PRISMA

Climate spotlight

Climate Smart Agriculture Case Study

Unlocking Climate-Resilient Rice Farming

Overcoming Barriers to High-Yielding Varieties Adoption in Indonesia

PRISMA is a partnership between the Indonesian Government (Bappenas) and the Australian Government (Department of Foreign Affairs and Trade) to boost the incomes of smallholder farmers by increasing farm productivity. PRISMA works with private sector partners to develop commercially viable business models to increase the distribution of technologies, services, and products that improve productivity. The majority of PRISMA's partnerships have climate-smart agriculture elements. Climate-smart agriculture aims to increase agricultural productivity while ensuring farmers' resilience to climate change and reducing the agriculture sector's environmental footprint. This case study draws from PRISMA's experience to demonstrate how the private sector supports farmers adapting to climate change and reducing emissions.

Kementerian PPN/ Bappenas

Australian Government

Introduction

Climate change risks rice productivity, which could harm the nation's food security. A 1°C temperature rise could lead to an 11.1 percent decline in yields for irrigated paddy fields and an even more pronounced 14.4 percent reduction for rainfed paddy fields nationwide.[1] One way to address this challenge is by promoting climate-smart agriculture practices.

Common climate-smart agriculture approaches include improving irrigation efficiency to reduce water wastage, applying more balanced fertilisers to reduce emissions, and using crop protection strategies to increase yields. However, adopting high-yielding variety seeds in rice cultivation affects all other aspects of its cultivation. High-yielding seeds require less fertiliser and less water and have higher yields.

Despite the benefits of high-yielding varieties, rice farmers in Indonesia continue to rely on traditional, low-yielding rice seed varieties. These varieties are often drought-susceptible, prone to pest attacks, and have lower yields. This results in higher emissions per tonne of rice produced, assuming the same amount of nitrogen-based fertiliser is used.

Based on PRISMA's five years of experience working in the rice sector, farmers' inefficiency stems from a limited supply of high-yielding varieties and significant gaps in perception and information regarding their benefits.

Scaling high-yielding varieties
The product and the business

In 2021, PRISMA partnered with high-yielding seed producer PT Botani Seed Indonesia (Botani). Botani is uniquely positioned in the rice seed market as a university-affiliated company under IPB University (Bogor Agricultural Institute). The company plays a crucial role in mainstreaming academic innovations in agriculture to a broader audience.

Before partnering with PRISMA, Botani heavily relied on grants and government projects to sustain its research and development (R&D) efforts and production activities. However, funding uncertainty posed challenges in scaling up its production and enhancing the organisational capacity.

Despite possessing an innovative climate-smart seed, IPB 3SPT, Botani needed a sustainable business model for selling its products in the open market. In its early stages, constrained by limited capital, Botani could only manufacture and distribute its products in quantities ordered by the government market. The company needed help to identify the appropriate target market for its products. Furthermore, as IPB 3S required farmers to shift when cultivating it, many farmers hesitated to adopt new seeds.

To fortify its standing and establish a more resilient business model, Botani needed an approach that enabled it to strengthen its company foundation, realign its target market, and effectively promote its products to farmers. In 2021, Botani partnered with PRISMA to determine a way forward. PRISMA proposed changing its previous business model to enter the free market and be more aggressive in its promotional activity.

[1] Yuliawan, Taufiq, and I. Handoko. "The Effect of Temperature Rise to Rice Crop Yield in Indonesia Uses Shierary Rice Model with Geographical Information System (GIS) Feature." *Procedia Environmental Sciences* 33 (2016): 214–20. https://doi.org/10.1016/j.proenv.2016.03.072.

Botani's Climate Smart Seed

Botani's seed has high productivity, reduced fertiliser use, and more efficient water utilisation. In other words, the seed is more adaptive to climate change and could reduce gas emissions production. Later, the seed was named a climate-smart seed because of its features.

Seeding the idea with farmers

Both the supply and demand sides of the business needed development to increase adoption. With PRISMA support, Botani increased its production, distribution, and promotion of climate-smart seeds to increase their widespread adoption among Central Java and East Java rice farmers.

Production

In production, Botani expanded the capacity of its nurseries and agronomists through targeted training sessions and capacity-building activities. By improving the skill and expertise of its staff, the company has a more consistent supply of good quality seed while leading to a gradual increase in its production and sales.

Demo plots

Botani identified and mapped suitable locations to optimise the seeds' potential through trial plots and pilot activities. This boosted farmer acceptance and enabled Botani to pursue market penetration aggressively.

Market outreach

Botani established new distribution channels to expand market reach and developed promotional activities, such as farmers' meetings, demo plots, and field days. Also, Botani revised its packaging to be more inclusive by implementing universal design principles to ensure it could be read easily by farmers with poor vision.

All these promotional interventions equip farmers with the knowledge and tips for climate-smart agriculture practices, thereby increasing farmers' income and resilience to climate change.

Botani's main challenge is ensuring that farmers follow the instructions on how to plant the seeds correctly. Convincing farmers that they only need a small amount of fertiliser to achieve the optimum production results can be particularly difficult. Therefore, all promotional activities take time to show results. Botani has found that farmers need around two planting seasons (or a year) to adapt to the new variety and achieve optimal results.

The result

The collaboration between PRISMA and Botani has increased the production, use and recognition of its climate-smart seed with farmers and other market actors, including the government. The Minister of Agriculture launched Botani's latest seed, the IPB-9G, at an April Lamongan event. The Minister called for increased seed production and broader use by farmers.

Compared with the situation before the partnership, Botani has significantly increased its company size, boosting its production capacity from 80 to 300 tonnes per year, increasing the total permanent staff from 5 to 15 persons (including five new agronomists), and expanding its distribution channel from 1 to 8 distributors.

In February 2024, during a roundtable discussion amongst PRISMA's rice seed partners, the Director of Botani acknowledged that this partnership has played a significant role in Botani's success.

Through a partnership with PRISMA, we found a home for our product. This marks a significant milestone, allowing us to transition from ground zero to a successful launch. PRISMA's approach to market system development has proven to be highly effective in facilitating the introduction of our climate-smart seed to the market.

Dadang Syamsul Munir, Director of Botani, at PRISMA's Roundtable Discussion event

PRISMA is conducting an impact assessment of the partnership's results at the farmer's level. Botani's research found that its seeds could reduce 20 percent of fertiliser and water usage, which will be confirmed through the impact assessment.

Based on the sales report, the partnership is expected to benefit around 6,000 farmers with a 30 percent increase in income. Through this collaboration, PRISMA is projected to contribute to reducing emissions by 70.47 tonnes of C02e.

IPB3S performs impressively. Despite the low water and fertiliser use, my production increased from 35 to 50 sacks, and the planting cycle was noticeably shorter. My livestock also prefers the rice straw it yields. Seeing its superior features, I'll surely use IPB3S in the next planting season.

Wariman,
Smallholder Paddy Farmer, Karanganyar

I am the type of farmer who likes to try a new variety of seeds. However, I will only continue if these are proven to perform well, and so far, nothing performs as exceptional as IPB9G. Its yield is remarkable; I recently harvested my crop, and it could reach 13 tons per hectare.

Wahid,
Smallholder Paddy Farmer, Lamongan

What next?

Moving forward, Botani will continue to grow production of climate-smart seeds – the company forecasts 500 tonnes will be produced in 2025. In addition, the company plans to conduct production trials on the newly invented seed varieties in the coming year and commercialise more climate-smart rice seed varieties as part of its product differentiation strategy. In this phase, Botani will face a challenge in finding the appropriate production sites to achieve the company's production forecast. The production location would require skilled nurseries, suitable climate conditions, and access to mechanisation providers.

The company will continue to advocate for government support in the agricultural sector by implementing and promoting climate-smart innovations. Botani's director emphasises that its pioneering climate-smart seeds should be integrated with other climate-smart agricultural practices, including efficient water management, organic farming inputs, and zero-waste agricultural methods, creating productive and more resilient farmers.

About PRISMA

PRISMA is a partnership between the Government of Indonesia and the Government of Australia to increase the productivity and income of smallholder farmers. Increased productivity contributes to food security and builds farmer resilience to market and agricultural shocks, including climate change.

PRISMA is supported by the Governments of Australia and Indonesia and implemented by Palladium, with Technical Assistance from Swisscontact, Zurich.

Find out more:
www.aip-prisma.or.id // info@aip-prisma.or.id // PRISMA