

# PROJECT MANAGEMENT IN THE CONSTRUCTION OF WATER RESERVOIRS AND PIPED IRRIGATION AS A CLEAN WATER SUPPLY SOLUTION FOR FARMERS IN PENANGGUNGAN VILLAGE, TRAWAS DISTRICT, MOJOKERTO REGENCY

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## Abstrak

Ketersediaan air bersih merupakan kebutuhan utama bagi peternak di Desa Penanggungan, Kecamatan Trawas, Kabupaten Mojokerto, yang selama ini menghadapi kendala keterbatasan air terutama pada musim kemarau. Pengabdian masyarakat ini bertujuan untuk mengatasi permasalahan kekurangan air bersih dengan mengelola pembangunan tandon air dan sistem irigasi perpipaan sebagai solusi pengadaan air bersih yang berkelanjutan. Karena dengan perencanaan dan pembangunan sistem irigasi perpipaan, diharapkan para peternak dapat memiliki akses air bersih yang lebih mudah, stabil, dan berkelanjutan. Metode yang digunakan meliputi perencanaan manajemen proyek terpadu, pelibatan aktif masyarakat sebagai mitra, serta penerapan teknologi sederhana yang sesuai dengan kondisi lokal. Kegiatan ini melibatkan banyak peternak sebagai peserta utama dan dilaksanakan selama beberapa bulan dengan tahapan perencanaan, pelaksanaan, dan evaluasi. Hasil pengabdian menunjukkan peningkatan signifikan dalam ketersediaan air bersih yang dapat digunakan untuk kebutuhan ternak dan irigasi lahan, serta peningkatan kesadaran dan partisipasi masyarakat dalam pengelolaan sumber daya air. Dengan demikian, pembangunan tandon air dan irigasi perpipaan ini memberikan kontribusi nyata dalam mendukung keberlanjutan usaha peternakan di wilayah tersebut.

**Kata Kunci:** manajemen proyek; tandon air; irigasi perpipaan; air bersih; peternak; Desa Penanggungan

## Abstract

The availability of clean water is a major need for farmers in Penanggungan Village, Trawas District, Mojokerto Regency, who have been facing water shortages, especially during the dry season. This community service aims to overcome the problem of clean water shortages by managing the construction of water reservoirs and piped irrigation systems as a sustainable clean water supply solution. Because with the planning and construction of piped irrigation systems, it is expected that farmers can have easier, stable, and sustainable access to clean water. The methods used include integrated project management planning, active involvement of the community as partners, and application of simple technology that suits local conditions. This activity involved many farmers as the main participants and was carried out over several months with the stages of planning, implementation, and evaluation. The results of the service showed a significant increase in the availability of clean water that can be used for livestock needs and land irrigation, as well as increased community awareness and participation in water resource management. Thus, the construction of water reservoirs and piped irrigation makes a real contribution in supporting the sustainability of livestock businesses in the area.

**Keywords:** project management; water reservoir; piped irrigation; clean water; farmer; Penanggungan Village

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## 1. INTRODUCTION

Trawas sub-district has considerable livestock potential, with Penanggungan village having the largest beef cattle population in the sub-district. The development of piped irrigation can provide irrigation water supply for sanitation and livestock drinking water. Penanggungan Village is an area that has considerable livestock potential. However, farmers have difficulty obtaining clean water for cattle drinking, cleaning cages, and other purposes. However, the availability of clean water is a major obstacle to the development of livestock in this area, especially during the dry season. This condition has a negative impact on livestock health, productivity and farmers' income.

Clean water is a basic need that is very important in supporting human life and economic activities, including in the livestock sector. The availability of sufficient and quality water is a

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major factor in increasing livestock productivity and maintaining animal health. However, in many rural areas, including Penanggungan Village, Trawas Subdistrict, Mojokerto District, access to clean water remains a serious challenge. Hilly geographical conditions and limited water sources make it difficult for farmers to obtain adequate water supply, especially during the dry season.

These problems require effective and sustainable solutions for water supply. One approach that can be applied is the construction of water reservoirs and piped irrigation systems that are appropriately designed and managed with good project management. Water reservoirs serve as water reserve reservoirs, while piped irrigation allows efficient and controlled distribution of water to locations in need. Thus, this system can ensure sufficient clean water availability for farmers throughout the year..

Project management in the context of water infrastructure development is critical to ensure that activities are implemented according to plan, on time and within budget. In addition, actively involving the community in the process of planning, implementing and maintaining the system is key to the success and sustainability of the project. Through a participatory approach, the community is not only a beneficiary, but also a manager who is responsible for the sustainability of the irrigation system and water reservoirs built.

This community service article aims to describe the application of project management in the construction of water reservoirs and piped irrigation as a clean water supply solution for farmers in Penanggungan Village, Trawas District, Mojokerto Regency. It is hoped that the results of this service can make a real contribution in improving the welfare of farmers through the fulfillment of sustainable clean water needs and become a model of water resource management that can be replicated in other areas with similar conditions.

## 2. METODE

The implementation of this community service uses a structured project management approach, consisting of several main stages as follows:

### 1. Preparation and Planning Stage

**Survey and Data Collection:** The team conducted direct observation in Penanggungan Village to identify the clean water needs of farmers, the condition of water sources, and the topography of the construction site of the reservoir and piped irrigation network.

**Needs Analysis and Technical Planning:** Based on field data, a water volume requirement analysis and technical design of the water reservoir and piped irrigation system were conducted. This planning used the Work Breakdown Structure (WBS) method to identify project activities in detail and the Critical Path Method (CPM) for scheduling and controlling project implementation time..

### 2. Implementation Stage

**Infrastructure Development:** Construction activities include the construction of tapping buildings, water reservoirs, and the installation of irrigation pipelines. Implementation is carried out in a self-managed manner by involving local communities as laborers, accompanied by a technical team from universities and related agencies.

**Project Management Training:** Communities and farmer groups were trained on project management principles, including resource management, quality control, and maintenance of irrigation systems to enable them to independently manage and maintain the infrastructure.

### 3. Monitoring and Evaluation Stage

**Mentoring and Supervision:** The team conducts periodic monitoring during and after construction implementation to ensure the project is on schedule, within budget, and according to technical specifications.

Project Performance Evaluation: An evaluation of project results was conducted by measuring the increase in access to clean water for farmers, the effectiveness of water distribution, and community participation in irrigation system management.

#### 4. Reporting and Documentation Stage

All processes and results of activities are systematically documented as material for community service reports and references for the development of similar programs in the future.

This method integrates technical project management approaches with community empowerment, so that the construction of water reservoirs and piped irrigation is not only physically successful but also sustainable through the active participation and management capacity of local communities.

### 3. HASIL DAN PEMBAHASAN

This community service program is carried out through several stages, namely:

#### 1. Project Planning and Preparation

The initial stage of project management includes an in-depth survey, investigation, and design (SID) to determine the location, volume of water demand, and technical plan for the construction of reservoirs and piped irrigation networks. In addition, the involvement of farmers and farmer groups (Poktan/P3A) in the preparation of the activity business plan (RUK) is very important to ensure that field needs are met and implementation can run in mutual cooperation.

Site Survey and Problem Identification: This stage aims to identify potential water sources, determine the clean water needs of the farmers, and determine the geographical and topographical conditions of the area



Image 1. Team Conduct initial survey

The service team conducted an initial survey to review field conditions and coordinate with related parties, including local community leaders. This survey aims to identify potential water sources and understand the need for clean water in the location

Design Planning: Based on the survey results, technical planning of the piped irrigation system is carried out, including the determination of pipe type and size, piping network design, water pump selection (if needed), and cost budget calculation. Determination of the pipe trajectory must consider the contours and topographical conditions of the area so that water distribution runs optimally and economically.

#### 2. Construction Implementation

The physical implementation of the construction is carried out in a self-managed manner by the local community with the guidance of the technical team. This stage includes the procurement of materials, excavation of pipelines, installation of pipes, construction of water reservoirs (if needed), and installation of water pumps (if needed). While the main component includes the construction of a tapping building as a water intake point from the source, a water reservoir as a reservoir, and an irrigation pipeline network that delivers water to the farm evenly.

This piping system allows for more efficient water management by minimizing water loss and facilitating distribution control.



Image 2 : Construction Implementation

Physical development involves procurement of materials, excavation of pipelines, installation of pipes, construction of water reservoirs (if required), and installation of water pumps (if required). Physical implementation (construction) is carried out with the full participation of members of the beneficiary farmer groups.

### 3. Management and Monitoring

Project management also includes the establishment of technical teams at the district and sub-district levels that are tasked with coordination, guidance, and periodic monitoring and evaluation of project implementation. This monitoring system is important to ensure that the quality and quantity of water supplied continues to meet the standard needs of farmers, and to make improvements if technical problems are found



Image 3 : Monitoring

### 4. Impact and Sustainability

With the application of good project management, the construction of water reservoirs and piped irrigation in Penanggungan Village is expected to increase the availability of clean water in a sustainable manner for farmers. This will not only support livestock productivity, but also improve the welfare of the local community through more effective and participatory water resources management.



Image 4 : water reservoir construction completed

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Training and Mentoring: After the piped irrigation system is completed, training is provided to the farmers on how to use, maintain, and make simple repairs. In addition, ongoing mentoring is provided to ensure the system is functioning properly and providing optimal benefits.



Image 5: Training and socialization of management

Training was provided to the farmers on the use, maintenance and simple repairs of the piped irrigation system. Ongoing assistance is also provided to ensure the system is functioning properly and providing optimum benefits. coordination, guidance, and periodic monitoring and evaluation of project implementation. Setelah melalui tahapan pelaksanaan, program pengabdian masyarakat ini telah berhasil mencapai beberapa hasil, antara lain:

1. Increased availability of clean water: The piped irrigation system that has been built is able to deliver clean water from the water source to the farm site with a discharge that is sufficient for the needs of the farmers.
2. Improved Livestock Health: With easy access to clean water, farmers can provide quality drinking water to livestock, clean pens regularly, and keep the farm environment clean. This has a positive impact on livestock health and reduces the risk of disease.
3. Improved Livestock Productivity: Sufficient availability of clean water allows farmers to increase the production of animal feed, such as grass and other forage crops. In addition, maintained livestock health also contributes to increased milk, meat and egg production.
4. Improved Livestock Farmer Welfare: With the increase in livestock productivity, the income of the farmers has also increased. This has a positive impact on the welfare of the farmer's family and the village economy as a whole.

Indicators of Benefits and Impacts are Increased production of food crops, horticulture, plantations, and livestock commodities, realization of increased income of farming communities and realization of increased welfare of farming communities due to increased production and realization of Regional and National Food Security.

#### 4. CONCLUSIONS

Structured and participatory project management is the key to the success of the construction of water reservoirs and piped irrigation as a solution to clean water supply in Penanggungan Village. Through careful planning, the implementation of gotong royong, and monitoring. The piped irrigation planning and development program has successfully become a solution for clean water provision for farmers in Penanggungan Village, Trawas District, Mojokerto Regency. This program has a positive impact on the availability of clean water, livestock health, livestock productivity, and the welfare of farmers. Some conclusions that can be drawn are: Project Management of the construction of piped irrigation for clean water supply for farmers in Penanggungan Village, Trawas District, Mojokerto Regency. carried out with the community from location survey to implement an effective and efficient piped irrigation system to meet the needs of clean water for farmers in Penanggungan Village. Increasing awareness and participation of the community, especially farmers, in the management and maintenance of piped irrigation

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systems in a sustainable manner is carried out by socialization and meetings of interested parties. With the construction of clean water pipes, the community becomes more productive so that there is an increase in the productivity and welfare of breeders in Penanggungan Village.

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