

Assistance in The Planning of Irrigation Channels for Farmers Using Water in Iwoi Sangia Area

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ABSTRACT

The water for the rice fields comes from the Iwoi Sangia spring. The water flows in irrigation canals that are not feasible so that a lot of water is wasted. Water flows out of the canal through cracks in the walls. This resulted in water not being distributed optimally to the farmers' paddy fields. Through this program, we took the initiative to repair damaged irrigation canals. It is hoped that after the existence of good irrigation canals, water will no longer seep in vain so that irrigation coverage can be wider, irrigation canals become cleaner, and can initiate program plans with government assistance. The method of implementing this activity contains steps to realize the objectives of the community service PKM proposal. Community Service activities, especially the planning of tertiary irrigation channels, were carried out very well and smoothly in accordance with the previous planning activities. This activity begins with interaction with the Village Government and continues with site inspections and field measurements. The result of this community activity is the delineation of irrigation canal plans and budget plans, which will facilitate irrigation work for the Village Government.

Keywords: Farmers; Irrigation Channels; Iwoi Sangia Area

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1. Introduction

Water is an essential component of life; without it, there would be no life. Therefore, the State continues to strive to maintain harmony and maximize the use of water resources for the survival of its population. Irrigation is one way of exploiting water resources. Extensification and intensification are two methods for developing irrigation areas. Extensification is a strategy to increase productivity by building new paddy fields and related infrastructure. Intensification is a process that combines rehabilitation and expansion of irrigation networks to increase productivity. The increasing rate of population growth puts pressure on the government's ability to provide food, especially rice; This encourages the government, farmers and other stakeholders to boost rice yields as a staple food crop. Rice productivity can be increased by wisely and appropriately managing irrigation water. One way of managing water that is good and right is to build an irrigation system that is able to control the distribution of water, namely by utilizing an irrigation system with planned channels (Sianto, Hidayat, and Bahri 2022). Irrigation area is a unit of land that gets water from an irrigation network (Irawan et al. 2021).

Irrigation has a very important role in efforts to increase agricultural productivity in Indonesia. However, the condition of the irrigation system has faced many obstacles in recent years. In addition, the occurrence of climate change as a result of environmental damage has increased the threat of drought and flood disasters. There was a decrease and increase in the amount of rainfall of 1% to 4% in different periods. The dry season lasts longer with less rainfall, whereas the rainy season is short with higher rainfall intensity. Another factor causing constraints is the low reliability of irrigation water where only 76,542

Ha (10.7%) of surface irrigation area is guaranteed by reservoirs, the remaining 6,383,626 Ha (89.3%) rely on river discharge.

The performance of the irrigation network is highly dependent on the condition of the river area. Fifth, the conditions and functions of the national surface irrigation infrastructure have not been optimal. Currently, total surface irrigation in Indonesia is 7.1 million ha or 78% of the total national irrigation area of 9.136 million ha. An area of 46% or around 3.3 million ha of irrigation infrastructure is in a state of disrepair, of which 7.5% is the authority of the central government, while 8.26% is irrigation under the provincial authority and 30.4% is the authority of district/city governments. If you look in more detail, it is known that irrigation management has not been optimal, as seen from the inefficient use of irrigation water. The current per capita capacity of 56.89 m³/second is still far from ideal (1,979 m³/capita). The conversion of agricultural land to non-agricultural functions has increased, where the rate of conversion of agricultural land in the period 1981 - 1999 was 90,417 ha/year, while the 1999 period - 2002 of 187,720 Ha/year (Susanti et al. 2020).

The use of water for irrigation is one of the various alternative uses of water. We know that the balance between food production and population in Indonesia is complex. Many factors affect the balance. Rapid population growth needs to be matched with rapid increases in food production. The method of supplying and the method of providing irrigation water can only be known through a careful study of irrigation problems by taking into account the factors that affect the effective and efficient management of water supply and delivery activities. In a simple irrigation network, the distribution of water is not measured or regulated so that more water will flow into the sewer. Water supplies are usually abundant and slopes range from moderate to steep.

Therefore there is almost no need for difficult techniques for water distribution. In semi-technical irrigation networks, the weir is located on the river complete with intake gates without measuring structures on the downstream side. Several permanent structures are usually also built in the canal network. The water distribution system is usually similar to a simple network. The intake building is used to serve/irrigate a wider area than a simple network service area. In technical irrigation networks there is a separation between the irrigation/carrier and discharge channels. This means that both carrier and exhaust channels work according to their respective functions. Thus in general hydrology can mean the study of water. Based on this concept, hydrology has a broad scope or coverage. Substantially, the scope of the field of science includes: the origin and process of the occurrence of water, the movement and distribution of water, the properties of water, and the relationship between water and the environment and life (Benny, Soeryamassoeka, and Umar 2014).

Farmers using water are all farmers who benefit directly from water management and irrigation networks, including pump irrigation which includes rice field owners, rice cultivators, rice field takers, fish pond owners who receive irrigation water, and business entities in the agricultural sector that utilize irrigation water. Pemberdayaan perkumpulan petani pemakai air adalah upaya penguatan dan peningkatan kemampuan P3A/GP3A/IP3A yang meliputi aspek kelembagaan, teknis dan pembiayaan dengan dasar keberpihakan kepada petani melalui pembentukan, pelatihan, pendampingan, dan menumbuhkembangkan partisipasi (Kementerian PUPR 2007). Along with the increasing population and ongoing economic growth, the demand for water resource infrastructure services, especially for non-irrigation, is increasing, especially for fulfilling residential, urban and industrial raw water as well as for pond fisheries. Besides that, water is provided not only for human needs but to maintain the balance of the river ecosystem (Sjarief 2002).

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canal through cracks in the walls. This resulted in water not being distributed optimally to the farmers' paddy fields. Through this program, we took the initiative to repair damaged irrigation canals. It is hoped that after the existence of good irrigation canals, water will no longer seep in vain so that irrigation coverage can be wider, irrigation canals become cleaner, and can initiate program plans with government assistance. Based on the Program for Development and Management of Irrigation Systems in Indonesia (2018) In general, the general conditions and strategic issues regarding the management of irrigation systems include the potential for surface water in Indonesia of 2.7 trillion m³/year, 691.3 billion m³/year can be utilized. Of this potential, 222.6 billion m³/year has been utilized, including for the irrigation sector of 177.1 billion m³/year (Kementerian Pekerjaan Umum dan Perumahan Rakyat 2018).

Indonesia as an agricultural country, of course, has a development program in order to support the strengthening of national food security. This is closely related to an effective and efficient agricultural industry and is very reasonable considering that most of the population has a livelihood as farmers. To support the agricultural sector, one of the steps is the need for effective and efficient exploitation with the aim that the level of network service and the service life of irrigation networks can last longer. The construction of irrigation canals to support the provision of national food is urgently needed, so that the availability of water in the land will be fulfilled even though the land is far from surface water sources. This is inseparable from irrigation engineering efforts, namely providing water with the right quality, right space and right time conditions in an effective and economical way. The selected irrigation developments are generally areas where the people have dominant livelihoods based on agriculture with evidence that they already have a lot of rainfed rice fields which have been cultivated by the local community. In addition, the rehabilitation of irrigation network infrastructure, which at the time needed repair, was a top priority for the development and improvement targets of the food security program.

This strategy was chosen aside from regional development and livelihood opening in rural areas, as well as accelerating the growth of usable lands, aside from the availability of human resources in the area, especially in the agricultural sector. The irrigation system in Indonesia is part of the social life system of the community which is quite old. From a historical point of view, irrigation systems in Indonesia have existed since the days of the kingdom before the Dutch colonialism came. So that when there are parties who discuss irrigation system policies, whoever these parties need to always be based on the reality of existing irrigation systems. Therefore as part of a social system, the irrigation system is a reality of the combination of various aspects of knowledge and authority. Irrigation systems are not only determined by physical factors or artifacts (the presence of water and land). Likewise, the irrigation system is not enough to be determined only by institutional factors. Or on the other hand, the irrigation system cannot only be determined by technical factors such as water control or planting suitability alone. The irrigation system is an aspect to support the lives of people who choose rice as a staple food for their daily lives.

Therefore, in an irrigation system there is always a combination of various factors, namely physical (artifacts), social factors of the community, and technological factors for water control and crop cultivation, which in the end are greatly influenced by the capacity of the local community, as subject users and managers, to treat existing irrigation systems. Looking at the history of irrigation that has been known since ancient times, irrigation is one of the main components in the food production process, especially in agricultural cultivation, not only as a need for rice plants, but irrigation has also become a staple part for agricultural cultivation in a broad sense such as plantations and fisheries. . With this understanding, it can lead to building understanding, that efforts to increase the effectiveness of the development and management of irrigation systems must be based on the various factors

above. Likewise in discussing the division of roles in the development and management of participatory irrigation systems, all parties need to build a common understanding, that the division of roles is always directed and leads to efforts to increase community capacity in the form of community empowerment which directly increases the effectiveness of irrigation development and management (Hidayat 2019).

Agriculture is an important sector in economic development, considering its function and role in providing food for the population, feed and energy, as well as being a place where the livelihoods of rural residents depend (Darajat et al. 2017). The agricultural sector has a significant contribution in the formation of Gross Domestic Product (GDP), increasing foreign exchange and improving the welfare of farmers, so that agricultural development can be said to be the driving force and support for the national economy. Irrigation route planning is often constrained by the overlap between different land uses. Irrigation channel planning must consider the surrounding land cover. Optimization of the determination of irrigation networks must be carried out by assuming the physical condition of the land or the topography of the area as well as the proximity of irrigation networks to irrigation areas (Hernawan 2003).

Mapping the area for optimizing the determination of the irrigation network alignment through geo-spatial analysis in the irrigation area of Sindangsari Village using the GIS approach. This approach aims to map the existing condition of the irrigation channel plan in the irrigation area of Sindangsari Village with regard to land cover and topographical conditions in the study area, map and determine the optimal irrigation network alignment based on spatial analysis of the existing land cover and topographical characteristics, as well as build a simulation concept. tiered irrigation service areas based on the height of the study area through geo-spatial analysis (Hidayah, Verawati, and Widjaja 2020).

The purpose of irrigation is to drain water regularly according to plant needs when the ground water supply is insufficient to support plant growth, so that plants can grow normally. In addition to being influenced by application procedures, efficient irrigation is also determined by the need for water to achieve the available water conditions needed by plants. Construction of irrigation canals is necessary to support the provision of food, so that the availability of water in irrigation areas will be fulfilled even though they are far from surface water sources (rivers). This is inseparable from irrigation engineering efforts to provide water in the right conditions, economically in order to obtain maximum results in agriculture by taking into account the irrigation system (Mulyadi 2021).

2. Method

The method of implementing this activity contains steps to realize the objectives of the community service PKM proposal. The initial activity of the program is discussion and counseling with farmers to find out the problems that exist. Furthermore, after an agreement was reached on the solution to be implemented, irrigation canal repair activities were carried out. After the improvement activities, we carry out post-activity discussions. This discussion aims to find out the response of the farmers and the government after the activity took place and to arrange further activities.

3. Result

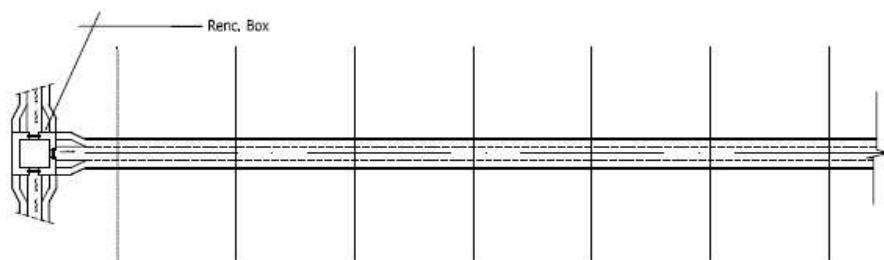
Before conducting research, the first thing to do is:

- a. Meet with local leaders to convey aims and objectives;
- b. Conduct a survey of the location of the area that will be used for community service;
- c. Planning working drawings at the location to be planned;

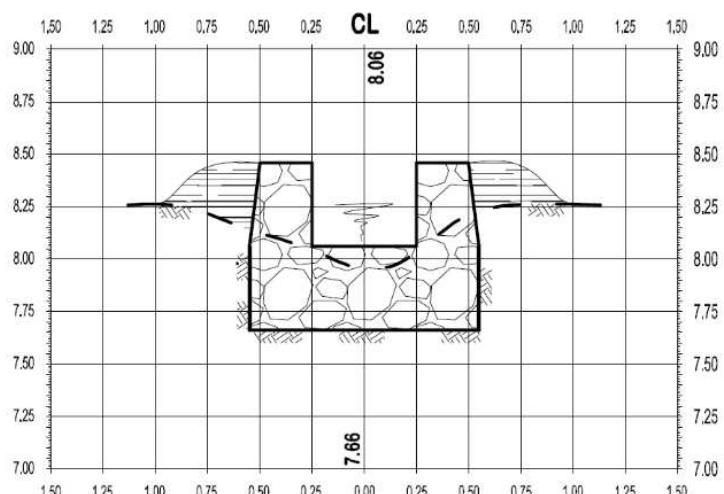
- d. Carry out assistance at the work location that will be planned;
- e. Community service has been completed;
- f. Make a dedication journal to be published as a form of accountability.

4. Discussion

- a. Make a plan drawing from the results of a location survey for service



Picture 1. Longitudinal Section of Irrigation Canal



Picture 2. Channel Details

- b. Provide assistance at the service location



Picture 3. Assistance in Building Irrigation Canals



Picture 4. Irrigation channel works

4. Conclusion

Community Service activities, especially the planning of tertiary irrigation channels, were carried out very well and smoothly in accordance with the previous planning activities. This activity begins with interaction with the Village Government and continues with site inspections and field measurements. The result of this community activity is the delineation of irrigation canal plans and budget plans, which will facilitate irrigation work for the Village Government.

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