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A test flight for agricultural drones: piloting a business model for smallholder farmers

*An interview
with Ibu Ezria Adyas
from the technology company,
PT Halo Indah Permai*



Drones have the potential to offer substantial benefits for smallholder farmers, including reductions in water and chemical usage. This is particularly relevant with climate change exacerbating water scarcity. Despite the potential cost savings, the high initial investment and the small plots make it an unprofitable option for smallholder farmers. To explore alternative business models, like the provision of drone services, PRISMA partnered with PT Halo Indah Permai. We interviewed Ibu Ezria Adyas from PT Halo Indah Permai to see if it could make drone technology accessible to smallholders while also creating commercial opportunities for drone dealers and service providers.

PRISMA, partnered with PT Halo Indah Permai to introduce drone sprayers to smallholder farmers. The partnership introduced the service to smallholders through drone demos and government agricultural events, prompting interest in the products and catalysing growth in the market.



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Please tell us a little about yourself.

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My background is in nutrition and food security, a field in which I've worked for over a decade. However, my passion for working with diverse stakeholders and my interest in exploring new opportunities has led me to branch out from nutrition and food security.

Influenced by my mother, who is a Professor in Seed Technology at IPB, a prominent agricultural university in Bogor, and excited by the evolving landscape of agricultural technology, I decided to expand into agriculture by joining Halo Robotics in early 2020. I was eventually promoted to Account Manager for agriculture and forestry.

What was the problem you were trying to solve?

We observed that Indonesia's adoption of drone spraying technology was much lower than other countries in Southeast Asia, such as Thailand.

Given the low adoption rates in Indonesia and how agricultural drone sprayers contributed to less than 5% of total sales in our agriculture and forestry division, we saw a huge opportunity to increase sales and promote drone sprayers through the smallholder market segment.

The technology could help smallholder farmers reduce the workload and costs associated with crop maintenance, which is particularly important given labour shortages and rising labour costs. Drones can complete the spraying of a one hectare field in less than hour.



Drone spraying can reduce water usage by 90%

In contrast, manual spraying would require 2 man-days for the same area. At the same time, cost savings from reduced labour amount to approximately IDR100,000 per hectare.

Additional benefits include reducing water usage by 90%, which will likely be an increasing concern for farmers as warmer temperatures lead to more water scarcity. Drone spraying is also a safer alternative to manual spraying since it can eliminate direct exposure to potentially harmful chemicals.

Despite the many benefits of drone spraying for smallholder farmers and interest from smallholder farmers to try the technology, we had no experience engaging this segment as we had only been targeting large plantations with our agricultural drones.

What was the business model you piloted?

We piloted two business models in order to penetrate the smallholder market. In the first model, we pitched the business opportunity of providing smallholder drone spraying services to potential rural entrepreneurs. The idea was to sell our drone sprayers to rural entrepreneurs who were interested in aggregating demand from smallholders and providing spraying services to this segment.



Information sharing on drone spraying during a farmers' meeting

The second model involved Halo Robotics being more directly involved in the provision of drone spraying services. In this model, we were responsible for aggregating smallholder demand ourselves and would contract service providers, such as Hasana Agro and Nusa Indonesia, to provide the spraying services.

The pilots involved drone product demonstrations, digital marketing, and the hiring of a field agent. We started the new strategy by hiring one field agent to conduct door-to-door canvassing of rural entrepreneurs.

Following that, in November 2021, we collaborated with a leading pesticide company, FMC, to conduct our first drone demo to smallholder farmers. FMC had just launched a new product that was specifically for drone spraying and was interested in conducting an exclusive promotion for its most loyal farmers. The drone demo allowed FMC to promote the benefits of its new product to its loyal farmers while also raising awareness of the drone spraying technology that could be used to apply it. At the same time, it allowed us to leverage FMC's existing customer base, making it easier for us to penetrate this new segment.

This was my first time witnessing a drone demo aimed at smallholder farmers. The experience deepened my understanding of rural markets and was particularly helpful as we were still in the early exploratory phase with regards to promoting drone technology to smallholders.



Drone demo with farmers

One of our key learnings from the demo was that the 30-litre drone was too big for the small landholdings of these farmers. As a result, we decided to import and introduce a smaller 10-litre drone to cater to the smallholder segment. Our second drone demo, which was conducted in March 2022, was in collaboration with another agro-chemical company, Syngenta.

Alongside the drone demos, we also adapted our digital marketing strategy to target this new market segment and used footage from our drone demos as part of our digital marketing campaign. We produced the first video on drones for smallholder farmers, which received over 819,000 views and increased the number of customer leads.

We began receiving 15-20 customer inquiries monthly, whereas previously, we only had a few inquiries. Encouragingly, approximately a third of these enquiries were from rural entrepreneurs who were interested in providing spraying services for smallholder farmers. The remaining enquiries were from large farmers who wanted to use drone spraying for their own lands. In 2022, after our first year of promoting drone sprayers to this new target segment, we managed to sell 4 drone sprayers to rural entrepreneurs who wanted to provide drone spraying services to smallholders. This was the first time we were able to sell drone sprayers to individual rural entrepreneurs, rather than large plantation companies, and it accounts to one third of our total drone sales that year.

Have you continued or adapted the business model?

We experienced numerous challenges while piloting the two business models that targeted the smallholder segment. This included technical challenges, such as the lack of electricity for charging drone batteries in rural areas as well as the lack of skilled drone operators that could be hired by rural entrepreneurs to provide drone spraying services.

Even though rural entrepreneurs have better access to capital than smallholder farmers, the high cost of drone sprayers coupled with limited financing options for advanced machinery remains a constraint for many potential drone spraying service providers. At the same time, we faced challenges from the farmer side, whereby farmers were questioning the efficacy of drone sprayers.

As they were more accustomed to having a lot of liquid being sprayed during manual crop spraying process, farmers were sceptical about whether the fine mist from drone sprayers would be effective in controlling insects and diseases and maintaining crop health.

These factors made it difficult for our field agent to convince potential rural entrepreneurs to purchase the drone sprayers and provide drone spraying services to smallholders. After six months, our agent had yet to convert any leads into drone sales. We also faced difficulties aggregating smallholder demand in-house through our field agent, which slowed down progress for the second business model. As a result, we decided to discontinue the use of a field agent and to re-evaluate our strategy for engaging smallholders.



A field agent demonstrating how to operate the drone

While these pilots raised our awareness about the potential to target smallholders, we also realised it will take a lot more time and investment to grow the smallholder segment. For now, we have decided to focus more of our resources on targeting our core agricultural market, in particular large plantations and government projects, and capturing a greater market share in these segments. Nevertheless, we are still interested in promoting drone spraying to smallholder farmers and hope to eventually unlock some of the barriers to penetrating this segment. Since this market is very much in its infancy, our focus going forward will be on laying the groundwork by building greater awareness and acceptance of drone spraying from smallholder farmers.

We are doing this through the continuation of drone demos through requests from agricultural companies (e.g. input companies) who are interested in hosting such a demo. The host will be responsible for identifying target locations and smallholder farmers while we will provide the technology for the demo. This approach, which allows us to gradually raise smallholder awareness around drone sprayers, compensates for our lack of experience with engaging smallholder farmers.

In the meantime, we will continue to offer smaller drone varieties that are more suited for providing spraying services to the smallholder segment. We will also continue promoting our technology through online channels. As a result of the positive response from our digital campaigns, we have decided to expand our marketing team from 2 to 5 staff members.

Finally, what do you see as the most exciting thing happening in Indonesian agriculture?



Drone sprayers have the potential to increase productivity and improve farmer well-being


The future of farming in Indonesia holds endless possibilities. Over the last two decades, the agricultural sector has evolved from conventional farming methods, utilising animal power for labour support, to the use of a range of agri-machinery. This shift has played a pivotal role in boosting agricultural productivity, increasing efficiency, reducing yield losses, and enhancing crop quality. As we look to the future, one of the most promising aspects for Indonesian agriculture lies in the collective willingness of all participants in the agricultural value chain—including farmers, government agencies, research institutions, and private enterprises—to embrace new innovations. In time, we will hopefully see more advanced technologies such as drone sprayers being embraced and widely adopted across Indonesia. These innovations have the potential to drive further transformation, leading to increased productivity, improved farmer well-being, and sustainable development.

PRISMA is a **partnership between the Government of Indonesia (Bappenas) and the Government of Australia (Department of Foreign Affairs and Trade)** to increase the productivity and income of smallholder farmers. A seminal program, the PRISMA partnership has increased incomes for 1.48 million smallholder farming households. Higher incomes increase investment back into agriculture, generating more resilient markets and creating stronger communities as farmers invest in children's education and family well-being.

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