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Article

Optimization of Clean Water Supply through Community Assistance in Preparing the Budget Plan for Domestic Water Channel Rehabilitation in Kelindang Atas Village

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KATA KUNCI

Air Bersih;
Bantuan Masyarakat;
Rencana Anggaran Biaya (RAB);
Rehabilitasi Saluran Air;

Abstrak

Penyediaan air bersih yang memadai merupakan bentuk pemenuhan kebutuhan dasar masyarakat, yang sangat penting untuk mendukung kesehatan dan kualitas hidup yang baik. Desa Kelindang Atas masih menghadapi masalah dalam pengelolaan dan rehabilitasi saluran air domestik. Pengabdian masyarakat ini bertujuan untuk mengoptimalkan pasokan air bersih dengan membantu masyarakat dalam mengembangkan Rencana Anggaran Biaya (RAB) untuk rehabilitasi sistem pasokan air domestik. Metode yang digunakan meliputi pengamatan kondisi sistem pasokan air, sosialisasi pengembangan RAB, dan fasilitasi diskusi kelompok dengan warga desa sebagai mitra. Hasil pengabdian masyarakat menunjukkan peningkatan pemahaman masyarakat tentang proses perencanaan dan penganggaran rehabilitasi, serta pengembangan RAB yang realistis dan sesuai dengan kondisi lapangan. Hal ini menghasilkan peningkatan akurasi penganggaran sebesar 60% yang diukur berdasarkan kesesuaian dengan kondisi lapangan. Keterlibatan aktif masyarakat dalam proses pengembangan RAB melalui bimbingan merupakan kunci keberhasilan dalam mengoptimalkan pasokan air bersih di Desa Kelindang Atas.

Abstract

The provision of adequate clean water is a form of fulfilling the basic needs of the community, which is very important for supporting good health and quality of life. Kelindang Atas Village still has problems in the management and rehabilitation of domestic water channels. This community service initiative aims to optimize clean water supply by assisting the community in developing a Cost Estimate Plan (CEP) for the rehabilitation of domestic water supply systems. The methods used include observing the condition of water supply systems, conducting outreach on CEP development, and facilitating group discussions with village residents as partners. The results of the community service initiative demonstrate an increase in community understanding of the planning and budgeting processes for rehabilitation, as well as the development of a realistic and field-appropriate RAB. Resulted in a 60% increase in budgeting accuracy as measured by alignment with field conditions. Active community involvement in the RAB development process through guidance is the key to the success of optimizing clean water supply in Kelindang Atas Village.

KEYWORDS

Clean Water;
Community Assistance;
Budget Plan (RAB);
Water Channel Rehabilitation;

1. INTRODUCTION

Infrastructure development at the village level is critical to improve the quality of life in the community. Well-planned infrastructure will promote economic development, education, and social welfare in the community (Dwiatmaja, I. A., et al 2024). The availability of household water sources in rural areas is an essential piece of community infrastructure. Clean water is a fundamental human need, much as meeting household requirements, and it will have an influence on health, social, and economic development (Utami, R., & Pratama, B.A.2023).

Population growth is directly proportional to the increase in demand for clean water. However, in reality, the quality and quantity of clean water sources are inversely proportional to population growth, especially in rural areas (Kustanto, A. 2020). The availability of clean water in rural areas still does not meet the required standards, necessitating human efforts to develop clean water distribution systems (Direktorat Pencegahan dan Pengendalian Penyakit, Kementerian Kesehatan Republik Indonesia 2018). Data from the Central Statistics Agency (BPS, 2024) shows that 12.94% of households in rural Indonesia still lack access to safe drinking water sources, and dependence on surface water or rainwater remains high.

Lack of access to clean water has a direct impact on household workloads, especially those borne by women and girls. According to a report by the World Health Organization (WHO, 2022), women and girls in developing countries spend more time per day transporting water. This activity not only adds to their physical burden, but also reduces the time that can be allocated to education, childcare, and productive household economic activities. The United Nations Development Programme (UNDP, 2022) report emphasizes that access to clean water is directly correlated with increased community productivity, as it reduces unproductive time and health risks associated with contaminated water. Therefore, the availability of clean water is not only an environmental health issue, but is also closely related to community productivity, gender equality, and social justice in the distribution of domestic work.

Kelindang Atas Village, which is located in the Central Bengkulu Regency of Bengkulu Province, is confronted with significant difficulties in meeting the requirements of its population for clean water for their household use. Because of the damage that has been done to the water channels over a considerable amount of time, the distribution of water has become uneven, and the flow of water has become unstable (Herjanto, D. 2018). Based on the preliminary assessment that was carried out, it was discovered that the water channels in Kelindang Atas Village had suffered structural damage of up to 60%, as well as leaks and sedimentation. As a consequence of this, just 40% of homes have access to water that is neither contaminated nor unsafe.

The limited availability of clean water poses significant risks to health and impedes community productivity. Research conducted in a comparable village indicates that the rehabilitation of domestic water channels can decrease the time required for water collection by as much as 70%, concurrently enhancing household income by 15-20% due to improved work time efficiency (Wahid, D.R.G., et al 2023). Efforts to enhance infrastructure frequently encounter challenges stemming from the community's failure to develop an accurate and transparent Budget Plan (BP).

Community involvement in the planning of clean water infrastructure remains limited, primarily due to insufficient technical capacity for developing budget plans. According to data from the Ministry of Villages, merely 12% of villages in Indonesia possess standardized BP documents for clean water projects, whereas the remaining 88% depend on undocumented cost estimates. The participatory preparation of the BP serves as a significant tool for community empowerment. This process entails identifying actual needs, assessing sustainable operational costs, and enhancing the management of village fund transportation. A case study at PT Air Minum Intan Banjar demonstrates that modifying the pipe network via a measurable BP can decrease water leakage from 35% to 12% and concurrently enhance service coverage by 40% (Januarianto, A.2023). An analogous strategy is required in Kelindang Atas Village, emphasizing active community involvement in the preparation of the BP to incorporate cost elements of suitable technology while leveraging locally available materials. This will ensure that the rehabilitation of domestic water channels is consistent with local priorities and the financial capacity of the village.

2. METHODS

The activity of assisting in the compilation of the Budget Plan (BP) employs observation and socialization methods to impart practical skills and comprehension to the participants (Sarwahita, et al 2020). The activity is executed in a series of phases, as outlined below:

Type of Activity

The activities conducted involved systematic observation and socialization aimed at enhancing the provision of clean water. This was achieved through community support in developing a budget plan for the rehabilitation of domestic water channels in Kelindang Atas Village.

The Participants

The participants of this activity were lecturers, village heads, village officials, students, and members of the Kelindang Atas village community, totaling thirty people. Lecturers played a role in preparing the budget plan and educating the community about the importance of using water wisely. Village heads were responsible for the activity budget, village officials supervised the implementation, and students documented the activity.

The Methods

This community service activity engages lecturers, village heads, village officials, students, and the residents of Kelindang Atas Village as both participants and speakers.

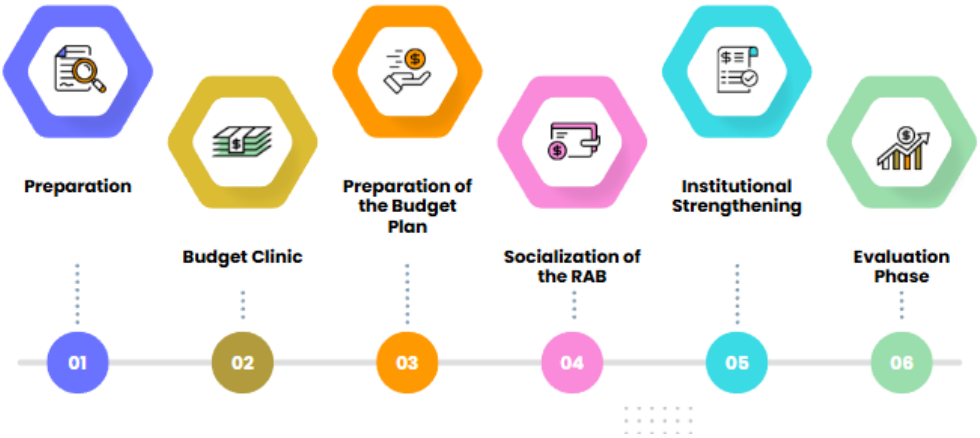
a. **Preparation Phase,** The preparation phase starts with collaboration within the internal team to strategize the community service activities including conceptualization, operations, and work allocation. (Herawati, E., & Rekso, Y. 2023). Every member of the service team is responsible for doing observations to assess the state of impaired residential water channels and for generating operational tools, including participant attendance lists, consumption records, publications, and paperwork.
b. **Implementation Phase,** The execution phase is conducted via a participative methodology. The methodology is executed directly and consistently between the proposal team and the partners, with the community partnership program coordinator facilitating ongoing support and advice for the partners.
c. The implementation of activities involves:
    - **Preparation of the Budget Plan**, where the service team engaged in discussions with the village head, village officials, and the community to estimate the cost of rehabilitating the 5 km long waterway.
    - **Budget Clinic,** the service team conducted an open discussion about the distribution of village funds for the ongoing maintenance of water channels.
    - **Socialization of the RAB,** the service team organized a socialization of the RAB, tailored to the availability of village funds and the priority scale for water channel repairs. The individuals involved in this socialization include the village head, village officials, and members of the community.
    - **Institutional Strengthening,** the establishment of water channel maintenance groups to oversee the condition of the water flow and establish a consistent cleansing schedule for the channels.

d. **Evaluation Phase,** the community service team assesses the generated BP in order to solicit feedback and suggestions from all participants regarding the optimization of waterway repairs. The following are the data collection techniques employed in this community service:

1. **Observation,** in order to qualitatively observe a variety of activities and events that occur, service is conducted both formally and informally. This service is performed through observation to acquire more detailed data or information regarding the field conditions of storage containers

located upstream and downstream of the river, as well as water pipelines.

2. **Literature Review,** the process of compiling data from archives or documents that are derived from books, research, journals, archives, and documents that are relevant to the service being executed.



Picture 1: Stages of Activities and Timing of Implementation

3. RESULT AND DISCUSSION

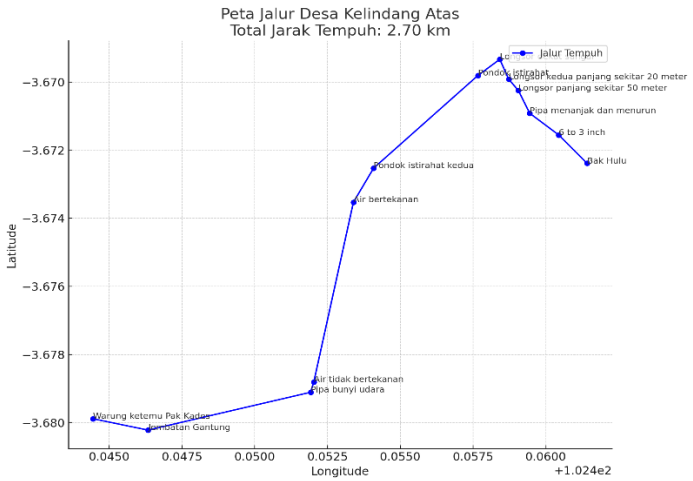
The community service activity occurred on January 18, 2025, in Kelindang Atas Village, Merigi Kelindang District, Central Bengkulu Regency. This activity includes a team of specialists from the Electrical Engineering Department at Universitas Bengkulu, Sociology lecturers from FISIP Universitas Bengkulu, the Head of Kelindang Atas Village, and local community representatives. The execution of the activities is categorized into two primary components: the technical assessment of the water distribution system and support in the development of the Cost BP. Throughout the implementation phase, resident engagement was notably strong, particularly in their readiness to contribute to the mapping of the water distribution route from upstream to downstream.

Picture 2: Inspection of Water Storage Tank Conditions by the Community Service Team

Technical Observation and Problem Identification

An observation was carried out on the water distribution system from the reservoir upstream to the residences. Several significant findings emerged during the field activities:

1. Multiple pipe leaks were identified at over seven locations, particularly at loose joints and aged, cracked pipes.
2. Significant sediment deposits were identified in the upstream water reservoir, resulting in a reduction in the flow rate.
3. There has been a significant reduction in water pressure in various downstream areas, leading to an uneven distribution.
4. Residents acknowledge that they frequently leave the taps running, contributing to increased water wastage.
5. The absence of technical education regarding the upkeep of household water distribution systems.

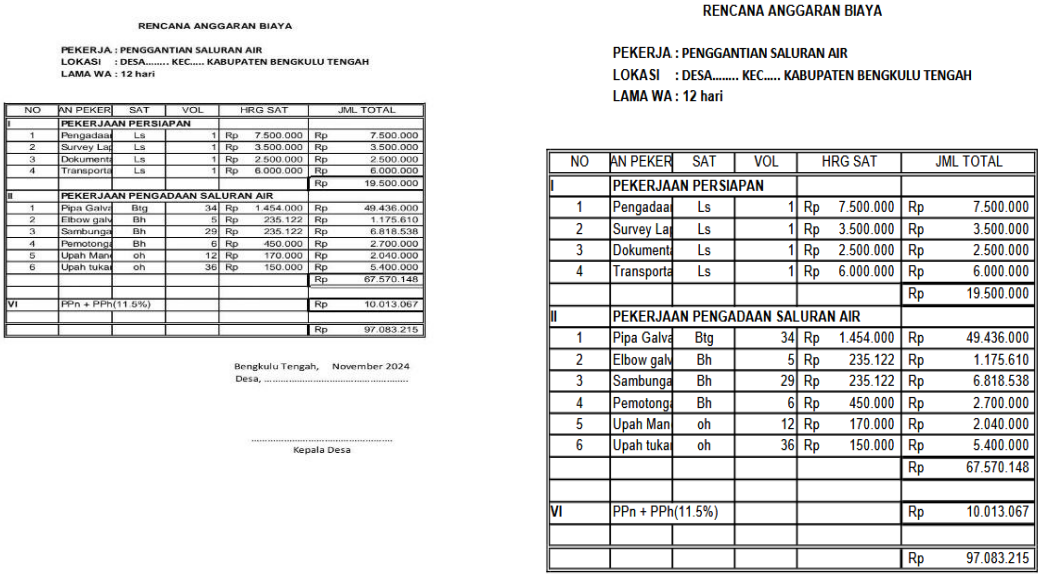


Picture 3: Leakage Point in the Water Pipe of Kelindang Atas Village

Organizing and Simulating the BP

Based on the results of the problem identification, the community service team prepared a Budget Plan (RAB) with community participation. The ideal RAB for water flow improvement is 97 million rupiah. However, if the village's financial condition is insufficient, we provide an alternative repair cost of 88 million without compromising the quality of the materials. This process is conducted via:

1. Introductory training on budget preparation utilizing a straightforward worksheet.
2. Simulation of material requirements based on documented damage points.
3. The utilization of actual cost units derived from pricing at local hardware retailers.
4. Compilation of the technical requirements list: replacement pipes, T-joints, cement, and transportation expenses.



RENCANA ANGGARAN BIAYA

PEKERJA : PENGGANTIAN SALURAN AIR
LOKASI : DESA..... KEC..... KABUPATEN BENGKULU TENGAH
LAMA WA : 12 hari

NO	AN PEKER	SAT	VOL	HRG SAT	JML TOTAL
I	PEKERJAAN PERSIAPAN				
1	Pengadaa	Ls	1	Rp 7.500.000	Rp 7.500.000
2	Survey La	Ls	1	Rp 3.500.000	Rp 3.500.000
3	Dokument	Ls	1	Rp 2.500.000	Rp 2.500.000
4	Transporta	Ls	1	Rp 6.000.000	Rp 6.000.000
					Rp 19.500.000
II	PEKERJAAN PENGADAAN SALURAN AIR				
1	Pipa Galva	Btg	34	Rp 1.454.000	Rp 49.436.000
2	Elbow galv	Bh	5	Rp 235.122	Rp 1.175.610
3	Sambunga	Bh	29	Rp 235.122	Rp 6.818.538
4	Pemotong	Bh	6	Rp 450.000	Rp 2.700.000
5	Upah Man	oh	12	Rp 170.000	Rp 2.040.000
6	Upah tuka	oh	36	Rp 150.000	Rp 5.400.000
					Rp 67.570.148
VI	PPn + PPh(11.5%)				Rp 10.013.067
					Rp 97.083.215

Bengkulu Tengah, November 2024
Desa, ...

.....
Kepala Desa

RENCANA ANGGARAN BIAYA

PEKERJA : PENGGANTIAN SALURAN AIR
LOKASI : DESA..... KEC..... KABUPATEN BENGKULU TENGAH
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2	Elbow galv	Bh	5	Rp 235.122	Rp 1.175.610
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5	Upah Man	oh	12	Rp 170.000	Rp 2.040.000
6	Upah tuka	oh	36	Rp 150.000	Rp 5.400.000
					Rp 67.570.148
VI	PPn + PPh(11.5%)				Rp 10.013.067
					Rp 97.083.215

Picture 4 : RAB for Repairing Water Pipes in Kelindang Atas Village

Discussion and Social Reflection

Optimizing clean water supply through community assistance in preparing a budget plan for the rehabilitation of domestic water channels in Kelindang Atas village provides an overview of problem solving through technical and social solutions. Technical issues are addressed by physically repairing water channels, while social issues are addressed by raising awareness about the importance of conserving and using water wisely. Both issues must be addressed simultaneously to achieve the best and most sustainable results. This initiative has yielded numerous beneficial outcomes:

1. Enhancement of the community's comprehension regarding the independent preparation of the RAB.
2. The advancement of collaborative citizen engagement in the repair and maintenance of water channels.

3. The development of awareness regarding water-saving behavior is emerging through socialization and discussion sessions.
4. The budget plan that was developed received legal endorsement from the village government as it was grounded in field data and the aspirations of the residents.

From a sociological perspective, the process of discussion and presentation of the RAB at the village hall functions as a dialogue space among the community, technocrats, and policymakers, fostering constructive synergy in tackling village infrastructure challenges.

4. CONCLUSION

The community service initiatives in Kelindang Atas Village demonstrate that a collaborative and educational strategy in developing the Cost Budget Plan (RAB) can significantly improve the community's ability to manage essential infrastructure. Through technical observation activities, field surveys, and group discussions, village residents identified damage to the water distribution channels, gained insights into the structure of the Budget Plan (RAB), and prepared a relevant budget based on actual conditions in the field.
The outcomes of this activity consist of:

1. The development of a comprehensive and feasible budget document totaling Rp4,605,000 for the requirements of clean water pipeline repairs.
2. The identification of seven instances of pipe leakage and the reduction in water flow attributed to sediment accumulation in the storage tank.
3. Enhanced awareness among residents regarding water conservation practices, along with the necessity for collaborative upkeep of the distribution system.
4. Enhanced participation of local government and community members in the development and endorsement of sustainable improvement action plans.

This activity illustrates that technical assistance rooted in social empowerment serves as an effective approach to tackling village infrastructure challenges, especially when resources are constrained and the community's technical literacy is taken into account.

5. SUGGESTION

Considering the outcomes of the activities, several recommendations can be proposed:

1. Implementation of analogous initiatives in additional villages facing challenges with water distribution and constrained capabilities for technical budget preparation.
2. Additional training is required in the areas of water channel maintenance and enhancing technical literacy within the village.
3. The village government is recommended to establish a local technical team responsible for carrying out regular inspections, maintaining documentation, and executing prompt repairs.
4. Continuous education on water-saving behavior is essential through outreach initiatives, educational billboards, or community-based activities.
5. A feasibility study is essential for the long-term consideration of incorporating supporting technologies, including flow measurement devices and basic water pressure sensors.
6. Regular checks should be carried out at least once every two weeks using a checklist system to prevent water leaks and ensure that the water flow is adequate.
7. Water leak detection devices and basic repair equipment should be available for a quick response to water leaks or pipe damage.

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