



UNIVERSITAS UDAYANA
FAKULTAS PERTANIAN
PROGRAM STUDI DOKTOR (S3) ILMU PERTANIAN

INTERNATIONAL WORKSHOP

SUBAK MANAGEMENT ON ENVIRONMENTAL SUSTAINABILITY

SPEAKERS



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PROF. DR. IR. I WAYAN WINDIA, SU
Udayana University

DATE
JUNE 25 - 26TH 2018

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FUNCTIONS OF SUBAK AS TRADITIONAL IRRIGATION SYSTEM¹

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ABSTRACT

Agricultural development still has important roles in the economic development in Indonesia. Rice farming development should increase the productivity and quality of product by using improved agricultural practices including irrigation water management. In Bali province, *subak* as traditional irrigation system has been a local institution for supporting government in the food security program. The main functions of *subak* are relating to the distribution and allocation of irrigation water; operation and maintenance of irrigation facilities, funds raising, conflict management and ritual activities. These functions are based on the internal by-laws own by each *subak* (*awig-awig*). *Subak* system as social capital, therefore, could ensure the management of irrigation water over the year through the activities, such as mechanism of planting schedule, cropping patterns, water borrowing, including ritual ceremonies which are conducted in the relation to phases of rice planting. This could support the food security program of government.

Key words: Subak, irrigation, food security, water distribution and allocation

I. INTRODUCTION

Rice is a staple food for the big population of Indonesian, in which its demand has become higher every year. Dependency of people toward rice is very high. In Indonesia, agricultural development could not be separated with rural development since they support each other. Agricultural development, particularly on rice field (*sawah*) has significant roles on national economic development because rice constitutes a staple food for the Indonesia people. Since the beginning of New Order era, government had increased the particular agricultural program for achieving rice self-sufficiency which was finally gained in 1984. Nowadays, the national demand of rice has been increased and even it bigger than the production at the national level. It has resulted in making import policy on rice. In order to solve the import problem, the government has intensively improved rice program through intensification by applying good agricultural practices supported by other related sectors, such as irrigation development, agro-inputs provision, credit, etc.

In case of Bali, the existence of *subak* as a traditional irrigation system is still very important in the agricultural programs, especially those which are related to rice farming on *sawah* (Dewi, *et.al.* 2014; Sedana, *et.al.* 2013). Irrigation water as one of important thing for rice farming has being a problem for *subak* concerning the scarce of irrigation availability and its worse quality. On the other hand, the government has still expected for the farmers to be able to increase cropping intensity for supporting the government program, rice self-sufficiency. *Subak* might have good management in water distribution and allocation to members aside from

¹ Paper presented in the International Workshop on Subak Management on Environmental Sustainability, held by The Faculty of Agriculture, Udayana University, on June 25-26, 2018.

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managing internal social activities of *subak*. *Subak* is not only an institution in agriculture, but also as a part of Bali's local wisdom about human society and its relationship with the environment. *Subak* is a customary law community that has the characteristics of socio-religious-agriculture, which represents farmers' associations that manage an irrigation system in paddy fields. Regarding this condition, objectives of this paper is to describe socio-cultural aspects of *subak* as traditional irrigation system; and to understand the functions of *subak* in supporting rice farming development.

II. *Subak* As Traditional Irrigation System

Water is one of the most important natural resource that is being used for agricultural and non-agricultural sectors. Nowadays, scarcity and competition of water have increasingly happened including in Indonesia. In Bali province, for instance, these frequently make conflicts among the users, such as *subak*, private sectors (for tourism and industry), and government (for domestic water), particularly along the water source such as river. *Subak* as an organization that regulates the distribution of water in the rice is one of Bali's cultural heritage that has been recognized worldwide (Aryawan, et.al., 2013).

Subak irrigation system in Bali has been known since more than thousands ago (Purwita, 1993). The *subak* is a widely known 'traditional' irrigation management institution for rice cultivation on the Indonesian island of Bali. It has developed over the centuries in the specific socio-cultural, agro-ecological and political-administrative environment of this small and mountainous island (Roth and Sedana, 2015). As a consequence, the *subak* and irrigated rice agriculture became well adapted to, and embedded in the characteristic Balinese landscape of rugged mountains and steep valleys deeply incised by fast-flowing rivers.

In the past, the kings (monarchy) involved in *subak* system by allowing farmers group to construct temporary dams on the rivers to irrigate the existence dry land. Even, the Monarchy gave freely some land tax for the farmers. In the period of the Dutch administration, the head of *subak* was instructed to collect land tax from the farmers (*subak* members). It is worthy to note that *subak* has specific activity--ritual ceremonies which might not be found in other irrigation systems in Indonesia (even in the world).

Subak is not only an institution in agriculture, but also as a part of Bali's local wisdom about human society and its relationship with the environment. *Subak* is a customary law community that has the characteristics of socio-religious-agriculture, which represents farmers' associations that manage an irrigation system in paddy fields. The philosophy of the *subak* system is *Tri Hita Karana* (three causes of happiness) concept based on the harmony among the three. *Tri Hita Karana* is a universal concept of harmony and togetherness (Windia, 2010). The fast growth of development in Bali, however, has brought about the increase of land converse. The competition of water also becomes complex due to water for non-agricultural purposes increase. This is a major threat to the *subak* sustainability in Bali. *Subak* must be revitalized in anticipating the challenges (Sutawan, 2005).

Functions of *Subak* in Supporting Rice Farming Development

The *subak* system as an organization has a variety of roles and functions (multi - functional roles), which is not merely to produce food. Several tasks of of *subak* on irrigated land are as follows: production and economic functions to ensure food security; environmental functions including flood control and erosion control, groundwater recharge; purification of air and water; and giving cool air; ecological function (as an habitus for various

species that provide a source of protein for farmers and preservation of biological diversity. It also has social and cultural task, namely as buffer of rural tradition and social-cultural values; rural development, which is the source of drinking water for livestock, washing and bathing for the villagers, providing employment opportunities for the villagers (Sutawan, 2002; Groenfeldt, 2006). In terms of tourism aspects, *subak* also has potential to develop ecotourism and agrotourism because of the attractiveness of scenic beauty in the form of rice terraces and natural rural and agricultural life of the rural population including agricultural production (Lorenzen, 2011; Mizutani, 2002; Shah and Shah, 1994).

At the *subak* level, there are some functions that should be done for achieving the goals of subak members and supporting the above mentioned functions. These are: distribution and allocation of irrigation water; mobilization of resources for operation and maintenance of irrigation facilities; fund raising, conflict management; and ritual activities.

Water distribution and allocation is the primary function for binding the farmers in farming activities within *subak* system. The division and allocation of irrigation water is done from the source at the river through weir to the farm level at the rice fields. At the weir level, for example, the water is proportionally divided to a *subak* and other *subaks* located at the downstream area. Before government's intervention, the *subaks* along the river had a consensus to divide allocation of water among themselves. Informally, they had coordination for water distribution, allocation including water control.

After government (Public Works Office or PU) intervention by constructing permanent weir, distribution and allocation of water was done by the government officer. They set water meter control device and put a water gate to up and down control and sedimentation flow control. Under the national regulation, operations and maintenance works at the primary level including at the weir are under government officials.

At river level, water distribution system is done through an agreement among *subak* that utilize water. In case of singular *subak* having some sub-*subak* called *tempek*, water distribution was done under various systems based on the *subak* consensus (Sushila, 1991). There are continuous, rotation and stragering system. During dry season, water distributon is run on the continuous system. In dry season, however, the system might be rotation and stragering. The *subak* should manage water uses for planting rice and secondary crops called palawija based on the availability of water at the source level or river. By *subak* system, it is fully allowed among the members to have mutual water borrowing in order to overcome scarcity of water ().

It is sometimes done by staggering system. There is interval period time for a number of farmers to cultivate their land earlier than the others. One the earlier farmers completed their land preparation, the water should be distributed to other farmers. Allocation of water is managed by using traditional measurement, called *tektek* or *depuk*, or *nyari* dependent on the locations where the subak are. These are found on the division structures at tertiary system. *Tektek*, or *depuk*, or *nyari* is a concept to allocate water to each subak members (farmers) proportionally, based on the wide of existing canal, where the water division is constructed (Roth, 2011).

In case of plural *subaks* (some subaks get water from a weir), water distribution is divided in the division structure. There is coordination between or among *subaks* for water distribution and allocation. In some irrigation networks under PU, government officer is the one who operate the water gate constructed on the water division structure. In order to have good water distribution and allocation, the *subaks* might establish coordination body called *subak-gede* (Windia, 2010). At the broader level, *subaks* getting water from one river might establish a federation of *subaks* called *subak-agung* (Sutawan, et al., 1995).

. Mobilization of resources is very important activities within *subak* system, particularly for operation and maintenance of irrigation facilities. Mobilization of resources is in the forms of physical and non-physical things. Physical forms needed are labor of farmers for the rehabilitation and upgrading of irrigation facilities through the mutual works called *gotong royong*. They also contribute cash money for buying materials. While non-physical forms are the ideas contributed by farmers shared within a meeting or *sangkepan*.

Fund is one of the important components in organizing the activities of an organization including *subak*. A fund in each *subak* is used to finance the operation and maintenance of irrigation facilities and other activities such as ritual ceremonies. In the financial aspect, *subak* manages several things that must be well known by all members. These are: the reason of money collected, the amount of money contributed, technique for money collection, uses of money collected, and accountability of money uses.

In some *subaks*, there are some sources of *subak* revenue, such as *sarin tahun*, the dues charged to all members after the rice harvest; *pengampel*, the fees charged to the *subak* members who are not active; *gegadon*, which dues charged to members of the *subak* rice growing season after *kerta masa* (rice planting within rainy season); auction, which is derived from dues payments made for example for rearing duck or planting tobacco after harvesting; fines, which is a payments made to members who violate the rules or other agreements of *subak*. Nowadays, *subaks* also get a source of revenue from the economic activities related to agricultural development, such as cooperative unit established under *subak* system, such as in Guama and Selanbawak *subaks* (Sedana, 2013) and grant from government.

Conflict among members of *subak* is managed by *subak* itself through the *subak* meeting. Kind of conflicts are water stealing, planting beyond the schedule, absence in the certain *subak* activities, and others. Conflict is also found in water distribution among *subaks* which have water from one source. The existence of coordination body inter-*subaks* is also needed for solving the problem of water distribution (Sutawan, 2000).

Recently, the conflict of water is also found between *subak* and other sectors, such as industry. There is a complex need of water at the source level wherein the water availability is scarcer. The use of water by industry could decrease the water supply for *subak*. For this problem, *subaks* getting water from the same river should establish federation of *subaks*.

Ritual activity is one of the principal activities of the *subaks* in Bali and makes *subak* is very specific cultural organization (Lansing, 2005). There are many sequent ritual activities performed by *subak* starting from fetching water in the weir, preparing the land until harvesting). Ritual activity of *subak* refers to the philosophy of *Tri Hita Karana* (three causes of happiness) which consists of three elements, namely *Parhyangan* (the relationship between man and God), *Pawongan* (the relationship among the members and outsiders), and *Palemahan* (the relationship between humans and their environment). The existence of *subak-gede* is very important to manage the activities of ritual works. .

CONCLUSION

Subaks' system has important functions in supporting the rice farming development in Bali. *Subak* has philosophy of *tri hita karana* which is guidance of *subak* in irrigation management. The functions of *subaks* are distribution and allocation of irrigation water; mobilization of resources for operation and maintenance of irrigation facilities; fund raising, conflict management; and ritual activities. Through these functions, *subak* might support the rice farming development.

REFERENCES

- Dewi, R.K., W. Windia and W. Budiasa. 2014. Simulation Subak Management Function Optimally in Subak Lodayuh, Bali, Indonesia. *Journal of Economics and Sustainable Development*. Vol.5, No.28, 2014
- Groenfeldt, D. 2006. Multifunctionality Of Agricultural Water: Looking Beyond Food Production And Ecosystem Services. *Irrigation and Drainage*.55 : 73–83
- Lansing, J.S. 2005. On Irrigation and the Balinese State. *Current Anthropology* Vol. 46, No. 2 (April 2005), pp. 305-308
- Mudzengi, B.K. 2012. An Assessment Of The Socio-Economic Impacts of The Construction of Siya Dam in The Mazungunye Area: Bikita District of Zimbabwe. *Journal of Sustainable Development in Africa*, Volume 14, No.4, 2012.pp 1-17.
- Roth, D. 2011. The Subak in Diaspora: Balinese Farmers and the Subak in South Sulawesi. *Hum Ecol* (2011) 39:55–68
- Roth, D. and Sedana, G. 2015. Reframing Tri Hita Karana: From ‘Balinese Culture’ to Politics. *The Asia Pacific Journal of Anthropology*, 16(2), 157 - 175
- Sedana, G. I G.A.A.Ambarawati, W. Windia. 2014. Strengthening Sosial Capital for Agricultural Development: Lesson from Guama- Bali, Indonesia. *Asian Journal of Agricultural Development, Volume 11, Issue 2*.
- Shah, P. and M.K. Shah., 1994. “Multifunction Irrigation Organisations: Advantage or Handicap”. *Irrigation Managemnt Network, Network Paper No.28, April 1994*. London: Overseas Development Institute.
- Sutawan, N., 2005. 'Subak in facing globalisation challenges', in: Pitana, I.G. and Setiawan, I.G. (eds), *Revitalising the Subak Entering the Globalisation Era* . ANDI, Yogyakarta, Indonesia, 1-18.
- Wiguna, W.A.A., Lorenzen, R.P. and Lorenzen, S. 2015. Past, Present and Future – Perspectives of Balinese Rice Farming. *International Rice Conference 2005: 12-14 September 2005, Indonesia*.
- Windia, W. 2010. Sustainability of Subak Irrigation System In Bali (Experience of Bali Island). Paper presented in the *Seminar on the History of Irrigation in Eastern Asia*, organized by ICID.IID, in Yogyakarta on October 13, 2010