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A STUDY ON ADAPTIVE STRATEGIES OF DUCK FARMERS IN RESPONSE TO WEATHER -INDUCED FLOOD VARIABILITY IN KERALA WITH SPECIAL REFERENCE TO ALAPPUZHA DISTRICT

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Abstract: Duck farming is a vital livelihood activity in Alappuzha district, Kerala, where the unique ecosystem of backwaters and paddy fields and inherent nature of geography support large-scale production. However, recurrent floods are a threat to the productivity of the sector and the growth of the market supply chains. This study examines the adaptive strategies adopted by duck farmers to cope with flood-induced weather variability. The primary data was collected from 100 randomly selected farmers, and the secondary data was collected from government reports and academic studies. The results of the study show that even though most of the farmers adopt traditional methods to cope with the effects of flood-induced weather variability in the study area, comprehensive policy measures from the part of the government are essential to ensure the productivity and sustainability of the sector.

Keywords: *Duck Farming, Duck Farmers, Floods, Flood-Induced Weather Variability, Weather Variability*.

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Introduction

Changes in the frequency and severity of the weather patterns have significant consequences on biological and human systems. The uncertainties associated with climate changes are increasing over time, and some of them are making farming communities vulnerable to a great extent. Even though extreme weather events like increased temperature, sea level rise, and high precipitation are evident globally, developing countries are particularly affected by their negative shocks.

Floods are one of the most hazardous climate disasters, which can wipe out entire natural elements of Earth as well as human beings. Floods, normal manifestations in the water cycle, result from the heterogeneity that characterizes the location, intensity, and duration of rains over time, being some of the most common extreme phenomena globally (Sili et al., 2020). However, the effect of floods varies in frequency, location, and intensity due to seasonal variations in rainfall. Despite the positive sides of floods, such as improvement of soil quality and recharge of the aquifers and surface water sources, their negative side seriously affects the daily lives of communities in the flood-prone areas.

Since agricultural and farming activities directly depend on climatic conditions, it is the most exposed sector to floods, as it makes significant changes in the productivity of the crops and income of producers, especially subsistence and marginal farmers. In the twenty-first century, heavy rain occurred over most parts of India, and in the future, both temperature and rainfall are projected to increase. The positive correlation between climate-related hazards and the vulnerability of human and natural systems raises some serious questions about the sustainability of the agricultural sector in the country.

Even though the State of Kerala, compared to other states, lies closer to the equator, it is flourishing with pleasant and equable climates throughout the year. In Kerala, in the district of Alappuzha which is characterized by rivers and river basins, duck farming is an important farming activity for many farmers. Alapuzha district is very famous for backwaters and canals and also known as “Venice of East” and its geographical conditions support duck rearing, as they are easy to manage, less hazardous, and have greater disease resistance than other feathered poultry creatures. However, changes in the weather conditions have significantly affected Kerala's livestock production and productivity, including duck farming, negatively, especially in the

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rural parts of the state. Frequent monsoon-induced floods threaten the continuity and productivity of this practice and many of the farmers are suffering from financial and marketing risks.

Statement of the Problem

The Alappuzha district of Kerala, which is endowed with backwaters and paddy fields, supports a thriving duck farming sector that contributes significantly to rural livelihoods of many farmers. However, recurrent flood events which intensified by climate variability, have emerged as a major threat to the sustainability of this sector. Despite the sector's economic and cultural importance, duck farmers in flood-prone areas face several problems which are hindering the proper growth of the sector.

Objectives

The main objectives of the study are,

1. To examine the adaptive strategies of duck farmers in response to flood-induced weather variability in Kerala.

2. To suggest policy recommendations for enhancing the sustainability in the duck farming sector in flood-prone areas.

Methodology

The present study was conducted in Alappuzha district of Kerala, a region highly prone to flood events. A sample of 100 duck farmers selected from the study area using the random sampling method. Primary data were collected from duck farmers using a structured questionnaire and secondary data sources were government reports, published academic articles, and research studies.

Results and Discussion

Experience in Duck Farming

Experience in farming has a significant impact on how the farmer manages his farming activity, base his production decision and how he reacts to market shocks. Table 1 shows the farming experience of duck farmers in Alappuzha district.

Table 1: Experience in Duck Farming

Experience in Duck Farming	Percentage of Respondents
Less than 10 years	19
10 - 20 years	39
More than 20 years	42

Source: Primary Data

The collected data shows that around 42% of the farmers have been doing duck rearing for over 20 years. This long-term involvement in farming indicates practical knowledge of the farmers over the years about disease management, changing seasons and market fluctuations.

Another 39% have been in this field for 10 to 20 years and only 19% have less than 10 years of experience. This is a clear signal of limited entry of new participants into the sector. This trend could be either because of lack of interest among youngsters or because of perceived shocks associated with duck farming practices, particularly in the flood-prone areas of Kerala.

Duck Farming System

The choice of farming system significantly influences the productivity, cost structure, decision making and overall sustainability of duck farming. The data regarding farming practice of duck farmers is given in the following table.

Table 2: Duck Farming System

Duck Farming System	Percentage of Respondents
Semi - Intensive System	81
Intensive System	13
Free-Range System	6

Source: Primary Data

The data shows that a substantial 81% of farmers rear ducks using the semi-intensive system. This farming system is a combination of controlled feeding with open scavenging in paddy fields. The shelter has easy access to outside run as the ducks prefer to be outdoors during the day time even during winter or monsoons. The system is very much suitable for districts like Alappuzha due to its geographical characteristics and availability of paddy fields.

Around 13% of farmers reported practicing intensive farming where ducks are reared in enclosed spaces. Even though the system has advantages such as disease control, better hygiene and production potential, it requires a high amount of investment in infrastructure and inputs.

Another farming system is free-range, in which birds roam freely and depend entirely on natural resources. Only 6% of the respondents follow a free-range system in the study area. The system exposes ducks to greater risks, including predation, disease, and inconsistent nutrition.

Severity of Flood Impact

The study area is characterized by low-lying and water logged geographical features. Therefore, floods pose a significant threat to the duck farming sector in the region. The table shows the severity of flood impact in the study area.

Table 3: Severity of Flood Impact

Severity of Flood Impact	Percentage of Respondents
Severe	48
Moderate	41
Mild	11

Source: Primary Data

The collected data shows that 48% of the farmers are struggling with severe flood, and their farming operations are disturbed with extensive damage to shelters, increased mortality of flocks and temporary closure of duck product sale.

An additional 41% of farmers reported a moderate impact, but still they experienced a significant amount of loss. The remaining 11% faced only a mild impact due to the geographical advantages within the district that minimized flood exposure.

Adaptive Strategies of Duck Farmers

In response to the flood-induced weather variability, duck farmers in the study area have adopted various adaptive strategies to safeguard their flocks.

Table 4: Adaptive Strategies of Duck Farmers

Adaptive Strategies of Duck Farmers	**Percentage of Respondents**
Improved Shelters	64
Relocation of Flocks	20
Adjustment in Feeding	16

Source: Primary Data

A significant proportion of farmers (64%) reported making improvements to their shelters, such as raising the floor level and maintenance of cages to continue their farming operations.

Another 20% of farmers opted to relocate their flocks temporarily during flood events. They moved the birds to safer locations of neighbouring districts to avoid potential mortality.

Meanwhile, 16% of the respondents coped with flooding by adjusting their feeding practices. They provide commercial feed or shift their birds to nearby unaffected areas where natural scavenging was available.

Policy Recommendations for Enhancing the Sustainability of Duck Farming in Flood-Prone Areas

- To strengthen the sustainability of duck farming in flood-prone areas, several measures can be considered.
- The government should provide subsidies or financial assistance to duck farmers to build flood-resistant shelters or duck houses. Then farmers can relocate their flocks quickly when floodwaters rise.
- Livestock insurance schemes will act like a safety net, ensuring that farmers are not left without resources after disasters. Additionally, rapid response systems such as mobile veterinary units and emergency feed supply networks should be provided to ensure the productivity of the duck farming sector during flood seasons.
- Formation of farmer cooperatives could help farmers to ensure high sales volume in local markets, affordable feed and veterinary care.
- Provision of credit facilities and low-interest loans for flood-affected duck farmers would help them restart their farming operations without falling into debts.

Conclusion

Biological diversity is the basis and foundation of life and well-being of humankind. The geographic settings of Kerala are much different from other states of India due to the inherent nature of its geography and climatic conditions. Over the years, the state lost much of its green cover due to heavy rainfall and floods. Additionally, this flood-induced weather variability poses a big threat to the livestock sector, including duck farming, especially for small and marginal farmers. So the government should take appropriate measures to reduce flood-related risks and ensure the productivity and sustainability of the sector.

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