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How to strengthen *Gotong-Royong* to rehabilitate the irrigation canals among traditional aquaculture farmers without monetary incentives?

SUMMARY

The Indonesian multilevel governmental program (PITAP) is a participatory pond irrigation management policy established by the Ministry of Marine Affairs and Fisheries (KKP). In PITAP, traditional aquaculture farmers are incentivized by government funding to create community-based co-management groups (POKLINA) to maintain self-governance of their irrigation canals. The logic of PITAP is to encourage POKLINA farmers to rehabilitate their irrigation canals through subsidized labor payments that are coupled with strengthening the strong cultural norm of mutual assistance (i.e., collective action) within Indonesian society called *Gotong-Royong*.

We identified the diverse social and ecological conditions that hindered or enabled collective action in four aquaculture villages through a critical analysis of the program's economic incentives, and by using the lens of collective action theory and crowding effects.

We offer our policy recommendations to KKP, the Department of Fisheries and Aquaculture (DKP) in the West and East Lombok districts, West Nusa Tenggara Province Regional Research and Innovation Agency (BRIDA NTB), and aquaculture farmers in Lembar, Sekotong, Jerowaru, and Sambelia villages.

KEY RESULTS

- There is a need for more investment into deliberation research in Global South contexts
- Many social and ecological factors influence PITAP policy program outcomes. If these context-specific factors are considered during implementation, better results can be expected.
- Social hierarchies can strongly influence deliberation and decision-making processes in rural settings.

RECOMMENDATIONS

Local governments and ministries may be able to improve PITAP program outcomes and aquaculture production by considering the following:

- Use deliberation processes with diverse stakeholders as a way to adapt the PITAP program to local contexts.
- Facilitate regular communication forums.
- Provide a moderator to facilitate deliberation.
- Provide capacity building such as cooperation options and technical skill trainings for farmers instead of monetary payments.
- Support the establishment of aquaculture farmer cooperatives to encourage self-organized mechanisms.

THE CONTEXT

Aquaculture ponds in coastal areas are private property and are often located around irrigation canals which are shared property. In such cases,

there is mutual interest and dependency in ensuring that the canals are well maintained for private benefit and mitigating shared risks (e.g., clearing debris and fixing leaks). On average, ponds need to be maintained and debris cleared every six months to avoid larger structural or permanent damage. The question is who should invest and why in repairing shared canals? Here arises a classic public goods provision problem familiar to the commons governance literature, which includes a head-and-tail dynamic of asymmetric risks and incentives for individuals. Therefore, enabling collective action for canal maintenance is an underlying governance problem in the earthen pond sector.

The *Gotong-Royong* is a traditional mechanism and informal institution in Indonesia for working together and embodying a collective spirit to strengthen economic and social resilience at the local level. *Gotong-Royong* can be understood as the Indonesian cultural practice of collective action to help each other and do collective tasks. The PITAP program was designed to leverage *Gotong-Royong* to motivate collective action in managing irrigation canals and improve the production of traditional aquaculture systems.

The PITAP is a widespread government policy program aimed at improving aquaculture production. It has been implemented since 2013 in 18 Indonesian provinces and 77 aquaculture districts (Technical Guidelines of the PITAP Program No. 31/2021). When implementing PITAP, aquaculture farmers are required to conduct community-based irrigation management (*Kelompok Pengelola Irigasi Perikanan* - POKLINA). POKLINA consists of a minimum of 20 aquaculture farmers in one village to manage their irrigation canals collectively.

The case studies underlying this policy brief were conducted in two villages in West Lombok and East Lombok. In West Lombok, the PITAP program was conducted in Lembar and Sekotong villages in 2021. In East Lombok, PITAP was conducted in the villages of Jerowaru and Sambelia in 2020 (Figure 1).

In Lembar, Sekotong, and Jerowaru, community-based aquaculture farming relied on traditional pond systems. Meanwhile, Sambelia village has been using traditional 'plus' pond systems. A pond aquaculture system is considered traditional when the pond is non-fed and the fish density is ≤5-10 seeds per m^2. In the traditional system, prior to cultivation, the pond is dried out and the soil in the pond is fertilized using a herbal treatment and agricultural fertilizer to grow

plankton and/or algae, depending on the type of cultivated species. In contrast, the traditional 'plus' system uses regular pellet feed, standardized pond densities of approximately 25-30 seeds per m^2, and several aerators. Otherwise, the fed and non-fed traditional systems would be similar. They both use earthen pond construction, working with simple tools such as hoes and shovels, and rely on low and high tides in irrigation canals for water exchange.

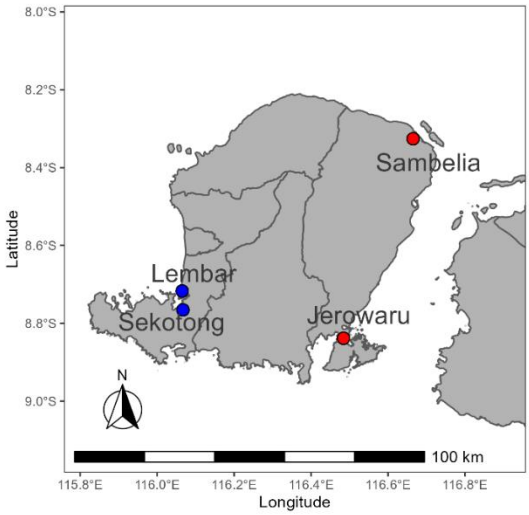

Figure 1. Map of Lombok Island, Indonesia, indicating the location of the study in the four villages.

This policy brief is part of a dissertation with the research objective is to leverage the role of deliberation in environmental governance and exploring its potential as a mechanism for local policy adaptation and to address collective action problems. This research used a variety of approaches: a systematic literature review, a case study, and an experimental study. The dissertation's findings contribute to the literature on collective action theory in community-based pond aquaculture governance and policy recommendations for the continued implementation of the PITAP program in Indonesia.

RECOMMENDATIONS

Use deliberation processes with diverse stakeholders as a way to adapt the PITAP program to local contexts. The PITAP program must be adapted according to the diverse social and ecological conditions of each village. Deliberation facilitates a mechanism for local adaptation by involving a wide range of actors (including community members) to discuss the challenges and best solutions. Integrating deliberation as a mandatory mechanism in policy programs can foster effective participatory governance.

Facilitate regular communication forums. Regular communication forums can lead to adaptive governance for improving aquaculture production. Regular meetings among actors (local government and local communities) not only increase trust and facilitate coordination but also sustain collective action. Beyond the PITAP program, the participation of resource users and local governments in regular communication forums can enable the discussion of common problems and provide fertile ground for finding common solutions with shared rules.

Provide a moderator to facilitate deliberation. One of the challenges of deliberating among resource users in the context of rural communities in Lombok is the social hierarchy among farmers. Social hierarchy based on capital ownership, experience, age, education and etc., could influence the participation of resource users in discussions. Understanding this dynamic, local governments should provide a moderator to encourage individuals to speak in discussions or deliberation processes.

Provide capacity building such as cooperation options and technical skill trainings for farmers instead of monetary payments. Capacity building for farmers is an important development objective supported by local governments. Local governments can provide capacity building options for farmers to enhance their leadership skills in coordinating people and managing conflicts. In addition, capacity building should consist of training to improve the production of traditional aquaculture systems. The lack of understanding of the systems' connectivity between aquaculture and irrigation systems has led to poor irrigation canal systems. Good knowledge of the resource system can increase the likelihood of collective action because resource users understand how to manage or improve the system efficiently and effectively.

Support the establishment of aquaculture farmer cooperatives to encourage self-organized mechanisms. To encourage self-organization, farmer cooperatives can facilitate collaboration, market access, technological advancement, and capital access among members. Farmer cooperatives play an important role in facilitating collective action and improving the welfare of traditional and small-scale aquaculture farmers in Indonesia. This is reflected in the success of agricultural farmers' cooperatives. Currently, fisher cooperatives in Indonesia do not accommodate aquaculture farmers. The establishment of aquaculture farmer cooperatives requires multilevel and across level government collaboration.

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ABOUT THIS POLICY BRIEF

This Policy Brief is part of a series aiming to inform policy-makers on the key results of the ZMT research projects and provide recommendations to policy-makers based on research results. The series of ZMT Policy Briefs can be found at www.leibniz-zmt.de/policy_briefs.html. This publication was commissioned, supervised and produced by ZMT.

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