

# Farmers' Behaviour in Applying Advanced Farming Technology

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**Abstract:** This article purposed to analyze the farmer's behaviour to apply advanced farming technology in the order to solve the gaps and improve quality control at the farm level. The survey conducted in An Giang province of the MRD to discuss the farmers' behavior and willingness to improve their farming practices towards the advanced farming technology. The data collection was taken up by conducting a survey of 100 farmers (50 traditional farmers and 50 fish cooperative members). Chau Phu district of An Giang province is selected to do a survey due to Chau Phu district was one of the early adopters of Pangasius pond aquaculture. Hence, this district has a large number of Pangasius ponds, many that have been in use for over 15 years. By choosing an established area like this, there is an opportunity to evaluate potentially more established and stabilized farming practices. The gaps analysis showed differences in farming practices between the traditional farming system and the advanced farming technology including farming production factors such as fingerlings, feeds, and veterinary drugs for fish disease treatment and fish culture conditions such as waste-water treatment system. The advanced farming technology fulfilled the requirements with respect to quality and safety such as certified fingerlings, industrial feeds, waste-water treatment system and proper disease treatment. Based on the analysis, the question how small-scale farmers can improve their practice and satisfy the quality requirements is answered.

**Key words:** farmers' behaviour, advanced farming technology, fish culture

## I. INTRODUCTION

In the context of international integration, fish export activities bring a lot of opportunities for the developing countries. The EU is the main export market for Pangasius from Vietnam, with one third of imports in quantity and 40% in value terms. Within the EU, Spain is the biggest market. Demand usually increases every year. Aqua-cultured fish is one of the dominant export products in Vietnam. The development of this sector is a major source of foreign currency and employment. The success of the sector encourages both local and foreign investment. Quality control at the farm level focuses on the biological and human activities for producing fish with certain intrinsic and extrinsic attributes). Quality assurance at the chain focuses on the chain actors' responsibilities for dovetailing several activities within the supply chain in order to deliver the quality that consumers desired. Quality management includes quality control and quality assurance that covers both biological management of the produce as well as human management of activities.

This paper focuses on the key dimension namely production technology and quality control at the farm level. This

dimension concerns technology and quality control, process control with respect to quality. The technological dimension relates to primary processes and the knowledge base with respect to dealing with fingerlings, feeds, water supply, and veterinary drugs that related to fish disease treatment. As the result, fish safety is achieved by improving the farmers' behaviour on how to apply advanced farming technology to control the agents of food-borne illness and reduce the occurrence of hazards that result in morbidity and mortality of fish.

## II. LITERATURE REVIEW

Rogers (1995) indicated the Diffusion of Innovation (DOI) Theory. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. Adoption of a new idea, behavior, or product (i.e., "innovation") does not happen simultaneously in a social system; rather it is a process whereby some people are more apt to adopt the innovation than others. When promoting an innovation to a target population, it is important to understand the characteristics of the target population that will help or hinder adoption of the innovation. This theoretical framework was applying to farmer's behavior in applying advanced farming technology for improving fish quality.

Food quality management is complicated because it involves the complex characteristics of food raw material due to variability, restricted shelf life and the large range of chemical, physical and microbial processes used. The food supply chain management is also complex and consists of a large number of linkages. Moreover, many stakeholders are involved in production operations along the food supply chain. Hence, human behaviour plays a crucial role due to unpredictable and changeable handling. As a result, the combination of individual actions striving for food quality is much more uncertain. Luning (2002) proposed the techno-managerial approach for food quality management as a way to analyze and solve the complex quality issues (see figure 1). Both the use of technology to understand behaviour of living materials and the use of managerial sciences to understand human behaviour is needed. Hence, both technological aspects (i.e. food characteristics and technological conditions) and managerial aspects (i.e. human behavior and administrative conditions) should be managed in order to improve food quality products.

Quality control at the farm level refers to the primary activities aiming to fulfill quality requirements. In this part,

we will look into how the small farmers access and apply the required technologies for *Pangasius* quality control. Good farming system is defined as those practices of the aquaculture sector that are necessary to produce quality food products conforming to food laws and regulations (Reilly *et al.*, 1997). The main primary activities that need to be controlled in one fish production cycle include site selection, design and construction, preparation and cleaning, fingerlings and fingerling stocking, feeds and feeding, water supply management, fish health management, and harvesting. The discussion for empirical study will be based on these elements of fish culture cycle.

### III. FARMER' BEHAVIOUR TO APPLY ADVANCED FARMING TECHNOLOGY

The data analysis showed that fish farmers could get better profits and market access by adopting the whole package of advanced farming technology. This section identified which factors in the advanced production system, which may influence farmers' behavior to adopt it. The survey results revealed that a large of farmers who considered themselves having capability to operate the whole package of advanced production system (Table 1).

Table 1: Assessment of advanced farming technology

Items (%) Farmers		Capability to operate advanced system	Unattainable farming practice			
			Certified fingerlings	Certified industrial feeds	Waste-water treatment pond	Certified drugs
Traditional farmers (N=50)	Yes	30.0	-	-	-	-
	No	50.0	60.0	48.0	72.0	32.0
	No opinion	20.0	60.0	50.0	70.0	40.0
Advanced farmers (N=50)	Yes	60.0	-	-	-	-
	No	30.0	66.7	53.3	73.3	33.
	No opinion	10.0	60.0	50.0	80.0	20

Source: Survey results, 2019

Information on Table 1 shows that for the farmers who said no about capability to operate this advanced production system, we rank the frequency of answer in order to see which items they are unacceptable. The results revealed that traditional farmers have the same ranking with advanced farmers. They rank waste-water treatment ponds as the first, second ranking is certified fingerlings, certified industrial feeds and certified veterinary drugs are the third and fourth ranking, respectively.

On the other hand, there are 10 traditional farmers and 5 advanced farmers who said no opinion about this advanced production system because they lacked the image of the package. They also revealed the ranking of unacceptable items in this package as (I) waste-water treatment pond; (II) certified fingerlings; (III) certified feeds; and (IV) certified veterinary drugs. For this group, they need more information and see the efficiency of conducting these items before making decision to adopt or not.

### IV. CONCLUSION

Integrated fish farmers into integrated export supply chain faces many challenges. It is necessary to change farmers' behaviour to apply advanced farming technology. The correlation between five items (fingerlings, stocking density, feeds, waste-water treatment pond and veterinary drugs used) in advanced production system by computing Cronbach's alpha. The results show that cronbach's alpha is higher than 0.7 for all cases. This confirms that these questions have high reliability. More consistent supplies and better application of major inputs such as fingerlings, feed, and veterinary

services, and an improvement of fish quality can be achieved when cooperation among input suppliers, output processors/exporters, and farmers improves. Fish farmers may be compelled to apply advanced farming culture properly if they know that they would be rewarded for it. This means that processing/export firms should be willing to pay for quality. The results also show that fish farmers' position in the supply chain is compromised by lack of price information and interlocked fish markets

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