

Analysis of Benefits of the Irrigation Water Use Improvement Acceleration Program (P3-Tgai) on Improvement of Irrigation Network Infrastructure to the Regional Development at Hutagurgur Village, Regency of the Humbang Hasundutan

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Abstract

The research objective is to analyze the benefits of The Irrigation Water Use Improvement Acceleration Program to improve irrigation network infrastructure, increase functional land area and increase rice productivity and increase community income for regional development in Hutagurgur Village. The location of the study was carried out in Hutagurgur Village with a sample of all P3A Gurgur Indah members as recipients of the program. Research using descriptive methods with a quantitative approach. The results showed that the Irrigation Water Use Acceleration Improvement Program had a positive effect on improving irrigation infrastructure. Evidenced by the SPSS 23 program by increasing the length of the irrigation network significantly influence the increase in the area of functional land area of 8.25 Ha. The increase in functional land has a positive effect on increasing the productivity of paddy fields, which is significantly increased by 498.45 Kg/Ha/MT and in line with the average income of farmers which increased significantly by Rp.5,172,193.42Ha/MT.

Keywords

the irrigation water use improvement acceleration program; irrigation infrastructure; irrigation network; regional development



I. Introduction

The lack of attention and awareness of the community, especially the Water User Farmers Association (P3A) to maintain and maintain irrigation buildings that have been built by the local government has also become one of the factors inhibiting the availability of irrigation water to farmers' fields. The Ministry of Public Works and Public Housing (PUPR) through the Sumatra River Region II Center provides assistance funds through the Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI) which aims to provide water for agricultural areas through maintenance, rehabilitation and improvement of small (wide) irrigation networks. less than 150 Ha), tertiary irrigation and village irrigation carried out by empowering the Water-Using Farmers' Association (P3A) or the Water-Using Farmers' Association (GP3A) or the Parent Water-Using Farmers' Association (IP3A).

The Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI) is one of the activities of the Community-Based Infrastructure (IBM) program. The Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI) is implemented to support national food sovereignty as a manifestation of economic independence by moving the strategic sector of the domestic economy as contained in the seventh Nawacita program through empowering farming communities in improving irrigation networks, rehabilitating irrigation networks and increasing participatory irrigation network in rural areas. This

program aims to build and repair village irrigation canals which are carried out by farmers or local residents with wages so that they can increase their income.

II. Review of Literature

2.1 Area Development

Regional development in principle is an effort made to improve the level of welfare of life in a certain area and efforts to provide welfare to the quality of life of the community. Sirojuzilam (2005), regional development basically means increasing the value of the benefits of the area for the community of a certain area and being able to accommodate more residents, with a level of community welfare that on average has many facilities and infrastructure, available goods or services and business activities increasing community, both in terms of type, intensity, service and quality.

There are three indicators of the success of regional development that can be seen as the success of regional development. The first indicator is productivity, which can be measured from the performance development of an institution and its apparatus. The second indicator is efficiency, which is related to increasing technological/system capabilities and the quality of human resources in the implementation of development. The last is community participation, which can ensure the continuity of the implementation of a program in an area.

2.2 Impact of Irrigation Development on Regional Development

Irrigation development aims to improve welfare in the economic field, having an impact on the economy itself, social and environmental aspects.

- a) Environmental Aspects. Irrigation networks are canals, buildings and complementary structures which are an integral part needed for the regulation of irrigation water which includes the provision, distribution, administration, use and disposal of irrigation water (Directorate of Water Management, 2010).
- b) Social Aspect. The social aspect is the aspect that most determines the characteristics and properties of the network system. This aspect is not only related to technical issues but is often related to issues of tradition or even religion/belief.
- c) Economic Aspect. This aspect is more emphasized on the economy such as local people's livelihoods, community incomes and local people's habits in assessing a material and land value.

2.3 Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI)

The Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) is implemented in small irrigation areas with an area of less than 150 (one hundred and fifty) Ha and/or village irrigation, and tertiary irrigation networks in irrigation areas under the authority of the Central Government, Provincial Governments and the Government Regency/City area.

The targets of the Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI) are:

- a) Empowerment of P3A/GP3A/IP3A in technical activities of irrigation network repair, irrigation network rehabilitation and irrigation network improvement.
- b) Repair of irrigation networks to partially restore conditions and functions of irrigation canals and/or buildings to their original state.
- c) Rehabilitation of irrigation networks to repair irrigation networks in order to restore irrigation functions and services as before.

- d) Improvement of irrigation networks to improve the function and condition of existing irrigation networks or activities to increase the service area of existing irrigation networks by taking into account changes in the environmental conditions of irrigation areas.

The Principles and Approaches of the Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI) are implemented based on participatory, transparent, accountable, and sustainable ways. The Program for the Acceleration of Improvement in Irrigation Water Use (P3-TGAI) is carried out by taking into account the needs, difficulties, and aspirations of everyone, both men and women, including the elderly, groups with disabilities, and other special needs, so as to create gender equality and justice.

2.4 Stages of Implementation of the Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI)

Then empowerment can also be interpreted as one of the solutions for those who experience powerlessness so that they participate in feeling the results of development that they have not fully felt, this is because development is actually considered as something that weakens the position of vulnerable communities. (Adiwijaya et al, 2018) According Heathfield in Abida, et al. (2020). explains that Empowerment plays an important role in employee satisfaction thereby increasing their performance in the organization. Empowerment is also defined as a process that allows and gives authority to individuals to think, behave, take action and make decisions and control work independently. It is the feeling of self control of one's own destiny.

Community empowerment as an application of government programs requires full enthusiasm from the community itself so that they will make every effort to improve the quality of their human resources in a total and continuous manner. Many efforts have indeed been carried out by the government, one of which is by providing assistance which is directly channeled to remote villages to support village development and the development of local potentials that are undoubtedly empowered. (Mawardi et al, 2019)

The activities of the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) are carried out in accordance with the priority proposals that have been prepared through the village deliberation process. In addition, empowerment of farming communities also aims to strengthen and increase the independence of farming communities in irrigation network management activities. The stages of implementation of the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) are the preparation stage, planning stage, implementation stage, and activity completion stage.

2.5 Irrigation Network Infrastructure

Irrigation network is a channel, building, and its complementary structures which constitute a single unit required for the provision, distribution, provision, use and disposal of irrigation water. Primary irrigation network is part of the irrigation network consisting of the main building, main/primary canal, drainage channel, share building, tapping share building, and complementary building. Secondary irrigation network is part of the irrigation network consisting of secondary canals, drainage channels, share buildings, tapping buildings, tapping buildings, and complementary buildings. Tertiary irrigation network is an irrigation network that functions as an irrigation water service infrastructure in a tertiary plot consisting of tertiary channels, quaternary channels and discharge channels, tertiary boxes, quarter boxes, and complementary buildings.

a. Irrigation Network Classification

Based on the method of regulation, measurement of water flow and completeness of facilities, irrigation networks can be divided into three types, namely 1) simple irrigation networks (non-technical), usually managed independently by a group of farmers using water, so that the completeness and ability to measure and regulate is still very low limited. 2) Semi-technical irrigation network, having permanent or semi-permanent tapping structures. Tapping buildings are generally equipped with take-up and measuring structures. The channel network already has several permanent buildings, but the distribution system is not yet fully capable of regulating and measuring. 3) The technical irrigation network has a permanent tapping building. Tap buildings and buildings to be able to regulate and measure. In addition, there is a separation between the giver and discharge channels. Arrangements and measurements are carried out from the tapping building to the tertiary plot. Tertiary plots occupy a central function in the technical irrigation network.

To facilitate the irrigation service system for agricultural land, an organization of plots was arranged consisting of primary plots, secondary plots, tertiary plots, quarter plots and rice fields as the smallest unit.

- a) Tertiary Plot. Tertiary plots receive irrigation water that is channeled and measured at tertiary offtake buildings which are the responsibility of the Irrigation Service. The tertiary tapping building drains the water into the tertiary canal. Tertiary plots that are too large will result in inefficient distribution of water.
- b) Secondary Plot. The secondary plot consists of several tertiary plots, all of which are served by one secondary channel. Usually secondary plots receive water from buildings for those located in primary or secondary canals. The boundaries of secondary plots are generally in the form of clear topographic signs such as drainage canals.
- c) Primary Plot. The primary plot consists of several secondary plots that take water directly from the primary canal. The primary plot is served by a primary canal that draws its water directly from a water source, usually a river. The area along the primary canal often cannot be served easily by tapping water from the secondary channel.

b. Irrigation Building

Irrigation buildings are used for purposes of supporting the collection and regulation of irrigation water, so that water can flow properly to rice fields. The types of irrigation buildings are Main Buildings, Carrier Buildings, Plunging Buildings, Sharing and Tapping Buildings, Regulatory and Gauging Buildings, Disposal and Draining Buildings, and Complementary Buildings.

III. Research Methods

This study uses a descriptive method with a quantitative approach. The research was conducted in Hutagurgur Village, Doloksanggul District, Humbang Hasundutan Regency, North Sumatra Province. The population in this study were all farmers in the Water User Farmers Association (P3A) of Gurgur Indah as P3A who received grants from the Ministry of Public Works and Public Housing (PUPR). Data collection was done by means of questionnaires, observations and interviews as well as documentation.

IV. Results and Discussion

4.1 Benefits of the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) for the Improvement of Irrigation Network Infrastructure

The Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI) is implemented to support national food sovereignty as a manifestation of economic independence by mobilizing strategic sectors of the domestic economy. Improvement of irrigation network, rehabilitation of irrigation network and improvement of participatory irrigation network. This activity is part of the planned and systematic empowerment of farming communities to improve the performance of irrigation network management.

The Gurgur Indah Water-Using Farmers' Association (P3A) as the beneficiaries of the Hutagurgur Irrigation Area has twice received aid funds from the Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI). The activity was carried out in 2018 and 2020. The cash fund of Rp.195,000,000, -/year of implementation was used by members of P3A Gurgur Indah to build a 300-meter tertiary canal in 2018 and 250 meters in 2020. The additional length of irrigation canals was 550 meters. meter has a positive impact on improving the condition of the irrigation network because of the addition of assets in the form of infrastructure that can be used by farmers to irrigate their fields.

4.2 Benefits of Improved Irrigation Network Infrastructure to Increase Functional Land Area

The functional area of paddy fields before the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) was 31.50 Ha and after the improvement of irrigation networks from the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) 39.75 Ha. After being analyzed using the Paired Sample T-Test method using SPSS 23 software, the $t\text{-count } 4.578 < t\text{-table } 2.015$ with sig. 0.000 0.05 so that the second hypothesis is accepted, namely: "Improvement of Irrigation Network Infrastructure implemented in a participatory manner through the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) to increase the Functional Land Area of Farmers' Agriculture in the Hutagurgur Irrigation Area".

There is a significant difference in the functional area before and after the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI), namely the addition of an area of 8.25 Ha. This is because irrigation buildings built through the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) have been able to irrigate farmers' fields. In addition, farmers have a higher sense of belonging to the buildings they build themselves, so they can take better care of the canals so that the water lost due to sedimentation has been reduced. With the program of the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) at the research location, the functional area of rice fields managed by P3A Gurgur Indah farmers who became respondents increased this is because irrigation water has been able to irrigate their fields.

4.3 Increasing Farmer Productivity and Income Before and After the Acceleration Program for Improvement of Irrigation Water Use (P3-TGAI)

The improvement of irrigation networks to improve the function and condition of irrigation networks or activities to increase the service area of irrigation networks is the goal of the Program for Accelerating the Improvement of Irrigation Water Use (P3-TGAI). Based on the results of research through the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) 300 meters of irrigation canals were built in 2018, with

the construction of irrigation infrastructure increasing the service area of 8.25 hectares, this is an indicator of increasing the function of the irrigation network.

With the improvement of irrigation network conditions in the Hutagurgur Irrigation Area through the construction of irrigation infrastructure from the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) there was an increase in farmer production of 496.41 Kg/Ha in line with the increase in farmers' income by Rp. 5,186,594, 43/Ha/MT. Increased productivity of farmers' fields before and after the Acceleration Program for Improvement of Irrigation Water Use (P3-TGAI) was caused by several things, namely:

- a) The existence of an irrigation network through P3-TGAI causes an increase and the area of irrigation water services to increase so that the functional area of rice fields that can be irrigated by the irrigation network is increasing.
- b) The existence of an irrigation network through P3-TGAI encourages farmers to use production inputs well and the impact of water shortages that often occurs during the planting process is reduced.
- c) If the irrigation channel is in good condition and functioning, the irrigation water needs can be met efficiently and there will be no leakage along the channel. So that if the irrigation water needs are fulfilled, it will increase the production of farmers.

V. Conclusion

Based on the results of data analysis in this study, the following conclusions were obtained:

1. The Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) is beneficial for improving irrigation infrastructure in the Hutagurgur Irrigation Area by constructing a 550-meter tertiary canal.
2. Increasing the functional area of rice fields that can be managed by farmers because irrigation water has reached the farmers' fields. The unused land that used to have the potential to be managed by farmers is now able to function.
3. Improvement of irrigation network infrastructure through the Program for the Acceleration of Improvement of Irrigation Water Use (P3-TGAI) also has a positive impact on the average productivity of farmers. With the availability of sufficient irrigation water, production inputs can work well and production costs are reduced. In addition, farmers also receive additional funds from the construction of the Program for the Acceleration of Improved Irrigation Water Use (P3-TGAI).

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