

## A Narrative Review of the P3-TGAI Program for Enhancing Agricultural Recovery and Resilience

### *Tinjauan Naratif Program P3-TGAI untuk Meningkatkan Pemulihan dan Ketahanan Sektor Pertanian*

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#### Abstract

*The Covid-19 pandemic severely disrupted Indonesia's agricultural sector, diminishing farmers' livelihoods and underscoring the urgency for resilient irrigation governance. While prior studies on the Irrigation Water Use Improvement Acceleration Program (P3-TGAI) emphasized physical outputs such as canal length, irrigated area, and productivity gains, there has been limited exploration of institutional and governance dimensions, particularly regarding Water User Associations (WUAs) and sustainability beyond state subsidies. Addressing this gap is critical, given that P3-TGAI's recognition as a flagship program in the 2020–2024 RPJMN and its alignment with SDGs on food security and poverty reduction. This study employs a qualitative narrative literature review, triangulating data from academic publications, government regulations, and field evaluation reports. The findings reveal that P3-TGAI rehabilitated 3,794 km of canals, improved 459,517 hectares of irrigated land, and absorbed 767,463 workers in 2021, thereby boosting planting indices and rural incomes. However, persistent challenges include delayed disbursement, inadequate WUA capacity, limited socialization, and regulatory inconsistencies. The study recommends enhancing governance through harmonized regulations, strengthening WUA capacity with systematic training, diversifying funding beyond central budgets, and embedding irrigation governance in local planning. These measures are essential for transforming P3-TGAI from a short-term recovery mechanism into a sustainable model of participatory irrigation governance.*

#### Abstrak

Pandemi Covid-19 sangat mengganggu sektor pertanian Indonesia, melemahkan mata pencaharian petani dan menegaskan urgensi tata kelola irigasi yang tangguh. Sementara studi sebelumnya mengenai Program Percepatan Peningkatan Tata Guna Air Irigasi (P3-TGAI) lebih menekankan pada output fisik seperti panjang saluran, luas lahan terairi, dan peningkatan produktivitas, eksplorasi

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mengenai dimensi kelembagaan dan tata kelola masih terbatas, khususnya terkait Perkumpulan Petani Pemakai Air (P3A) serta keberlanjutan program di luar subsidi negara. Mengatasi kesenjangan ini sangat penting, mengingat pengakuan P3-TGAI sebagai program unggulan dalam RPJMN 2020–2024 dan keterkaitannya dengan SDGs tentang ketahanan pangan serta pengurangan kemiskinan. Studi ini menggunakan metode tinjauan pustaka naratif kualitatif, dengan triangulasi data dari publikasi akademik, regulasi pemerintah, dan laporan evaluasi lapangan. Temuan penelitian menunjukkan bahwa P3-TGAI telah merehabilitasi 3.794 km saluran, meningkatkan kualitas irigasi pada 459.517 hektare lahan, dan menyerap 767.463 tenaga kerja pada tahun 2021, sehingga mendorong peningkatan indeks pertanian dan pendapatan pedesaan. Namun demikian, sejumlah tantangan masih berlanjut, termasuk keterlambatan pencairan dana, kapasitas P3A yang belum memadai, minimnya sosialisasi, serta inkonsistensi regulasi. Studi ini merekomendasikan penguatan tata kelola melalui harmonisasi regulasi, peningkatan kapasitas P3A melalui pelatihan yang sistematis, diversifikasi sumber pendanaan di luar anggaran pusat, serta pengarusutamaan tata kelola irigasi dalam perencanaan daerah. Langkah-langkah tersebut penting untuk mentransformasikan P3-TGAI dari mekanisme pemulihan jangka pendek menjadi model berkelanjutan dari tata kelola irigasi partisipatif

## INTRODUCTION

The Covid-19 pandemic profoundly transformed the socio-economic and political landscape of Indonesia, forcing communities to adapt to a new order of life shaped by restrictions, health protocols, and declining economic activity. Its impact was particularly severe in the health, education, and economic sectors, where rising unemployment and poverty eroded people's purchasing power and limited access to decent work opportunities (Mirani et al., 2021). Among the groups most heavily affected were farmers, whose livelihoods depend on mobility, access to markets, and stable input-output systems. The restrictions imposed during the pandemic reduced their ability to maintain capital, diminished the competitiveness of agricultural products, and pushed rural households further into economic precarity. Responding to these pressures, the government at both central and regional levels introduced a variety of countermeasures, ranging from direct cash

assistance and essential goods distribution to health infrastructure strengthening and job training. A critical aspect of these interventions was the introduction of cash-for-work programs aimed at providing short-term relief for affected communities and stimulate local economies.

The Ministry of Public Works and Public Housing (PUPR), recognizing the dual need to reduce unemployment while also investing in sustainable infrastructure, introduced the Irrigation Water Use Improvement Acceleration Program (P3-TGAI). This program was embedded within the larger framework of labor-intensive public works aimed at empowering rural communities, particularly those organized under Water User Associations (WUAs). As a cash-intensive scheme, P3-TGAI strategically aligned infrastructure improvement with socio-economic recovery, enabling communities to directly participate in rehabilitating and expanding irrigation

networks while generating immediate income. Beyond its economic rationale, the program embodied a broader vision of social empowerment, positioning communities as key actors in development rather than passive beneficiaries. The choice of irrigation as the focal point was deliberate, given the centrality of water management in ensuring food security and agricultural resilience. Indonesia's agricultural productivity relies heavily on irrigation sourced from rivers, watersheds, and reservoirs, whose quality and availability are in turn determined by watershed health (Pambudi, 2022). Water resource conservation has therefore emerged as a critical dimension of sustainable watershed-scale development, particularly in relation to maintaining irrigation systems for food security (Tri Asmorowati & Sarasanti, 2021).

Within this context, P3-TGAI was conceptualized not merely as a short-term fiscal instrument during the pandemic, but as an integral component of Indonesia's long-term development agenda. By empowering WUAs to directly plan, implement, and oversee irrigation network rehabilitation, the program strengthened the principle of participatory governance. This orientation was consistent with the seventh pillar of *Nawa Cita*, which emphasizes food sovereignty as a foundation of national economic independence, while also resonating with the broader goal of reducing rural poverty through community-driven development (Burhanudin et al., 2022). In practice, the P3-TGAI focused on tertiary irrigation networks under the authority of districts, municipalities, and villages, thereby targeting the scale most directly connected to farmers' day-to-day activities. Supported through Special Allocation Funds and other fiscal mechanisms, the program facilitated irrigation improvement, rehabilitation, and construction activities that placed WUAs at the center of implementation, ensuring that investments were not only efficient but also socially embedded (Pambudi & Pramujjo, 2022).

It relies significantly on irrigation drawn

from rivers, watersheds, and reservoirs, whose quality and availability are ultimately determined by the condition of the surrounding watershed (Pambudi, 2022). Water resource conservation has therefore emerged as a critical dimension of sustainable watershed-scale development, particularly in relation to maintaining irrigation systems for food security (Tri Asmorowati & Sarasanti, 2021).

Within this context, the P3-TGAI was conceptualized not merely as a short-term fiscal instrument during the pandemic but as an integral component of Indonesia's long-term development agenda. By empowering WUAs to directly plan, implement, and oversee irrigation network rehabilitation, the program advanced the principle of participatory governance. This orientation was consistent with the seventh pillar of *Nawa Cita*, which emphasizes food sovereignty as a foundation of national economic independence, while also resonating with the broader goal of reducing rural poverty through community-driven development (Burhanudin et al., 2022). In practice, the P3-TGAI focused on tertiary irrigation networks under the authority of districts, municipalities, and villages, thereby targeting the scale most directly connected to farmers' day-to-day activities. Supported through Special Allocation Funds and other fiscal mechanisms, the program facilitated irrigation improvement, rehabilitation, and construction activities that placed WUAs at the center of execution, ensuring that investments were not only efficient but also socially embedded (Pambudi & Pramujjo, 2022).

Nevertheless, despite its strong conceptual foundation, the implementation of P3-TGAI has revealed critical challenges. Empirical evidence demonstrates that while the program successfully improved planting indices and absorbed significant amounts of labor, its effectiveness varied across regions. Reports highlight problems such as delayed disbursement of funds, inadequate socialization, limited institutional capacity within WUAs, and even instances of

maladministration that compromised construction quality (Martief, 2022; Thohir et al., 2020). These findings underline a fundamental research gap. Most prior studies have assessed the P3-TGAI through the lens of physical output or economic outcomes, often focusing on the number of kilometers of canals rehabilitated, hectares of rice fields covered, or increases in crop productivity (Silitonga et al., 2021; Setiawan et al., 2022). Yet, far less attention has been paid to its

broader institutional and governance dimensions, particularly regarding how WUAs internalize participatory values, sustain operations beyond government funding, and integrate into local development planning. As Rahmawati et al. (2022) emphasize, the sustainability of such programs hinges not merely on financial inputs but on the ability of farmer organizations to foster accountability, autonomy, and resilience.

**Table 1.** Research Gap Supporting the Novelty and Urgency of the Study

Aspect	Prior Research Focus	Identified Gap	Contribution of This Study
<b>Program Outcomes</b>	Emphasis on physical results: canal length, irrigated area, productivity (Silitonga et al., 2021; Setiawan et al., 2022).	Lack of linkage between outputs and sustainable empowerment.	Connects irrigation improvements with farmer resilience and empowerment.
<b>Institutional Role</b>	WUA noted as implementers (Rahmawati et al., 2022).	Limited assessment of WUA capacity, accountability, and independence.	Evaluates WUA empowerment and participatory governance.
<b>Governance</b>	P3-TGAI seen as technical engineering (Martief, 2022).	Weak analysis of transparency, participation, and maladministration risks (Thohir et al., 2020).	Frames program as participatory governance model.
<b>Crisis Recovery</b>	Viewed as a pandemic recovery tool (Burhanudin et al., 2022).	Focused mainly on short-term labor absorption.	Positions P3-TGAI as long-term resilience strategy.
<b>Policy Linkage</b>	Fragmented evaluations, rarely tied to RPJMN or SDGs.	Absence of policy integration.	Aligns findings with RPJMN 2020–2024 and SDGs.

This table underscores that prior research remains confined to technical and short-term dimensions, whereas the present study introduces a novel contribution through the integration of technical, social, and participatory governance aspects—further amplified by its urgency and alignment with national agendas and sustainable development imperatives.

The urgency of addressing these gaps is twofold. First, P3-TGAI is formally recognized as part of Indonesia’s 2020–2024 National Mid-Term Development Plan (RPJMN), which situates infrastructure

strengthening as a priority agenda for economic recovery and service delivery (GoI, 2020). Its role as a flagship labor-intensive program demands rigorous evaluation to ensure alignment with national targets. Second, the COVID-19 crisis underscored the vulnerability of the agricultural sector to external shocks. Strengthening irrigation governance through participatory schemes like P3-TGAI is essential not only for immediate recovery but also for building long-term agricultural resilience in the face of future crises, including climate change, market volatility, and environmental degradation. Without systematic evaluation and responsive

policy learning, there is a risk that P3-TGAI will remain overly dependent on continuous state budget interventions, undermining its sustainability (Supriadi & Rivai, 2018).

The present study thus positions itself to critically assess P3-TGAI's performance by examining not only its tangible contributions to irrigation improvement but also its effectiveness in cultivating self-reliance and participatory governance among rural farming communities. Unlike earlier works that predominantly measured program success in terms of physical progress, this research incorporates an institutional perspective, asking how WUAs are empowered through the program, how they interact with local governments, and what challenges they encounter in sustaining irrigation functions. Such an approach provides a more holistic understanding of the program's outcomes, bridging technical, social, and governance aspects.

The novelty of this study lies in its integrative perspective. Whereas most evaluations of P3-TGAI remain confined to infrastructure indicators, this research explicitly situates the program within the discourse of sustainable governance and resilience. By analyzing how participatory mechanisms within P3-TGAI translate into tangible empowerment outcomes for WUAs, the study advances the argument that irrigation development should not be treated solely as an engineering challenge but as a socio-political process of capacity building and institutional strengthening. Moreover, by framing P3-TGAI as both a pandemic-era recovery measure and a long-term resilience strategy, the study contributes new insights into how cash-for-work schemes can evolve beyond temporary relief into vehicles of sustainable rural transformation.

The benefits of this research are expected to extend across theoretical, practical, and policy domains. Theoretically, it enriches the body of literature on irrigation governance by highlighting the intersection between labor-intensive infrastructure development and community empowerment.

Practically, it offers actionable recommendations for improving the design and implementation of P3-TGAI, particularly with respect to strengthening WUA capacities, enhancing transparency, and ensuring program sustainability beyond government subsidies. For policymakers, the study provides empirical evidence that can inform the calibration of national and regional development strategies, ensuring that participatory irrigation programs contribute meaningfully to poverty alleviation, food security, and rural economic development. In addition, the research holds wider implications for achieving the Sustainable Development Goals (SDGs), notably those relating to poverty eradication (SDG 1), zero hunger and food security (SDG 2), and sustainable water management (SDG 6).

In conclusion, the introduction of P3-TGAI as a labor-intensive irrigation program during the Covid-19 pandemic reflects a pragmatic yet ambitious effort to intertwine economic recovery with long-term community empowerment. While its achievements in enhancing irrigation performance and absorbing labor are commendable, persistent challenges at the site level underscore the need for continuous refinement. By situating this evaluation within the broader debates on participatory governance and agricultural resilience, this study aspires not only to document the successes and shortcomings of P3-TGAI but also to chart a pathway toward more inclusive, accountable, and sustainable irrigation policies in Indonesia.

The Irrigation Water Use Improvement Acceleration Program (P3-TGAI) has emerged as one of Indonesia's key policy instruments to strengthen food security while simultaneously supporting agricultural recovery in the aftermath of the Covid-19 pandemic. Scholars consistently highlight irrigation as a critical determinant of agricultural productivity, particularly in developing countries dominated by smallholder farmers (Supriadi & Rivai, 2018). However, chronic challenges—including

insufficient maintenance budgets and the progressive degradation of irrigation networks—continue to undermine infrastructure performance (Rusli et al., 2021).

Designed as a labor-intensive and community-driven initiative, P3-TGAI emphasizes the active participation of Water User Associations (WUAs) in planning, rehabilitating, and managing irrigation networks. Empirical studies confirm that WUA engagement fosters enhanced accountability, inclusivity, and long-term sustainability of irrigation governance (Rahmawati et al., 2022). This aligns with broader evidence that community-based resource management strengthens resilience and efficiency in rural water systems (Blanco-Moreno et al., 2024). Nonetheless, structural weaknesses remain pervasive, including bureaucratic delays, regulatory inconsistencies, and limited institutional capacity at the grassroots level (Thohir et al., 2020; Martief, 2022).

Impact evaluations demonstrate that P3-TGAI has successfully expanded irrigation coverage and increased rice field productivity, directly enhancing rural livelihoods (Silitonga et al., 2021). Furthermore, despite partial shortcomings in program achievement, the initiative has been effective in poverty alleviation and empowerment during crisis conditions (Setiawan et al., 2022). Conceptually, P3-TGAI embodies a participatory development paradigm, linking state fiscal intervention with localized empowerment. Taken together, the literature underscores P3-TGAI's significance as both an economic recovery mechanism and a farmer empowerment instrument, while also highlighting the need for governance reforms and sustainability strategies to secure its long-term impact.

## RESEARCH METHODS

This study employed a qualitative approach using a narrative literature review to analyze the performance and challenges of the Irrigation Water Use Improvement

Acceleration Program (P3-TGAI). A literature review method was chosen because it provides a systematic, explicit, and reproducible procedure for identifying, evaluating, and synthesizing previous research and policy documents (Poth, 2023). The process began with surveying relevant academic articles, government regulations, and technical reports directly related to irrigation management and P3-TGAI in Indonesia. Sources included national legislation, ministerial decrees, and operational guidelines, alongside empirical studies on irrigation governance and community empowerment.

Data were then subjected to descriptive analysis, enabling the integration of qualitative insights from multiple references into a coherent narrative. This analytical framework emphasized not only physical outputs—such as canal rehabilitation and irrigated land area—but also institutional aspects, including farmer participation, Water User Association (WUA) accountability, and governance mechanisms. The descriptive approach was particularly relevant to capturing the contextual realities of community-based irrigation management during the Covid-19 pandemic (Rahmawati et al., 2022).

By triangulating findings from scientific journals, official regulations, and field-based evaluations, the methodology ensured a comprehensive understanding of P3-TGAI's dual role as both an infrastructure intervention and a participatory governance mechanism. The results are expected to inform policy recommendations that enhance irrigation sustainability, farmer resilience, and rural economic recovery (Silitonga et al., 2021; Setiawan et al., 2022).

## RESULTS AND DISCUSSION

### A. P3-TGAI Effectiveness in Supporting Labor Intensive Programs

Irrigation in Indonesia is broadly defined as the deliberate and systematic provision, regulation, and drainage of water to

sustain agricultural activities across various modalities, including surface irrigation, pumping systems, underground networks, swamp-based irrigation, and pond irrigation (GoI, 2021a). Its centrality to national food security is undisputed, as irrigated agriculture underpins the productivity of staple crops. Nonetheless, the country's irrigation infrastructure has long been vulnerable to recurring problems. The most acute challenges arise from inadequate operation and maintenance practices as well as natural disturbances such as sedimentation, flooding, and climate variability, all of which accelerate infrastructure degradation (Rusli et al., 2021; Puspitasari, 2014). Inevitably deteriorate decline, underscoring the importance of continuous operation and routine maintenance. In this context, operation refers specifically to the regulation of water flows to ensure services meet agricultural needs, while maintenance concerns the ongoing safeguarding and repair of facilities to restore functionality before irreversible damage occurs (Kusumastuti, 2019).

The government has attempted to address these recurring issues by allocating budgetary resources for irrigation maintenance in order to slow down degradation and extend system longevity. Yet these efforts remain hampered by chronic fiscal constraints. Funds are often insufficient to cover Indonesia's vast irrigation networks, and allocation mechanisms tend to be based primarily on land area rather than on performance indicators or actual needs, resulting in inefficiencies and uneven outcomes. These limitations make farmer participation increasingly indispensable. As personnel within both central and local water management agencies continue to decline, communities are expected to share responsibility for sustaining irrigation functionality. According to Idris et al. (2019), several factors accentuate the urgency of farmer involvement: the extensive size of irrigated lands requiring large-scale rehabilitation; logistical difficulties due to poor rural infrastructure; the immediacy of

farmers' water needs that demand rapid responses; and the necessitate of governance models rooted in collaborative and democratic principles.

In response, the government has introduced initiatives to strengthen the role of Water User Associations (WUAs). These farmer-led institutions are established democratically at the tertiary block or village level to manage irrigation services locally. WUAs not only oversee water allocation but also carry out maintenance, monitoring, and evaluation, thereby safeguarding the long-term benefits of irrigation (GoI, 2021a; Martief, 2022). By empowering WUAs, the government embeds accountability, inclusivity, and resilience into irrigation governance, while simultaneously compensating for the declining capacity of state institutions.

A flagship initiative aligned with this participatory framework is the Irrigation Water Use Improvement Acceleration Program (P3-TGAI). Conceived during the Covid-19 pandemic as part of a labor-intensive recovery package, P3-TGAI combined economic stimulus with infrastructure rehabilitation. The program placed WUAs, their unions, and umbrella organizations at the center of implementation, supported by Community Assistance Teams (TPM) to ensure adherence to technical and financial guidelines (Turangan, 2022; Riski, 2021). Through clearly defined stages—including signing cooperation agreements, disbursing funds, executing rehabilitation works, documenting results, and undertaking monitoring—P3-TGAI aimed not only to restore irrigation services but also to safeguard rural livelihoods and purchasing power during the crisis (Directorate General of Water Resources, 2021).

The outcomes have been substantial. In 2021, P3-TGAI achieved nearly complete physical realization at 99.99%. This encompassed 726 main buildings, 9,074 complementary structures, and approximately 3,800 kilometers of rehabilitated canals. The program benefitted

a total irrigated area of 459,517 hectares across 11,999 sites, averaging 38 hectares per location. Productivity indicators improved markedly, with the planting index increasing from 120.1 percent to 170.2 percent. From a socio-economic perspective, the program absorbed 767,463 workers and generated 32.8 million working days in 2021, compared to 533,613 workers and 22.9 million working days the year before. These figures attest to its role as an effective labor-intensive scheme that simultaneously boosted agricultural output and rural employment (Silitonga et al., 2021; Setiawan et al., 2022).

The effectiveness of P3-TGAI is, however, strongly influenced by its regulatory architecture. At the legislative level, Law No. 17 of 2019 on Water Resources articulates the principles of sustainability and community participation in water governance, while Law No. 17 of 2003 on State Finances ensures fiscal discipline and accountability in program implementation. Complementing these, Presidential Regulation No. 18 of 2020 on the National Mid-Term Development Plan (RPJMN) 2020–2024 establishes irrigation development as a strategic infrastructure priority, while Presidential Regulation No. 27 of 2020 affirms the institutional authority of the Ministry of Public Works and Public Housing (PUPR) to oversee irrigation management.

At the ministerial level, PUPR Regulation No. 4 of 2021 provides detailed

technical guidelines for P3-TGAI, specifying eligible activities such as rehabilitation, improvement, and new construction. This is supported by earlier frameworks like PUPR Regulation No. 30/2015 on irrigation system management and PUPR Regulation No. 14/2015 on irrigation area criteria. Financial aspects are addressed through Ministry of Finance Regulation No. 82/PMK.03/2021, which grants tax relief for WUAs involved in P3-TGAI to ensure farmers fully benefit from program participation (GoI, 2021b). Operational directives are set through annual decrees, such as Ministerial Decree No. 776/KPTS/M/2021 on program targets, and circulars like 04/SE/D/2021, which issue technical instructions for field implementation.

While these regulations collectively aim to enhance irrigation functionality, promote community empowerment, and secure financial accountability, they vary in scope and operational detail. Laws establish overarching principles, presidential regulations situate irrigation within national development priorities, ministerial regulations define technical and financial mechanisms, and decrees or circulars translate them into yearly targets. This layered structure creates both coherence and fragmentation. On the one hand, it aligns grassroots implementation with national objectives; on the other, delays in issuing decrees have occasionally disrupted timelines and undermined efficiency (Thohir et al., 2020).

**Table 2. Similarities and Differences among the Key Regulatory Instruments that govern P3-TGAI**

Regulation Type	Key Content	Similarities	Differences
Law No. 17/2019 on Water Resources	Principles of sustainable and participatory water governance	All emphasize sustainability and accountability	Provides broad legal foundation without technical detail
Law No. 17/2003 on State Finances	Fiscal accountability for public programs	Shared goal of ensuring transparency in financing	Focused solely on budgeting and fiscal responsibility
Presidential Regulation No. 18/2020 (RPJMN 2020–2024)	Positions irrigation as infrastructure priority	Aligns irrigation with national development	Strategic planning instrument, not operational
Presidential Regulation No. 27/2020	Institutional role of PUPR	Ensures clear institutional responsibility	Narrower focus on administrative authority
PUPR Regulation No. 4/2021	Technical guidelines for P3-TGAI	Operationalize national goals at local level	Specific to P3-TGAI activities (rehabilitation, improvement, construction)
PUPR Regulation No. 30/2015 & No. 14/2015	Management standards and irrigation area criteria	Support governance framework for irrigation	Apply beyond P3-TGAI, broader in scope
Finance Regulation No. 82/PMK.03/2021	Tax relief for WUAs	Ensure economic benefits reach farmers	Distinct financial incentive mechanism
Ministerial Decree No. 776/KPTS/M/2021 & Circular 04/SE/D/2021	Annual targets and technical instructions	Translate policy into implementation	Limited to yearly operational details

The comparative analysis illustrates that, while the legal and policy instruments converge on shared objectives of participation, sustainability, and accountability, they diverge in their specificity and operational focus. Together, they form an integrated framework that underpins the effectiveness of P3-TGAI. Yet the persistence of challenges such as budget delays, limited socialization, and governance weaknesses indicates the need for stronger coordination across regulatory layers.

Ultimately, the findings show that P3-TGAI has delivered tangible outcomes in infrastructure rehabilitation, labor absorption, and productivity improvement. Nevertheless, the program’s long-term success depends on continuous refinement of governance mechanisms and the harmonization of regulatory instruments. Strengthening the linkages among laws, policies, ministerial regulations, and operational decrees will be essential to transform P3-TGAI into a sustainable model of participatory irrigation governance that supports food security and enhances rural resilience in Indonesia.

**Table 3. Main Regulatory Basis of P3-TGAI Policy in Indonesia**

Law	Presidential Regulation	Ministerial Regulation	Ministerial Decree / Circular Letter of Echelon 1 Officials (Operational)
<ul style="list-style-type: none"> <li>• Law 17 of 2019 concerning Water Resources</li> <li>• Law 17 of 2003 concerning State Finances</li> </ul>	<ul style="list-style-type: none"> <li>• Presidential Regulation 18 of 2020 concerning the National Mid-Term Development Plan 2020-2024</li> <li>• Presidential Regulation 27 of 2020 concerning the Ministry of Public Works and Public Housing</li> </ul>	<ul style="list-style-type: none"> <li>• Ministerial Regulation of the Ministry of Public Works and Public Housing 4 of 2021 concerning Guidelines for the Irrigation Water Use Improvement Acceleration Program Implementation</li> <li>• Ministerial Regulation of the Ministry of Finance 82/PMK.03/2021 concerning Amendments to Ministerial Regulation of the Ministry of Finance 9/PMK.03/2021 concerning Tax Incentives for Taxpayers Affected by the Corona Virus Disease Pandemic 2019</li> <li>• Ministerial Regulation of the Ministry of Finance 173/PMK.05/2016 concerning Amendments to Ministerial Regulation of the Ministry of Finance 168/PMK.05/2015 concerning Mechanism of Government Assistance Budget Implementation at State Ministries/Agencies</li> <li>• Ministerial Regulation of the Ministry of Public Works and Public Housing 14/PRT/M/2015 concerning Criteria and Determination Status of Irrigation Area</li> <li>• Ministerial Regulation of the Ministry of Public Works and Public Housing 30/PRT/M/2015 concerning the Development and Management of the Irrigation System</li> </ul>	<ul style="list-style-type: none"> <li>• Decree of the Ministry of Public Works and Public Housing 109/KPTS/M/2022 concerning the Determination of Irrigation Areas Recipient of the Irrigation Water Use Improvement Acceleration Program Fiscal Year 2022</li> <li>• Decree of the Ministry of Public Works and Public Housing 776/KPTS/M/2021 concerning Second Amendments to Decree of the Ministry of Public Works and Public Housing 308/KPTS/M/2021 concerning Determination of Irrigation Areas Recipient of the Irrigation Water Use Improvement Acceleration Program Fiscal Year 2021</li> <li>• Circular Letter 04/SE/D/2021 concerning Technical Guidelines for the Irrigation Water Use Improvement Acceleration Program Implementation</li> </ul>

According to the Ministerial Regulation of Public Works and Public Housing No. 4 of 2021 concerning the Guidelines for Implementing the Irrigation Water Use Improvement Acceleration Program (P3-TGAI), the program encompasses several categories of activities. The first is the rehabilitation of irrigation networks, which involves repairing and restoring systems to

their original functionality and service level. The second involves irrigation network improvement, which includes upgrading existing systems to expand their service area or adapt them to changing environmental conditions in irrigation regions. The third activity concerns the construction of new irrigation networks in locations where such infrastructure does not yet exist. Beyond these

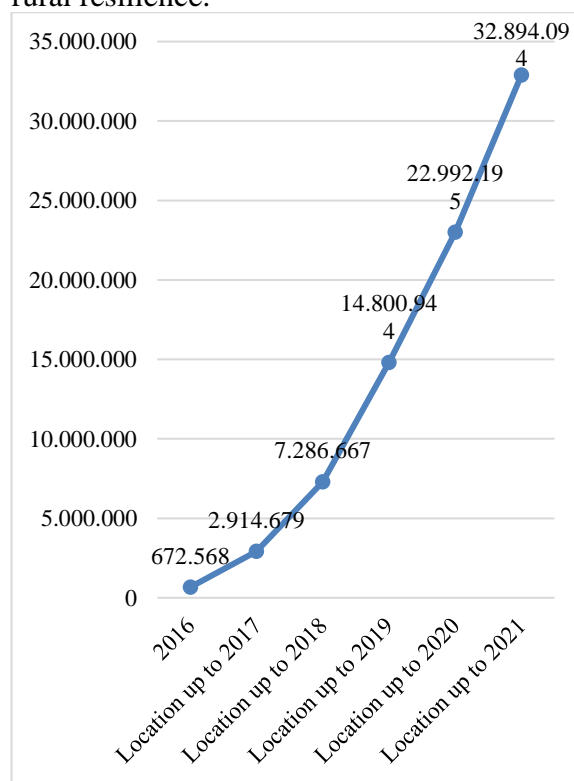
three categories, P3-TGAI also accomodates network normalization activities, particularly through community-based labor without reliance on heavy machinery.

The program targets both tertiary irrigation networks under the jurisdiction of central, provincial, or local governments, as well as village-level irrigation systems. Locations are selected based on proposals submitted by River Basin Organizations, local government institutions, and community groups. Eligible recipients must hold legal status, formally endorsed through regional head decrees, notarial acts, or village-level authorizations for Water User Associations (WUAs). However, certain activities are explicitly prohibited, such as projects that risk damaging irrigation systems, activities detrimental to the environment, groundwater well drilling, pump procurement, or any initiatives misaligned with the objectives of P3-TGAI.

The essence of the program lies in empowering farming communities by fostering their direct participation in rehabilitating, improving, and constructing irrigation networks. Unlike conventional contractual approaches, P3-TGAI employs a labor-intensive, self-managed model, where communities themselves propose, plan, implement, and supervise projects. To safeguard technical quality, farmer groups collaborate with local government agencies, ensuring that the resulting infrastructure aligns with required specifications and farmer needs. Community Assistance Personnel (CAP) are deployed by the government to provide oversight and technical guidance throughout the process.

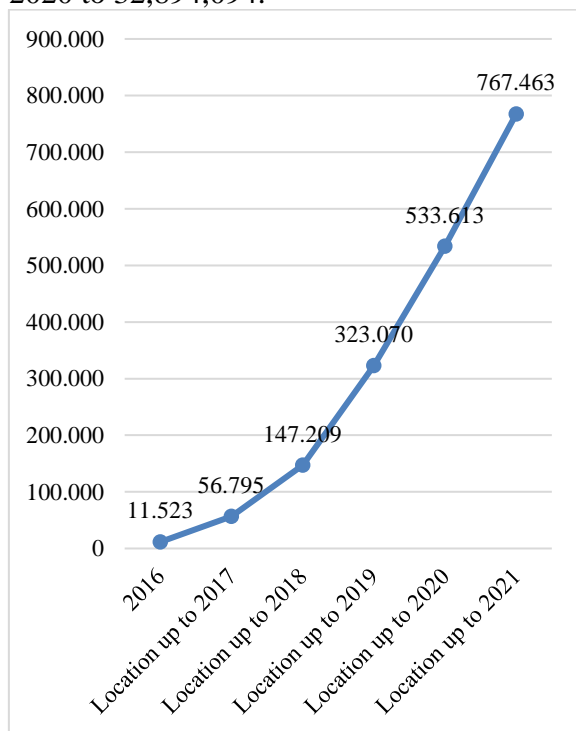
In terms of water resource management, P3-TGAI aims to expand irrigation service capacity and increase agricultural productivity. Field performance results have been remarkable. In 2021, overall physical completion reached 99.99%, comprising 726 main structures, 9,074 complementary structures, and nearly 3,794 kilometers of rehabilitated canals. The outcomes were equally significant: 459,517 hectares of rice

fields benefited across 37 River Basin Centers, and the national planting index rose from 120.1% to 170.2%. According to the 2021 Central Technical Team report, physical progress indicators—particularly on tertiary canals totaling approximately 3.47 million meters—showed nearly complete achievement (Martief, 2022). Nationally, P3-TGAI covered 11,999 locations in 2021, averaging 38 hectares per site, with village irrigation systems accounting for 41.4% of all activities. The majority of projects, 97.07%, were implemented on tertiary networks, while smaller proportions were allocated to primary, secondary, and drainage networks. By irrigation type, 88.5% of interventions targeted surface irrigation, followed by swamp (5.8%), groundwater (3.5%), pump (2%), and pond irrigation (0.1%). Within the broader framework of boosting national rice production, P3-TGAI has proven effective in mobilizing both public and private investment for the development of small-scale irrigation systems, thereby reinforcing food security and rural resilience.



**Figure 1.** Absorption of Working Days in P3-TGAI Activities up to 2021

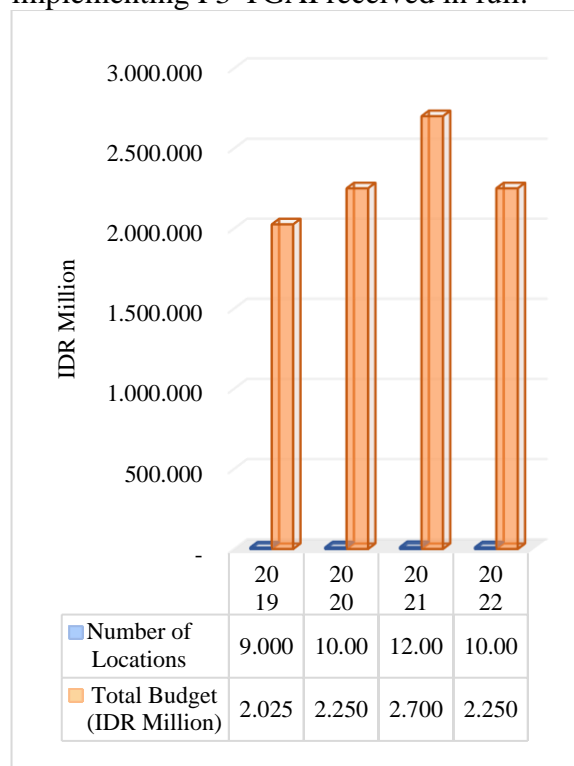
With an average cost of Rp5.2 million/ha, P3-TGAI activities are efficient and effective enough to push the target of achieving the handled irrigation area. Small irrigation investments by the community impact increased the planted area and rice production (Supriadi & Rivai, 2018). The empowerment and participation of P3-TGAI members can be proven by the increase in budget allocations and P3-TGAI realization in 2020 and 2021. In general, the number of labor absorption and the number of working days increasing in 2021 shows the effectiveness of P3-TGAI. The total labor absorption in P3-TGAI grew from 533,613 people in 2020 to 767,463 people, while working days improved from 22,992,195 in 2020 to 32,894,094.



**Figure 2.** Absorption of Labors (Person) in P3-TGAI Activities up to 2021

The impressive aspect of the P3-TGAI implementation lies in the fact that there is involvement from third parties in this program so that there is an incentive for final income tax borne by the government for existing construction services (GoI, 2021b). As is known, Article 1, point 32 of the Minister of Finance Regulation No. 9/PMK.03/2021

states that taxpayers who receive P3-TGAI are WUA, Water User Associations (WUAs), WUA Unions, or Main Water User Associations. They carry out P3-TGAI as stipulated by the Commitment-Making Officer and ratified by the Head of the Central Work Unit. River Basin Organization or Major River Basin Organization of the Ministry of PWPH. It is a tangible form of government support for the Covid-19 pandemic condition, which significantly impacts farmers so that they are not burdened with income tax in P3-TGAI. The final income tax borne by the government incentive will make the income of farmers implementing P3-TGAI received in full.



**Figure 3.** Budget Ceiling and Number of P3-TGAI Locations in the Last 4 Years

The implementation of the Irrigation Water Use Improvement Acceleration Program (P3-TGAI) has been predominantly carried out by the Water User Farmers Association (WUA) accounting for 97.2% of activities, followed by WUA Unions at 2.7% and WUA Heads at 0.1%. The number of P3-TGAI locations has steadily increased, with a growing trend of villages receiving more than

one program site. In 2021, locations expanded from the initial 10,000 to 12,000 through the Ministry of Public Works and Public Housing Decree No. 776/KPTS/M/2021. Distribution was lowest in the Riau Islands and Bangka Belitung Provinces and highest in West, Central, and East Java.

The effectiveness of P3-TGAI cannot merely be assessed by budget realization or infrastructure construction but must also account for the extent of community participation. Active involvement of farmers in planning, implementation, and evaluation is crucial to ensuring sustainability and balancing government efforts. Community engagement is therefore central to transforming P3-TGAI from a top-down initiative into a genuinely participatory program that enhances irrigation governance and strengthens rural livelihoods.

Setiawan et al. (2022) evaluated P3-TGAI's effectiveness using four key indicators: program success, target achievement, program satisfaction, and input-output levels, alongside overall goal attainment. Findings demonstrate that, despite the challenges of the Covid-19 pandemic, P3-TGAI has been broadly effective. However, two dimensions—program success and target achievement—were not fully realized, highlighting gaps in execution and outcome alignment. By contrast, program satisfaction, input-output efficiency, and overall goal attainment were well implemented. These results affirm P3-TGAI's relevance as a poverty reduction and empowerment instrument, while underscoring the need to address critical shortcomings in target precision and program outcomes.

## **B. Problems of P3-TGAI Implementation in the Regions**

Limited funds, facilities, and operation and maintenance personnel provided by the government for managing and maintaining irrigation network functions, if not supported by the community, will have the potential to cause a decrease in the condition of irrigation networks and at an advanced level can disrupt

the function of irrigation networks in the distribution of irrigation water. It must therefore be implemented with caution in government assistance programs (both State Budget and Local Government Budget); so it does not replace the self-subsistent role of the beneficiaries, which has been routinely carried out (Supriadi & Rivai, 2018). The implementation of the Government assistance program should be carried out independently by the beneficiary community if the program is technically and financially feasible. Farming communities will be more responsible for the development results because they are the direct beneficiaries.

The P3-TGAI program represents a labor-intensive initiative in the infrastructure sector, primarily aimed at restoring village and tertiary irrigation networks. Its implementation relies on the participation of Water User Associations (WUAs) through contractual agreements with River Basin Organizations or Major River Basin Organizations at designated irrigation sites. By promoting the involvement of farmers' groups (P3A), the program seeks to foster ownership, accountability, and capacity within farming communities, thereby enhancing the efficiency, effectiveness, and sustainability of irrigation systems. Central to this effort is the role of the Community Assistance Team, which serves as the spearhead of community empowerment. Equipped with expertise in engineering, finance, and social facilitation, these facilitators guide communities through structured stages of implementation, ensuring alignment with the vision and mission of P3-TGAI (Rahmawati et al., 2022).

The active involvement of farmers and WUAs in the operation and maintenance of irrigation facilities ensures the long-term preservation of infrastructure. Furthermore, wages distributed during project implementation provide an additional income source for members of WUAs. Empirical evidence underscores the program's impact: Silitonga et al. (2021) found that P3-TGAI significantly expanded irrigation networks,

thereby increasing the functional area of rice fields. This expansion led to higher agricultural productivity and substantial improvements in farmers' income. At the macroeconomic level, government budget allocations for labor-intensive programs like P3-TGAI contribute to reducing unemployment and alleviating poverty, while simultaneously strengthening rural economic resilience (Rahmawati et al., 2022).

Despite these achievements, persistent challenges remain at the site level. From a regulatory standpoint, Thohir et al. (2020) highlighted delays in the issuance of decrees by the Ministry of Public Works concerning

project locations, which in turn postponed field supervision. Moreover, administrative shortcomings persist in several regions, particularly regarding the legality of WUA governance structures and bookkeeping systems. These issues hinder program implementation and weaken accountability.

Overall, while P3-TGAI has demonstrated considerable success in strengthening irrigation infrastructure, improving agricultural productivity, and supporting poverty reduction, it still faces critical operational and administrative gaps that must be addressed to ensure its long-term sustainability and governance credibility.

**Table 4. Problems of the P3-TGAI Program at the Site Level**

Aspect	Key Problems	Response and Solutions by Central Government	Response and Solutions by Local Government	Response and Solutions by WUAs/Farmers	Response and Solutions by TPM/Other Stakeholders
Budget	Weak transparency in budget use; delayed disbursement of Phase I funds; unsustainable participation; low community willingness to contribute resources	Issuing stricter technical guidelines for faster disbursement; strengthening audit and transparency mechanisms (GoI, 2021b).	Mainstreaming P3-TGAI financing needs into regional planning (RKPD) and local budgets (APBD).	Increasing willingness to co-finance operations and provide in-kind contributions.	Assisting WUAs in financial reporting to meet accountability standards.
Institutional	Limited understanding of WUAs' roles and benefits; unclear indicators of independence; weak readiness to collaborate	Developing guidelines for assessing WUA independence; conducting national-level capacity-building.	Providing technical and managerial assistance through Public Works and Agriculture agencies.	Strengthening internal governance through training and cross-group collaboration.	Delivering both technical and social facilitation to reinforce WUA capacity.
Regulatory	Delays in ministerial decrees on project sites; absence of rules on O&M funding allocation	Accelerating decree issuance; introducing regulations on O&M budget allocation (GoI, 2020).	Drafting local bylaws or regulations to institutionalize participatory irrigation O&M.	Advocating for O&M budgets through village development planning forums.	Advising on synchronization of local regulations with field-level needs.
Technical Implementation	Risk of collusion between TPM and WUAs; poor construction quality; delays in fund transfer;	Enhancing central oversight; enforcing sanctions for	Deploying more field supervisors and local technical staff.	Encouraging broader member participation to avoid elite capture.	Providing technical training for WUAs and local artisans; expanding program outreach.

Aspect	Key Problems	Response and Solutions by Central Government	Response and Solutions by Local Government	Response and Solutions by WUAs/Farmers	Response and Solutions by TPM/Other Stakeholders
	lack of skilled workers; inaccurate targeting; weak socialization	technical violations.			
Territorial	Difficult access to remote sites; insufficient data on irrigation needs and water sources; challenges in consolidating diverse WUA members	Supplying spatial and GIS-based data for location planning.	Integrating local irrigation data into regional databases.	Conducting participatory mapping of irrigation needs and water availability.	Facilitating WUA member consolidation through socio-cultural approaches.

Source: Analysis Result, 2025

### C. Potential for P3-TGAI Development in Indonesia

Indonesia, the world’s largest archipelagic state with a total land area of nearly 192 million hectares, is characterized by a highly fragmented agrarian structure. Approximately 80 percent of its farmers are smallholders cultivating less than one hectare, while around 28 million households depend on farming, of which 11.1 million are entirely landless. This unequal distribution of resources has serious implications for national food security, as 50 percent of the 13 million hectares of rice-producing land is concentrated on the island of Java. Moreover, half of the farming population controls only 21 percent of total agricultural land, demonstrating the structural vulnerability of rural livelihoods. Against this backdrop, sustainable community empowerment becomes not only desirable but essential, as communities must be equipped to manage local assets effectively and pursue prosperity through participatory means.

An inter-village development approach within broader regional frameworks offers promising opportunities to synergize economic activities that are more viable, diversified, and productive. By fostering multi-stakeholder participation, this model responds directly to entrenched rural poverty

and systemic powerlessness. Empirical studies affirm that community participation is not merely symbolic but represents one of the most effective routes to empowerment, particularly when institutionalized through community-based rural development policies (Blanco-Moreno et al., 2024).

The Irrigation Water Use Improvement Acceleration Program (P3-TGAI) has been one of Indonesia’s flagship interventions to tackle these challenges. Implemented by the Ministry of Public Works and Public Housing (Ministry of PUPR) through Operations and Maintenance Work Units across 37 River Basin Centers in 33 provinces, the program has focused on rehabilitating, repairing, and improving irrigation networks (Ministry of PUPR, 2021). Initially designed as a cash-for-work scheme during the COVID-19 pandemic, its objectives were twofold: to restore the functionality of irrigation infrastructure and to stimulate rural economies through labor absorption.

Irrigation water is among the most strategic factors determining agricultural productivity, particularly in a country where food security depends on reliable irrigated rice production. The P3-TGAI program adopts principles of participation, transparency, accountability, and sustainability, ensuring that Water User

Associations (WUAs) directly manage activities at the local level. However, questions of long-term sustainability arise when program continuity depends almost entirely on central government budgetary support.

For P3-TGAI to evolve into a sustainable empowerment model, four interrelated aspects of community development must be pursued simultaneously: recovery from economic shocks, capacity building to strengthen local institutions, resource management to maximize local potential, and networking to connect communities with external stakeholders. Once these dimensions are institutionalized, adoption processes are more likely to yield lasting impacts. Within the WUA empowerment framework, sustainability will materialize when interventions meet three conditions: improving the welfare of individuals and households, protecting and enhancing the environment, and generating economic profitability.

Looking ahead, the program's potential lies in embedding empowerment processes within local governance systems. Sub-district and village administrations, together with community leaders, can play pivotal supervisory roles in ensuring that farmers remain motivated to manage irrigation sustainably. Such integration will prevent dependency on state transfers and create a culture of self-reliance.

Developing the right empowerment program, however, requires a comprehensive and diagnostic approach. Identifying root problems should precede solution design, ensuring that interventions remain context-specific and community-driven. Equally important is the availability of both financial and institutional resources. Without sufficient resources, the stimulus provided by P3-TGAI cannot be transformed into sustainable outcomes. More importantly, empowerment must be understood as a deliberate attempt to dismantle structural barriers that perpetuate poverty. Poverty in

Indonesia is not solely the product of natural limitations but rather of systemic inequalities shaped by policy and power relations. Thus, future empowerment initiatives must incorporate both redistributive justice and participatory governance.

In conclusion, the developmental trajectory of P3-TGAI rests on its ability to evolve from a crisis-response, budget-driven intervention to a long-term community-based irrigation governance model. By deepening farmer participation, aligning with local government planning, and ensuring adequate resourcing, P3-TGAI can evolve into a transformative tool that not only revitalizes irrigation systems but also secures livelihoods, strengthens food security, and builds resilience against future economic and environmental shocks.

## CONCLUSION

The assessment of the Irrigation Water Use Improvement Acceleration Program (P3-TGAI) underscores its strategic role as both a pandemic-era recovery measure and a long-term mechanism for strengthening irrigation governance. Findings demonstrate that the program significantly improved agricultural productivity through the rehabilitation of 3,794 kilometers of canals, the construction of 726 main buildings, and an expansion covering 459,517 hectares in 2021. Beyond physical infrastructure, P3-TGAI successfully absorbed 767,463 workers and generated 32.8 million workdays, thus contributing to poverty alleviation and rural resilience. The participatory model of implementation through Water User Associations (WUAs) fostered community ownership and accountability, aligning with principles of sustainability and empowerment. However, challenges persist in the form of delayed fund disbursement, regulatory inconsistencies, weak institutional capacity within WUAs, and limited socialization at the grassroots level. These weaknesses underline that while P3-TGAI effectively delivers outputs and short-term outcomes, its sustainability remains at risk if not accompanied by stronger governance

frameworks and continuous empowerment strategies for local communities.

## RECOMMENDATION

Based on these findings, future development of the P3-TGAI should prioritize strengthening governance, institutional resilience, and integration with local development agendas. First, financial management must be improved through timely disbursement mechanisms and transparent auditing systems to address accountability gaps. Second, WUA capacities require systematic enhancement via targeted training, monitoring, and evaluation frameworks that measure independence, sustainability, and technical competence. Third, regulatory frameworks should be harmonized across government levels by accelerating decree issuance, ensuring alignment with the 2020-2024 RPJMN, and embedding irrigation governance within local regulations. Fourth, program sustainability should be pursued by diversifying funding sources, including regional budgets and community-based financing, to reduce overdependence on central government allocations. Additionally, greater use of digital platforms and spatial data should be adopted to strengthen monitoring, transparency, and responsiveness. Finally, P3-TGAI should be reframed as part of a broader resilience strategy, linking irrigation infrastructure with climate adaptation, food security, and poverty reduction goals. By addressing these aspects, the program can evolve into a durable participatory irrigation governance model that balances economic recovery with long-term sustainability.

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