

Toward an Integrated IPOO–DMAIC Framework for Diagnosing and Improving Waqf Governance: A Conceptual Case Study Protocol for West Sumatra, Indonesia

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ABSTRACT

This paper develops an integrated Input-Process-Output-Outcome (IPOO) and Lean Six Sigma DMAIC framework for diagnosing and improving waqf governance in West Sumatra, Indonesia, and reports its Define-phase output: identifying quick wins, specifying a baseline data-collection plan, proposing tentative root causes for empirical testing, and outlining improvement and control mechanisms. The framework was built through analysis of national and provincial regulations and institutional reports (SIWAK, the Indonesian Waqf Board, the Ministry of Religious Affairs) and a structured synthesis of the waqf-governance and Lean Six Sigma literature, benchmarked against Malaysia, Türkiye, Kuwait, Egypt, and Singapore. A forthcoming empirical phase will use semi-structured interviews, observation, and document analysis, validated through triangulation. Cash waqf collection rose from IDR 763.32 million (2024) to IDR 1.68 billion (April 2026), and the National Waqf Index from 0.422 (2023) to 0.447 (2024). Yet only 3,604 of 5,235 land parcels were certified, leaving 1,631 (31.16%) uncertified. Weak coordination and fragmented data were flagged as priority quick wins, while inadequate nazhir guidance and weak process standardisation emerged as tentative root causes. The Improve phase proposes standardised training, a Waqf Plan of Action, and a monitoring dashboard, with performance indicators specified in the Control phase. Once validated, this framework offers measurable stages for institutionalising continuous improvement in waqf governance.

Keywords: Community Welfare, Conceptual Framework, DMAIC, Indonesia, Islamic Social Finance, Lean Six Sigma, System Approach, Waqf



INTRODUCTION

Waqf represents a sustainable instrument of Islamic social finance through which the principal asset is preserved while its benefits are continuously distributed to society. It has the potential to support poverty reduction, economic empowerment, education, healthcare, religious services, and other forms of community welfare, and occupies a central position in Indonesia's broader Islamic economic and social-finance masterplan (Komite Nasional Ekonomi dan Keuangan Syariah, 2019). In contemporary Islamic finance, waqf is no longer limited to conventional religious assets such as mosques, prayer facilities, and cemeteries but also encompasses cash waqf, productive property, business investment, sukuk-linked instruments (Cahyono & Hidayat, 2022; Laila et al., 2025), and technology-enabled fundraising. Accordingly, effective waqf governance requires professional management, institutional accountability, productive asset development, and continuous performance evaluation (Ali & Oseni, 2021; Rohim et al., 2022; Adinugraha et al., 2024).

In Indonesia, waqf governance is supported by Law No. 41/2004 concerning Waqf, Government Regulation No. 42/2006, and Government Regulation No. 25/2018. These regulations define the responsibilities of the wakif (endower), nazhir (waqf manager), the Indonesian Waqf Board (BWI), the Ministry of Religious Affairs, and other relevant institutions. They also regulate waqf pledges, asset registration, land certification, management, development, supervision, and benefit distribution. Nevertheless, the existence of a comprehensive legal framework has not automatically ensured consistent implementation across regions. Waqf governance in Indonesia continues to face challenges involving institutional fragmentation, uneven nazhir competence, limited transparency, incomplete land certification, and inadequate productive utilisation of waqf assets (Government of the Republic of Indonesia, 2004, 2006, 2018; Dewi et al., 2025).

As one of Indonesia's provinces with a strong Islamic social and cultural foundation, West Sumatra has considerable potential for developing waqf as an instrument of community welfare. This potential is reinforced by the Minangkabau philosophy of Adat Basandi Syarak, Syarak Basandi Kitabullah, which places Islamic principles at the centre of social and customary life. Various waqf initiatives have been implemented through collaboration among the West Sumatra Provincial Government, BWI, the Regional Office of the Ministry of Religious Affairs, Islamic financial institutions, community organisations, and nazhir. These initiatives include cash waqf campaigns, civil-servant waqf, prospective marriage waqf, land certification, digital fundraising, and the development of productive waqf assets. Effective implementation, however, requires clear authority, coordinated responsibilities, reliable information systems, and professionally competent nazhir (Ramdani et al., 2022; Lestari et al., 2023; Dewi et al., 2025).

Available data demonstrate substantial growth in waqf collection in West Sumatra. Cash waqf collection increased from IDR 763.32 million in 2024 to IDR 1.20 billion in mid-2025 and reached IDR 1.68 billion by April 2026. The province's National Waqf Index also increased from 0.422 in 2023 to 0.447 in 2024, placing West Sumatra among the five best-performing provinces in western Indonesia. The National Waqf Index is important because it provides a multidimensional instrument for assessing waqf institutions, regulatory support, management processes, systems, outcomes, and impacts at the regional level (Lestari et al., 2023). Nevertheless, growth in collection and index performance must be accompanied by measurable improvements in asset productivity, governance quality, nazhir competence, beneficiary coverage, and sustainable community benefits.

Land-waqf data reveal a continuing certification and asset-management gap. The national Waqf Information System (SIWAK) records 5,235 waqf land parcels in West Sumatra covering 596.58 hectares. Of these, 3,604 parcels covering 373.13 hectares have been certified, while 1,631 parcels

covering 223.44 hectares remain uncertified. Thus, approximately 31.16% of recorded waqf land parcels remain without certification. This condition may create administrative uncertainty, expose assets to legal disputes or misuse, and restrict opportunities for productive development and institutional financing. Certification should therefore be integrated with asset mapping, legal verification, database updating, risk management, and productive-development planning rather than treated solely as an administrative procedure (Bank Indonesia & Badan Wakaf Indonesia, 2018; Lestari et al., 2023).

These figures reveal a fundamental paradox in West Sumatra's waqf governance. Although cash waqf collection, registered assets, and the National Waqf Index have increased, productive utilisation has not developed proportionately. Variations in nazhir capacity, fragmented institutional data, limited use of digital systems, unclear stakeholder responsibilities, and the absence of standardised performance indicators continue to restrict effective management. Previous studies have similarly identified weak coordination, inadequate human-resource capacity, limited transparency, and insufficient digital integration as major barriers to professional and productive waqf management in Indonesia (Rohim et al., 2022; Adinugraha et al., 2024; Lubis et al., 2024; Dewi et al., 2025).

This divergence is unlikely to be coincidental. Cash waqf collection and land certification are driven by fundamentally different governance mechanisms. Collection is a high-visibility, campaign-driven activity that produces immediate, quantifiable results (rupiah mobilised), can be championed centrally, and can be executed by a single actor through digital fundraising, civil-servant waqf, and prospective-marriage schemes. Certification, by contrast, is a procedurally complex, document-dependent, and multi-agency process involving nazhir, the National Land Agency, the Office of Religious Affairs, and the Ministry of Religious Affairs; it yields no immediately visible benefit, has long lead times, and lacks a single accountable owner.

On this basis, the study advances a preliminary hypothesis for empirical testing *rising collection and stagnant certification stem from the same underlying governance weakness the absence of standardised processes and a designated coordination authority which centralised collection campaigns can bypass but inter-institutional certification cannot. Where results are quick, visible, and attributable to one actor, performance improves; where they depend on sustained cross-agency coordination and process standardisation, performance stalls.* This proposition links both arms of the paradox to the systemic root causes examined in the later analytical phases, rather than treating them as unrelated outcomes.

From an operational perspective, the absence of structured and routine technical guidance for nazhir may lead to variations in regulatory understanding, asset-recording procedures, financial management, investment practices, fundraising, benefit distribution, and performance reporting. Waqf activities may therefore depend heavily on the individual experience and capacity of each nazhir. In addition, the absence of a formally designated Provincial Waqf Coordination Team or Person in Charge may weaken cross-sector coordination, supervision, data verification, performance monitoring, and corrective follow-up. These conditions demonstrate that suboptimal waqf performance is not merely an individual nazhir problem but reflects broader systemic weaknesses in governance, leadership, capacity development, information management, and institutional accountability (Ali & Oseni, 2021; Ramdani et al., 2022; Dewi et al., 2025).

Given these multidimensional challenges, a systematic analytical approach is required to identify critical governance issues, establish reliable baseline measurements, trace root causes, formulate targeted improvements, and maintain sustainable results. Lean Six Sigma offers such an approach through the Define–Measure–Analyze–Improve–Control (DMAIC) cycle. The Define phase identifies priority problems and quick-win opportunities; Measure establishes operational indicators



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and baseline performance; Analyze traces underlying causes; Improve formulates and implements evidence-based solutions; and Control monitors outcomes and sustains improvements. Lean Six Sigma has been successfully applied beyond manufacturing to healthcare, service organisations, and transactional processes because of its emphasis on data reliability, process standardisation, waste reduction, variation control, and continuous improvement (Pyzdek & Keller, 2018; Wartati et al., 2021; Monday, 2022).

The suitability of Lean Six Sigma for waqf governance does not rest on task repetition but on the presence of processes. Although governance tasks are often non-repetitive and judgment-intensive, waqf administration nonetheless comprises recurring process classes registration, certification, financial reporting, fund collection, and benefit distribution each exhibiting measurable variation in how it is performed. DMAIC targets this process variation rather than any physical production task, which is why the methodology has already been extended beyond manufacturing into healthcare, public administration, and transactional and knowledge-based services that share the same non-repetitive, rule-bound character (Pyzdek & Keller, 2018; Wartati et al., 2021; Monday, 2022).

Three features make governance a particularly fitting application. First, regulatory frameworks function as an asset rather than an obstacle: Law No. 41/2004 and its implementing regulations provide an explicit performance standard against which deviations uncertified parcels, non-compliant reporting, inconsistent nazhir practice can be defined as measurable gaps, analogous to the critical-to-quality specifications of conventional Lean Six Sigma. Second, qualitative outcomes such as accountability, transparency, and nazhir competence can be operationalised through proxy indicators (certification rate, reporting compliance, competence assessment, and productive-asset utilisation), as specified in this study's Control phase. Third, the central observation that waqf performance depends heavily on the individual experience and capacity of each nazhir is precisely a problem of process variation, the canonical target of Lean Six Sigma. The methodology is therefore adopted not as a manufacturing transplant but as a structured, evidence-based diagnostic-and-control discipline suited to standardising rule-bound administrative processes.

To provide a broader organisational and policy perspective, the DMAIC cycle is integrated with the Input–Process–Output–Outcome (IPOO) System Approach. Regulatory support, human resources, infrastructure, financing, and information technology constitute the inputs; collection, certification, management, development, utilisation, monitoring, and evaluation represent the processes; funds collected, assets certified, productive projects developed, and beneficiaries reached constitute the outputs; and sustainable economic empowerment and community welfare represent the expected outcomes. The integration of IPOO and DMAIC enables waqf governance to be examined as an interconnected system rather than as a series of isolated activities. This is important because weaknesses in one component such as nazhir competence or data quality may affect the performance of the entire governance system (Jackson, 2019; Organisation for Economic Co-operation and Development, 2017).

Despite a growing literature on productive waqf, cash waqf, digitalisation, and institutional governance, prior studies display four specific limitations. First, they are predominantly descriptive or normative mapping legal frameworks, fundraising models, digital platforms, investment instruments, and nazhir professionalism without applying a structured process-improvement methodology to diagnose and remedy governance failures (Aldeen et al., 2022; Rohim et al., 2022; Cahyono & Hidayat, 2022; Adinugraha et al., 2024). Second, they identify barriers (weak coordination, limited capacity, low transparency) but rarely establish standardised baseline measurement with operational indicators against which improvement can be verified. Third, they stop at recommendations, offering no closed-

loop mechanism that links root-cause analysis to piloted interventions and to sustained control. Fourth, they examine waqf functions in isolation rather than as an integrated input-to-outcome system in which a weakness in one component propagates through the whole.

No prior study, to the authors' knowledge, has combined an IPOO system perspective with the DMAIC cycle to diagnose governance gaps, measure performance, trace root causes, design interventions, and institutionalise control within a single provincial waqf-governance setting. This study therefore addresses this theoretical and practical research gap by extending Lean Six Sigma into Islamic philanthropic governance and applying it to the institutional context of waqf management in West Sumatra Province.

This qualitative study aims to examine in depth the implementation of waqf governance through an integrated IPOO and Lean Six Sigma approach within the administrative jurisdiction of West Sumatra Province. The DMAIC framework is employed as a systematic analytical and process-improvement tool. Across its five phases, the study seeks to

Table 1. DMAIC Phases and Research Objectives

Phase	Research objective
Define	Identify critical governance issues and quick-win improvement opportunities.
Measure	Review data-collection planning and establish standardised baseline performance.
Analyze	Trace the root causes of suboptimal waqf-governance performance.
Improve	Formulate an evidence-based improvement implementation plan from the preceding phases.
Control	Establish indicators for evaluating performance before and after intervention.

Table 1 presents the five DMAIC phases and their corresponding research objectives. The Define phase identifies critical governance issues and quick-win opportunities, while the Measure phase reviews data collection planning and establishes standardized baseline performance. The Analyze phase traces the root causes of suboptimal waqf-governance performance, the Improve phase formulates an evidence-based improvement plan based on the preceding phases, and the Control phase establishes indicators for evaluating performance before and after intervention. Collectively, these phases provide a structured and sequential pathway for diagnosing, improving, and sustaining waqf governance in West Sumatra.

METHODS

1. Research Design and Paradigm

This study adopts an embedded single-case study design (Yin, 2018) situated within an interpretive qualitative paradigm (Creswell & Poth, 2018; Creswell & Creswell, 2018). Three design choices require justification. First, a case-study strategy was selected because the research question is a "how" and "why" question about a contemporary governance phenomenon over which the researcher has no control, and because waqf governance cannot be meaningfully separated from the regulatory, institutional, and cultural context in which it operates the defining condition under which case-study inquiry is preferred over survey or experimental designs (Yin, 2018). Second, an embedded (rather than holistic) design was chosen because waqf governance in the province is enacted by several distinct actors whose roles, incentives, and information differ; treating each as a separate unit of analysis within the single bounded case allows cross-unit comparison and guards against an overly abstract, system-



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level account that would obscure where coordination actually breaks down. Third, an interpretive paradigm was adopted because the study seeks to understand how regulations, responsibilities, and performance expectations are understood and operationalised by the actors themselves meanings that are socially constructed and context-dependent rather than to measure the frequency of predefined variables, which a positivist design would require.

2. Case Boundary and Units of Analysis

The case is bounded by the administrative jurisdiction of the West Sumatra Provincial Government. Within this bounded case, four embedded units of analysis are specified: the Provincial Government, the Regional Representative of the Indonesian Waqf Board (BWI), the Regional Office of the Ministry of Religious Affairs, and district/city nazhir. These units were selected because, together, they hold the statutory authority and operational responsibility for waqf planning, coordination, certification, supervision, and reporting in the province, and therefore collectively constitute the governance system under study.

3. Research Programme and Scope of This Paper

The research programme is organised in two stages corresponding to the Lean Six Sigma DMAIC cycle. This paper reports Stage 1, the Define-phase conceptual and analytical framework; Stage 2 is the planned empirical fieldwork that will test and refine it. The two stages, their methods, and the status of their outputs are described in turn below.

a. Stage 1: Define-Phase Framework Development

Stage 1 is a desk-based study that developed the conceptual framework through document analysis integrated with a structured literature synthesis and international benchmarking. Its procedures are specified below.

Documents were selected purposively against four inclusion criteria:

- 1) authoritative source issued by a competent regulatory or governing body (the national government, the Indonesian Waqf Board, or the Ministry of Religious Affairs);
- 2) direct relevance to waqf governance, administration, or performance measurement;
- 3) currency the regulation or report in force, or the most recent available edition;
- 4) verifiability officially published or formally recorded. On this basis the corpus comprised the governing regulations (Law No. 41/2004; Government Regulation No. 42/2006; Government Regulation No. 25/2018; Peraturan Badan Wakaf Indonesia No. 1/2020) and institutional records (SIWAK data, BWI annual and National Waqf Index reports, and Ministry of Religious Affairs reports).

Documents were analysed through directed content analysis, extracting mandated responsibilities, prescribed processes, and performance expectations, which were then compared against the institutional-record data to locate gaps between regulatory intent and operational outcome. Literature synthesis method. The waqf-governance, Islamic social-finance, and Lean Six Sigma/DMAIC literatures were examined through a structured narrative synthesis. Sources were retrieved from Scopus, Web of Science, and Google Scholar using combinations of the terms “waqf governance,” “cash waqf,” “nazhir,” “Lean Six Sigma,” “DMAIC,” and “public-sector process improvement,” prioritising peer-reviewed work and authoritative methodological texts (Pyzdek & Keller, 2018; Council for Six Sigma Certification, 2018; Monday, 2022). The synthesis mapped recurring governance problems, candidate performance indicators, and established DMAIC applications in non-manufacturing settings, and aligned

these with the Input–Process–Output–Outcome (IPOO) systems-thinking approach (Jackson, 2019; Organisation for Economic Co-operation and Development, 2017) to structure the framework.

Benchmarking procedure. International benchmarking compared West Sumatra's waqf-governance arrangements with practice in Malaysia, Türkiye, Kuwait, Egypt, and Singapore. These jurisdictions were selected as information-rich comparators representing diverse but well-documented institutional models (centralised statutory boards, ministry-led administration, and corporatised or hybrid management). For each, publicly available regulations, institutional reports, and scholarly accounts were reviewed against a common set of dimensions regulatory architecture, coordination mechanism, nazhir professionalisation, data and information systems, and productive-asset management to identify transferable practices and to contextualise the local findings rather than to rank jurisdictions.

Fishbone and Five-Why procedure. Tentative root causes were generated using cause-and-effect (fishbone) analysis followed by Five-Why interrogation. The defined problem statement was placed as the effect, and candidate causes were organised under standard categories adapted to a governance setting People (nazhir competence), Process (standardisation), Policy/Regulation, Data/Information systems, and Organisation/Coordination. Each major branch identified from the document and literature evidence was then subjected to iterative “why” questioning until an underlying structural cause was reached. Because Stage 1 is conceptual, these causes were derived from documentary and literature evidence and are presented as propositions to be verified in Stage 2, not as empirically confirmed findings. This desk-based analysis was used to define the governance problem, classify quick-win issues (Tables 1–2), specify a Measure-phase data-collection plan (Table 3), and generate the tentative root causes (Tables 4–5) that inform the Improve/Control-phase design (Tables 6–7).

b. Stage 2: Planned Empirical Fieldwork

Stage 2, the empirical fieldwork, will test, refine, and triangulate the propositions developed in Stage 1 using semi-structured interviews, non-participant observation, and analysis of administrative documents.

Sampling and recruitment. Informants will be selected through purposive criterion sampling of information-rich cases (Saunders et al., 2019). The inclusion criterion is direct responsibility for waqf planning, coordination, certification, supervision, or reporting, drawn from the four embedded units. An indicative sample of approximately 15–20 informants is planned covering the Provincial Government, the BWI regional representative, the Ministry of Religious Affairs regional office, and nazhir from several districts/cities selected for variation in asset size and performance with the final number determined by data saturation, the point at which additional interviews yield no new themes. Participants will be recruited through formal written requests to each institution, followed by invitation of named officeholders; where helpful, initial informants will be asked to identify other eligible officeholders (snowball referral within the criterion frame). Non-participant observation of coordination and reporting activities, and collection of administrative documents, will complement the interviews.

4. Trustworthiness

Rigour will be established against the four criteria of Lincoln and Guba, operationalised following Nowell et al. (2017) and Tracy (2020). Credibility will be strengthened through source and method triangulation across interviews, observation, and documents, and through member checking of interview interpretations with participants. Transferability will be supported by thick description of the case context, the embedded units, and the institutional setting, and by benchmarking against the five



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comparator jurisdictions, enabling readers to judge applicability to other provinces. Dependability will be secured by maintaining an audit trail documenting design decisions, coding, and analytic steps, so that the research process is transparent and traceable.

Confirmability will be addressed by grounding every interpretation in traceable evidence, by reflexive memoing to surface researcher assumptions, and by retaining raw data and coding records for independent inspection. Interview and documentary data will be analysed thematically (Braun & Clarke, 2022) using the coding and matrix-display procedures of Miles, Huberman, and Saldaña (2020) and Saldaña (2021) and Kiger and Varpio's (2020) guidance; the fishbone and Five-Why techniques applied conceptually in Stage 1 will be reapplied to the empirical data to confirm or revise the proposed root causes.

5. Ethical Considerations

Ethical clearance will be obtained from the relevant university research ethics committee prior to any data collection, and the study will proceed only after approval. Informed consent will be sought from every participant in writing, after they have been provided with an information sheet explaining the study's purpose, their voluntary participation, their right to withdraw at any point without penalty, and how their data will be used; institutional permission will be obtained from each participating organisation.

Data confidentiality will be protected by anonymising informants and reporting findings at role or institutional level rather than by name, by storing data securely with restricted access, and by separating identifying information from transcripts. The study also recognises potential power imbalances between the researcher and junior officeholders, and between subordinate and senior informants within the same institution. These will be mitigated by interviewing informants individually and in settings of their choosing, by assuring them that responses will not be attributed to identifiable individuals or shared with their superiors, and by framing questions around processes and systems rather than individual performance, so that candid disclosure is not discouraged.

6. Status of the Findings Reported Here

Because Stage 2 has not yet been conducted, the findings reported in the remainder of this paper including the fishbone and Five-Why analyses represent the Define-phase conceptual output of Stage 1 and should be read as propositions for empirical testing rather than as verified empirical results. This distinction and its implications are discussed further in the Discussion and Limitations section.

RESULTS

Because the empirical fieldwork for this study is scheduled for a later stage, the outputs reported here comprise the conceptual and analytical framework developed through the Define phase of the research programme the problem definition, root-gap identification, and integrated analytical model set out in the Methods. These are deliberately framed as Define-phase outputs rather than results: in Lean Six Sigma-guided research, the Define-phase output (problem framing, baseline design, and analytical scaffolding) is a substantive, reportable contribution in its own right, but it precedes measurement and therefore makes no empirical claim about magnitudes or verified causes.

1. Critical Issues and Quick-Win Opportunities (Define Phase)

The Define phase identified the primary problem that waqf governance in West Sumatra has not yet transformed the province's considerable waqf potential into productive assets and sustainable community welfare, despite a national regulatory framework, rising cash waqf collection, and a growing

number of registered assets. The problem is reflected in gaps between potential and actual collection, a large share of uncertified land parcels, limited productive utilisation, and variation in governance performance across institutions and nazhir, compounded by incompletely integrated roles among the Provincial Government, BWI, the Ministry of Religious Affairs, and nazhir.

a. Derivation of the three problem bursts

The critical issues were organised using a problem-burst analysis. The three bursts were not chosen arbitrarily: they correspond to the three sequential stages of the governance process in the IPOO model inputs and their planning (Burst 1: Waqf Planning), the transformation process (Burst 2: Waqf Governance Implementation), and the output/outcome feedback loop (Burst 3: Monitoring and Evaluation). Mapping each documented issue to the process stage at which it originates locates where in the value chain the breakdown occurs, which a simple undifferentiated list would obscure. Within each burst, issues were then prioritised by two Define-phase criteria — severity (the degree to which the issue blocks downstream performance) and systemic reach (whether it is confined to one actor or propagates across the system) yielding the priority ranking indicated in the final column of Table 1.

Table 1. Problem-Burst Analysis of Waqf Governance Implementation in West Sumatra (with priority)

No.	Burst 1: Waqf Planning	Burst 2: Governance Implementation	Burst 3: Monitoring & Evaluation	Priority
1	Formal agreements and role allocation among the Provincial Government, BWI, Ministry of Religious Affairs, and nazhir are not comprehensively established.	Coordination among waqf stakeholders is fragmented and largely incidental.	No integrated provincial report covers collection, asset utilisation, certification, and community benefits.	High
2	A unified, validated baseline database (land, cash waqf, productive assets, nazhir) is not fully developed.	Waqf data are dispersed across institutions and not consistently updated or integrated with SIWAK.	No integrated performance dashboard monitors changes in assets and governance performance.	High
3	Nazhir and stakeholders are not consistently involved in preparing an integrated Waqf Plan of Action.	Programmes are implemented under different procedures and standards across institutions and districts/cities.	Performance indicators and assessment criteria are not standardised.	Med
4	Competency mapping and structured professional development for nazhir are limited.	Variation in nazhir knowledge, managerial, financial, and digital capacity affects implementation quality.	Periodic evaluation of nazhir performance and training outcomes is not consistently conducted.	Med

Priority = Define-phase judgement combining severity and systemic reach; to be verified in fieldwork.



b. Quick-win selection criteria

A quick win was defined as an issue meeting four criteria simultaneously: a. high leverage resolving it also enables or de-risks several other issues; b. feasibility within existing authority achievable without new primary legislation or major new funding; c. short time-to-effect deliverable within roughly one planning cycle; d. measurability progress can be tracked with an observable indicator. Against these criteria, two of the twelve catalogued issues qualify as first-order quick wins (Table 2): fragmented data and weak coordination. They were selected not because they are the only problems but because they are the enabling constraints: baseline measurement, performance comparison, and every subsequent intervention depend on integrated data and a designated coordinating authority, so the remaining ten issues cannot be addressed reliably until these two are resolved. The other ten are retained for the Improve phase and sequenced behind these enablers.

Table 2. Quick-Win Issues and Resolution Plan

No.	Quick-Win Issue	Resolution Plan	Responsible Stakeholders	Expected Output
1	Waqf data (land, certification status, cash collection, productive utilisation, nazhir profiles) are fragmented and not consistently updated.	Develop a unified, validated provincial waqf database integrated with SIWAK, with a simple monitoring dashboard.	Ministry of Religious Affairs, BWI, Provincial Government, nazhir	Accurate, integrated, regularly updated provincial waqf database.
2	Coordination, role allocation, and performance standards among stakeholders are not clearly established.	Establish a Provincial Waqf Coordination Team and a standardised Waqf Plan of Action (responsibilities, targets, timelines, indicators).	Provincial Government, BWI, Ministry of Religious Affairs, local governments, nazhir	Coordinated governance with clear responsibilities, measurable targets, standardised procedures.

These two quick wins address weak institutional coordination and fragmented data management conditions consistent with prior Indonesian evidence on barriers to productive waqf governance (Rohim et al., 2022; Adinugraha et al., 2024; Dewi et al., 2025). Within Lean Six Sigma, the Define phase fixes the problem, scope, stakeholders, and priority improvements (Monday, 2022); the proposed quick wins therefore also provide the baseline scaffolding for the Measure, Analyze, Improve, and Control phases.

2. Data-Collection Plan (Measure Phase)

The Measure phase specifies how baseline performance will be established, focusing on the availability of technical guidance for nazhir, the completeness and integration of waqf data, and the formal designation of a coordination team or person in charge (PIC). Two issues flagged by review are addressed explicitly below: operational definitions of the indicators, and the “data paradox” created by relying on the very data systems whose weakness is under study.

a. Operationalising the indicators

Each indicator is given an observable definition so that it can be measured consistently. For example, “nazhir competence” is operationalised as a composite score across four defined domains regulatory and governance knowledge, financial management, digital literacy, and productive-asset development assessed through a standardised pre/post instrument, alongside the proportion of active nazhir who have completed certified training. “Data completeness” is operationalised as the percentage of required SIWAK fields populated and reconciled against source records; “coordination” as the existence of a formal decree plus the number of minuted coordination meetings per period. Table 3 states each indicator’s definition, data type, measurement frequency, and source.

b. The data paradox and its mitigation

A measurement design that draws on SIWAK, BWI, and institutional records to assess governance quality faces a paradox: those same records are themselves fragmented and incompletely updated one of the problems being diagnosed. Using them uncritically would import that weakness into the baseline. The design therefore treats data quality as an explicit object of measurement rather than a given: the completeness, consistency, and timeliness of the records are themselves scored as baseline indicators, discrepancies are resolved by cross-checking against primary sources (National Land Agency records, financial statements, and Stage-2 interviews and field verification), and figures are reported with their provenance and reliability. In this way the fragility of the secondary data becomes a finding, not a hidden assumption.

c. Rationale for measurement frequency

Frequencies are tied to the natural cycle of each data source and the decision it supports rather than set uniformly. Flow variables that change continuously and drive operational decisions cash collection and asset data are compiled monthly and verified quarterly to match institutional reporting and allow timely correction. Competency and training data are reviewed quarterly, aligned to training cohorts. Structural/governance items such as the decree and coordination arrangements, which change infrequently, are verified at implementation and reviewed every six months. This matches measurement effort to the rate at which each variable actually moves.

Table 3. Data-Collection Plan for the Measure Phase (with operational definitions)

Burst / Data Requirement	Data Captured	Type & Frequency (rationale)	Operational Definition / Purpose
Absence of standardised technical guidance and competency development for nazhir	Guidance materials, training schedules, attendance, competency-assessment results, activity reports	Documentary & quantitative; collected continuously, reviewed quarterly (aligned to training cohorts)	Operational definition: % of active nazhir trained, and mean competency score (0–100) across regulatory, financial, digital, and asset-development domains via a standardised pre/post instrument.

Burst / Data Requirement	Data Captured	Type & Frequency (rationale)	Operational Definition / Purpose
Fragmented/incomplete data on assets, certification, collection, utilisation, beneficiaries, nazhir	Monthly/annual data on land, certified/uncertified assets, collection, productive assets, beneficiaries, registered nazhir	Quantitative & documentary; updated monthly, verified quarterly (matches flow variables)	Operational definition: % of required SIWAK fields populated and reconciled to source; data-quality scored on completeness, consistency, accuracy, timeliness. Data quality is itself an indicator (mitigates the data paradox).
Absence of a formally designated provincial coordination team / PIC	Draft and approved decrees, organisational structure, role descriptions, meeting minutes, Plan of Action, coordination reports	Documentary & qualitative; verified at implementation, reviewed every six months (structural variable)	Operational definition: binary existence of a decree, plus count of minuted coordination meetings and share of roles with an assigned, accountable owner.

3. Root-Cause Analysis (Analyze Phase)

Candidate root causes were generated from the document analysis and literature review using a cause-and-effect (fishbone) analysis across six categories people, process, data and technology, institutional governance, assets and financing, and monitoring and control followed by Five-Why interrogation. Because this is the Define-phase output, these causes are propositions for verification, not confirmed findings.

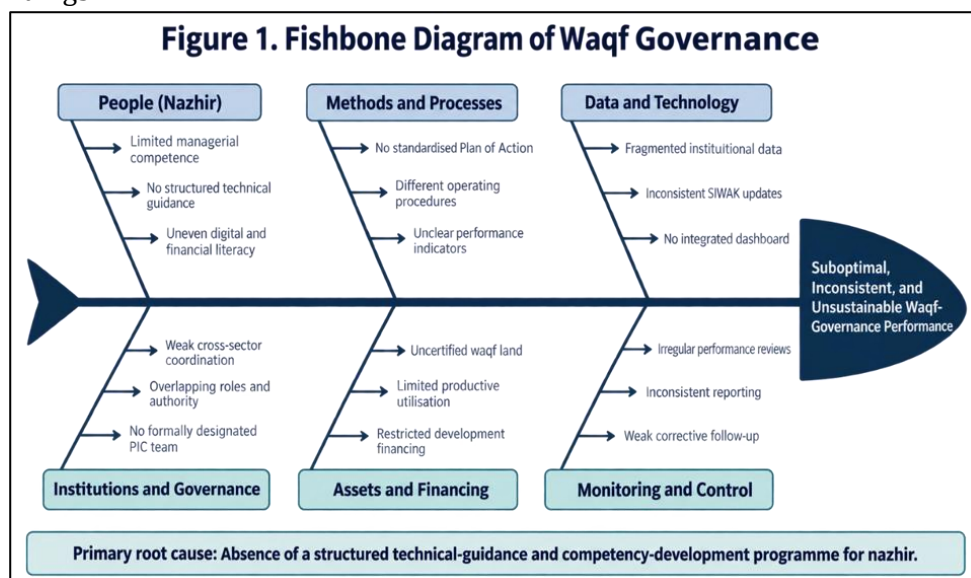


Figure 1. Fishbone (Ishikawa) Analysis of Suboptimal Waqf Governance in West Sumatra

The analysis converges on two mutually reinforcing primary candidates: the absence of a structured technical-guidance and competency-development programme for nazhir (a People/Process cause), and the absence of a formally designated Provincial Waqf Coordination Team or PIC (an Institutional-Governance cause). The two Five-Why chains below trace each to a structural origin.

Table 4. Five-Why Analysis Nazhir Capability

Level	Why analysis
Why 1	Nazhir could not manage and develop waqf assets productively and sustainably.
Why 2	They lacked adequate knowledge and skills in governance, financial management, fundraising, digital technology, and productive asset development.
Why 3	They had not received sufficient training, technical guidance, or continuous mentoring.
Why 4	No structured, standardised, routinely implemented technical-guidance programme existed for nazhir in West Sumatra.
Why 5	Capacity-building and continuous coaching had not been prioritised within the provincial waqf-governance system — because no body held an explicit, funded mandate to deliver it (link to Table 5).

Table 5. Five-Why Analysis Institutional Coordination (extended)

Level	Why analysis
Why 1	Collection, management, and productive utilisation of waqf assets remained suboptimal.
Why 2	Nazhir and stakeholders did not consistently implement development, reporting, and monitoring activities.
Why 3	No integrated monitoring, evaluation, and incentive system drove them toward performance targets.
Why 4	The institutional structure coordinating the Provincial Government, BWI, the Ministry of Religious Affairs, local governments, and nazhir did not function optimally.
Why 5	No formal decree (SK) from provincial leadership regulated roles, targets, reporting, and evaluation.
Why 6 (extended)	No decree existed because waqf had not been positioned as a provincial development priority with a clear lead agency: authority is split between the provincial government and the vertically-structured Ministry of Religious Affairs/BWI, no political champion had taken ownership, and competing agenda items crowded it out a political-economy and mandate problem, not an oversight.

Extending the chain past “no decree” to why no decree exists reframes the root cause from an administrative omission to a structural issue of fragmented authority and political priority which has direct implications for the feasibility of the proposed remedies (discussed below).



4. Improvement Plan (Improve Phase)

The Improve phase translates the candidate root causes into targeted actions. Several interventions training, a plan of action, a coordinating body are, taken individually, standard governance measures. What the DMAIC approach adds is not the novelty of each action but the discipline connecting them: every intervention is tied to a specific root cause and burst (traceability), anchored to a measurable baseline and target rather than a general aspiration (measurability), and paired in the Control phase with an indicator that prevents regression (sustainability). The value added is the closed loop from defined problem to monitored control, not the interventions in isolation.

a. Critical path

The five tasks are not parallel. The governing sequence is: Task 1 (standardised modules and Waqf Plan of Action) and Task 3 (the coordinating decree) are the critical path Task 2 (delivering training) cannot begin until the modules exist, and Task 5 (monitoring and corrective follow-up) cannot function until both the decree assigns accountable owners and the Task-4 dashboard exists. Task 3 is the binding constraint, since the Five-Why analysis shows it depends on a political-mandate decision upstream of the project; it should therefore be initiated first even though it delivers no immediate visible output. Table 6 marks each task's place on the path.

Table 6. Waqf-Governance Improvement Implementation Plan (with critical path)

No.	Task	Dependency	Resources	Output / Path
1	Develop standardised technical-guidance modules, an integrated Waqf Plan of Action, and a training schedule	Competency-gap and baseline identification	BWI, MoRA, Provincial Government, experts, academics, district coordinators	Critical path. Modules + Plan of Action (targets, indicators, timelines).
2	Deliver routine, tiered technical guidance and mentoring for nazhir	Task 1 complete; Plan of Action approved	BWI, MoRA, Provincial Government, academics, experienced nazhir	Depends on Task 1. Improved nazhir competence.
3	Issue a Provincial Government Decree establishing the Coordination Team and PIC	Political mandate; role mapping; draft decree	Governor/Provincial Secretary, Provincial Government, BWI, MoRA	Critical path / binding constraint. Formal team & PIC with authority and targets.
4	Build digital learning media and an integrated information/monitoring system	Modules; baseline data; designated PICs	BWI, MoRA, Provincial Government, IT team, district coordinators	Depends on Tasks 1, 3. Integrated database + dashboard.

No.	Task	Dependency	Resources	Output / Path
5	Post-training monitoring, evaluation, and corrective follow-up	Tasks 2–4 complete; baseline indicators	Coordination mentors, BWI, Provincial & governments	Team, MoRA, local improvement; reduced variation; accountability.

5. Control-Phase Evaluation Design

This subsection sets out an evaluation design, not a result: Table 7 specifies how performance will be compared before and after intervention once Stage 2 is complete, and the “after” cells are therefore targets to be measured, not achieved values. The design was also extended to address a gap noted in review that the original indicators sat largely at the output level (parcels certified, funds collected). Outcome-level indicators capturing community welfare have been added, since the study’s ultimate claim concerns welfare, not administrative throughput.

Table 7. Control-Phase Indicators Output and Outcome Levels

No.	Dimension	Before LSS (baseline)	After LSS (target)	Indicator / Data source
Output-level indicators (administrative throughput)				
1	Coordination Team & PIC	No formal team / decree	Team & PIC via Provincial Decree	Clear roles, accountability (decree, coordination reports)
2	Technical guidance for nazhir	No standardised programme	Structured, tiered guidance delivered	↑ trained, competent nazhir (records, assessments)
3	Integrated database waqf	Fragmented, not updated	Provincial integrated SIWAK + dashboard	DB ↑ data completeness, accuracy, timeliness (SIWAK/BWI/MoRA)
4	Land certification	3,604 of 5,235 (~68.84%) certified	Target set after intervention	↑ certified parcels; ↓ uncertified (SIWAK, Land Agency)
Outcome-level indicators (community welfare)				



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No.	Dimension	Before LSS (baseline)	After LSS (target)	Indicator / Data source
5	Productive utilisation revenue	Limited, & inconsistently recorded	Target after productive-waqf pilots	↑ productive assets, revenue, reinvestment (nazhir reports, field verification)
6	Beneficiary reach & welfare	Not systematically tracked	Baseline then periodic survey	↑ beneficiaries; improved income/education/health proxies; beneficiary-reported benefit
7	Sustained accountability	Ad hoc reporting	Routine reporting	public Reporting compliance rate; transparency of fund use over time

“After” values are targets to be measured in Stage 2, not achieved results. Rows 5–7 are outcome-level (welfare) indicators added to the original output-level set.

Reported cash waqf collection rose from IDR 763.32 million (2024) to IDR 1.68 billion (April 2026), indicating development potential; however, this increase must not be attributed to the intervention until verified before-and-after data exist. The Control phase compares baseline and post-intervention performance using SIWAK records, financial reports, competency assessments, dashboards, and field verification, so that any causal claim rests on measured change rather than coincident trend.

DISCUSSION

Read together, the Define- and Measure-phase outputs suggest that West Sumatra’s waqf-governance paradox rising cash waqf collection and a rising National Waqf Index alongside a persistent 31.16% land-certification gap and limited productive utilisation is best explained by systemic rather than individual weaknesses: fragmented data, the absence of a formally designated coordination team, and the lack of structured technical guidance for nazhir. This interpretation is consistent with earlier studies of Indonesian waqf governance (Rohim et al., 2022; Adinugraha et al., 2024; Dewi et al., 2025) and extends that literature by embedding these weaknesses within a systems (IPOO) and process-improvement (DMAIC) framework that specifies, phase by phase, how they might be diagnosed and addressed.

The systemic account above is the most parsimonious reading of the Define-phase evidence, but it is not the only plausible one, and three alternatives are considered explicitly rather than assumed away. First, a resource-based explanation holds that the binding constraint is inadequate funding, staffing, and time rather than coordination design: nazhir and offices may be unable to perform regardless of how clearly roles are assigned, so that certification and productive utilisation lag because the operational resources to pursue them are absent. Second, a political-economy explanation holds that fragmented authority persists because it is functional for the actors who benefit from the status quo; on this reading the recurring “no coordinating decree” is less an oversight than an equilibrium, and a decree alone would not change behaviour without realigning incentives and assigning a funded mandate. This reading follows directly from extending the Five-Why chain past “no decree” to why no decree exists. Third, a legal-ambiguity explanation holds that overlapping jurisdictions the provincial government

alongside the vertically structured Ministry of Religious Affairs and BWI generate genuine uncertainty about who is statutorily empowered to act, making the problem interpretive and legal rather than merely organisational. These explanations are not mutually exclusive with the systemic account, and the forthcoming fieldwork is designed to adjudicate among them through informant accounts and documentary evidence rather than to confirm the preferred interpretation.

The study makes a distinct contribution to three bodies of work. To systems theory, it operationalises the Input–Process–Output–Outcome framework for a social-finance governance system and traces an explicit mechanism of cross-component propagation showing how a weakness in one element, such as data quality or nazhir competence, degrades inputs, processes, outputs, and outcomes in sequence rather than remaining a local fault. Systems accounts often assert such interdependence; this study specifies and locates it. To process-improvement science, it extends DMAIC beyond its manufacturing and service origins into a rule-bound, non-repetitive governance setting, and in doing so re-specifies the method's core constructs for that context: regulatory standards serve as critical-to-quality specifications, inconsistency in rule-bound administrative practice becomes the measurable process variation, and the Control phase supplies the anti-regression mechanism that distinguishes DMAIC from a one-off reform. To Islamic social-finance and waqf governance, it moves the field beyond the descriptive mapping of legal frameworks, fundraising models, and nazhir professionalism that characterises prior work toward a measurable, closed-loop diagnostic that links root causes to interventions and to sustained control, and that connects operational governance to the welfare ends of *maqāṣid al-sharī'ah*.

The framework yields concrete and differentiated guidance for each stakeholder group rather than a single generic recommendation. For policymakers (the Provincial Government and leadership), the priority action is to issue a coordinating decree that names an explicit lead agency and attaches a funded mandate identified in the analysis as the binding constraint instead of expanding further collection campaigns whose visible gains obscure the certification and productivity gap. For waqf institutions (BWI and the Ministry of Religious Affairs regional office), the guidance is to integrate waqf data with SIWAK and manage data-quality (completeness, consistency, timeliness) as a tracked indicator, and to deliver the standardised technical-guidance curriculum which lies on the critical path before scaling other activities. For practitioners (nazhir), the framework supplies an explicit competency standard across regulatory, financial, digital, and productive-asset domains against which individuals can assess and develop their own practice, together with standardised procedures for registration, certification, reporting, and fund management. Because each recommendation is tied to a specific burst, root cause, and control indicator, effort can be sequenced along the critical path rather than dispersed across simultaneous, uncoordinated initiatives.

Four limitations qualify these outputs and bound the claims that can be drawn from them. First, researcher bias: the fishbone and Five-Why analyses, the categorisation of causes, and the selection of the primary root cause reflect the researcher's interpretive judgement applied to documentary and literature evidence; reflexive memoing, and in the next stage independent coding and member checking, are intended to mitigate this. Second, the absence of stakeholder validation: no informant has yet tested the propositions, so the framework currently lacks confirmation from the very actors it describes the central purpose of the planned interviews and triangulation (Yin, 2018). Third, reliance on secondary data: the baseline draws on SIWAK, BWI, and institutional reports whose update cycles and completeness are themselves among the data-integration weaknesses the framework seeks to address, so the reported figures should be read as the best currently available administrative data rather than independently audited outcomes; this is precisely why data quality is treated as an explicit measured



indicator rather than a settled input. Fourth, transferability: as an embedded single-case study bounded by one province, the framework's applicability to other provinces or national waqf systems should be assessed contextually rather than assumed (Creswell & Poth, 2018). Relatedly, the before-and-after comparison in Table 7 is a planned evaluation design, not achieved results; the observed growth in collection and the National Waqf Index therefore cannot be attributed to the framework until an intervention is implemented and verified.

These limitations define the next stage of the research programme, which will test specific questions and propositions using specified methods rather than general follow-up. Three research questions structure the work. RQ1: Does the absence of a coordinating decree, rather than resource constraints or legal ambiguity, best explain stalled certification and productive utilisation? RQ2: Which of the proposed quick wins and critical-path interventions do the responsible actors judge feasible and sufficient? RQ3: Do the proposed outcome-level indicators capture welfare change in a way beneficiaries recognise? These will be addressed through semi-structured interviews across the four embedded units, non-participant observation, and triangulated document analysis, with the three alternative explanations entered as competing hypotheses, and through beneficiary-level data and field verification for RQ3.

The study advances three testable propositions. *P1*: rising collection and stagnant certification share a single root in the absence of standardised processes and a designated coordinating authority. *P2*: formal designation of a coordinating authority is necessary but not sufficient unless accompanied by a funded mandate and realigned incentives. *P3*: integrated data and standardised nazhir competence are prerequisites whose absence caps the effectiveness of all downstream interventions. Subsequent research could then pilot the proposed interventions (Table 6) before provincial rollout, compare the framework's outputs against the benchmarking jurisdictions (Malaysia, Türkiye, Kuwait, Egypt, and Singapore), and extend the Control-phase indicators (Table 7) into a longitudinal design capable of testing the framework's causal claims once an intervention has actually been implemented.

CONCLUSIONS

The integration of the Input–Process–Output–Outcome (IPOO) Systems Approach with the Lean Six Sigma DMAIC cycle provides a comprehensive and testable framework for diagnosing waqf governance in West Sumatra. The Define phase identified two priority, high-leverage issues weak institutional coordination and fragmented waqf data selected because baseline measurement and every subsequent intervention depend on them. The Measure phase translated these into a Data Collection Plan specifying operationally defined indicators (nazhir competence, asset registration and certification, cash waqf collection, productive-asset utilisation, reporting compliance, and beneficiary outcomes), their sources, methods, frequency rationale, and data-quality assurance, consistent with DMAIC's requirement for a valid baseline before analysis and intervention (Monday, 2022; Rohim et al., 2022; Adinugraha et al., 2024; Dewi et al., 2025).

The Analyze phase used fishbone and Five-Why analyses to provisionally identify the absence of continuous technical guidance for nazhir, weak process standardisation, fragmented information systems, and the lack of a designated coordination team or PIC as candidate root causes, with the chain extended to show that the missing decree reflects fragmented authority and political priority rather than mere administrative omission. Accordingly, the Improve phase proposed standardised technical-guidance modules, an integrated Waqf Plan of Action, tiered training and mentoring, a Provincial Government Decree establishing the coordination team and PIC, integrated digital learning and data systems, and continuous corrective action, sequenced along an identified critical path; and the Control



phase specified output- and outcome-level indicators to sustain improvement and prevent regression (Ali & Oseni, 2021; Pyzdek & Keller, 2018; Adinugraha et al., 2024; Dewi et al., 2025).

Theoretically, the framework contributes by integrating systems theory with process-improvement science and extending DMAIC into Islamic philanthropic governance; practically, it offers stakeholder-specific guidance for professional, coordinated, digital, and accountable waqf management. Because the study reports a Define-phase design rather than verified results, its claims are propositions for empirical testing: the alternative explanations, propositions, and indicators set out above must be examined in the forthcoming fieldwork before improvements can be attributed causally to Lean Six Sigma. Subject to that validation, the model offers a systematic foundation for strengthening productive asset utilisation and sustainably advancing community welfare in accordance with maqāṣid al-sharī‘ah (Wartati et al., 2021; Monday, 2022; Rohim et al., 2022; Adinugraha et al., 2024).

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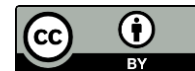


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