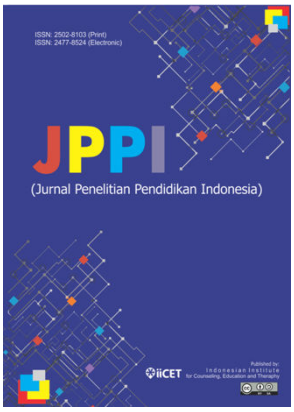
JPPI (Jurnal Penelitian Pendidikan Indonesia)
Volume 11, Number 3 2025



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Publication details, including author guidelines
URL: https://jurnal.iicet.org/index.php/jppi/about/submissions#authorGuidelines
Editor: Nilma Zola

Article History
Received: 13 Oct 2024
Revised: 26 Jul 2025
Accepted: 6 Oct 2025

How to cite this article (APA)
Djambar, D., Darman, S., & Rifai, A. (2025). Evaluation of policy for granting of rock mining business license in Palu Donggala axis road. Jurnal Penelitian Pendidikan Indonesia.11(3), 208-217. https://doi.org/10.29210/020254830

The readers can link to article via https://doi.org/10.29210/020254830

JPPI (Jurnal Penelitian Pendidikan Indonesia)
ISSN: 2502-8103 (Print) | ISSN: 2477-8524 (Electronic)

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Vol. 11, No. 3, 2025, pp. 208-217
DOI: https://doi.org/10.29210/020254830

Evaluation of policy for granting of rock mining business license in Palu Donggala axis road

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Article Info

Article history:

Received Oct 13th, 2024
Revised Jul 26th, 2025
Accepted Oct 6th, 2025

Keywords:

Environmental impact
Environmental policy
Evaluation
Mining
Mining business license

ABSTRACT

This study evaluates the implementation effectiveness of the Rock Mining Business License (IUP) policy in Palu City and Donggala Regency, Central Sulawesi. The focus lies on the extent to which the implementation aligns with good mining practices and its socio-environmental impacts. Despite the strategic value of the Palu Donggala area, the policy has led to significant issues, including non-compliance by IUP holders, weak administrative oversight, and minimal contributions to community welfare. Some companies operate beyond their licensed areas and neglect environmental standards, resulting in increased pollution and deteriorating public health. Data were collected through interviews with key stakeholders, including government officials, company representatives, and impacted communities. The analysis employed the model developed by Miles, Huberman, and Saldana, consisting of data condensation, display, and conclusion drawing. The findings show that in terms of input, companies have not invested adequately in human resource development, and the infrastructure at mining sites remains poor. Regarding the process, operational practices often deviate from applicable regulations, and supervisory mechanisms are weak. The output dimension reveals that negative impacts such as pollution, infrastructure degradation, and low absorption of local labor outweigh the perceived benefits to surrounding communities. In the outcome dimension, the policy tends to generate adverse effects on both the environment and people s lives, leading to negative perceptions among affected residents. In conclusion, the implementation of the rock mining license policy in the Palu Donggala area has not met expectations and requires urgent policy reform and enforcement to ensure alignment with regulatory standards, environmental sustainability, and equitable community outcomes.

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Introduction

Mining plays a major role in economic development by generating income, employment, and infrastructure (Hilson, 2002; B. Zhang et al., 2022; J. Zhang et al., 2023). The Palu-Donggala Main Road is a strategic area in Central Sulawesi Province, boasting abundant natural resource potential, particularly in the rock mining sector. These minerals are widely distributed and readily available, making them a crucial commodity for infrastructure development, both locally and regionally. This significant potential has driven the development of rock mining businesses, largely managed by private companies. These activities contribute to Regional Original Income (PAD) and create new jobs, particularly for communities surrounding the mining areas. It's no surprise that the mining sector is a key focus for the local government as a driver of the local economy.

However, despite its economic potential, rock mining activities in this region raise various complex governance issues. Mining practices brings significant environmental, social, and health challenges (Agboola et al., 2020; Carvalho, 2017; da Silva-Rêgo et al., 2022; Mancini & Sala, 2018; Stewart, 2020). Furthermore, weak implementation of corporate social responsibility (CSR) programs and non-compliance with good mining practices add to the socio-environmental burdens felt by the surrounding community. This situation raises fundamental questions regarding the effectiveness of the implementation of mining licensing policies, which should not only pursue economic growth but also ensure sustainability and social justice.

Regulatory, mining licensing policies in Indonesia are governed by various laws and regulations. Law Number 4 of 2009 concerning Mineral and Coal Mining regulates various forms of mining permits, such as Mining Business Permits (IUP), Exploration IUP, Production Operation IUP, People's Mining Permits (IPR), and Special Mining Business Permits (IUPK). However, with the enactment of Law Number 23 of 2014 concerning Regional Government (which was later amended by Law Number 9 of 2015), there has been a shift in authority in the management of mineral and coal resources. The authority to issue permits, previously held by district/city governments, has now been transferred to provincial governments. This is emphasized in the Minister of Energy and Mineral Resources Circular Letter No. 04.E/30/DJB/2015, as well as Minister of Energy and Mineral Resources Regulation No. 02 of 2014, which strengthens the Governor's role as the central government's representative in granting mining permits.

Although the legal and policy framework has been designed to create orderly and sustainable governance, implementation on the ground often falls short of expectations. The numerous discrepancies between regulations and field practices are an important signal that a systematic evaluation of policy implementation is necessary. This study aims to evaluate the implementation of the Mining Permit (IUP) policy in the Palu-Donggala axis, specifically in terms of input, process, output, and outcome. This study also emphasizes the importance of assessing the social and environmental impacts of mining activities and evaluating the extent to which this policy has been able to create equitable and sustainable mining governance.

Policy evaluation plays a crucial role in distinguishing effective policies from those that are ineffective, thereby supporting evidence-based decision making and enhancing accountability and organizational learning within government operations (Orr, 2018; Meier,1998). Evaluations may be conducted at various stages, either ex ante before policy implementation or ex post after implementation, with focuses ranging from the policy process to its impacts or outcomes (Walker et al., 2022). A wide array of approaches is available, including qualitative, quantitative, and mixed-method strategies, with evaluative frameworks often tailored to the specific context and complexity of the policy domain (Annet, 2024). However, effective policy evaluation requires not only careful planning and methodological rigor but also active stakeholder engagement and the ability to overcome administrative and practical barriers (Jacob, 2024; Pattyn & Bouterse, 2020).

Environmental policy evaluation presents even greater challenges due to long time horizons, intricate ecological systems, and high levels of uncertainty (Oaks & Delhi, 2003; Scott, 2007). The successful implementation of environmental policies often varies by region and depends heavily on governance structures, stakeholder participation, and the robustness of legal frameworks (Bondarouk & Mastenbroek, 2018; Coglianese & Starobin, 2020). Moreover, uncertainty surrounding environmental

policies can discourage long-term investment (Rea et al., 2024). In some cases, local governments may implement policies opportunistically focusing on compliance only during evaluations or under external scrutiny particularly in settings where economic growth is prioritized over environmental sustainability (Kiros Hagos, 2021; Liu & Deng, 2025). This tension between developmental objectives and environmental protection frequently undermines the achievement of policy goals (Fadwa Chalfoun, 2018; Howes et al., 2017).

Various studies on mining policy have been conducted in both global and national contexts. At the international level (Baker & McLelland, 2003) evaluating the effectiveness of the environmental assessment process in British Columbia with a focus on Indigenous participation in mining development. Meanwhile, in Indonesia, (Ode Wahiyuddin et al., 2023) discuss the implementation of Mining Business Permit (IUP) policies in general and (Rahayu & Faisal, 2021) examine the legal aspects of mining business permits after regulatory changes.

However, to date, there are limited studies specifically evaluating mining permit policies, particularly in the context of developing regions like Central Sulawesi, using a comprehensive evaluative approach. This study fills this gap by applying an input-output-outcome-based policy evaluation framework to assess the effectiveness of mining permit (IUP) policies in the Palu-Donggala region. In addition to introducing an approach that has not been widely used in Indonesian literature, the study's findings also provide empirical evidence of weak government oversight and the minimal socio-economic contribution of mining to local communities.

These findings are crucial for promoting more inclusive mining policy reforms, strengthening the role of local governments, and promoting socially and environmentally sustainable natural resource governance.

Method

This study uses a descriptive qualitative approach with the aim of evaluating the implementation of the policy of granting Mining Business Permits (IUP) for rocks in the Palu-Donggala axis area. The evaluation was conducted based on the Bridgman and Davis (2003) framework which emphasizes four components in the policy process, namely input, process, output, and outcome. This approach was chosen to obtain a comprehensive understanding of policy formulation, technical implementation in the field, administrative outputs, and the actual impacts caused to the community and the environment. Data collection was conducted through in-depth interviews, observations, and documentation studies. Interview techniques were used to obtain information from key stakeholders, including the Head of the Mineral and Coal Division of the Energy and Mineral Resources Office of Central Sulawesi Province, the Head of the Ombudsman Representative Office of Central Sulawesi Province, the Head of the Environmental Management Division of the Environmental Office of Central Sulawesi Province, the Head of Mining Engineering (KTT) of PT. Putra Elan Balindo and PT. Watu Meriba Jaya as representatives of rock mining companies, as well as several community members as direct recipients of the impacts of rock mining activities on the Palu-Donggala axis road. Informants were selected using purposive sampling based on their involvement in the policy cycle, including formulation, implementation, oversight, and impact recipients. Semi-structured interviews were conducted using open-ended questions based on the Bridgman and Davis framework. Questions focused on input (regulations, permits, and authority), process (implementation and oversight mechanisms), output (administrative outputs such as IUPs and activity reports), and outcome (social, economic, and environmental impacts). Observations were conducted at mining sites to record physical conditions, field operations, and community interactions with mining activities. Documentation studies were conducted through a review of policy documents such as laws, ministerial regulations, circulars, oversight reports, and local media coverage. All data were analyzed using the Miles, Huberman, and Saldana (2014) model, which includes data reduction, data presentation, conclusion drawing, and verification. The data reduction process was carried out by grouping data into four main components of policy evaluation; data presentation was carried out in the form of thematic narratives and direct quotes from informants to demonstrate the dynamics of policy implementation; Meanwhile, conclusions are drawn through triangulation between data sources, methods, and

validation from key informants (member checking). This approach allows researchers to see the extent to which IUP policies have been implemented according to their objectives and to uncover gaps between formal regulations and the reality of implementation on the ground.

Results and Discussions

Input Indicators

Input indicators within the Bridgman and Davis (2003) framework reflect the readiness and adequacy of resources to support policy implementation. In this study, inputs comprise three main aspects: human resources, facilities and infrastructure, and financial resources. Based on data collection and analysis using the Miles, Huberman, and Saldaña approach, it was found that weaknesses in the input aspect are directly related to weak implementation processes, poor policy outputs, and minimal achievement of policy outcomes.

Table 1. Findings Based on Policy Input Indicators

Indicators	Subcomponents	Key Findings	Source of Information
Input	Human Resources	Lack of supervisory personnel in the ESDM and Environmental Agencies	Interview with Head of Mineral Division, Head of Environmental Division
	Facilities and Infrastructure	Limited access to operational vehicles and technical monitoring tools	Environmental Agency interview
	Financial	Insufficient funding; monitoring often delayed	Environmental agency, Ombudsman

Human Resources

In terms of human resources, the limited number of mining auditors and inspectors at the Energy and Mineral Resources Agency (ESDM) is a major obstacle in ensuring company compliance with regulations. Information from interviews indicates that the ratio between the number of inspectors and the vast working area is significantly disproportionate. As a result, field supervision cannot be conducted routinely and comprehensively. This limitation triggers the emergence of permit violations, such as companies with exploration IUP status already operating, as well as the disregard for OHS principles. As one informant stated :

> "We only have a few mining inspectors, while our working area is vast, not commensurate with the number of active IUPs" (Interview, ESDM Province, 2024).

This situation demonstrates that limited human resource input not only impacts technical aspects but also directly contributes to violations in company operations.

Facilities and Infrastructure Resources

Furthermore, a lack of facilities and infrastructure also undermines the effectiveness of the policy process. Relevant agencies lack adequate environmental measurement tools, such as air and water quality testing kits. As a result, the monitoring process cannot objectively assess the environmental impacts of companies. On the company side, basic facilities such as drainage channels, dust control systems, and even K3 posts are still largely unavailable. This lack of facilities leads to policy outputs such as road damage, air pollution, and health threats to communities surrounding the mines. In fact, observations revealed that not a single company has a water tank for sprinkling the roads to control mine dust, which the community has directly linked to the increase in cases of acute respiratory infections (ARI) in the area.

Financial Resources

This imbalance in input is also evident in financial resources, where the monitoring budget is very limited and does not allow for regular field inspections. When state oversight weakens due to a lack of financial support, companies tend to operate without active oversight, resulting in a lax implementation of good mining principles. Furthermore, companies themselves demonstrate low budget commitments to CSR and local workforce training. This weak financial commitment inhibits positive outcomes such as increased local revenue (PAD) or community empowerment.

Intersecting the interrelationships between these themes, it can be concluded that limited human resources, infrastructure, and budget (inputs) lead to weak oversight and control (processes), which in turn opens the door to permit violations, neglect of occupational health and safety (K3), and environmental damage (outputs). Ultimately, this situation leads to the failure to achieve policy outcomes, such as low local labor absorption, poor environmental quality, and minimal socio-economic contributions to the community.

Thus, these findings demonstrate a strong causal relationship between the elements in the Bridgman and Davis evaluation framework. Input evaluation cannot stand alone, as weaknesses have been shown to have a significant domino effect on the overall success of the policy.

Process Indicators

The process indicators in Bridgman and Davis's (2003) evaluation framework reflect the technical implementation of policies in the field, specifically how mining business permits (IUP) are administered by companies and monitored by the government. The research findings indicate that weak policy process implementation is closely related to limitations in input indicators, including human resources, infrastructure, and budget. This imbalance directly impacts the emergence of violations, irregular oversight, and the neglect of environmental impacts that could have been prevented early on.

Table 2. Findings Based on Policy process Indicators

Indicators	Subcomponents	Key Findings	Source of Information
Process	Operational Implementation	Mining companies do not adhere to good mining practic	KTT of PT PEB and PT WMJ
	Supervision	Oversight is rarely conducted directly on-site	Environmental Agency, affected communities

Mining Operational Activities

Data collection results indicate that mining operations by companies holding Mining Permits (IUP) in the Palu-Donggala axis area do not comply with the principles of good mining practices. This activity not only reflects non-compliance with regulations but is also a direct consequence of weak state oversight due to limited input. For example, companies holding exploration IUPs were found to be conducting production activities, and many did not properly implement the Occupational Safety Management System (SMKP). This situation was exacerbated by the lack of sufficient mining inspectors to conduct on-site validation.

The link between weak human resources and operational violations is clear. The limited number of mining supervisors results in the absence of routine inspections that should prevent illegal or non-permit-compliant mining activities. An informant from the Ministry of Energy and Mineral Resources admitted, "With our current personnel, it's impossible for us to reach all IUPs. Many operate without us knowing exactly what they are doing" (Interview, Provincial Ministry of Energy and Mineral Resources, 2024). As a result of this lack of oversight, companies are free to engage in deviant practices without fear of sanctions.

Furthermore, the company also neglected its corporate social responsibility (CSR) and worker safety. Several mine workers were found working without adequate personal protective equipment (PPE). In terms of causality, this non-compliance resulted from a combination of weak external controls (due to passive supervision) and weak internal company commitment (due to inadequate human

resource development and management). Therefore, violations of mining operational regulations were not merely technical errors in the field, but rather a manifestation of a weak system that failed to function due to inadequate input.

Supervision Implementation

The supervision function is a key element in process indicators and should serve as a control mechanism to ensure policy implementation is carried out according to regulations. However, in practice, supervision by the Energy and Mineral Resources Agency and the Environment Agency of Central Sulawesi Province has not been optimal. Supervision activities tend to be administrative and reactive, rather than based on planned and periodic field inspections. The primary cause is a lack of budget and supporting facilities. One informant stated, "We haven't been to the field this year because we don't have travel expenses. We only read reports from the company" (Interview, Environment Agency of Province, 2024).

Budget and personnel limitations prevent oversight from detecting violations in real time, ultimately leading to their continued neglect. The link between weak oversight and environmental impacts is strong because inspections are absent, companies are not reprimanded even if they lack water pipes or dust sprinklers, which then leads to flooding and air pollution. Affected communities lack clear reporting channels, and informal complaints to village governments often go unanswered.

This situation makes it clear that failures in the oversight process are not a single issue, but rather part of a causal chain: limited inputs (human resources and budget) → weak processes (ineffective oversight) → undetected operational violations → outputs and outcomes that deviate from policy objectives. Thus, weak policy process implementation is inextricably linked to system unpreparedness at the input stage, creating a chain of failures that impacts the entire policy cycle.

Output Indicators

In the Bridgman and Davis (2003) policy evaluation framework, output indicators reflect the direct results of policy implementation. In the context of a rock mining business permit (IUP), expected outputs include contributions to Regional Original Income (PAD) and sustainable environmental management. However, field findings indicate that policy outputs are suboptimal and even show signs of failure, rooted in weaknesses in input and process indicators.

Table 3. Findings Based on Policy Results Indicators

Indicators	Subcomponents	Key Findings	Source of Information
Process	Policy Results	Negative impacts dominate: dust, road damage, low absorption of local labor	Affected communities, Ombudsman

Contribution to Regional Original Revenue

One of the main objectives of the Mining Business License (IUP) policy is to increase regional revenue through tax and levy collection from mining activities. However, data shows that contributions to Regional Original Revenue (PAD) are not being achieved evenly and optimally. Palu City did show an increase in tax revenue from the mining sector, for example, in 2021, the realization reached IDR 19.1 billion, compared to the target of IDR 17.5 billion. However, in Donggala Regency, the PAD target from the same sector was never fully achieved between 2015 and 2017. In interviews, Bapenda officials admitted that some companies delayed tax payments for technical reasons, even though the mined materials had already been moved and marketed (Interview, Bapenda Donggala, 2024).

Table 4. Contribution of Rock Mining Business to Local Revenue

Region	PAD Target (Selected Years)	PAD Realization
Palu City	IDR 17.5 billion (2021)	IDR 19.1 billion (2021)
Donggala	Unspecified targets (2015 2017)	Targets not achieved (2015 2017)

This underachievement is inextricably linked to weak oversight processes resulting from a lack of input. Limited human resources in the supervisory field, the absence of a digital mining production tracking system, and administrative field supervision mean that potential PAD is not closely monitored. As a result, many companies are free to set their own payment schedules and even operate without fully meeting their financial obligations. This indicates a clear causal relationship: lack of personnel and monitoring tools (input) → passive and incomplete monitoring (process) → revenue leakage and failure to achieve PAD targets (output).

Environmental Impact

Environmental impacts are a direct outcome of mining practices in the field and serve as an important benchmark in policy evaluation. Observations indicate that mining activities along the Palu-Donggala axis have caused road damage, air pollution, coastal ecosystem disruption, and an increased risk of flooding and landslides. This situation is exacerbated by the lack of adequate waste management and dust emission controls. During heavy rains, runoff from the mining area enters residential areas due to the lack of a drainage system built by the company. "When it rains, water mixed with gravel from the mine flows into our homes. There are no ditches on their premises," said one resident (Interview, Community, 2024).

Figure 1 Mining impacts. Source : BBC.com

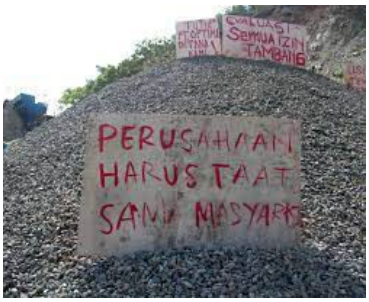

Figure 2 local residents protest. Source : Mongabay

Figure 3 Mining Impact. Source : Walhi Sulteng

This impact is the result of a combination of two issues: first, an ineffective monitoring process, and second, the company's lack of commitment to environmental management. Both can again be traced to weak inputs. Budgetary constraints prevented the Environmental Agency from field visits during the observation year, while the lack of air and water quality measuring instruments prevented technical agencies from conducting substantive evaluations of company reports. Consequently, violations of environmental standards went undetected and unaddressed. This demonstrates a strong causal chain between systemic weaknesses and policy outputs: lack of facilities and funding (input) → absent oversight (process) → uncontrolled environmental degradation (output).

Furthermore, this environmental degradation created a domino effect on policy outcomes, such as increased cases of acute respiratory infections (ARI), loss of livelihoods for fishermen, and social conflict around the mine. Therefore, the failure of output indicators cannot be separated from the problematic design and capacity of the implementation system, which began at the input and process stages.

Outcome Indicators

In the Bridgman and Davis (2000) framework, outcome indicators refer to the long-term impacts of policy implementation on society and the environment. In the context of evaluating the Mining Business Permit (IUP) for rock mining in the Palu-Donggala axis, policy outcomes should reflect improved local community welfare, job creation, and environmental protection. However, the analysis shows that these outcomes have not been optimally achieved. In fact, several findings point to interrelated negative impacts resulting from failures in policy input and processes.

One of the targeted outcomes of this policy is to reduce unemployment through the absorption of local workers. However, data shows that mining companies actually recruit more workers from outside the region. PT. Putra Elan Balindo, for example, employs only 40% local workers, with the rest coming from outside the region. When contacted, the company cited the low quality of local human resources

as the primary cause. Meanwhile, the community stated that there has never been any training or capacity-building programs from the company or the government. One resident stated,

> "We've never been involved or trained. If we don't have experience, we're not hired" (Interview, Community, 2024).

This is evident in the fluctuations in unemployment rates in each sub-district (namely Ulujadi and Banawa) within the Palu-Donggala Main Road in recent years. For more details, see the following graph. This situation demonstrates a clear causal relationship: limited human resource development (input) → lack of training or development of the local workforce (process) → minimal community participation in the mining sector (output) → high unemployment and low local welfare (outcome). This means that the failure to generate local economic benefits is not an isolated event but a result of policy design and technical implementation that do not support community capacity building.

Furthermore, another expected outcome of this policy is community empowerment through CSR programs. However, the implementation of CSR by companies is largely symbolic and unfocused. CSR mostly consists of occasional, small cash assistance, without ongoing programs such as business training, production equipment assistance, or assistance to MSMEs. When questioned, residents stated that the precise use of CSR funds is often unclear. This shows that the CSR implementation process is not transparent and does not involve the community in planning or evaluation.

The failure of this CSR program can be traced to its root causes in the input and process: the lack of clear obligations and oversight of CSR implementation (process), stemming from limited supervisors and budget (input). Consequently, CSR outputs are low-quality, and outcomes, such as community empowerment, are not achieved. Instead of improving people's lives, CSR actually creates the potential for new conflicts due to unclear distribution.

On the other hand, environmental outcomes also demonstrate similar failures. Mining activities cause road damage, air pollution, coastal ecosystem disruption, and an increased risk of respiratory diseases (ARI). Observational data shows that mine runoff enters residential areas due to a lack of drainage, and residents complain of dust that causes respiratory problems. According to community health center data, ARI is the most prevalent disease in mining-affected areas.

Causally, the lack of an environmental monitoring and mitigation system (process) is due to the lack of measuring instruments and a monitoring budget (input). Consequently, no action is taken against environmental violations (output), which then leads to permanent damage to ecosystems and public health (outcome). In other words, negative environmental impacts are not isolated failures, but rather the result of systemic weaknesses from the beginning of the policy cycle.

Overall, the outcomes of the rock mining permit (IUP) policy on the Palu-Donggala axis demonstrate structural failures stemming from inadequate input, weak implementation processes, and passive oversight. These three elements are causally interconnected and produce socio-economic-environmental impacts that are counterproductive to policy objectives. These findings emphasize the importance of comprehensive system improvements from upstream to downstream if policies are to produce outcomes that benefit communities and the environment.

Conclusions

This study shows that the implementation of the rock mining permit (IUP) policy on the Palu-Donggala axis is suboptimal. Limited human resources, facilities, and budget (inputs) directly impact weak implementation and oversight processes, which in turn lead to low contributions to local revenue (PAD), operational violations, environmental damage (outputs), and minimal improvements in local community welfare (outcomes). This situation reflects a systemic failure in the policy cycle, where each weakness in the initial stage has a domino effect on subsequent stages. Therefore, policy reforms should focus on strengthening oversight capacity, utilizing technology, reformulating CSR obligations, and increasing community involvement. These findings highlight the need for a policy evaluation approach that not only assesses outcomes but also understands the root causes of problems in policy design and implementation. This will allow for more precise and impactful improvement.

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