

## **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<sup>1</sup>, Yasuhiro Mori<sup>2</sup>, Takumi Kondo<sup>3</sup>

The University of Jember, Indonesia.

<sup>2</sup> Graduate School of Agriculture, Hokkaido University, Japan.

<sup>3</sup> Research Faculty of Agriculture, Hokkaido University, Japan.

email: rondhi.faperta@unej.ac.id

### **ABSTRACT**

In Indonesia irrigation water management in tertiary canal is autonomously organized by water user association (WUA). The management varies among areas and periods. In Klambu Wilalung irrigation area last four decades some WUAs have experienced some management changes, 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 been applied since 2005. Nowadays 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 census to 34 WUA in Klambu Wilalung irrigation area, Kedung Ombo dam, Central Java. This data is analysed by descriptive quantitative method by Pearson correlation. The results show that from the WUA 67% is applying lelang system and the rest applying swakelola system. The main reason for applying lelang system is the budget availability to establish agriculture infrastructure (including irrigation infrastructure) in the initial period of governing WUA. Then, reason for applying swakelola system is the system accentuates working together (gotong royong) in managing irrigation water. Furthermore, area has positive and significant correlation to value of lelang, while contract duration and productivity don't have correlation to value of lelang. This research also finds that some WUAs that applied contract system change to swakelola system. This research concludes that farmer choice to water irrigation system is dependent on good governance of WUA.

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

### **BACKGROUND**

Irrigation is a 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) cited that in low income countries agriculture sector consumes 91% water, while in medium-income countries it consumes 69%. This figure shows that irrigation is an important part of life to support food production.

Government in the rest of the world has been massively developing irrigation systems during the 19<sup>th</sup> and 20<sup>th</sup> century. This effort proved in improving agriculture growth (Booth, 1977). However, some issues emerged related to this irrigation system. That are (1) some irrigation systems have been old therefore some canals have been deteriorated, (2) some conflicts emerge among water users (farmers) especially those who belong to 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 tertiary canal is autonomously 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 (Duwel, 1984), "swakelola management" in 1990s-now, and recently "lelang management" that has first time being applied since 2005 (Rondhi, 2016a). Nowadays 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 allocated to maintain canal and to operate irrigation. Then, swakelola management bases on discussion among representative farmer to manage irrigation water. The managements have its advantages 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 tertiary canals. Irrigation management in primary and secondary canals are responsibility of central government, whereas tertiary canal is autonomously governed by water usage association.

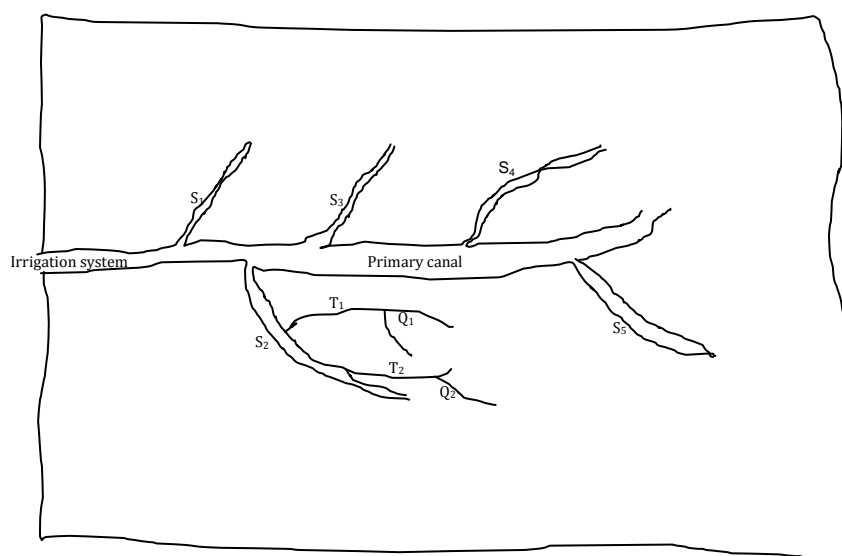


Figure 1. Illustration of Irrigation system

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 governed by government, partly by government and farmer, and fully governed 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 transferring 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 applied wehere there are several agencies which compete to manage the irrigation system.

Actually, the irrigation 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 transferring 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 allocated 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 tertiary canal is autonomously managed by water usage association. In the research site the distance between intake area to tail area is 40 km<sup>2</sup>. Based on information from water officer (person in charge to flow water in Klambu dam) irrigation water flows during season 1 (October to January) and season 2 (February to June), While July to September irrigation water is off, instead the water is addressed 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 incentive.

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 system, where the highest bidding is autonomously decided as chairman. Besides, the meeting also decides (1) water management system in the WUA, (2) what agricultural infrastructure should be established, (3) how to maintain tertiary and quarterly canal, (4) how to control any crop 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 $\approx \frac{3}{4}$ 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 productivity	(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 necessity to improve irrigation infrastructure, especially during rainy season (end of season 1) where some coverage areas were stagnated by flooded 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 apply 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 investment 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 infrastructure. However, in some cases 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 autonomously depended on farmer choice. Farmer has right to evaluate previous 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 incentive 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 managed 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, because the poor management achievement, the budget was not well 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.

#### Correlation between Coverage Area, Contract Period, and Land Productivity to Lelang Value

Lelang system (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 correlation to value of lelang with 0.642 Pearson correlation. The higher coverage area managed by WUA, the higher value of lelang. The data shows that the value 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 correlation. The shortest 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 productivity is 8 years by Rp 275 million.

#### CLOSING REMARKS

Irrigation water management has been changed by time depend on farmer necessity. 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 Sussex.