



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



S&T in Agriculture

Vincent Jim P. Palor, DVM*

Cagayan State University, College of Agriculture, Gonzaga Campus, Gonzaga, Philippines

Corresponding Author: vincentjimpalor@csu.edu.ph

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

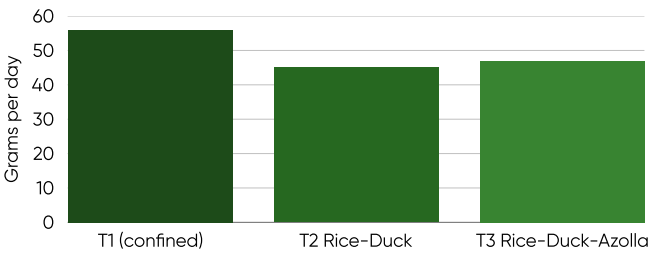


Figure 1. Average Daily Gain (ADG) of Pekin Ducks.

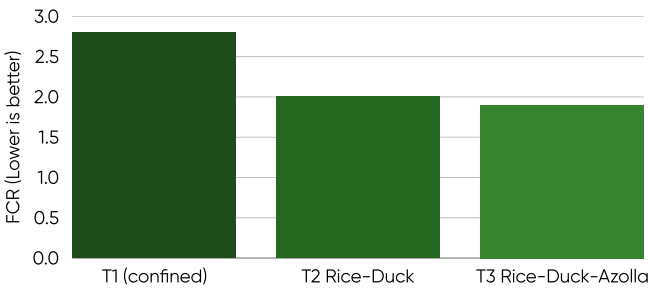


Figure 2. Feed Conversion Ratio (FCR).

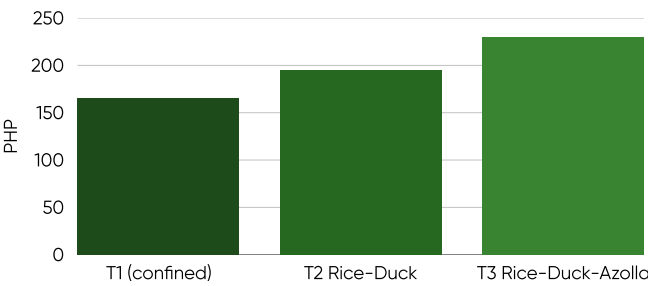


Figure 3. Net Income per Duck.

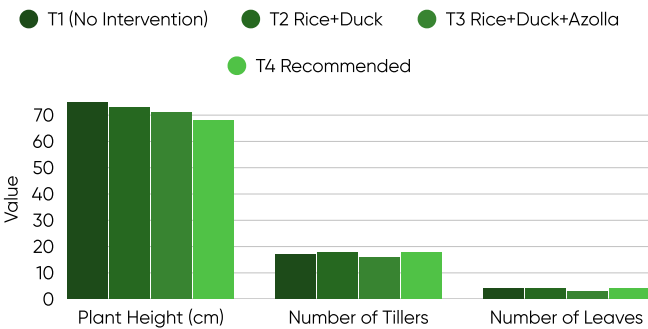


Figure 4. Growth Performance of Rice per Treatment.

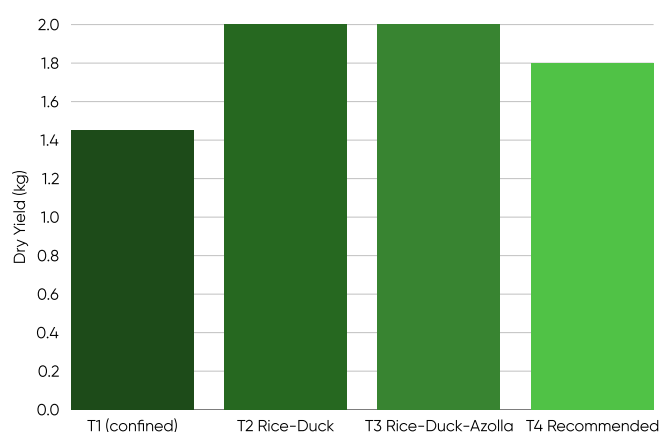


Figure 5. Dry Rice Yield per Treatment.

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, J. A.** (2013). A study of the consumer market for duck and quail egg products: The case of Chinese Canadians in Vancouver, British Columbia (Master's thesis). University of British Columbia.
<https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0073593>
- Becker, G. S.** (2008). Livestock feed costs: Concerns and options (Report No. RS22908). Congressional Research Service.
<https://nationalaglawcenter.org/wp-content/uploads/assets/crs/RS22908.pdf>
- De Castro, N., Ranola, R., Lambio, A., Chang, H. S., Dagaas, C., & Malabayabas, M.** (2002, October). Market prospects of duck eggs and by-products [Paper presentation]. 39th Philippine Society of Animal Science (PSAS) Annual Convention, Cebu City, 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.

Editor's Note

This policy brief is based on results of the CSU-funded project "The Benefits of Pekin Duck-Rice Integrated Farming To Rice Farmers". This project was implemented by the Cagayan State University - Gonzaga Campus. The CSU - Lasam Campus project is composed of Dr. Vincent Jim P. Palor, DVM



About CSU Policy Brief

Our policy brief offers an in-depth analysis of contemporary challenges and opportunities within higher education, with a special focus on the unique context of Cagayan State University. Through rigorous research and stakeholder engagement, we examine key areas such as academic innovation, research advancement, community engagement, and administrative excellence. Each recommendation is carefully developed to foster an environment of growth, equity, and sustainability. **This policy brief is published bi-annually.**

Our approach is built on transparency and inclusiveness. By integrating comprehensive data analysis with practical insights from experts and the broader university community, we ensure that our policy recommendations are not only academically robust but also practically implementable. This process underscores our commitment to creating a positive and lasting impact on the university's future.

The policy brief also serves as a platform for translating research outputs into practical policy insights across six strategic thematic areas including Science and Technology in Agriculture, Natural Resources, Education, Food Science and Chemistry, Public Health and Medicine, and Behavioral and Social Sciences. These areas reflect the university's research priorities and address emerging concerns related to agriculture and livestock, environmental management, teaching and learning, food innovation, clinical diagnostics, and community resilience.

While these publications provide science-based interventions for regional and national development, the analyses and recommendations are those of the authors and do not necessarily represent the official positions of Cagayan State University. Any reproduction, distribution, or citation of this work must acknowledge the author and the CSU Policy Brief.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means without prior permission from Cagayan State University. This Policy Brief is part of the CSU Policy Brief.



Get in touch with us via:

-  facebook.com/csuktmpo
-  csu_ktmooffice@csu.edu.ph
-  csu.org.ph/policybrief



Cagayan State University

Knowledge & Technology Management and Publication Office
RDE Bldg., CSU- Andrews Campus Caritan Sur, Tuguegarao City, Cagayan

Editorial Board

Gilbert C. Magulod Jr., PhD

Editor-in-Chief

Patrianne M. Padua, PhD

Associate Editor-in-Chief

Peer Reviewers

Junel B. Guzman, PhD

Josie Y. Bas-Ong, PhD

Danica B. Ibañez

Arianne Faye D. Perucho, MD

Editorial Staff

Jamaica C. Pedro

Managing Editor

Marcel W. Visitacion

Layout Artist

Technical Staff

Christian Dave E. Columna

IT Technician

Interagency Local Advisory Board

Florentina S. Dumlao, PhD

University Consultant, Cagayan State University

Maria Mercedes Arzadon, PhD

University of the Philippines

Atty. Norman Clarence T. Lasam

Cagayan State University

Engr. Gil Mark S. Hizon

Department of Science and Technology Region II

Emma L. Ballad, PhD

Bureau of Fisheries and Aquatic Resources Region II

Arthur G. Ibañez, PhD, ASEAN Engr.

OIC, Office of the University President



POLICY BRIEF

Cagayan State University
Knowledge & Technology Management and Publication Office



csu.org.ph/policybrief