e-ISSN 3027-0537
p-ISSN 3027-0375

10.5281/zenodo.14493250 Vol. 07 Issue 11 Nov - 2024 Manuscript ID: #1671

Development of financial management plan for Tambang Waterworks Cooperative

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Abstract:

This research focuses on developing a financial management plan for the Tambang Waterworks Cooperative, a community water provider in Barangay Tambang, Tinambac, Camarines Sur. The cooperative faces significant challenges, including financial constraints, inadequate manpower, and limited facilities, which have resulted in unstable water services and compromised water quality. The primary objective of this study is to formulate a comprehensive financial management plan that addresses these challenges. The plan focuses on optimizing resource allocation, improving operational efficiency, and ensuring financial sustainability. It highlights the interconnectedness between operational efficiency and the challenges the cooperative faces. The research provides actionable recommendations to support the cooperative's long-term viability and service reliability through surveys and financial analysis. The financial management plan will serve as a roadmap for the cooperative to achieve sustainable operations and improve the quality of life for its stakeholders by ensuring continuous access to safe water.

Keywords:

Financial, Water Cooperative, Challenges, Operations, Financial Management Plan.

How to cite: Andes, L., Encinas, K. N., Monserate, A. N., Ogarte, N., Palaya, R., & Talangan, L. (2024). Development of financial management plan for Tambang Waterworks Cooperative. *GPH-International Journal of Business Management*, 7(11), 27-47. https://doi.org/10.5281/zenodo.14491350

INTRODUCTION

Access to clean water is a fundamental human necessity, yet globally, only 0.01% of Earth's water is readily available for human consumption, according to the United States Geological Survey (USGS). Despite the Philippines' abundant water resources, with over 421 rivers and 221 lakes, many areas face water scarcity and sanitation issues. Recent climate challenges, such as extreme temperatures caused by El Niño, exacerbate this problem, particularly in underserved regions.

Tambang Waterworks Cooperative, established in 1998 in Barangay Tambang, Tinambac, Camarines Sur, exemplifies the challenges of delivering sustainable water services. The cooperative struggles with financial constraints, manpower shortages, and operational inefficiencies, affecting businesses, households, and schools. Residents endure scheduled water access and poor water quality, threatening health and economic stability.
This study aims to evaluate the Tambang Waterworks Cooperative's operational efficiency and develop a financial management plan addressing its financial, environmental, and social challenges. The scope is limited to data from the cooperative's existing operations and member feedback within a defined period, excluding external factors beyond the cooperative's direct control. By enhancing resource allocation and decision-making, this plan aspires to improve service reliability and community well-being, fostering long-term sustainability.

Research Questions

This study evaluated the financial situation and internal management of the Tambang Waterworks Cooperative. Specifically, the researchers sought to answer the following objectives:

1. What is the level of operational efficiency of Tambang Waterworks Cooperative along financial, environmental, and social aspects?
2. What are the challenges faced by Tambang Waterworks Cooperative in terms of manpower, financial resources, and facilities?
3. Is there a significant relationship between the level of operational efficiency and challenges faced by Tambang Waterworks Cooperative?
4. What can be the financial management plan for Tambang Waterworks Cooperative?

Theoretical Framework

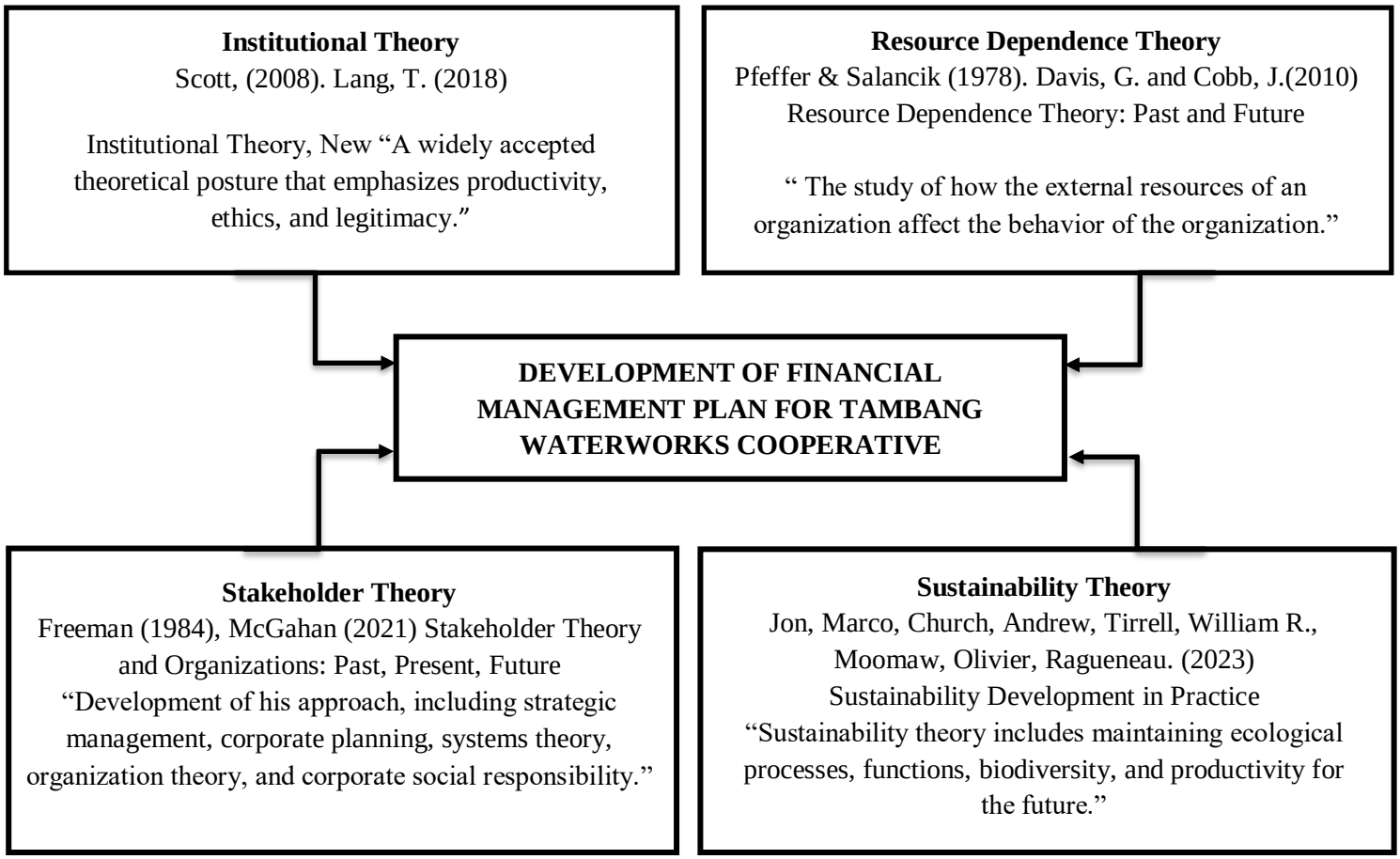


Figure 1. **Theoretical Paradigm**

The figure shows the deeper and more resilient aspects of social structure. It considers the processes by which structures, including schemes, rules, norms, and routines, become established as authoritative guidelines for social behavior. New institutional theory, or new institutionalism, explores how structures like norms, rules, and routines become authoritative guidelines for social behavior. Unlike the "old" institutionalism, which focused on formal institutions like laws, new institutionalism emphasizes informal and immaterial institutions, such as norms and beliefs, reflecting a broader range of definitions and approaches across sociology, economics, and political sciences. It adopts a nondeterministic perspective on institutions, considering them as dynamic entities composed of symbolic elements, social activities, and material resources (Scott, 2001). New institutionalists often analyze the interaction between individual actors and organizations rather than merely formal settings, challenging the "under-socialized" view of human behavior as purely rational or rule-driven (Granovetter, 1985). This theory was useful in determining the effect of social aspects on the cooperative's operations as it became part of the community. It served as a guide to identify the social structure, norms, and to enhance legitimacy.

Resource Dependence Theory (Pfeffer and Salancik, 1978) highlights how organizations rely on external resources to operate effectively. This theory influences decisions about organizational structure, hiring practices, production strategies, contracts, and external partnerships. Applying this theory, the study examined the factors affecting the cooperative's operations based on its current resources. Key resources, such as financial capital, human resources, and infrastructure, are essential for the cooperative to develop a more effective strategic management plan. By using this approach, the cooperative can better manage its resources, reduce risks from resource disruptions, and enhance growth and sustainability.

Stakeholder Theory, introduced by Freeman in *Strategic Management: A Stakeholder Approach* (1984), emphasizes the importance of addressing the goals, needs, and interests of various stakeholder groups. Freeman's work drew from multiple disciplines, including corporate planning, systems theory, and corporate social responsibility. Giancarlo Pallavicini (1968) anticipated similar concepts by analyzing non-economic outcomes related to ethical, social, and environmental issues. The theory views organizations as tools for achieving shared stakeholder purposes, where success depends on effectively creating stakeholder value and meeting mutual goals. For Tambang Waterworks Cooperative, applying stakeholder theory enhanced their stakeholder engagement, accountability, and collaboration, leading to sustainable and community-focused outcomes.

This theory emphasizes meeting current needs without compromising future generations, maintaining ecological processes, biodiversity, and productivity. It integrates the scientific, social, and economic aspects of sustainable resource use, addressing overconsumption, pollution, and poor land use. As global economies and natural environments face stress, achieving sustainability requires an interdisciplinary approach. The Tambang Waterworks Cooperative applied this theory to help water cooperatives provide reliable, affordable, and environmentally responsible water services, ensuring the well-being of current and future generations.

Conceptual Framework

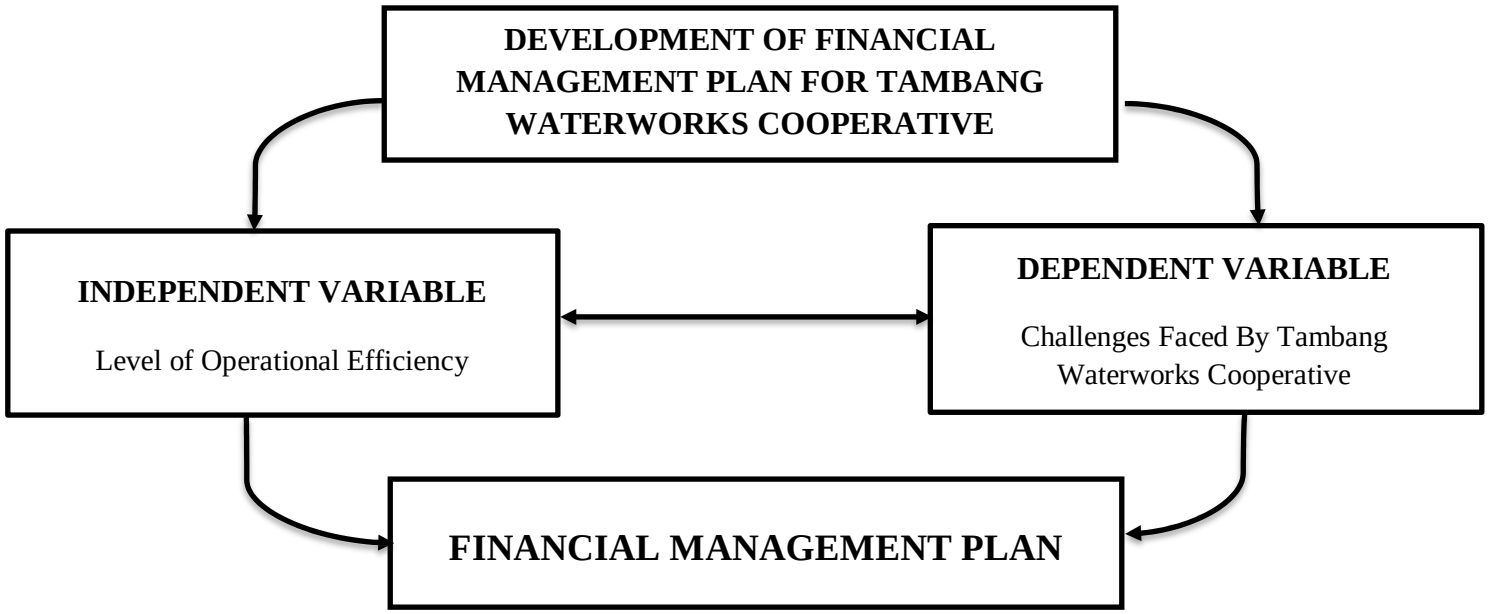


Figure 2. Conceptual Paradigm

Figure 2 presents the conceptual paradigm, showing the interrelationship between the level of operational efficiency and the challenges faced by Tambang Waterworks Cooperative. It illustrates how the development of a financial management plan (the dependent variable) is influenced by the level of efficiency (the independent variable) and the challenges faced, such as financial, environmental, and social aspects. The research indicates that enhancing the financial management plan can boost operational efficiency and help tackle these challenges. It posits that operational efficiency is shaped by financial, environmental, and social factors and seeks to develop a financial management plan to address issues concerning manpower, financial resources, and facilities.

Research Methods

This study employed a mixed-method research design, integrating qualitative and quantitative data collection techniques to achieve an understanding of the phenomenon. Specifically, a descriptive-correlational design was utilized to investigate the relationship between the level of operational efficiency and the challenges encountered by the Tambang Waterworks Cooperative. This approach enabled the researchers to examine associations between variables without asserting causal relationships, providing meaningful insights into their interplay and impact on the cooperative's operations.

To gather data, the researchers used both interviews and surveys. The interviews were conducted in person, providing an opportunity for more personalized interactions, while surveys allowed for the collection of data from a larger group. The survey was divided into four parts: basic respondent information, assessment of operational efficiency, challenges faced by the cooperative, and improvement suggestions. This combination of methods enabled the researchers to obtain both qualitative insights and quantitative data, ensuring a thorough examination of the study's objectives.

Table 1. General Information of the Respondents

Profile	F	%	Rank
Gender			
Male	48	48%	2
Female	52	52%	1
TOTAL	**100**	**100%**	
Age			
18-25	12	12%	3
26-30	10	10%	7
31-35	7	7%	9
36-40	11	11%	5.5
41-45	16	16%	1
46-50	12	12%	3
51-55	12	12%	3
56-60	9	9%	8
61-Above	11	11%	5.5

TOTAL	**100**	**100%**	
Zone			
1	4	4%	8
2	14	14%	3.5
3	9	9%	7
4	12	12%	5
5	10	10%	6
6	17	17%	2
7A	20	20%	1
7B	14	14%	3
TOTAL	**100**	**100%**	
Years Stayed in the Barangay			
1-3 years	0	0%	4
4-6 years	3	3%	3
6-10 years	14	14%	2
10 years or more	83	83%	1
TOTAL	**100**	**100%**	

The respondents of the study were selected through purposive sampling, targeting individuals directly affected by water supply disruptions. These included member-consumers, employees, businesses, and residents of Tambang, Tinambac, aged 18 and above, who were capable and willing to participate. Purposive sampling was chosen to ensure that the respondents met specific criteria, aligning with the study's objectives of gathering insights from those most impacted by the cooperative's operations.

Sampling Method

This study employed purposive sampling, a non-probability technique that selects respondents based on specific criteria relevant to the research objectives. The respondents included community members directly affected by disruptions in the water supply, such as member-consumers, employees, businesses, schools, and households currently using water services from Tambang Waterworks Cooperative. All respondents were residents of Tambang, Tinambac, aged 18 and above, who were capable and willing to participate in the survey and interviews.

The purposive sampling method enabled the researchers to focus on individuals with direct knowledge and experience of the cooperative's operations, ensuring that the gathered data was relevant and insightful. This approach allowed for a targeted selection of 100 respondents, representing various age groups, zones, and years of residency in the barangay, thus providing a comprehensive perspective on the water supply issues and cooperative challenges.

This sampling method saved time compared to random sampling while ensuring that the selected respondents were well-informed about the cooperative's operations. The inclusion of diverse community members enhanced the validity of the findings by capturing a broad range of experiences and viewpoints concerning the operational efficiency and challenges faced by Tambang Waterworks Cooperative.

RESULTS AND DISCUSSION

Operational Efficiency of Tambang Waterworks Cooperative Along With Financial, Environmental, and Social Aspects

The operational efficiency of Tambang Waterworks Cooperative, along with financial, environmental, and social aspects, is shown in Tables 2.1 to 2.3. All data were analyzed using statistical methods, including the weighted mean and rank analysis, to determine the factors contributing to challenges and the level of operational efficiency faced by the cooperative in terms of manpower, financial resources, and facilities.

Financial

Based on Table 2.1, operational efficiency in terms of financial aspects was considered "Efficient." Overall, the total weighted mean is 3.09. Among the five parameters, all were rated efficient, with 3.26 as the highest and 2.76 as the lowest.

As per the results, it can be inferred that investment in water infrastructure is efficient in the cooperative due to the availability of equipment that helps improve the supply system. However, investment in water-saving practices is crucial for the cooperative, as management has not given enough effort to promoting these matters. The remaining parameters are also interpreted as efficient, as these aspects were present in the cooperative.

Table 2.1

Operational Efficiency of Tambang Waterworks Cooperative Along With Financial Aspects

Parameters	Mean	Rank	Interpretation
Investing in Sanitation	3.19	2	E
Investing in Water Infrastructure	3.26	1	E
Building Resilient and Sustainable Water Supply System	3.11	4	E
Improving Affordability of Water Management	3.14	3	E

Investing in water saving practices	2.76	5	E
Overall Mean	**3.09**		**E**

Note: 4.50-5.00 – Very Highly Efficient (VE); 3.50-4.49 – Highly Efficient (HE); 2.50-3.49 - Efficient (E); 1.51-
2.49 – Somehow Efficient (SE); 1.00-1.50 – Not Efficient (NE).

It is crucial for a water cooperative to have adequate infrastructure to support its full-scale operations. According to Meniga (2019), improving water resources is achievable by promoting flexible infrastructure. Infrastructure plays a vital role in ensuring a proper water supply, enabling the cooperative to navigate strategies for managing water supply infrastructure investments across multiple cities under conditions of deep uncertainty.

Environmental

In Table 2.2, the operational efficiency of Tambang Waterworks Cooperative in terms of environmental aspects was rated as "Efficient," with an overall mean of 3.17. All parameters under this aspect were also rated as efficient, with the highest mean of 3.28 attributed to "control strategies for climate change," while "allocating water resources" ranked the lowest with a mean of 3.10.

The cooperative's operational challenges during the summer season are evident, as the limited water supply affects its ability to meet community needs. This scarcity highlights the importance of implementing effective control strategies for climate change. The primary water source for the cooperative comes from local bodies of water. Consequently, during the dry season, water availability becomes difficult to sustain. On the other hand, the allocation of water resources also requires careful attention to optimize efficiency and ensure a reliable supply.

Table 2.2

Operational Efficiency of Tambang Waterworks Cooperative Along With Environmental Aspects

Parameter	Mean	Rank	Interpretation
Water Resources Planning	3.11	4	E
Control Strategies for Climate Change	3.28	1	E
Mitigating Effects of Water System	3.15	3	E
Climate Action of the Water Sector	3.20	2	E
Allocating Water Resources	3.10	5	E
Overall Mean	**3.17**		**E**

Note: 4.50-5.00 – Very Highly Efficient (VE); 3.50-4.49 – Highly Efficient (HE); 2.50-3.49 - Efficient (E); 1.51-2.49 – Somehow Efficient (SE); 1.00-1.50 – Not Efficient (NE).

The Tambang Waterworks Cooperative faces significant challenges in supplying water to the barangay due to extreme climate conditions and insufficient tree coverage. Trees are vital for water production, flood mitigation, toxin filtration, and soil erosion prevention. The lack of trees negatively impacts the cooperative's natural water sources and worsens the effects of climate change on water availability. Additionally, water allocation remains a pressing challenge, as consumers receive water only at scheduled times, resulting in distribution issues and limited daily supply.

According to Butler R. A. (2019), Shemer, H. et al. (2023), and Makaya, E., Rohse, M., et al. (2020), deforestation leads to substantial biodiversity loss, disrupts global climate by increasing carbon dioxide levels, and negatively affects local and indigenous communities by destroying their natural resources and ways of life. Heidari, H. et al. (2021) emphasized that as populations and cities expand, better urban planning and sustainable water management become essential. Understanding factors that may cause future water shortages enables planners to develop policies that improve water-use efficiency and resource sustainability.

Social Aspects

Fostering Cooperation and Collaboration ranked the highest among social aspects, with a mean of 3.29, interpreted as "efficient." On the other hand, Satisfying Customer Expectations ranked the lowest with a mean of 2.88, though it was still interpreted as "efficient." The overall weighted mean for the social factors was 3.03, indicating that the cooperative's performance in this domain is efficient.

The high ranking of Fostering Cooperation and Collaboration highlights that while cooperation is present, it may lack deeper engagement or commitment. This could stem from factors such as reliance on leadership and regular communication about operational issues, like water scheduling. However, the emphasis on operational efficiency may sometimes overshadow broader success measures, such as customer satisfaction and community impact. The lower ranking of customer satisfaction could be attributed to issues like the poor quality of water delivered by the cooperative, which requires improvement.

Table 2.3

Operational Efficiency of Tambang Waterworks Cooperative Along With Social Aspects

Parameter	Mean	Rank	Interpretation
Fostering Cooperation and Collaboration	3.29	1	E
Satisfying Customer Expectations	2.88	5	E

Communication Strategies	2.94	4	E
Community Involvement	3.03	2.5	E
Community Participation Process	3.03	2.5	E
Overall	**3.03**		**E**

Note: 4.50-5.00 – Very Highly Efficient (VE); 3.50-4.49 – Highly Efficient (HE); 2.50-3.49 - Efficient (E); 1.51-–- Somehow Efficient (SE); 1.00-1.50 – Not Efficient (NE).

The Tambang Waterworks Cooperative faces significant challenges, primarily due to inadequate facilities for improving water cleanliness and an inflexible watering schedule that inconveniences consumers. Misunderstandings and dissatisfaction often arise from ineffective communication practices. While fostering internal collaboration is efficient for operational tasks, it falls short of aligning with broader organizational goals, such as enhancing customer cooperation and driving strategic growth. This misalignment results in inefficiencies and limits the cooperative's ability to achieve external outcomes effectively. One of the most critical issues is the failure to deliver satisfactory water quality, a major factor contributing to low customer satisfaction.

Effective governance, including urban partnerships and stakeholder engagement, is essential for addressing these challenges. Improved water policy outcomes—such as better access, quality, reliability, equity, and sustainability—can be achieved through robust partnerships and active stakeholder involvement (Mathew, 2023; OECD, 2022; Lafont et al., 2023). Stakeholder Theory, as highlighted by Pareja et al. (2022), underscores the importance of interconnected relationships among organizations, communities, and other key actors in enhancing both urban and rural water management. For Tambang Waterworks Cooperative, fostering collaborative relationships, maintaining transparent communication, and actively engaging with member-consumers are critical strategies to ensure services align with community needs, build trust, and improve water delivery outcomes.

Challenges Faced by Tambang Waterworks Cooperative in Terms of Manpower, Financial Resources, and Facilities

Manpower

Table 3.1 shows that "Sufficiency of staff" has the highest score of 3.37, categorized as "Challenging," while "Cooperative Stability" has a score of 3.06, also interpreted as "Challenging." The overall weighted mean for manpower challenges is 3.20, indicating this area as "Challenging." Insufficient staffing stands out as a dominant issue, caused by overburdened employees, operational inefficiencies, difficulties in talent retention, financial constraints, and political interference affecting recruitment and workforce management.

Staffing shortages in water cooperatives are exacerbated by factors such as political interference, weak leadership, and misallocation of funds. These issues hinder the recruitment of qualified personnel and reduce operational efficiency. Cooperative stability often ranks lower due to frequent leadership changes, which disrupt continuity, lead to policy inconsistency, and erode trust among members. Weak internal support, limited member engagement, and competition from other service providers further contribute to the instability of the cooperative. Collectively, these challenges lead to reduced organizational performance, delays in project implementation, and diminished public trust, ultimately undermining service delivery and the long-term sustainability of the cooperative.

Table 3.1

Challenges Faced by Tambang Waterworks Cooperative in Terms of Manpower

Parameters	**Mean**	**Rank**	**Interpretation**
Manpower Training	3.18	3	C
Cooperative Stability	3.06	4	C
Good Leadership	3.14	5	C
Sufficiency of Staff	3.37	1	C
Proper Monitoring of Duties and Responsibilities	3.27	2	C
Overall Mean	**3.20**		**C**

Note: 4.50-5.00 – Very Highly Challenging (VC); 3.50-4.49 – Highly Challenging (HC); 2.50-3.49 - Challenging (C); 1.51-2.49 – Somehow Challenging (SC); 1.00-1.50 – Not Challenging (NC).

Water Governance and Its Implications for Tambang Waterworks Cooperative

Studies on water governance emphasize the positive outcomes of Community-Based Water Governance (CWG) interventions in urban areas of the Global South. These include improved water quantity, supply reliability, pricing, community empowerment, employment opportunities, reduced non-revenue water, and financial viability (Adams et al., 2020; Rahmasary et al., 2020). Huang (2023) discusses governance challenges in transboundary water management in the Greater Mekong Subregion, suggesting enhanced cooperation for sustainable water management. Similarly, Makaya et al. (2020) examine rural South Africa's water governance challenges during droughts, highlighting issues of institutional coordination, poor funding, weak infrastructure, and political interference. These findings indicate that the Tambang Waterworks Cooperative could significantly improve employment opportunities and other operational areas by adopting CWG interventions.

Challenges Faced by Tambang Waterworks Cooperative in Financial Resources

Financial Resources

Table 3.2 reveals that the "Investment in Water System" scored the highest at 3.16, categorized as "Challenging," while "Proper Financial Management Plan" scored slightly lower at 3.09, also categorized as "Challenging." The overall weighted mean for financial resource challenges is 3.13, indicating this area as "Challenging."

Investment in water systems is hindered by limited financial resources, which result from inefficient allocation practices within the cooperative. This prevents necessary infrastructure upgrades, negatively affecting water supply efficiency. Allegations of corruption have further damaged the cooperative's reputation, reducing its access to funding. Ineffective financial management practices, such as inadequate budgeting and assigning multiple duties to a single individual, lead to unnecessary expenses and increase the risks of fraud and errors. Insufficient financial reporting and weak internal controls exacerbate mismanagement and resource inefficiency.

Globally, financial challenges in the water sector mirror similar trends. Trindade B. C. et al. (2020) identified financial risks, restricted access to capital, regulatory hurdles, and competition for limited water resources as dominant concerns in the global water supply industry. The World Bank Group (2022) emphasized that investing in water and sanitation is vital for achieving sustainable development goals, underscoring the importance of data, capacity development, and innovative solutions. Innovations by Manila Water, as noted by Iñares (2023), have successfully improved operational efficiency, environmental protection, and sustainable services for 7.4 million customers in Metro Manila. However, poor governance, as highlighted by Rola (2023), has been linked to the Philippine water crisis, with Simeon L. M. (2021) reporting an economic toll of ₱431 billion due to inadequate Water, Sanitation, and Hygiene (WASH) practices.

Table 3.2

Challenges Faced by Tambang Waterworks Cooperative in Financial Resources

Parameter	Mean	Rank	Interpretation
Financing Opportunities	3.15	2.5	C
Proper Financial Management Plan	3.09	5	C
Sustainable Water Supply and Financial Risk	3.11	4	C
Investment to Water System	3.16	1	C

Proper Allocation of Budget for Water Sanitation	3.15	2.5	C
Overall Mean	**3.13**		**C**

Note: 4.50-5.00 – Very Highly Challenging (VC); 3.50-4.49 – Highly Challenging (HC); 2.50-3.49 - Challenging (C); 1.51-2.49 – Somehow Challenging (SC); 1.00-1.50 – Not Challenging (NC).

Facilities

Table 3.3 the Renovation of old infrastructure received the highest rank of 3.33, classifying it as Challenging. On the other hand, the Wastewater treatment facilities received a lowest rank of 2.88, also interpreted as Challenging. Overall, the weighted mean for challenges in financial resources is 3.13, also interpreted as Challenging.

Table 3.3

Challenges faced by Tambang Waterworks Cooperative in terms of Facilities

Parameters	**Mean**	**Rank**	**Interpretation**
Alternative Water Resources	3.12	3	C
Adoption of Water-Related Technological Innovations	2.93	4	C
Wastewater Treatment Facilities	2.88	5	C
Proper Maintenance of Facilities	3.24	2	C
Renovation of Old Infrastructure	3.33	1	C
Overall Mean	**3.10**		**C**

Note. 1.00-1.50 Not Challenging (NC) 1.51-2.49 Somehow Challenging (SC) 2.50- 3.49 Challenging(C) 3.50-4.49 Highly Challenging (HC) 4.50-5.00 Very Highly Challenging (VC)

Tambang Waterworks Cooperative is currently dealing with numerous complaints stemming from inadequate water supply for the community, yet poor improvements have been made to address these issues. The complaints emphasize the need for upgrades to the cooperative's aging infrastructure. However, management appears to have only implemented DIY (do-it-yourself) filtration systems at the source, rather than developing a comprehensive plan to renovate the outdated facilities. The cooperative's focus remains on water filtration rather than expanding the capacity of the tanks to ensure sufficient water reserves during the

summer months. The existing infrastructure, particularly the tanks and pipes, is insufficient and unable to store adequate water supplies.

According to Fletcher S. et al. (2019) and Tsani, S. et al. (2020), evaluating trade-offs between flexible and traditional static planning approaches requires an extension of current paradigms for planning under climate change uncertainty, which do not assess opportunities to reduce uncertainty in the future. Tambang Waterworks Cooperative, like many other water utilities, is facing growing challenges due to climate change. These challenges include more frequent and severe droughts, floods, and changes in rainfall patterns.

Significant Relationship Between Level of Operational Efficiency and Challenges Faced by Tambang Waterworks Cooperative

The significance of this study lies in understanding the relationships between financial, environmental, and social aspects concerning manpower, financial resources, and facilities. Statistical analysis was conducted using Pearson's correlation, and the findings suggest significant associations across all three aspects.

The table presents the correlation coefficients (r) for each aspect, indicating a very strong positive relationship, with all values exceeding 0.95. Specifically:

- **Financial Aspect**:
  - Manpower: $r(98) = .972$
  - Financial resources: $r(98) = .968$
  - Facilities: $r(98) = .963$
    (All significant at $p < .001$.)
- **Environmental Aspect**:
  - Manpower: $r(98) = .958$
  - Financial resources: $r(98) = .984$
  - Facilities: $r(98) = .959$
    (All significant at $p < .001$.)
- **Social Aspect**:
  - Manpower: $r(98) = .957$
  - Financial resources: $r(98) = .953$
  - Facilities: $r(98) = .952$
    (All significant at $p < .001$.)

Table 4

Relationship Between Level of Operational Efficiency and Challenges Faced by Tambang Waterworks Cooperative

	FINANCIAL ASPECT	**ENVIRONMENTAL ASPECT**	**SOCIAL ASPECT**
Man power	r(98) = .972, p < .001***	r(98) = .958, p < .001***	r(98) = .957, p < .001***
	Very Strong	Very Strong	Very Strong
Financial Resources	r(98) = .968, p < .001***	r(98) = .984, p < .001***	r(98) = .953, p < .001***
	Very Strong	Very Strong	Very Strong
Facilities	r(98) = .963, p < .001***	r(98) = .959, p < .001***	r(98) = .952, p < .001***
	Very Strong	Very Strong	Very Strong

Note: 1.0 – Perfect Relationship; 0.80-0.99 – Very Strong Relationship; 0.60-0.79 – Strong Relationship; 0.40-0.59– Moderate Relationship; 0.20-0.39 – Weak Relationship; 0.01-0.19 – Very Weak Relationship; 0 – No Relationship

The high correlation coefficients highlight strong relationships, suggesting that improvements in one variable are likely to drive positive changes in others. These findings emphasize the potential for targeted interventions in manpower, financial resources, or facilities to create a cascading effect, improving multiple aspects of the organization. The statistical significance of the results supports reliable strategic decision-making and resource allocation. Strong correlations indicate that enhancing manpower, finances, and facilities would likely improve financial, environmental, and social outcomes. Prioritizing these areas can improve Tambang Waterworks Cooperative's services, fostering collaboration for both immediate benefits and long-term sustainability, positioning it as a leader in the sector.

As Gold, D. V. et al. (2019) pointed out, even seemingly balanced management strategies can have significant, and sometimes unintended, consequences that may hinder cooperation. Additionally, the National Economic and Development Authority (NEDA) (2021) identified financial resources, technical expertise, and manpower as key challenges for water cooperatives, limiting their ability to provide efficient water services. Furthermore, Liu, X. et al. (2020) developed a Shapley value-based method for fair benefit distribution in water-saving projects, promoting equity and cooperation among stakeholders.

Development of Financial Management Plan for Tambang Waterworks Cooperative

Tambang Waterworks Cooperative faces financial and operational challenges, including limited revenue and outdated infrastructure. To ensure sustainability and improve services, a **Financial Management Plan (FMP)** using the Input-Process-Output (IPO) model was

developed to guide decisions and optimize operations. The plan aims to achieve financial stability, operational efficiency, and long-term growth.

Input

a. **Primary Resources**: Employee statements, monthly collections, budgets, and operational expenses are gathered from cooperative membership and billing records, infrastructure reports, and feedback from management, employees, and community leaders. These primary sources offer firsthand data essential for informed decision-making.

b. **Secondary Resources**: Relevant data from sources like the Philippine Cooperative Development Authority (CDA), World Bank, USAID, and academic research on cooperative management and water supply systems offer valuable context and best practices. These resources provide comparative analysis, supporting strategic planning and financial management decisions for the cooperative.

Process

1. The process begins by collecting financial data, which includes current monthly collections, annual budgets, and projected operational expenses.
2. Next, the cooperative reviews operational data, assessing the condition of infrastructure such as pipelines and water tanks, along with water consumption patterns.
3. Human resources are then engaged, involving cooperative employees, management, and stakeholders to provide insights and align the financial plan with community needs.
4. The cooperative considers external factors, including government regulations and market conditions, to ensure compliance and adaptability in its operations.
5. Finally, the team evaluates potential risk factors, such as equipment breakdowns and financial vulnerabilities, to develop effective mitigation strategies.

Output

The cooperative aims to:

- Increase monthly collections from ₱40,000 to ₱60,000 by improving cash flow and reducing delinquency rates.
- Boost operational efficiency through a 10% annual expense reduction and a 15% decrease in water loss.

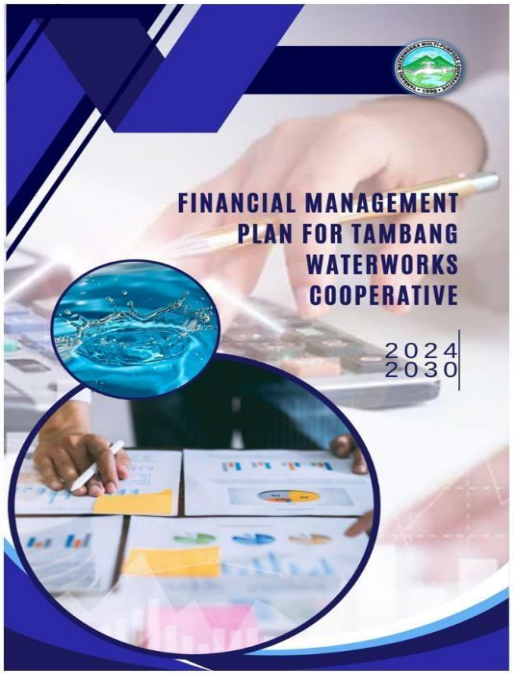
- Achieve 20% membership growth to enhance revenue and community engagement.
- Establish a contingency fund covering six months of expenses to ensure financial stability.

Financial Management Plan for Tambang Waterworks Cooperative

The Financial Management Plan of Tambang Waterworks Cooperative aims to ensure long-term sustainability by boosting revenue, managing costs, and investing in essential infrastructure. Key strategies include:

- Expanding membership.
- Optimizing billing and offering payment incentives to enhance cash flow and reduce delinquencies.
- Allocating resources for infrastructure development, social responsibility, and environmental sustainability.

These strategies aim to improve operational efficiency and address challenges effectively.



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CONCLUSION AND RECOMMENDATIONS

This section presents the findings from the data analysis, the conclusions regarding the problem being addressed, and the recommendations for improving the operational efficiency of Tambang Waterworks Cooperative.

Operational Efficiency of Tambang Waterworks Cooperative

1. **Financial Efficiency**: The study found that constituents prioritize investment in water infrastructure over water-saving practices, yet financial efficiency was rated positively overall. The primary challenge affecting operational efficiency is inadequate storage capacity.
    - **Recommendation**: Invest in building additional water tanks and upgrading the distribution system to enhance storage capacity and ensure a reliable water supply during peak demand periods, particularly in the summer.
2. **Environmental Efficiency**: Climate change control strategies were rated as the most important environmental priority, while water resource allocation was considered less effective. Limited tree coverage and an inefficient allocation system exacerbate water supply issues.
    - **Recommendation**: Initiate tree planting projects, explore alternative water sources, promote water collection systems, and implement an automated water allocation system to bolster resource management and resilience against climate change.
3. **Social Efficiency**: Collaboration and cooperation were highly valued, while customer satisfaction was considered less critical, though social factors were rated efficient overall. Despite strong internal teamwork, the lack of alignment with broader goals and insufficient water treatment and maintenance have led to low customer satisfaction.
    - **Recommendation**: Improve community engagement through regular forums, establish efficient customer support channels for prompt responses to concerns, and enhance service quality and member relations.

Challenges Faced by Tambang Waterworks Cooperative

1. **Manpower**: The study revealed that staffing sufficiency is prioritized, but cooperative stability is less so, classifying manpower factors as challenging. Key issues include political interference, unqualified hires, fund misallocation, and leadership instability, impacting operational efficiency and trust.
    - **Recommendation**: Conduct regular gap analyses and implement flexible staffing options to optimize workforce efficiency.
2. **Financial Resources**: Investment in water system infrastructure was prioritized, but financial management plans were rated lower, resulting in classified financial challenges. The cooperative's budget allocation issues, unethical practices, and poor financial oversight have hindered investments in infrastructure.
    - **Recommendation**: Develop a comprehensive financial management plan that emphasizes strategic investment in infrastructure, technology, and sustainable water treatment.

3. **Facilities**: Renovation of aging infrastructure was prioritized, whereas wastewater treatment was less emphasized, leading to classified facility challenges. Outdated water tanks and pipes were found to struggle under peak usage due to reliance on temporary solutions.
    - **Recommendation**: Prioritize comprehensive infrastructure renovation, replace outdated pipes and tanks, implement a regular maintenance program, and educate the community on infrastructure importance.

Significant Relationship Between Level of Operational Efficiency and Challenges Faced

The study found a significant relationship between the operational efficiency of Tambang Waterworks Cooperative and the challenges it encounters, with positive correlations across financial, environmental, and social aspects tied to key resources like manpower, financial resources, and facilities. This interdependence suggests that targeted improvements in these areas can lead to substantial gains in operational performance and sustainability.

Recommendations for Improvement

- **Adopt an integrated strategy** that includes strategic investments, workforce optimization, and community engagement.
- **Prioritize infrastructure development and upgrades**, ensuring consistent, high-quality water services.
- **Engage stakeholders** in strategic decision-making to align community needs with organizational goals.
- **Implement sound financial management** to ensure appropriate budget allocation for infrastructure and technological advancements.

Conclusion

In conclusion, improving the operational efficiency of Tambang Waterworks Cooperative requires a multi-faceted approach that prioritizes infrastructure investment, optimizes manpower, and enhances community and stakeholder engagement. By addressing these challenges through targeted strategies and proactive measures, the cooperative can strengthen its performance, overcome its current limitations, and position itself as a leader in sustainable water management.

REFERENCES

Adams, E. A., Zulu, L. C., & Ouellette-Kray, Q. (2020). Community water governance for urban water security in the Global South: Status, lessons, and prospects. *WIREs Water*. https://doi.org/10.1002/wat2.1466

Butler, R. A. (2019, April 1). The impact of deforestation. *WorldRainforests.com*. https://worldrainforests.com/09-consequences-of-deforestation.html

Fletcher, S., Lickley, M., & Strzepek, K. (2019). Learning about climate change uncertainty enables flexible water infrastructure planning. https://doi.org/10.1038/s41467-019-09677-x

Freeman, R., & Moutchnik, A. (2013). Stakeholder management and CSR. *Research Gate*. https://www.researchgate.net/publication/257440377_Stakeholder_management_and_CSR_questions_and_answers

Gold, D. V., Reed, P. M., Trindade, B. C., & Characklis, G. W. (2019). Identifying actionable compromises: navigating multi-city robustness conflicts to discover cooperative safe operating spaces for regional water supply portfolios. *Water Resources Research*. https://doi.org/10.1029/2019wr025462

Heidari, H., Arabi, M., Warziniack, T., & Sharvelle, S. (2021). Effects of urban development patterns on municipal water shortage. *Frontiers in Water*. https://doi.org/10.3389/frwa.2021.694817

Huang, W. (2023b). Cooperative governance of transboundary water in Greater Mekong Subregion: Challenges in the Lancang-Mekong Cooperation. *BCP Social Sciences & Humanities*, 21, 366–373. https://doi.org/10.54691/bcpssh.v21i.3522

Iñares, A. (2023, May 5). Manila Water showcases innovations on operational efficiency and environmental protection. *Inquirer.net*. https://newsinfo.inquirer.net/1764888/manila-water-showcases-innovations-on-operational-efficiency-and-environmental-protection

Lafont, J., Saura, J. R., & Soriano, D. R. (2023). The role of cooperatives in sustainable development goals: A discussion about the current resource curse. *Resources Policy*. https://doi.org/10.1016/j.resourpol.2023.103670

Liu, X., Wang, Q., Guo, H., & An, X. (2020). Benefit allocation in shared water-saving management contract projects based on modified expected Shapley value. *Water Resources Management*, 35(1), 39–62. https://doi.org/10.1007/s11269-020-02705-2

Makaya, E., Rohse, M., Day, R., Vogel, C., Mehta, L., McEwen, L., Rangecroft, S., & Van Loon, A. F. (2020). Water governance challenges in rural South Africa: Exploring institutional coordination in drought management. *Water Policy*. https://doi.org/10.2166/wp.2020.234

Mathew, L. M. (2023). Evaluating implementation uncertainties and defining safe operating spaces for deeply uncertain cooperative multi-city water supply investment pathways. https://doi.org/10.1029/2023wr034841

Meniga, M., Ghebremichaeal, B., & Teferi, W. D. (2019). Assessment of community participation in implementation of rural water supply schemes: Empirical evidence from Kilte Awlaelo, Ethiopia. *Zenodo (CERN European Organization for Nuclear Research)*. https://doi.org/10.5281/zenodo.3476033

National Economic and Development Authority (NEDA). (2021). Philippine Water Supply and Sanitation Master Plan 2019-2030. https://neda.gov.ph/wp-content/uploads/2021/09/120921_PWSSMP_Main-Report.pdf

OECD (2022). Financing a water-secure future. *OECD Studies on Water*. OECD Publishing, Paris. https://doi.org/10.1787/a2ecb261-en

Pareja, C., Fuentes, N., & Arriagada, A. (2022). Relationships as a basis for safe drinking water provision by cooperatives in rural Chile. *MDPI Water*. https://www.mdpi.com/2073-4441/14/3/353

Pfeffer, J., & Salancik, G. (1978). The external control of organizations: A resource dependence perspective. *SSRN*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1496213

Rahmasary, A. N., Koop, S., & Van Leeuwen, C. (2020). Assessing Bandung's governance challenges of water, waste, and climate change: Lessons from urban Indonesia. *Integrated Environmental Assessment and Management*, 17(2), 434–444. https://doi.org/10.1002/ieam.4334

Scott, W. (2008). Institutions and organizations: Ideas and interests. *Digital Commons @ USU*. https://digitalcommons.usu.edu/unf_research/55

Shemer, H., Wald, S., & Semiat, R. (2023). Challenges and solutions for global water scarcity. *Membranes*, 13(6), 612. https://doi.org/10.3390/membranes13060612

Trindade, B. C., Gold, D. V., Reed, P. M., Zeff, H. B., & Characklis, G. W. (2020). Water pathways: An open source stochastic simulation system for integrated water supply portfolio management and infrastructure investment planning. *Environmental Modelling and Software*, 132, 104772. https://doi.org/10.1016/j.envsoft.2020.104772

Tsani, S., Koundouri, P., & Akinsete, E. (2020). Resource management and sustainable development: A review of the European water policies in accordance with the United Nations' Sustainable Development Goals. *Environmental Science & Policy*, 114, 570–579. https://doi.org/10.1016/j.envsci.2020.09.008

World Bank Group. (2022, December 2). GWSP 2022 annual report. *World Bank Document*. Retrieved February 25, 2024, from https://documents1.worldbank.org/curated/en/099102211102224772/pdf/IDU0a8831b08028b604d070aa0104893aa4ceda2.pdf