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Rice-fish Farming System Practices in Irrigated Urban Farming, Pasuruan - Indonesia

The integrated system of growing rice and fish together is one of the concepts of the 'Save and Grow' approach to rice farming. This case study examines rice-fish in urban farming in the Municipality of Pasuruan where vegetables are also grown.

Density of plants was adjusted to allow the fish adequate space to thrive

One of the farmers, Wahono, has a second job as carpenter. But during planting and harvesting season, he devotes his time to farming. In 2015, Wahono participated in a Farmers Field School (FFS) training where he learned Save and Grow methods that focus on the integrated rice-fish farming system. In this FFS, a plot of paddy field was identified for a pilot project. Wahono and other farmers learned how to produce their own bio-fertilizers and bio-pesticides using local resources. But the emphasis is on how to manage fish and vegetable farming integrated in the rice agro-ecosystem.

After completion of the FFS, Wahono was convinced that the system is more profitable than the traditional farming (e.g. mono-cropping and using chemical pesticides), as he now harvests rice, fish and vegetables. He has now adopted this system on a piece of 0.2 ha irrigated paddy land.

Wahono explains that the concept of Save and Grow, with the integrated rice-fish farming system, requires regular observation which must be conducted to ensure the aquatic environment is healthy enough for the fish to thrive and grow to their full potential.

In the rice-fish farming system, land preparation needs adjustment with several furrows developed in the middle of the paddy and at the sides. The density of plants is also adjusted by reducing the number of rice seedlings. This farming practice applies environmentally friendly technologies such as the application of ecological pesticides as a substitute for synthetic pesticides. Inorganic fertilisers are also partly replaced with organic materials. Borders of his paddy field were slightly expanded for "refugia" crops and other edible crops such as vegetables. Sometime, if the water condition in the agro-ecosystem is not good, the fish may need additional feeding to stimulate normal growth.

A farmer checks the water condition to ensure the agroecosystem is environmentally sound

"Previously, I applied a lot of chemicals, consisting of inorganic fertilisers and synthetic pesticides to control pests and diseases. After integration with fish farming, I rationalised the use of the chemicals and the result is better. Before rice-fish the total amount of chemical fertilizers that we applied were equivalent to 100 kg for one season. But now we only apply organic fertilizer, 30 thousand rupiahs per sack. For one plot of paddy field we need two sacks of organic fertilizers, which value IDR 60,000."

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Rice-Fish farmer Wahono prepares botanical pesticides as a substitute for chemicals

Aside from environmental concerns, rationalizing the use of chemical fertilizers and pesticides means reducing the operational costs of farming. The use of environmentally friendly fertilizers and pesticides educates farmers to recognize natural enemies and that can help farmers to control pests and diseases. There is also "refugia" plants that can serve as alternative hosts and food source for the natural enemies. This practice aims to substitute the use of chemical fertilisers and pesticides.

A farmer's wife picks chilli along the borders of plots

The successes of adopting rice-fish farming are apparent. The production of rice increases and the costs of production decrease. Increase in production is due to better management of agro-ecosystems – from land preparation to its maintenance. Reductions in costs are realized due to substitution of purchased chemicals with organic materials generated from locally available resources. The low density of plants reduces the amount of seed and seedling needed. The result is an increase in income from the trio of harvests: rice, fish and vegetables. This also results in greater food, nutrition and dietary security for the farmers and their families.

Farmers provide supplemental feeding for fish, which is created from local materials

"On average, I harvest 1.2 t of rice, equivalent to IDR 5 million. If the weather is conducive, I can earn IDR 6.5 million to IDR 7 million. In addition, I also harvest fish that provides about IDR 150 thousands per month. I also harvest vegetables which account for about IDR 20 thousand per day, and we also consume them at home and sometimes we share with relatives. The added benefit is it improves our family's nutrition through regular vegetable and fish consumption, providing important vitamins, micronutrients and protein."

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