Institutional Change and its Effect to Performance of Water Usage Associtions in Irrigation Water Managements

(A Case Study in a Water Usage Association (WUA) in Kedong Ombo Dam, Central Java)

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Abstract

Water irrigation plays an important role in increasing land productivity. Kedung Ombo Irrigation system is one of governmental establishment dam that fullfill agriculture irrigation water need in four related region; Grobogan, Kudus, Pati and Demak district. In structure, there are four types of canal to flow water from Kedung Ombo dam to farmer plot; primary, secondary, tertiary, and quartery canals. The first two are managed by government, while the another two are manged by water usage association-WUA or Perkumpulan Petani Pemakai Air-P3A. Our research concern is the last two; tertiary and quarterly canal management. Since 2005, farmer has been introduced indegeneusly ″lelang system″ as an alternative to manage irrigation water in farm level as replacement of ″swakelola system″. The lelang system provide more right to farmer; not only water right but also improving agriculture infrastructutre. One of P3A is a P3A that located in Kalirejo, Undaan Sub-district, Kudus District that started to adopt the system since 2007. However, since in the lelang system head of P3A is decided by highest bidder that potentially not the farmer, their achievement to manage water and other agriculture activities were not satisfied enough. Unless in 2015 farmer tried to return the system back to swakelola system with some modification that we call as lelang-swakelola system. This research aim to (1) describe institutional change of irrigation management system in a P3A, (2) compare performance of two irrigation water management systems; lelang system and lelang-swakelola system. The data was collected from P3A seasonal record and depth interview to key infromants. The results show that lelang-swakelola system give more right to farmer: (1) providing agriculture infrastructure, (2) maintaining tertiary and quarterly canal, and (3) conducting pest control. The first two duty was the same with the lelang system, while the the last is additional duty as conducted by swakelola system before 2007. The performnace of lelang-swakelola system is known better than lelang system. This research is preliminary research that need to be expanded in more coverage the get more comprehensive finding.

Keywords: *irrigation water management, lelang-swakelola system, lelang system, performance.*

Introduction

Water irrigation plays an important role in increasing land productivity. Long story regarding to water infrastructure development was devide into four major era as mentioned by Gany (2010), that are (1) before Dutch Colonization that establish water resources system to avoid flood; (2) Dutch colonilalization era (1600-1940) that established several dams that also to avoid flood such as Malahayu dam and Sempor dam in Central Java, Sempor dam Setupetok Dam in West Java, Pascal dam and Prijetan dam in East Java; (3) Japan occupation era that established some water infrastructure such as Tuluangung Tunnel, Citanduy River, Solo City that both proposed flood control and increase food production (4) After independence era that established water infrastructure such Jatiluhur dam in West Java in 1967, Sutami dam in East Java 1972, Cacaban dam in Central Java in 1959.

Kedung Ombo Irrigation system is one of governmental establishment dam that estabshied in 1990s that fullfill agriculture irrigation water need in four related regions; Grobogan, Kudus, Pati and Demak district. Worldwide, irrigated area had been expanded from 1950s to 1980s through government infrastructure program. After that period, many governments found its difficulty to finance the recurring costs of

irrigation or to collect water charges from farmers (FAO, 1999).

In structure, there are four types of canal to flow water from Kedung Ombo dam to farmer plot; primary, secondary, tertiary, and quartery canal (See figure 1). The first two are managed by government, while the another two are manged by water usage association-WUA or Perkumpulan Petani Pemakai Air-P3A. Historically, water management in tertiary and quarterly canal in Central Java (including Kedong Ombo irrigation system) has changed by the time. Before 1976 it was managed by *ulu-ulu*[1] (Booth, 1977). Plots were cultivated based on rain fed intake. Then, after 1976 it had been changed by *dharma tirta*. Plots are cultivated by rainfed and semi technical irrigation (Duewel J., 1984).

Since 2005, farmer has been introduced indegeneusly ″lelang system″ as an alternative to manage irrigation water in farm level as replacement of ″swakelola system″. The lelang system provide more right to farmer; not only water right but also improving agriculture infrastructutre. One of WUA is a WUA that located in Kalirejo, Undaan Sub-district, Kudus Regency that started to adopt the system since 2007 (Rondhi *et. all*, 2016). However, since in the lelang system head of WUA is decided by highest bidder that potentially not the farmer, their achievement to manage water and other agriculture activities are not satisfied enough. Until in 2015 farmer tried to return the system back to swakelola system with some modification that we call as lelang-swakelola system. This research compares performance of two different irrigation water management systems; lelang system and swakelola-lelang system.

[1] Ulu-ulu is a person who is pointed by village authority to manage water in a farm area. Ulu-ulu does not receive any water fee for his job. As compensation, he receives a customary plot that being able to be cultivated with crop. Dharma tirta is an farm organization that manage water in a farm area. Board member of the dharma tirta is elected in general meeting. They receives water fee as compensation.

Theoritcal Framework

Irrigation water is common pool resources. Management of water irrigation can be either self-organization or self-governance that closely related to how to organize and govern themselves to obtain continuing join benefits when all face temptations to free-ride, shirk, or otherwise act opportunistically (Ostrom, 1990).

Main objectives of water management are efficiency, equity, and sustainability. Norton (2004) mention that efficiency refers to technical meaning (reduction water losses) and to increase net economic returns. The first related to how generate and maintain irrigation infrastructure, whereas the second related to how distributing water to whom it is addressed. FAO (1995) describes the equity objective is providing irrigation to all farmers along an irrigation system without any favoritism. This refer to some cases that poor farmers in the tail end of irrigation system has unreliable access. The term sustainability points out that maintaining water and soil quality and correct balance of water resources. This is related long term objective that water availability is necessary condition for all the time.

Some problems regarding to equity objectives, that are (1) farmer in the tail area get lower access to the water; (2) the tertiary canal is not well constructed. Therefore water management system that can reduce the problem can create equity and tend to be efficient.

Institutionally, there are several types of irrigation system that vary among country. In national level, the interaction among scheme might have better achievement. In the farm level (small schemes) there are many types of water irrigation management. To mention a few are joint allocation by user and government, individual allocational decision by owners of infrastructure, and administrative allocation, user-based allocation system, and market

allocation of tradable water rights. In small (farm) level, farmers can be owners of the entire system that is possible to manage water by themselves (Norton, 2004).

Institutional Performance of water management system can be defined as achievement of the system to distribute water and to maintain canal.

Fekete and Stakhiv in Bhaduri et al (2014) mentions that there several instrument in governing institutional arrangement; which are technical measure, economic measure, administrative information systems, legal measure, institutional regulatory bodies, social and participatory measures.

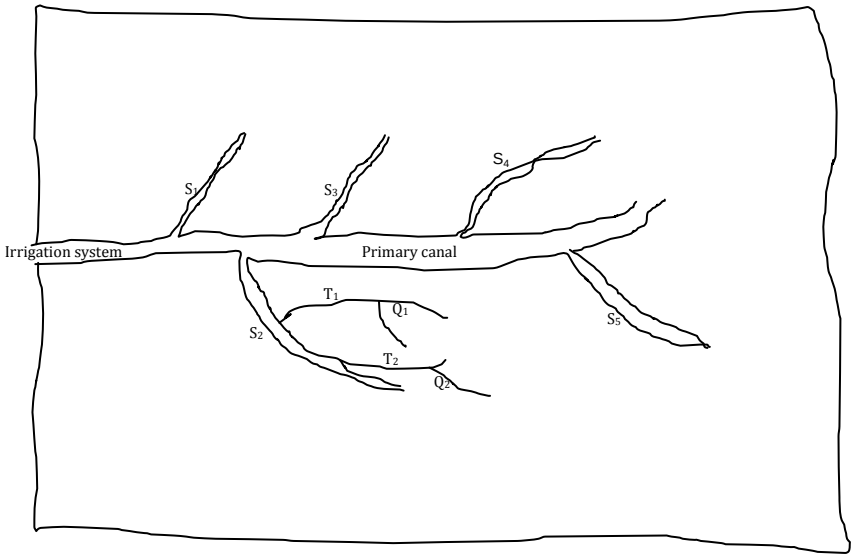
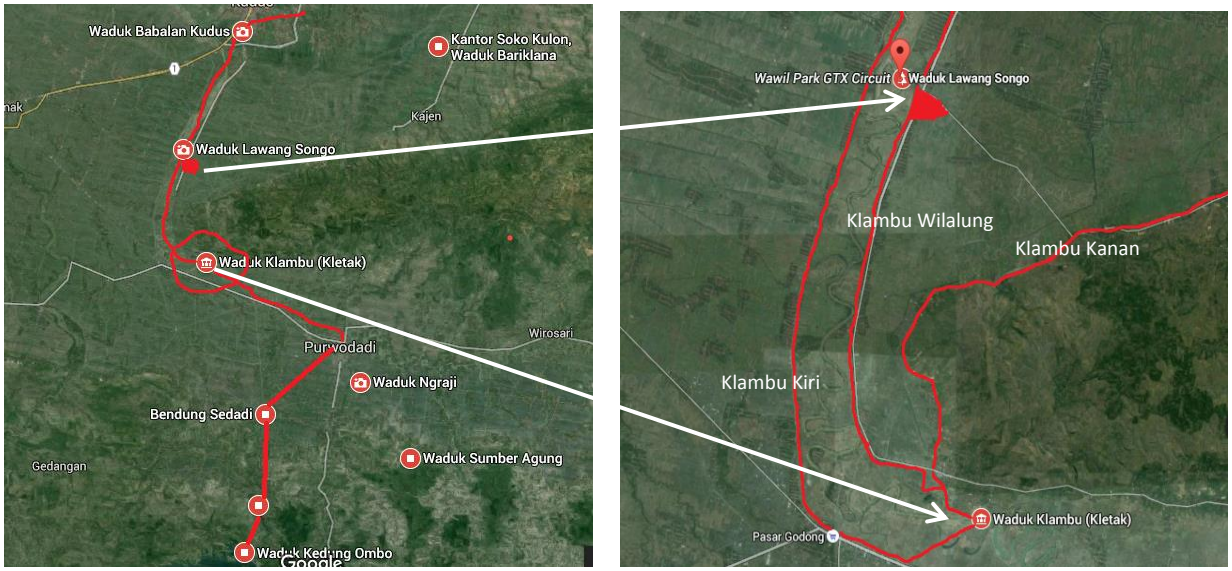


Figure 1 Illustration of Irrigation system
Notes: S=secondary canal; T=tertiary canal; Q: Quarterly canal

Methods

Kedongombo is one of biggest dam in Central Java besides Gajah Mungkur dam. Klambu Wilalung dam is one of three integrated dam, branch of Klambu dam (detail see picture 1). This research is purposively selected in a WUA in Kalirejo Village, one of P3A in Klambu Wilalung dam that has been experiencing swakelola and lelang system in irrigation water management.



Picture 2. Kedung Ombo Irrigation system

The data was collected through WUA seasonal record, observation and depth interview. Seasonal record was collected from WUA 2014-2015 when was applying lelang system and seasonal record when applying swakelola-lelang system 2015-2016. Observation was conducted by observed to agricultural infrastructure that being established by swakelola-lelang system. Depth interview was carried out to key informants to know performance of WUA, including representative of farmer.

The data was analyzed descriptively with economic and social approach. Economic analysis Descriptive analysis describes the performance of swakelola system and swakelola-lelang system.

Results and Discussion

This research concerns on institutional change and its performance of a WUA that was applying lelang system (2007-2015), but move to swakelola-lelang system afterwards. Before 2007 the WUA applied swkalola system that concerned on discussion and working together (gotong royong) as main idea. General meeting is integrated process to decide what kind of irrigation water management system that being used for spesific period. Table 1 show lelang system was applied two times, that are 2007-2011 and 2011-2015.

Physically there is no difference coverage area and water fee before and after 2015. That coveragae area is 72 bahu, and water fee is 100kg/bahu. The main difference of the two systems is the head of WUA is how to decide the system, by auction for lelang system and by discussin for swakelola system. The detail can be shown at Table 1.

Table 1. The general condition of swakelola system and swakelola-lelang system

Descriptive	Swakelola system	Lelang system	Swakelola-lelang system
Period	< 2007	2007-2015	2015 – 2020
Deciding chairman	discussin	Auction	discussion
Payment in advance over establishing agriculture infrastructure	-	Yes	Yes
Number of board member (person)	na	10	16
Board member	farmer	farmer and people who are able to pay	Farmer
Maintaining and organizational activities	- working together	- hiring worker	- working together (gotong royong) - hiring worker (if needed)
Water fee (kg/bahu[2])	100	100	100
Coverage area (bahu)	88	88	88
Obligation	– maintain tertiary and quarterly canal – pest control	maintain tertiary and quarterly canal	– maintain tertiary and quarterly canal – pest control

Notes:
* 1 bahu ≈ ¾ ha.
na : not available

The main factor of movement from swakelola to lelang system was the availability of budget to establish rural infrastructure provided by lelang system, that potentially managed by rich farmer or rich people (not farmer). This condition potentially causes poor achievement of maintenance and even pest control. Therefore, the system has been changed to swakelola-lelang system which make sure that the board member must be farmer. By this, the maintain activity should be better that before.

Performance of Two Water Management Systems

The term performance means achievement of water management systems based on economic and service indicator (quality of achievement). Economically performance is calculated as ratio actual yield and potential yield, while service indicator is defined as the frequency of maintenance and pest control activity and attendance of board member in the activities.

Based on WUA record and interview we know that potential yield from 88 bahu is 9549 kg[2]. The water fee collected by swakelola-lelang system was 9,515 kg, lower than lelang system, 8570. The ratio between actual yield and potential yield for lelang system and swakelola system are 90% and 99, respectively. Economically swakelola-lelang system has higher achievement that lelang system.

Most of the maintenance canal expenses of lelang system is addressed to pay hired worker. This is due to board member of the WUA part time farmer that spent their time not in agriculture job. In another side most of canal maintenance expenses and pest control expenses for swakelola-lelang system is addressed for meal during working together. Some activities had done by hiring worker due its complexity of the job that qequires more worker at the time.

Working together (*kerja bakti*) is main advantage of swakelola-lelang system. For one season along, there are 9 times canal maintain activity and 5 times pest control activity (Table 3). By these, farmer may feel satisfy with WUA performance.

[2] Actually the potential yield from water fee is 8.800 kg (88 bahu x 100kg). Bacuase of uncertain plot size belonging to a farmer, and the plot size is narrow, then calculation is by assesement. For example, the plot size more than 1/2 bahu but les than 2/3 bahu, then water fee is in between 50 – 66 kg. Then the water fee might be 60 kg.

Table 2. Revenue, cost, and profit of lelang and lelang-swakelola systems

	Lelang	Lelang-swakelola
Revenue		
Yield	8,570	9,515
Price	4,321	4,634
Total revenue	37,027,300	44,097,000
Cost		
Maintenance expenses	7,885,000	4,128,000
Pest control expenses	-	585.500
Collecting water fee	2,700,000	3,763,000
Administrative fee (thanks giving)	1,860,000	3,200,000
Sharing with farmer group	1,800,000	-
Management expenses	-	6,847,500
Total cost	14,245,000	18,524,000
Profit	22,782,300	25,573,000

Source: Seasonal record, 2014-2015

Table 3. Working together (*gotong royong*) for canal maintenance and pest control by swakelola-lelang system.

Seasonal activity	Frequency	Member participation (person)*
Canal maintenance	9	90%
Pest control		
- Spreading pesticide	1	90%
- Vermin population control	4	90%

Source: Observation and Seasonal Record, 2014-2015
* Average of several activities

Summary

Efficiency, equity, and sustainability are the objectives of water management. These can be achieved by good governence of water irrigation both government and farmer. Primary and secondary canal are responsibility of government, while teriary and quarterly are respnsibility of farmer. In farm level water management system had been changed by time. Before 2007 farmer applied swakelola system, then 2007-2015 farmer applied lelang system. Then, since 2015 farmer returned back toswakelola system sith some modification as called swakelola-lelang system.

Based on the research it is found that economically performance of swakelola-lelang system is higher than lelang system. Besides, swakelola-lelang system give more attention (careness) to maintain activity and pest control. This is due to board memeber of swakelola-lelang system is mostly farmer. Therefore they have same emotion to succes farmer need.

This finding may conclude that the practice of water management system will find its own best practice based on farmer need. Before 2007, the best practice was swakelola system, then move to lelang system until 2015. After that period farmer change to swakelola-system due to they need of infrastructure, canal maintain and other agricultural activities such as pest control. This is preliminary research to conduct more comprehensive research by expanding research coverage area.

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