get the money back. This is positive opinion of lelang system. Village officer has insentive to suggest farmer to select the lelang system. By suggestion this village office has more budget to provide agriculture infrastructure. In some cases provided agriculture infrastructure was manged by village office (committee).

Some WUAs choose swakelola system than lelang system. This is due to the system emphasis on working together to establish agriculture infrastructure. Board member is selected by discussion that has more possibility that board member comes from farmer, rather than lelang system that board member is decided by money availability to be board member. If board member is selected by providing some amount money, board member has less effort to manage WUA, instead they work to get the money back. This is negative opinion of lelang system. Negative opinion to swakelola system is its difficulty to provide investment budget to provide agriculture infrastructure. Actually the system also allocate some budget to be invested in the end of season. However, bacause the poor management achievement, the budget was not wll collected.

This finding argue that either swakelola system or lelang system has possibility to be elected by farmer. It is depended on WUA's performance during previous periods. If performance of WUA is satisfied enough, it will be selected again in the next period. In another side, if performance of WUA is poor, it will be abandoned in the next period.

Corellation between Covrage Area, Contract Period, and Land Productivity to Lelang Value

Lelang sytem (contract system) is relatively new being practiced in irrigation water management. Farmer selected this system due to its advantages to establish agriculture infrastructure. The value of contract vary Rp 20 million to 1 billion. The interesting question is which factor effect to value of lelang. Based on data, factors that effect to lelang value are coverage area, contract period and land productivity.

Furthermore, coverage area has positive and significant correllation to value of lelang with 0.642 Person corellation. The higher coverage area managed by WUA, the higher value of lelang. The data shows that the valu of lelang for 60 bahu is Rp 60 million, while for 717 bahu is Rp 275 million.

Contract period to manage P3A and land productivity is statistically not significant effect to value of lelang by -0,144 and 0,096 pearson corellation. The sortest contract period, 2.5 years, has Rp 50 million, while the longest contract period, 10 years, has Rp 350 million. The lowest land productivity is 4.5 years by Rp 705 million of lelang value, while the highest land productvity is 8 years by Rp 275 million.

CLOSING REMARKS

Irrigation water management has been changed by time depend on farmer necessety. Swakelola system is being practiced by WUA during last two decades, while lelang system by last decade. Diffusion rate of lelang system is 67% and the rest, 33% is applying swakelola system. This means that the system is well diffused in Klambu Wilalung irrigation area. Lelang system emphasis on availability of investment budget, while swakelola system put

more attention to working together to manage WUA. Main factor for farmer to select irrigation management system is performance of WUA in previous period, which means good governance of WUA is key factor to manage WUA. The value of lelang is based on irrigated area. The higher coverage area, the higher value of lelang.

REFERENCES

Booth, A., 1977, Irrigation in Indonesia Part I, Bulletin of Indonesian Economic Studies, Volume 13, Issue 1.

Booth, A., 1977, Irrigation in Indonesia Part II, Bulletin of Indonesian Economic Studies, Volume 13, Issue 2.

Duewel J., 1984, Central Java`s Dharma Tirta WUA Model: Peasant Irrigation Organization Under Condition of Population Pressure, Agricultural Administration (17) 261-285.

FAO, 1999, Transfer of Irrigation Management Services (Guidelines), Food and Agriculture Organization of the United Nations, Rome based on International Water Management Institute, Rome.

Rondhi M., Mori Y., Kondo T., 2016a, Institutional Arrangement of Irrigation Water Management in Rural Area (Case Study of a WUA in Central Java, Indonesia), Proceeding of International Conference on Strengthening of Indonesian Agribusiness: Rural Development and Global Market Linkages, page 349-356.

Rondhi M., Mori Y., Kondo T., 2016a, Institutional Change and Its Effect to Performance of Water Usage Association (WUA) in Irrigation Water Management, Proceeding of International Conference on Agribusiness Development for Human Welfare, page 68-74.

Norton, R.D., 2004, Agricultural Development Policy: Concept and Experiences, John Wiley & Sons, Ltd, West Susex.