



## Indonesia Market Watch

July 2022

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# Commercialising drought-tolerant rice seeds in Indonesia

The Australia-Indonesia Partnership for Promoting Rural Incomes through Support for Markets in Agriculture (PRISMA) is a development partnership between the Government of Australia (Department of Foreign Affairs and Trade, DFAT) and the Government of Indonesia (Bappenas).



# Food security and climate change



Increased global conflict and climate change are significant factors intensifying the focus on food security. The President of Indonesia, Joko Widodo, is using the G20 summit meeting in Bali in November to bring together all agricultural ministers to get commitment from the G20 members to focus on food security.

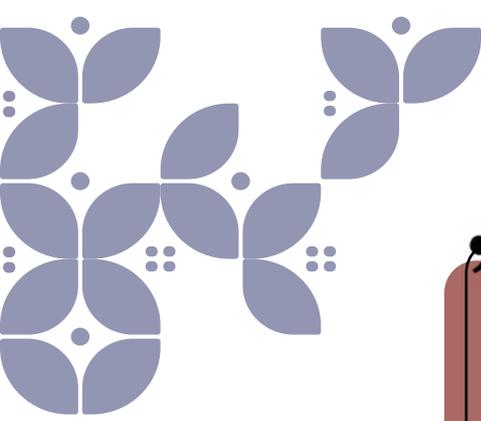
There is a significant link between climate change and food security. The current heat waves in Europe, recurring flood events in Australia, and unseasonal rain in Indonesia have all impacted food supply chains.

Erratic rainfall before the last agricultural season in Indonesia reduced production levels in key crops, including rice, maize, and mung beans. Drops in production can lead to increased prices. In January 2022, for example, rice prices increased by 4.94% due to reduced production levels in December – the last month of the harvest season.

Longer-term price spikes impact the ability of smallholder farmers in Indonesia to invest in quality agricultural inputs, leading to a cycle of reduced production and increasing food supply instability.

PRISMA, a bilateral development program funded by the Australian Government, supports the Indonesian private sector in producing and selling innovative products and services to smallholder farmers to increase farm productivity and improve food security. One such innovation has been in the advancement of drought tolerant seeds.





IPB3S is achieving incredible harvests for smallholder farmers in Malang. This rice seed variety is exactly what Indonesia needs to address food security issues. I will ensure that the government supports further production of IPB3S.

Joko Widodo, President of the Republic of Indonesia.

## Commercialising innovation

Indonesia's rice productivity level has stagnated at around 5.1 tonnes per hectare in the past few years. One of the barriers to increased productivity is the lack of access by smallholder farmers to high-yielding seed varieties<sup>1</sup> because very few companies are producing these seeds. The Government of Indonesia's successful rice self-sufficiency movement of the 1980-90s led to brand loyalty and molded the Indonesian taste to only a few rice seed varieties.

PRISMA is working with several rice seed producers in Indonesia to develop and promote high-yielding seed varieties. Research and demonstration trials show that high-yielding varieties can improve productivity from 5.1 tonnes per hectare to 8.4 tonnes per hectare. Hybrid varieties can give even higher yields, but the penetration rate after two years of support by PRISMA is only 0.67 percent. The primary issue with the uptake of hybrid seeds is a perceived taste difference, short shelf life, and production licence difficulties.

Both hybrid and high-yielding varieties have high tolerance to abiotic stresses (drought/ submergence/ salinity) and pest and diseases. The higher productivity of the seeds and their adaptation to climate change makes the seeds a good choice to combat food insecurity.

One of the seed producers PRISMA is supporting is PT Botani, the commercial arm of the renowned Bogor Agricultural University. PT Botani produces a high-yielding rice seed variety, IPB3S, that only requires intermittent irrigation, making it suitable for growing in arid areas, highland areas, and areas where access to water is difficult. The need for less water is increasingly important for farmers in tropical and subtropical climates with far fewer climate change adaptations available to them. PRISMA is helping PT Botani with business plans and marketing strategies to promote and sell IPB3S.

## Changing the way rice producers do business to benefit smallholders

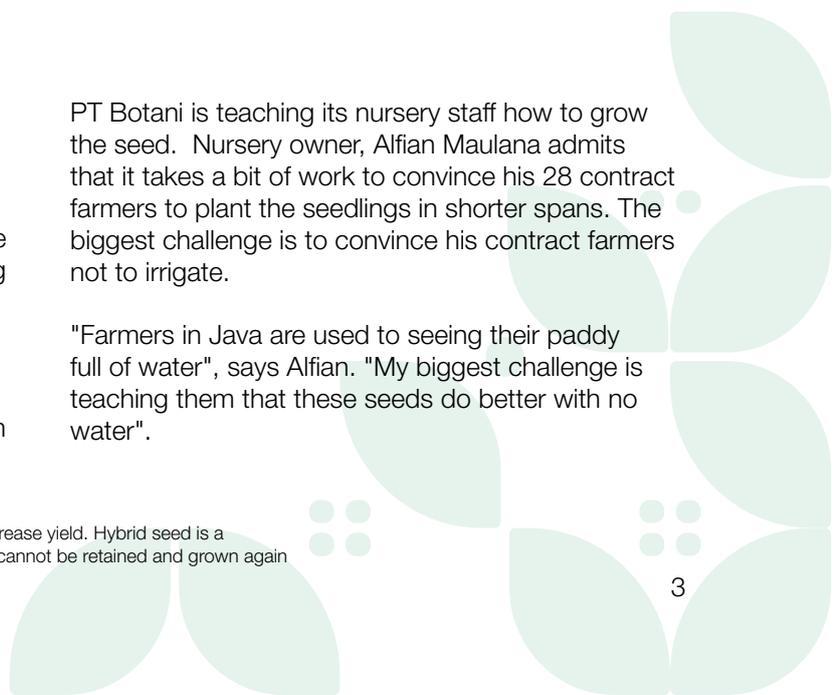
PRISMA supports seed producers like PT Botani to develop and commercialise new high-yielding seed varieties to help build market resilience against climate impacts. PRISMA has supported PT Botani to move from a research-oriented business to a more commercial business, increasing sales and marketing staff by 350% in a year.

Within one year, PT Botani has increased production from 2 to 80 tonnes and has contracted more nurseries to increase production to 500 tonnes within the next two years.

PT Botani is teaching its nursery staff how to grow the seed. Nursery owner, Alfian Maulana admits that it takes a bit of work to convince his 28 contract farmers to plant the seedlings in shorter spans. The biggest challenge is to convince his contract farmers not to irrigate.

"Farmers in Java are used to seeing their paddy full of water", says Alfian. "My biggest challenge is teaching them that these seeds do better with no water".

1. High yielding seed varieties (HYV) are seeds specifically developed to increase yield. Hybrid seed is a specific HYV that is cross bred. Hybrid differs from HYV because the seed cannot be retained and grown again like HYV. In-bred seed is seed that is pollinated from the same plant.



### Reducing the burden of inputs, including water

The drought tolerant high-yielding rice seeds only require intermittent water and no water in the weeks up to harvesting, saving on water load by at least twenty percent.

There is evidence that IPB3S and hybrid seeds are more resistant to pests and disease, reducing the need for other chemical and/or toxic crop protection inputs.

### Increased yields enables smallholder farmers to invest in other quality agri-inputs, leading to increased productivity and better food security

IPB3S increases productivity by 1.5 to 3 tonnes per hectare, increasing incomes for smallholder farmers. This means farmers have more choice to invest in quality inputs in future seasons, improving overall farm productivity.

## Environmental advantages of drought tolerant seeds

### The drought tolerant seeds reduce harvest loss, leading to increased income for smallholder farmers

The rice grain of IPB3S is more stable on the stalk, and the grain is held firmer in the husk. This means that if the paddy is harvested manually and transported manually from the field, there is less grain fall from the sheath. This means harvest loss can be minimised.

Each sheath has a 100 percent productivity rate with 350 grains per sheath compared to 150 grains for in-bred varieties. The planting distance is shorter than in-bred varieties, meaning smallholdings can increase output significantly.

### The seeds do not require water prior to harvest making the crops more suitable for mechanised harvesting

Because water is not used prior to harvesting, the land is dry. This makes the crops more suitable for mechanical harvesting (another area PRISMA is promoting). Mechanical harvesting can reduce harvest loss by up to 80%.

Harvesting on dry land reduces soil compaction and soil degradation, particularly when using the small rice combine harvesters being promoted to smallholder farmers in Indonesia.

## What's next?



To reach scale, PRISMA is trying to influence the Government of Indonesia to prioritise high-yielding seed varieties as part of the Ministry of Agriculture's free seed program. A small change to the procurement catalogue to include high-yielding seed varieties would encourage companies and nurseries to produce these varieties. PRISMA is working with rice experts, policy think tanks, and the relevant Ministries to advocate for this modest policy change.



PRISMA is continuing to support its rice partners in building the capacity of their nurseries. The good news is that demand for the new high-yielding seed varieties is currently outstripping supply. PRISMA is facilitating commercial partnerships to assist the seed companies expand their production capacity.





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