



Sustainable Duck farming in Kuttanad Wetland Ecosystem: Constraints and Solutions from an Environmental perspective

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ABSTRACT

Duck farming being a traditional farming system draws in attention in terms of its resource recycling mechanisms and environmental interaction. The crucial aspects of sustainability of duck farming was analysed by Delphi analysis IN KWLES area of KERALA. The constraints affecting the environmental sustainability of duck farming system identified were the practical difficulty in the safe disposal of the dead birds at the time of disease outbreak and death, lack of scientific waste management practices at selling and slaughter points, improper management of duck farm excreta and pollution of water bodies due to foraging flocks. Awareness programmes for farmers on scientific waste management along with initiatives to establish bio-waste management units was suggested as solutions. To prevent pollution from slaughter units and farms, licensing and regulation of these units and establishing organized selling points were recommended in addition to regulate the use of water bodies for duck movement and by practicing bio-waste management procedures. Chemical pollution of foraging paddy fields can be controlled by strict licensing of the sale of chemical pesticides and fertilizers, regulating their use and by promoting organic farming.

Key Words: Duck farming, Environmental sustainability, Pollution, Delphi analysis.

INTRODUCTION

Kuttanad wetland ecosystem (KWLES) is rich in biodiversity and contributes to livelihood needs of various agrarian communities. It's spread over three districts of Kerala, Alappuzha, Kottayam and Pathanamthitta. However, it's ecological sustainability is affected by various anthropogenic activities including development projects (Sreejith, 2013). A sustainable food system refers to chain of activities encompassing all aspects of food production starting from pre- production activities and moving up to the consumer end ensuring sustainability in all facets. A system which is profitable throughout, contributing to societal benefits and having a neutral or positive impact on

the environment may be considered as a sustainable one. Duck farming in Kuttanad has to satisfy these social, economic and environmental sustainability aspects to be identified as a sustainable system. Like in many other Asian countries, duck farming here follows trans-human nomadic pastoralism. Unlike the static agricultural or animal husbandry activities for food production, involvement of a moving flock put forth many challenges with regards to the environmental viability of this enterprise. The rice duck farming system has proven it's efficacy in terms of ecological cost and economic income(Long *et al*, 2013).The inbuilt natural interactions, even though contribute highly to the resource recycling, present itself with vulnerability from various sources.

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Table 1. Constraints of duck farming towards environmental sustainability and their solutions.

S	Environmental	
1.	Difficulty in disposing dead birds during outbreaks has been an unresolved constraint	Public burial grounds Government incinerator Waste management system by government
2.	Lack of scientific waste management practices at selling points of live as well as slaughtered birds which are usually public places	Establishing Scientific waste management system Regulation and licensing of selling and slaughter points Organized marketing units
3.	Pollution of water bodies due to foraging duck flocks	Regulation of duck movement in water bodies Implementing farmer awareness programmes
4.	Environmental pollution due to duck farm excreta	Conversion into bio fertilizer Licensing of farms
5.	Chemical pollution of paddy fields used as foraging fields cause health issues in ducks	Promotion of organic farming Regulating the use of chemicals and pesticides Licensed sale of chemical fertilizers
6.	Changed natural water flow of Kuttanad has affected the growth of fresh water fishes and snails that are natural food items of foraging ducks	Promoting Integrated farming Promoting organic farming

The farmers, consumers, environmental activists, policy makers and other stake holders, all have to play pivotal role in regulating the environmental interactions of duck farming enterprises. With this objective, a qualitative research approach has been followed to analyse the constraints to environmental sustainability and solutions for same, seeking expert opinions from all the stakeholders.

MATERIALS AND METHODS

Alappuzha, being the district with highest duck population (livestock census, 2012), it was purposively selected for the study. Multistage random sampling was adopted for further selection of the responding panelists. Since parts of both upper and lower Kuttanad regions fall in Alappuzha district, the panchayaths where duck rearing is predominant in both Lower and Upper Kuttanad regions were initially listed. A panel of 30 respondents was identified. This panel comprised of representatives of various stakeholders of duck farming in Kuttanad region such as veterinary

surgeons, farmers, office bearers of farmers unions of the area, officers of Government duck farm, representatives of NGOs and environmental activists. A three stage Delphi analysis was carried out to identify the sustainability issues and their solutions thereof. These solutions were evolved through the anonymous interaction among the panelists during the data collection procedure.

RESULTS AND DISCUSSION

The constraint affecting the environmental sustainability of duck farming system identified were the practical difficulty in the safe disposal of the dead birds at the time disease outbreak and death, lack of scientific waste management practices at selling and slaughter points, improper management of duck farm excreta and pollution of water bodies due to foraging flocks. The contents of Teng *et al* (2019) study reported in the lake areas of Shanghai regarding agriculture diffuse pollution using foraging duck flocks can be effectively used in Kuttanad too. It was suggested that for

disposing dead birds during outbreak public burial grounds must be made available besides setting up incinerators. Awareness programmes for farmers on scientific waste management along with initiatives to establish bio-waste management units was also suggested. These were in line with the findings of Muralikrishna and Krishnankutty (2020) during their study on constraints faced by Kerala farmers in controlling environmental pollution. They also suggested awareness creation among farmers to overcome the difficulties of scientific waste management and resource recycling.

To prevent pollution from slaughter units and farms, licensing and regulation of these units and establishing organized selling points were recommended. The constraint of water pollution due to foraging flocks as well as due to improper bio-waste management can be solved according to the panel by regulating the use of water bodies for duck movement and by practicing bio-waste management procedures. So also according to the panellists, chemical pollution of foraging paddy fields can be controlled by strict licensing of the sale of chemical pesticides and fertilizers, regulating their use and by promoting organic farming.

The pollution of paddy fields and water bodies of Kuttanad began as an after-effect of constructing Thottappaly spillway and Tanneermukam bund. These structures have hindered the natural water flow of the region. Thottappaly spillway though has prevented flooding of Kuttanad it has affected the natural process of flushing the pollutants out during rainy season. Similarly, the Tanneermukam bund has disrupted the harmony of sea and fresh water since it prevented sea water inundation during the summer season that would have again flushed pollutants out. Among scores of pollutants there is duck farm waste too. Duck farmers have been facing local ill-will in this regard. Hence, safe and scientific waste disposal practices must be introduced. Converting farm and slaughter waste into bio-fertilizer for use in agriculture need to be propagated at the aegies of LSGs so that waste is dealt with at source itself. In

the above circumstance, to facilitate a better control of the situation, regulation through licensing of farms, slaughter houses and the connected selling outlets must be made mandatory. FAO (2010) also reported that a change in the pollution status and its environmental ill effects was observed when strict monitoring and control measures were taken to control the activities in and around water bodies and also to control the waste discharge to the water bodies. Bonny and Vijayaragavan (2001) opined, to cater the needs of sustainable agriculture the extension system had to change its focus from economic and technological aspects to a more educational approach. Incorporating the sustainable practices to the now followed traditional one might improve the acceptance.

CONCLUSION

The stakeholder consensus on constraints for environmental sustainability brought about a comprehensive list of those practices to be stopped, that can continue and to be taken up afresh. A full-fledged disaster management mechanism with all infrastructures must be in place to work in tandem with stakeholders to contain any calamity.

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