MAINTENANCE OF TRADITIONAL IRRIGATION CHANNELS (SUBAK) AS A MEANS OF PRESERVING AGROTOURISM FACILITIES AND INFRASTRUCTURE IN SOBANGAN VILLAGE, BADUNG REGENCY, BALI PROVINCE

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ABSTRACT

Sobangan Village is a vegetable producing agricultural area which is a support for food products for the southern part of Bali. So it is hoped that the existence of agriculture in this area will be maintained from the influence of changes in land use due to tourism. and the economic development of local communities who are shifting from farmers to actors in the tourism sector. Changes in local community culture due to the influence of tourism will of course have an impact on spatial patterns in the area. This research aims to identify the initial conditions of the Subak irrigation canal infrastructure in the Sobangan area to determine educational patterns and maintenance of irrigation canals and to become a model for developing maintenance of traditional irrigation networks in the future. The method used in this research is a descriptive method which describes the identification of irrigation canal conditions, education patterns for the community and identification of irrigation canal maintenance based on field surveys and interviews in handling irrigation canals. Cooperation between the government and the community is needed in maintaining the Subak network so that it can function effectively. Regular monitoring can be carried out by the local community and in coordination with the PUPR Service

Keywords : Irrigation channels, Subak, Conservation, Coordination

1. INTRODUCTION

The word subak si a word that comes from the Balinese language where the word was first listed in the Pandak Bandung inscription dated 1072 AD (Buleleng 2021) (Kemendikbud 2013). Subak said Government Regulation no. 9 of 2019 (Bali 2019) refers to a unique social and religious institution, which has its own regulations, democratic associations of farmers in determining the use of irrigation water for rice growth. As a method of organizing living together, Subak has been able to survive for more than a century because the people adhere to ancestral traditions. Water is distributed fairly and evenly, all problems are discussed and solved together, even determining planting times and determining the type of rice to be planted are done together. Subak is a manifestation of the Tri Hita Karana (THK) (Investment 2022) philosophy, namely the Balinese Hindu philosophy of maintaining balance between humans, nature and the Creator. Sanctions for various forms of violations will be determined by the residents themselves through ceremonies or rituals carried at the temple.

This kind of harmony of life is the main key to the sustainability of Subak culture on the island of the gods (Haditama and Yujana 2024). Experts also mention that Subak is also a technological system that has become a culture in Bali. As an irrigation system, Subak has a network and irrigation facilities to regulate its water from the water source to the rice fields. Subak as a technological method from the original

culture of farmers (Indriani 2024) The main facilities of subak irrigation (palemahan) for each farmer member of the subak are in the form of pengalapan (water dam), jelinjing (ditch), and cakangan (a place/tool to insert water into the rice field). If in a rice field location there are two or more adjacent cakangan, the height of the cakangan is the same (the ease and smoothness of water flowing into each farmer's rice field is the same), but the difference in the width of the cakangan hole can still be tolerated which is adjusted to the difference in the area of the rice field cultivated by the farmer. The creation, maintenance and management of the use of subak irrigation facilities is carried out jointly by subak members.

The irrigation system network in subak is sorted from the water source consisting of (Febriyanti 2023):

1. Empelan/empangan as a source of water flow/dam.
2. Bungas/Buka is as an intake.
3. Aungan is a closed water channel or tunnel.
4. Telabah aya (large), is the main channel.
5. Tembuku aya (large), is a building for the main water distribution.
6. Telabah tempek (munduk/dahanan/kanca), is a branch water channel.
7. Telabah cerik, as a branch water channel.
8. Telabah panyacah (tali kunda), in some places known as Penasan (for 10 parts), Panca (for 5 people), and Pamijian (for yourself/1 person).

Illustration of the subak network image can be seen in Figure 1

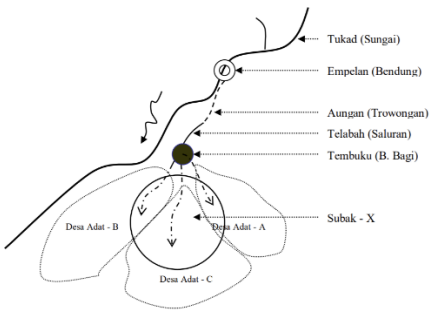

Figure 1. Ilustration of Subak network in Bali (Susila 2006)

Through this Subak system, farmers get their share of water according to the provisions set by the deliberation of the residents/krama subak and are still based on the philosophy of Tri Hita Karana. Activities in the Subak organization/association do not only cover agricultural or farming issues, but also include rituals and worship to ask for fortune and fertility (Windya 2015). However, every subak will definitely experience problems such as drought, network damage, sedimentation and others. (Haditama and Yujana 2024). Given the importance of subak in agriculture, especially rice for the Balinese people, it is necessary that irrigation channels as part of the subak organization need to be maintained, cared for and guarded so that the subak can be preserved from time to time. For this reason, the identification of the type of subak channel maintenance as an irrigation facility in channeling water from water sources to rice fields that are the area of the subak organization will be studied.

The location of the subak channel used for study is the subak in Sobangan Village. Sobangan Village is located in Mengwi District with an area of 256.56 H. The village boundaries include the north bordering Sembung Village, the east bordering Ayunan Village, the south bordering Baha Village, and the west bordering Werdi Bhuwana Village. Sobangan Village consists of Two Traditional Villages, namely Dukuh Moncos Traditional Village and Sobangan Traditional Village. Sobangan Village consists of 4 Banjars, namely Dukuh Moncos Banjar, Tegalnarungan Banjar, Tengah Banjar and Selat Banjar.

2. RESEARCH METODOLOGY

The methods used in this study are survey methods, interviews, literature studies, and exploration. The survey method was carried out to directly find out the object of study. The data collection techniques used include reviewing references and collecting primary data on the condition of the subak channels and their complementary buildings. Data were obtained by conducting observations in the field, interviewing parties involved in the subak. A qualitative approach was used because the main objective of this study was to understand the perspectives, perceptions, and experiences of the community in depth (Denzin, N. K., & Lincoln, Y. S. (Eds.). (2018). In carrying out this research activity, three stages were carried out, namely: the planning stage, the implementation stage, and the research results stage. The planning stage was carried out by identifying problems by comparing the existing conditions of the current spatial planning compared to the ideal conditions of integrated spatial planning.

3. RESULTS AND DISCUSSION

Sobangan Village consists of 4 Subaks, namely Subak Babakan Sobangan, Subak Abian Manik Sarwa Nadi, Subak Abian Tegal Sari and Subak Abian Werdi Putra Sedana. The irrigation system in Aobangan Village includes irrigation infrastructure, irrigation water, irrigation management, irrigation management institutions, and human resources. The use of irrigation water utilizes water from tertiary plots to irrigate agricultural land when needed.

According to Regional Regulation No. 21 of 2014, irrigation network maintenance is carried out by water user farmer associations. In this case in Bali, the farmer association is a subak. Irrigation network maintenance is an effort to maintain and secure the irrigation network so that it can always function properly in order to facilitate the implementation of operations and maintain its sustainability. The maintenance includes: Operation and maintenance of irrigation networks and their supporting structures starting from the intake structure to the tertiary channel along 50 (fifty) meters after the tapping structure, is the task and responsibility of the Government, Operation and maintenance of irrigation networks and their supporting structures from village irrigation, Subak irrigation and irrigation in tertiary plots, is the task and responsibility of the water-using farming community and Operation and maintenance of irrigation networks and their supporting structures owned by legal entities, social institutions or individuals, is the responsibility of the respective owners. Based on the Regulation. Securing irrigation networks is an effort to maintain the condition and function of irrigation networks and prevent things that are detrimental to the network and network facilities, whether caused by human actions, animals, or natural processes. 21. The association of water-using farmers is an irrigation management institution that is a forum for water-using farmers in an irrigation service area formed by the water-using farmers themselves.

The main purpose of maintenance can be defined as follows; 1. To extend the useful life of the asset (i.e. every part of a workplace, building and its contents). This is especially important in developing countries because of the lack of capital resources for replacement. In developed countries it is sometimes more profitable to 'replace' than to 'maintain'. 2. To ensure the optimum availability of installed equipment for production (or services) and to obtain a return on investment

To ensure the operational readiness of all equipment needed in an emergency at any time, for example, backup units, emergency and rescue units, and so on. 4. To ensure the safety of people using the facilities. Maintenance work can be planned. There is only one form of unplanned maintenance, namely emergency maintenance, which is defined as maintenance that needs to be carried out immediately to prevent more serious consequences, such as loss of building parts, major damage to equipment, or for corrective maintenance reasons including minor repairs, especially for short-term plans, which may arise between inspections, also planned overhauls/repairs such as annual or biennial overhauls/repairs, an extension planned in detail for the long term as a result of preventive inspections (PUPR 2019): 1. Emergency maintenance; maintenance that needs to be carried out immediately to prevent serious consequences. 2. Planned maintenance; maintenance that is organized and carried out with forethought, control and recording in accordance with a predetermined plan. 3. Damaged; failure resulting in the unavailability of a tool. 4. Corrective maintenance; maintenance carried out to repair a part (including adjustment and repair) that has stopped to meet an acceptable condition. Preventive maintenance is maintenance carried out at predetermined intervals, or against other criteria that are useful for reducing the possibility of other parts not meeting acceptable conditions. 6. Routine maintenance is maintenance that can be carried out while the machine/running water is in use. 7. Periodic maintenance is maintenance that can only be carried out while the machine is stopped/the water is not flowing/drying. 8. Overall repair; testing and complete repair of a tool, or most of its parts to an acceptable condition. 9. Idle time; the period of time when a tool is not in a condition capable of providing the expected performance. 10. Maintenance planning; determination before work, methods, materials, tools, machines, workers, when and the specified time.

Indicators of success of irrigation network maintenance activities are (Wandoyo 2017): 1. Fulfillment of channel capacity according to planned capacity; 2. Maintaining the condition of buildings and channels:

a. Good condition if the level of damage is <10% of the initial condition of the building and channel, routine maintenance is required

b. Lightly damaged condition if the level of damage is 10-20% of the initial condition of the building and channel, periodic maintenance is required in the form of maintenance;

c. Moderately damaged condition if the level of damage is 21-40% of the initial condition of the building and channel, periodic maintenance is required in the form of repairs;

d. Severely damaged condition if the level of damage is >40% of the initial condition of the building and channel, periodic maintenance is required in the form of heavy repairs or replacement; 3. Minimizing the cost of rehabilitation of irrigation networks;

From the survey results of the subak conditions in Subangan Village, the level of channel damage is good, lightly and moderately damaged so that maintenance, periodic maintenance and routine maintenance are required. Education in irrigation maintenance is needed for subak members, the community and the younger generation in this case elementary school children as the next generation who will continue the subak culture.

Some of the educational identifications carried out by the Badung Regency government are shown in Table 3.1

Tabel 3.1 Identifikasi Permasalahan dan pemecahan

Problems identification	Solution	Related Parties
Irrigation networking damage	Increased use of more durable and efficient materials	Subak society and government
Sedimentation	Use of local materials and techniques that can reduce sedimentation	Government and subak society
Local community commitment to subak conservation	1. Training and socialization of subak sustainability 2. Strict rules and regulations 3. Implementation of ritual ceremonies related to subak by the community 4. Incentives for community members who preserve subak 5. Assistance in implementing rituals for rice fields by the government	Government and society
Government Commitment	1. Pelaksanaan perawatan rutin terhadap jaringan irigasi oleh Dinas PUPR 2. Insentif terhadap warga masyarakat yang melestarikian subak	Pemerintah Daerahndan Dinas PUPR
Human Resources	Community participation to implement sustainable management practices such as soil and water conservation. Declining interest of the younger generation in agriculture	Government, society, young generation and academics Socialist and intensive to the young generation

Sources : Analysis, 2025

Network maintenance education is provided in the form of socialization and training of local communities regarding maintenance and good water management practices and accompanied by training in new technologies and monitoring systems. For this reason, active community participation, funding support from various parties, and

partnerships with related institutions such as the sub-district, the PU Service are also important to ensure the success of irrigation network maintenance. Periodic

monitoring and evaluation by will help identify and resolve emerging problems, and increase the efficiency of the irrigation system as a whole. The targets of the training

are subak members, community leaders, and the younger generation and school children in the Sobangan village environment so that they understand and support the maintenance of irrigation channels to maintain the sustainability of Subak in Sobangan Village.

4. CONCLUSION

In preserving the existence of subak, coordination is needed for the maintenance of the irrigation network in the Sobangan subak. For this reason, it is necessary to provide it to the community and the younger generation to participate in these activities. Cooperation is needed between the government and the community in maintaining the subak network so that it can function effectively. Periodic monitoring can be carried out by the local community and in coordination with the PUPR Service. In addition, to improve human resources, cooperation is needed through training and socialization to the community. Incentives are also needed for communities and organizations that participate in preserving the existence of subak.

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