



The Benefits of Pekin Duck-Rice Integrated Farming to Rice Farmers



S&T in Agriculture

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Key Findings and Implications

- Pekin duck-rice integrated farming has emerged as the most profitable production system among evaluated treatments. The integration of ducks in rice fields has been shown to increase yields by up to 20% and generate approximately 50% higher net returns.
- Ducks can be raised directly within the rice paddies, providing an additional income stream through meat production.
- Moreover, their presence significantly reduces the need for chemical inputs and manual labor for weed and pest control, while also contributing organic fertilizer—leading to more sustainable and cost-efficient rice farming.
- This suggests that promoting the adoption of integrated rice-duck farming could enhance farmers' income and support more sustainable, environmentally friendly agricultural practices.

- Policymakers are encouraged to support this system through training programs, input subsidies for startup integration, and research-extension linkages to improve efficiency. Such support could accelerate the transition to low-input, high-efficiency farming models in rural areas.

Background

The increased cost of agricultural inputs, including synthetic fertilizers, insecticides, and commercial feeds, has put more financial strain on rice producers in recent years. Meanwhile, as more and more inexpensive imported rice enters the local market, the farmgate price of rice has stayed the same or even decreased. This disparity has had a significant negative effect on rice farming's profitability, driving many farmers into

debt and some to give up farming entirely in pursuit of other sources of income.

Cost-cutting measures that can replace or reduce the use of pricey inputs are desperately needed to preserve sustainable rice production and maintain viable incomes. The rice-duck integrated farming system, a traditional, natural method used in other nations, is one promising strategy that provides a workable and affordable substitute. Farmers can diversify their revenue streams and lessen their need for artificial inputs by introducing ducks into rice fields. In order to promote broader adoption among rice producers, this study attempts to illustrate the financial and ecological advantages of rice-duck integration.

Research Objectives

The primary objective of this study was to evaluate the effectiveness of the integrated rice-duck-Azolla farming system in enhancing both rice yield and the growth performance of Pekin ducks. The study specifically sought to:

1. Examine Pekin ducks' average daily weight gain and feed conversion efficiency in various farming conditions (with and without access to Azolla and rice fields).
2. To identify the most profitable system, compare the costs and returns of each treatment.
3. Compare the growth and yield performance of rice grown using integrated farming techniques to that of traditional methods.
4. Assess this integrated system's capacity to lower production input costs and raise smallholder farmers' incomes.

Methodology

The study was conducted at Cagayan State University-Gonzaga to evaluate the performance of the integrated rice-duck-Azolla farming system. It involved two main studies:

(Duck Growth)

Seventy-two (72) three-week-old Pekin ducks were assigned to three treatments using a Completely Randomized Design (CRD):

T1: Ducks fed with pure commercial feeds (confined)

T2: Ducks fed with commercial feeds + allowed to graze in rice fields

T3: Ducks fed with commercial feeds + grazing in rice fields with Azolla

The data collected included average daily gain (ADG), feed conversion ratio (FCR), feed cost, and net income.

(Rice Performance)

A rice field was divided into four treatments using a Randomized Complete Block Design (RCBD):

T1: Rice only (no intervention)

T2: Rice + duck

T3: Rice + duck + Azolla

T4: Recommended method (with chemical inputs)

Growth and yield data (plant height, tillers, panicle count, grain yield, etc.) were collected and analyzed statistically.

Key Findings

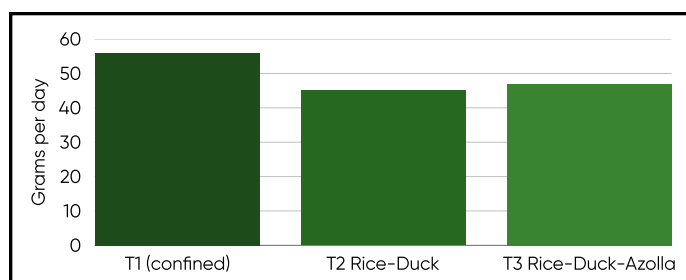


Figure 1. Average Daily Gain (ADG) of Pekin Ducks.

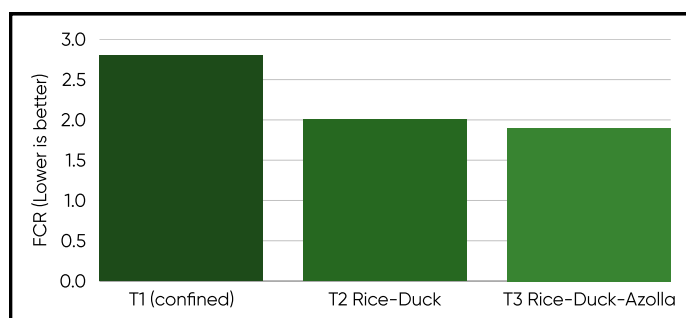


Figure 2. Feed Conversion Ratio (FCR).

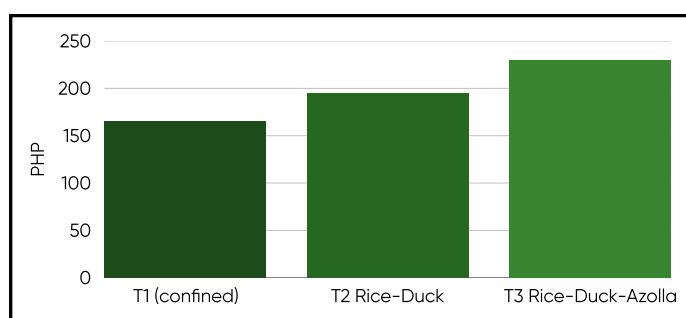


Figure 3. Net Income per Duck.

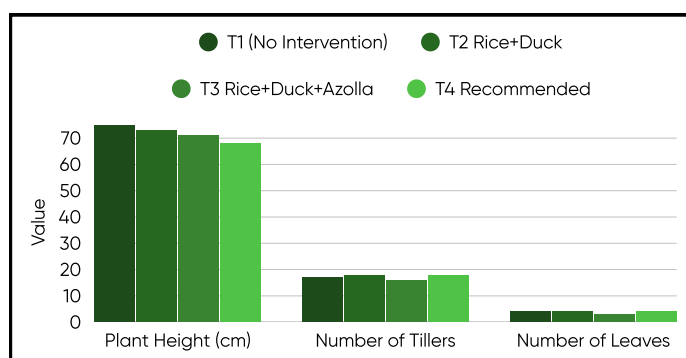


Figure 4. Growth Performance of Rice per Treatment.

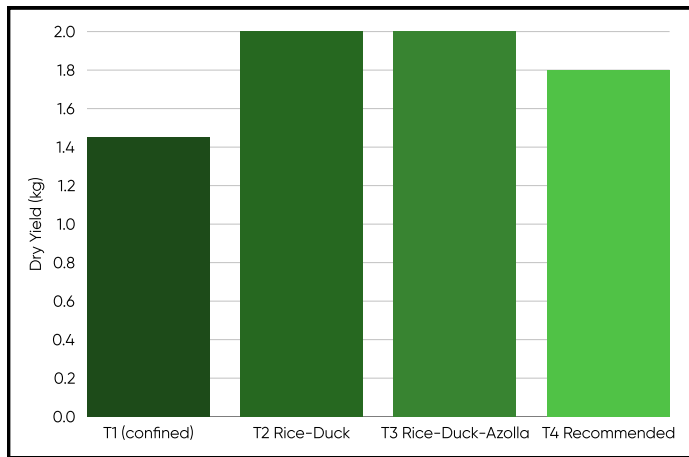


Figure 5. Dry Rice Yield per Treatment.

Out of all the treatments, the integrated rice-duck-Azolla farming system (T3) is the most economical and environmentally friendly.

Conclusions

The study concluded that while confined Pekin ducks (T1) showed the highest weight gain, this method required the most expensive inputs, resulting in the lowest net income. In contrast, the integrated rice-duck (T2) and rice-duck-Azolla (T3) systems proved to be more profitable due to reduced feed costs and the use of natural food sources available in the rice paddies. Among these, the rice-duck-Azolla system (T3) had the most efficient feed conversion and highest overall income.

In addition to offering ecological advantages including weed and pest management and natural fertilization, the integrated systems (T2 and T3) for rice production generated yield outcomes that were on par with or greater than traditional chemical-based methods (T4). This demonstrates that integrating rice, duck, and azolla is a practical, affordable, and sustainable way to enhance duck and rice cultivation, especially for smallholder farmers.

Recommendations

The enclosed system (T1) produced the fastest-growing ducks, but it also cost the most to produce. The optimum balance, however, was provided by T3, which produced the highest net income while lowering the requirement for commercial feeds and chemical inputs while preserving competitive growth in rice and ducks.

Farmers are advised to employ the rice-duck-Azolla integration system for the following reasons:

- By using less feed, fertilizer, and insecticide, it cuts production expenses.
- Ducks enhance soil fertility and rice health by naturally controlling weeds and pests.
- Azolla adds nitrogen to the soil and acts as an extra

high-protein feed.

- The strategy encourages earning money from both duck meat and rice.
- It promotes sustainable agriculture and is eco-friendly.

In order to increase revenue and lessen reliance on pricey chemical inputs, it is advised that government organizations and agricultural institutes assist in the promotion and training of this technique for smallholder rice farmers.

Target Policy Actors and Beneficiaries



References

- Arthur JA. 2013. A study of the consumer market for duck and quail egg products: The case of Chinese Canadians in Vancouver. British Columbia: The University of British Columbia.
- Becker GS. 2008. Livestock feed costs: Concerns and options. Retrieved from <https://nationalaglawcenter.org/wpcontent/uploads/assets/crs/RS22908.pdf>
- Castro N De, Ranola R, Lambio A, Chang HS, Dagaas C, Malabayabas M. 2002. Market prospects of duck eggs and by-products. Paper presented at the 39th PSAS Annual Convention, Cebu City, The Philippines.
- Furuno T. 1996. Significance and practice of integrated rice cultivation and duck farming-sustainable agriculture. Kyushu International Center, Japan International Cooperation Agency, and Kitakyushu Forum on Asian Women, pp. 12.

Editor's Note

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