

CHAPTER I

INTRODUCTION

1.1. Background

Safe drinking water provision directly supports public health and environmental stability in accordance with Sustainable Development Goal 6 (The Global Goals, 2015). Indonesia integrates this standard into the 2025 to 2029 National Medium Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional* [RPJMN]). The central government prioritizes water resilience by expanding piped distribution networks across regions. The 2025 to 2029 RPJMN sets a specific target to increase urban household access to piped ready-to-drink water from 39,20 percent in 2025 up to 51,36 percent by 2029. The planning document also projects the National Water Resilience Index to reach 3,75 within the same timeframe. Reaching these exact metrics requires local utilities to apply strategic physical expansion alongside full cost recovery financial models. The Universitas Andalas water supply system operates under these exact regulatory expectations.

Higher education institutions like Universitas Andalas (Unand) mirror these circumstances on a micro scale. The campus population continues to grow alongside its routine academic and research operations. This steady expansion creates higher water demands, matching the projections in the university Master Development Plan (Universitas Andalas, 2021). The existing drinking water supply system encounters operational limitations that affect the daily execution of the university's core functions. Recent evaluations note the Water Treatment Plant (WTP) does not fully align with the drinking water quality standards set by Ministry of Health Regulation (*Permenkes*) No. 2 of 2023. Tests record parameters above the recommended thresholds. These include TDS at 73 mg/L, turbidity at 12,3 NTU, and total coliform at 300 CFU/100mL. The distributed water volume does not fully accommodate present consumption needs. The system also requires scaling to support future development targets. Intermittent service continuity occasionally prompts user feedback (Komala et al., 2024).

Managing quality, quantity, and continuity (the 3Qs) requires the campus SPAM business model to shift from conventional methods to an autonomous and adaptive structure. Operating this utility depends on established legal guidelines. Government Regulation (*Peraturan Pemerintah* [PP]) No. 122 of 2015 on Water Supply System (*Sistem Penyediaan Air Minum* [SPAM]) directs these operations by defining minimum service standards (Government of the Republic of Indonesia, 2015). Campus infrastructure planning should also connect with broader regional policies. West Sumatra Provincial Regulation No. 4/2025 of Medium-Term Regional Development Plans (*Rencana Pembangunan Jangka Menengah Daerah* [RPJMD]) of West Sumatra Province and Padang City provides the framework for this coordination. Following this regulation matches university development with regional priorities.

System resilience can be improved through several practical opportunities. Smart metering and routine audits introduce data-driven efficiency to the network. These methods help reduce Non-Revenue Water (NRW), which remains a prominent national focus. Alternative water sources become viable by applying circular economy principles. Facilities can capture rainwater and recycle greywater to ease the demand on primary supplies. Pump system optimization connects water and energy management. These technical adjustments lower operational expenses while reducing the campus carbon footprint. This approach fits the green campus targets within the Unand sustainability agenda (Zulfikar, 2024).

Furthermore, the structural vulnerability of the current system was exposed during the hydrometeorological flood disaster in November 2025. This catastrophic event directly impacted the study site, specifically the primary raw water intake at the Limau Manis river. The flood severely altered the baseline water quality by introducing massive, instantaneous turbidity spikes and heavy sedimentation loads that overloaded the existing treatment capacity. This shifting environmental reality dictates that future raw water quality will remain highly volatile and susceptible to extreme climate anomalies. Consequently, integrating climate-adaptive infrastructure investments and rigorous disaster risk mitigation into the 2027-2032 Business Plan is no longer optional, but an absolute necessity to ensure long-term service continuity.

Universitas Andalas functions as an integrated zone rather than an academic institution. The campus layout now includes several revenue-generating entities like the University Hospital, community dormitories, and commercial outlets. Clean water acts as a direct production input for these specific business units. It supports regular operations alongside user satisfaction. Inconsistent water delivery or quality changes at the hospital might influence routine medical and sterilization procedures. Dormitory occupancy and rental revenue also depend on steady utility access. Relying on standard management approaches without detailed economic assessment limits long-term efficiency. A structured Business Plan introduces a framework to treat water distribution as an economic commodity. This planning ensures these commercial units receive measurable services in both quantity and quality. It also supports university cash flow by applying tariff and cost-recovery schemes.

Developing a SPAM Business Plan (*Renbis/Rencana Bisnis*) aligns governance compliance with existing operational conditions. Ministry of Home Affairs Regulation No. 118 of 2018 outlines required strategic planning documents for public utility management, which include a business plan, a work plan, and a budget. These frameworks support business entity accountability. They also guide operational efficiency. Existing management practices at Unand operate without these specific planning instruments. This situation correlates with observable variations in technical service delivery across the campus. Field observations note occasional discontinuities in water flow within lecture buildings during peak hours, alongside increased water turbidity in faculty housing areas and the campus mosque during periods of higher rainfall. These physical patterns suggest existing management approaches experience limitations in maintaining the 3Qs (Quality, Quantity, Continuity). A business plan offers a structured method to reorganize the system.

The Universitas Andalas Water Supply System (SPAM) Business Plan incorporates a Full Cost Recovery (FCR) approach. This financial model sustains routine service delivery while supporting independent infrastructure planning. These steps apply the transparency and efficiency guidelines from Minister of Home Affairs Regulation (*Permendagri*) No. 21 of 2020. The document covers a 2027 to 2032

timeframe matching standard five-year strategic cycles. Implementation begins in 2027 as the base year. This start date immediately follows the 2026 documentation phase. Tracking this schedule helps measure physical development targets during the final years of the Universitas Andalas Masterplan 2020-2030. The timeline also prepares the facility for the next operational cycle.

Planners bypassed the Partial Cost Recovery method since it maintains a reliance on rectorate subsidies. Relying on these external funds often postpones routine infrastructure maintenance and affects continuous water distribution whenever the university adjusts its overall budget. It also dismissed a pure profit model because it conflicts with an educational institution's public service mission. Applying high profit margins alters the core function of supplying affordable basic utilities to the academic community and dormitory residents. The Full Cost Recovery strategy instead creates structural financial independence. This specific scheme covers all operational expenses, routine maintenance, and asset depreciation through a cross-subsidy tariff structure. Under this arrangement, commercial campus units directly subsidize the operational costs of student dormitories and worship facilities.

Developing a SPAM Business Plan brings strategic value to Universitas Andalas. The document serves as a technical and financial guide to improve existing operations, establishing a utility model capable of adapting to climate variations and shifting campus demands. This research presents academic value. It applies professional water utility practices directly within a higher education setting. The practical outcomes give university leadership a clear framework for future investment and policy decisions. This approach supports consistent delivery of quality drinking water for the entire academic community. Recognizing these operational realities, the following sections define specific research problems and objectives.

1.2. Research Aim and Objectives

1.2.1. Research Aim

This study aims to develop a comprehensive, full cost recovery (FCR) Business Plan for the Universitas Andalas Drinking Water Supply System (SPAM) for the 2027–2032 period. Serving as a strategic roadmap, the plan seeks to transition

SPAM from a conventional technical unit into a financially sustainable, professionally managed enterprise.

1.2.2. Research Objectives

The research pursues three specific objectives:

1. Evaluate the existing infrastructure and performance. This evaluation supports an optimization plan for the 2027 to 2032 period. The technical adjustments aim to meet projected water demands while aligning with the 3Q minimum service standards (Quality, Quantity, Continuity).
2. Formulate the corporate strategy for the campus water utility. This phase defines a distinct vision and mission. It applies an internal and external SWOT analysis to guide functional work programs across operations and human resources.
3. Determine the financial feasibility of the proposed *SPAM* operations using a Full Cost Recovery (FCR) approach measured by standard investment parameters and construct the risk management to ensure long-term business resilience.

1.3. Research Benefits

The benefits of this research include:

1. Theoretical Benefits

The research adds to existing academic literature on strategic management and environmental engineering. It documents the application of a business planning cycle within a non-municipal water system in a campus setting. These findings serve as a reference for developing public infrastructure management theory in similar institutional contexts.

2. Practical Benefits

a. For Universitas Andalas's *SPAM*

The document provides a measurable plan to guide operations, management, and investment over the next five years. It offers a clear path toward consistent service and financial sustainability.

b. For Universitas Andalas Leaders

The study acts as a data-driven resource for budget decisions and policy development. It helps ensure that water infrastructure remains aligned with the broader goals of the Universitas Andalas Masterplan.

3. Policy Benefits

These results offer a model that other universities or water operators in specialized zones, such as hospital complexes or industrial areas, may adapt. The approach encourages more professional and sustainable management of drinking water infrastructure.

1.4 Research Scope and Limitations

The scope of this study are as follows:

1. Geographical Scope

The scope covers the Drinking Water Supply System (SPAM) at Universitas Andalas, specifically for the Limau Manis Campus area in Padang. The analysis also identifies potential customer segments within residential areas surrounding the university and regions prone to hydrometeorological hazards.

2. Planning Period

The business plan covers a five-year horizon from 2027 to 2032. All projections and analysis rely on historical data and relevant assumptions available at the time of this study.

3. Focus of Analysis

The study concentrates on managerial, strategic, and financial elements necessary for business planning. It does not include Detailed Engineering Design (DED) for recommended infrastructure units. The final document will instead identify the requirement for such designs as part of the proposed work programs.

4. Data Sources

The analysis relies on a mix of primary and secondary information. Key sources include data from the Universitas Andalas Directorate of General Affairs and Asset Management (DU-PA), internal SPAM records, official university documents like the Masterplan, and relevant previous studies.

Although the initial research plan included primary water quality testing, the available laboratory equipment failed proper calibration. Consequently, the evaluation of the existing physical water quality strictly utilizes secondary data from recent technical engineering evaluations (Komala et al., 2024). The

primary focus of this study lies in strategic business modeling, institutional restructuring, and financial feasibility using a Full Cost Recovery approach. Establishing the technical baseline relies on these validated secondary reports rather than executing uncalibrated laboratory-based water quality assessments.

1.5. Writing Systematics

The systematics of writing in this thesis project are as follows:

CHAPTER I INTRODUCTION

This chapter presents the background, research aim and objectives, research benefits, scope and limitation of the study, and writing systematics of the thesis.

CHAPTER II LITERATURE REVIEW

This chapter covers the theoretical foundations of business planning, the theoretical basis of drinking water supply systems, feasibility analysis methodologies, as well as the regulatory framework and relevant previous studies.

CHAPTER III RESEARCH METHODOLOGY

This chapter discusses the research design (type and characteristics), research location and period, research objects and limitations, data types and sources, data collection methods, and data analysis techniques.

CHAPTER IV RESULTS AND DISCUSSION

This chapter presents the existing conditions, business plan policy directions, technical and non-technical business development programs, risk management implementation, as well as investment and financial projections for *SPAM* Unand.

CHAPTER V CONCLUSIONS AND RECOMMENDATIONS

This chapter provides the conclusions drawn from the study and recommendations for future research.