

REALITY AND FACTORS AFFECTING THE HIGH-TECH APPLICATION BEHAVIOR OF HOUSEHOLDS IN SHUTCHI CATFISH FARMING IN CAN THO CITY

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Abstract

The study aims to analyze the reality and factors impacting the high-tech application behaviors of households in shutchi catfish farming in Can Tho city. This is basis for proposals and recommendations to local authorities in order to enhance the effectiveness of promoting factors of high-tech application in the city's shutchi catfish farming.

Keywords: *Application, High technology, impacting factors, Can Tho city.*

1. Introduction

Can Tho city is one of the top provinces with largest farming area of shutchi catfish in the Mekong Delta. The areas with large farming scale of shutchi catfish of the City include Thot Not district; Co Do district; Vinh Thanh district; in which Thot Not district specially has 360 ha. By 2020, Can Tho city has applied new science and technology in the field of shutchi catfish farming; particularly in building a concentrated area of shutchi catfish rearing and farming in accordance with the farming planning; in processing stage; has continued to promote the development of shutchi catfish farming for export. This, thereby, contributes to rational and effective use of natural resources, increases the proportion of the fishery industry, and at the same time improves incomes of people involved in the industry.

However, in general, the application of high technology in shutchi catfish farming of households in Can Tho city has not been well implemented, still use manual labor in some stages while that can be replaced by mechanization to increase productivity. The question is, how to promote the application of high technology in shutchi catfish farming? This study aims to analyze and clarify the reality and elements affecting the application behavior of shutchi catfish farming households in Can Tho city.

2. Method

2.1. Data collection method

The study conducted a survey of 120 shutchi catfish farming households in some districts of the city, including Thot Not, Co Do, Vinh Thanh, in order to collect qualitative and quantitative information on the behavior of high technology application in shutchi catfish farming as well as effectiveness of the application (the survey took place from 15th

to 25th October, 2020). The farming households were randomly selected according to the list provided to the research team by the local government of the districts.

2.2. Analytical method

The study collected information from shutchi catfish farming households and analyzed, processed the survey results. The study applied the Independent-sample T-Test model to analyze the relationship between high-tech application behavior (dependant variable, with nominal scale) with independent variables such as number of years of experience, area, age, educational background (with proportion scale). On the basis of analyzing this relationship, the study established a logistic regression model to test the factors impacting high-tech application behavior in shutchi catfish farming of households in Can Tho city. Based on the analysis of qualitative data from in-depth interviews, the study determined a logistic regression model with the following independent variables:

Table 1. Logistic regression model with independent variables

Variables	Explanation	Sources
Age	Measured by age	Syntherized from qualitative research
Experience	Measured by number of farming years	
Area	Measured by farming area (m2)	
Social capital:		
+ Local government support	+ Measured by local support (yes/no)	
+ Government training	+ Measured by number of training sessions per year	
+ Business training	+ Measured by number of training sessions per year	
Educational background	Measured by number of schooling years	

(Source: Author syntherized from in-depth interviews)

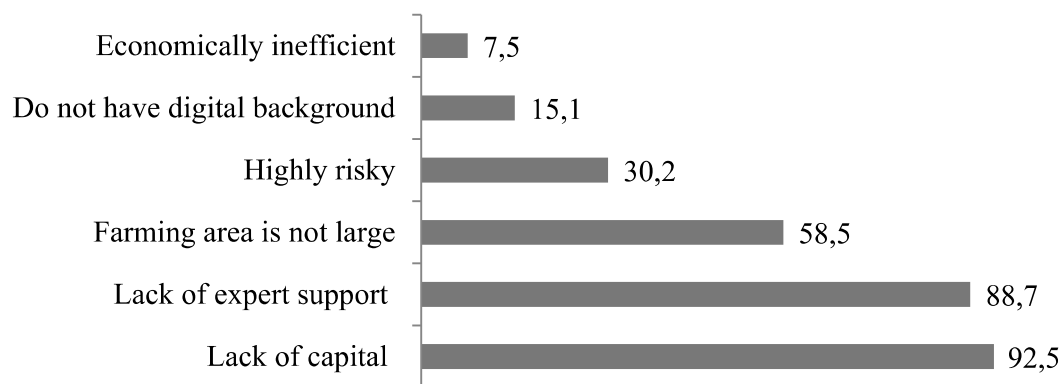
3. Result

3.1. Reality of farming households' high-tech application in shutchi catfish farming

The survey results of 120 shutchi catfish farming households in Can Tho city showed that 71 households, accounting for 59.2% of the total surveyed subjects, said that they have applied high technology in shutchi catfish farming while the 40,8% remaining said the opposite (the reason of not application is shown in Table 1; in which, the lack of capital and

the support of experts accounts for the highest proportion and economically inefficient accounts for the lowest one).

Figure 1. Reason of not applying high technology in shutchi catfish farming (%)



(Source: Results of author's survey, 2020)

For households those apply high technology to the process of raising catfish, the survey result shows that the application of high technology to water treatment accounts for the highest proportion, followed by raising/caring techniques and the lowest is to stage of food processing. This proves that water plays an important role in shutchi catfish farming. Also, previous studies show that water management techniques for shutchi catfish farming have not been advanced while water demand changes with each period of farming.¹⁰⁶

Table 2. Farming households apply high technology to stages of shutchi catfish farming

Stage	Number (out of 71)	Proportion (%)
Water treatment	69	97.2
Fish caring/raising	50	70.4
Preventice/cure diseases	46	64.8
Food processing	43	60.6
Harvest and storage	41	57.8

(Source: Results of author's survey, 2020)

¹⁰⁶ Nguyen Thanh Phuong and Nguyen Anh Tuan (2016), Shutchi catfish farming in the Mekong Delta: success and challenges for sustainable development, Agriculture Publishing House, Hanoi, p.78.

Previously, farmers took care of, processed food and prevented diseases for shutchi catfish mainly by traditional methods or through accumulated experience, but now, some farming households have applied high technology. This does not only help fish grow quickly but also reduce costs, increase productivity and ensure quality. The survey results show that the average productivity of shutchi catfish farming before applying high technology is 306.3 tons/ha/year and increase 50.87 tons/ha/year after applying high technology, making average productivity to 357tons/ha/year. Also, the cost of investments also decreased from 2.4 million VND/kg/crop of fish farming to 2 million VND/kg/crop.

Income is one of the criteria to evaluate the effectiveness of high-tech application in shutchi catfish farming. The average income of shutchi catfish farming households is about 34.4 million VND/ha/crop. In which, the households those apply high technology have an average income of about 45.9 million VND/crop/ha, much higher than those do not (17.6 million VND/crop/ha). In addition, the study also shows that the income gap is very clear between the 20% of the top income group and the 20% of the bottom income group, about 4.5 times. In which, 92% the lowest income group do not apply high technology in shutchi catfish farming and 8.0% of those do; meanwhile, 100% of households applying high technology belong to the highest income group (see table 3).

Table 3. Income distribution of households applying high technology in shutchi catfish farming (%)

	Apply	Not apply	Total
Group 1 (lowest)	92.0	8.0	100.0
Group 2	90.9	9.1	100.0
Group 3	27.3	72.7	100.0
Group 4	0.0	100.0	100.0
Group 5 (highest)	0,0	100	100.0
Total	40.8	59.2	100.0

(Source: Results of author's survey, 2020)

Thus, the application of high technology in shutchi catfish farming has brought many benefits to farmers in Can Tho city. However, the number of households that do not apply high technology in shutchi catfish farming is still quite high.

3.2. Factors impacting households' behaviors of high-tech application in shutchi catfish farming

The reality from the survey results shows that there is still a fairly high percentage of households in Can Tho city that have not yet applied high technology in shutchi catfish

farming. In order to have practical solutions to promote the application of high technology in shutchi catfish farming, the study analyzes the factors impacting the behavior of high-tech application of households in shutchi catfish farming in the city.

To evaluate the factors, the study analyzed logistic regression model with 7 independent variables. As shown in data table 4. The model with a value of -2 Log likelihood = 27,336 shows that this model is suitable, allowing the analysis to clarify the relationship between independent variables and high-tech application behaviors of households in shutchi catfish farming in Can Tho city.

Table 4. Model of factors affecting the high-tech application behavior of households in shutchi catfish farming in Can Tho city

Variables	Coefficient B	Exp (B)	Statistical significance	Confidence interval 95%	
				Lower	Upper
Constant	-2.656	0.070	0.001		
1.Area	1.357(***)	3.884	0.001	1.270	2.680
2.Number of farming years	-0.477(**)	0.621	0.015	0.904	1.926
3.Educational background	0.847(**)	2.333	0.041	1.018	2.372
4.Local government support	0.478(**)	1.612	0.036	0.230	1.032
5.Number of local authority's training sessions	0.695(**)	2.003	0.016	0.426	189.068
6. Expert support	0.639	1.894	0.185	0.001	3.451
7. Business support	1.019	2.769	0.480	0.164	46.750
-2 Log likelihood = 27.336; N=120					
(***), (**): Statistical significance 1%, 5%					

(Source: Results of author's survey, 2020)

As for the variable on area, the survey results show that the average area of shutchi catfish farming households is about 46,865m²; of which, households with high technology application in shutchi catfish farming have the average area is about 60,735 m², 3 times higher than that of households without high-tech application. To illustrate this difference, the data in Table 6 show that, if the pond area is increased to 1000m², the ability of households to apply high technology is also 3.9 times higher. Obviously, farming area is one of the factors affecting the decision of households to implement high-tech application behavior in shutchi catfish farming. This is explained that, if the pond area is expanded while

fish is still raised by traditional methods, the households cannot guarantee the handling of problems such as water treatment, care, harvesting and preservation. . Furthermore, traditional farming leads to high investment costs.

As for the variable on farming years (experience), the survey results show that households applying high technology in pangasius farming have an average of 6.28 years of farming, 1.84 years lower than households without application. The question is, how does the number of farming years affect the households' decision to apply high technology in shutchi catfish farming? And the results in Table 6 show that the number of farming years has a negative relationship with the decision to apply high technology. It means fewer years of fish farming the household have, the higher possibility they apply high technology in fish farming. The reason is, households with many years of shutchi catfish farming often use and believe in their experience in handling problems that occur during fish farming. Indeed, it is good to use experience in shutchi catfish farming, but in the current situation, the competitiveness in terms of quality, price as well as the harshness of the environment (water source, climate) make empirical fish farming no longer suitable, difficult to compete as well as create an increased risk of disease.

As for the variable on local government support, this is the variable that represents the relationship between local government and farmers. The results in Table 4 show that, if households receive support from local government, the ability to apply high technology in fish farming is 1.6 times. This finding further strengthens the relationship between local support and farmer behavior in performing livelihood activities. In fact, local authorities have supported many activities such as connecting farmers with banks and credit funds for capital access; with scientists and technicians for activities of training fish farming techniques, supporting disease treatment, and controlling water sources.

As for the variable on local authority's training, in recent years, local authorities have regularly trained farmers on techniques of shutchi catfish farming. As a result, households have advantages in applying high technology to shutchi catfish farming. The regression model in Table 6 shows that, if the session number of local training in shutchi catfish farming techniques is increased by one time, the ability to apply high technology in shutchi catfish farming will double.

As for the variable on business and expert support, although the results in Table 6 show that the support of enterprises and experts increases the ability to apply high technology in shutchi catfish farming; however, the level of statistical significance shows the value of $p > 0.05$; therefore the study cannot conclude the influence of these two variables.

4. Conclusion and recommendations

4.1. Conclusion

In recent years, farmers of the surveyed localities in Can Tho city have applied high technology in shutchi catfish farming. Farmers often apply high technology in stages such as fish care/raising, water treatment, harvesting and preservation. High technology application in shutchi catfish farming has brought many benefits to farmers in the surveyed localities in Can Tho city. High technology application helps to reduce costs, increase productivity and farmers' income. However, there is still a high percentage of households participating in the survey that have not yet applied high technology in shutchi catfish farming due to lack of capital, limited educational background and they have not known the benefits of high technology application in shutchi catfish farming.

Regarding the factors impacting the behavior of applying high technology in shutchi catfish farming, the study has shown that the behavior of applying high technology in shutchi catfish farming is influenced by many factors. These are pond area, number of farming years (experience), educational background, local authority support, participation in training sessions organized by local authorities. The factors have a positive relationship with the behavior of applying high technology in shutchi catfish farming, only the variable on shutchi catfish farming experience has a negative relationship. This is one of the important bases for researching a number of recommendations which encourage farmers to apply high technology in shutchi catfish farming in Can Tho city in the coming time.

4.2. Recommendations

On the basis of analyzing the factors affecting the behavior of high-tech application in shutchi catfish farming, the study suggests some recommendations as below:

Firstly, plan the appropriate pond area. To do this, local authorities need to develop plan for every single stage of shutchi catfish farming and provide information about this plan fully and publicly; encourage farming households to participate in cooperation to expand the area of farming ponds under the direction of local authorities; guide shutchi catfish farming households to expand their farming pond area based on specific local conditions.

Secondly, improve human capital. It is necessary to improve farmers' educational background in order to access information and easily absorb shutchi catfish farming techniques; strengthen training in fish farming techniques according to modern methods so that farmers can effectively apply them to the farming process; encourage farmers to change traditional and manual farming methods into modern ones with high technology application in order to contribute to improving the value chain of the local shutchi catfish industry.

Thirdly, improve social capital. The government needs to timely support people when they face difficulties in accessing capital and technical resources; strengthen and overcome limitations in cooperation, develop production models in groups, and replicate the effectively cooperative model of shutchi catfish farming in the community of farming household.

5. References

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