IMPACTS FROM FARMER FIELD SCHOOL (FFS) TO APPLICATION ON AGRICULTURAL PRODUCTION IN HAU GIANG PROVINCE

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Abstract

The Farmer Field School - FFS about crop composition conversion on rice land in Hau Giang province was organized to provide farmers with practical knowledge and to introduce new technologies. The purpose of this research is to measure the results of the FFS training course as well as to evaluate the improvements and new technique applied by the farmers after the course. Research results show that after the course, the farmers' relevant knowledge had been improved significantly with α=5%. It also shows that after the course, the cost of growing rice has been lowered as compared to that before the farmers joined the course. In addition, profit from growing rice is also higher after the farmers participated in the training course. When comparing profit margins, the research finds out that profit margin earned by farmers who participated in the training course is higher than the profit margin earned by farmers who didn't. However, after FFS training course, only few farmers conversed their crop composition into 2 crops of rice and 1 non-rice crop a year as recommended by FFS facilitators during the training course.

Keywords: *conversion, FFS, farmer, impact, training*

1. INTRODUCTION

Crop diversification instead of rice monoculture is the key solution to the current situation of the Mekong Delta which is the bowl rice of Vietnam (DCP, 2013). This is considered an effective solution to rice farmers with the fact that the increase in rice yield year over year doesn't mean more profits for farmers. Moreover, bad impacts from climate change, more yield loss caused by pests, bad impacts from saline intrusion, droughts etc. are some among many reasons that lead to the need of effective and suitable conversion of crop composition on rice-land.

FFS - a group-based learning process aims at helping the farmers to effectively converse their crop composition through new technology transfer and on-site experiment and practice. FFS is well-known for effectively transferring technology, encouraging agricultural production and new technology application, enhancing the capability of farmers and officers specializing on agriculture at different levels (Tin and Cuc, 2016). Trainees are farmers who are different from age, education, background, and experience in agricultural production. The true value of FFS is that after the training the farmers are more willing to apply new technologies and to converse their crop composition effectively. This is the key to encourage more and more farmers to converse crop composition to yield higher profit from agricultural production. However, what are the real impacts of FFS and how to maintain these impacts as well as how to bring FFS approach to more and more farmers - these questions remains unclear. Therefore, this research was carried out to evaluate the impacts of FFS about crop composition conversion on rice land in Hau Giang province.

2. MEANS AND RESEARCH METHODS

2.1 Data collection methods

The research studied FFS classes organized in Hau Giang province in 2015, 2016 to understand how the classes were organized as well how the trainees' knowledge had been improved after the training course.

Primary data were collected by stratified sampling and random sampling in 3 districts in which these classes were organized, including Chau Thanh A district (n=30), Phung Hiep district (n=30) and Vi Thanh town (n=30). Sample size was 90. All farmers participated in the research were trainees of the training courses.

2.2. Data analysis methods

Data were analyzed by Excel and SPSS 16.0 software and descriptive statistic. First, raw data were encrypted then analyzed, in which descriptive statistic method was used to analyze factors including age, education background and year of agricultural production experience. Income of earned by farmers before and after the FFS training course was also compared.

3. RESULTS AND DISCUSSION

3.1 Characteristic of samples

3.1.1 Age

Among 90 researched farmers who joined FFS, the majority of them were in the age between 46 and 60 (45 people, made up 50%), 23 people were above 60 year-old (accounted for 25.6%) and only 2.2% were under 30 year-old. The average age of trainees was 52.5 in which farmers who were from 46 - 60 year-old made up the biggest group. They also are the main labors and are willing to invest more money in agricultural production and to converse to crop diversification as compared to other groups (Chi and Thanh, 2012). According to Fig. 1, group of under 30 year-old farmers was the smallest group. It means that, the FFS couldn't draw much attention from young people.

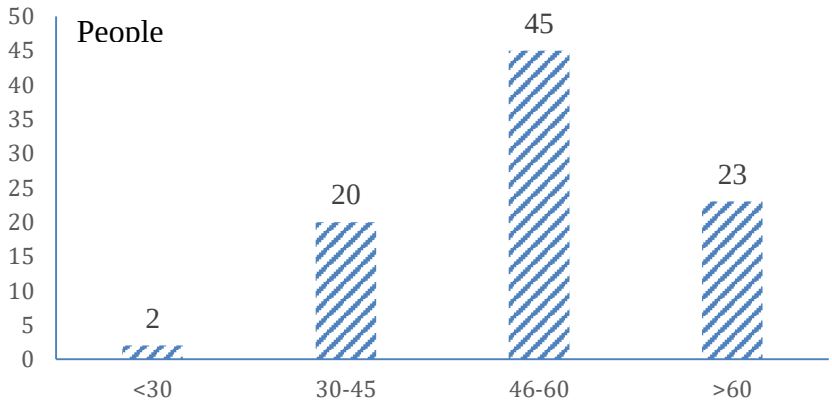

Fig. 1. Ages of farmers who joined FFS

Source: Survey on 90 farmers who joined FFS

3.1.2 Education background

About education background, 42.2% of farmers attended primary school while 28.9% of them completed secondary education and only 24.4% among them (22 people) went to high school. Besides, there were 4 farmers who are illiterate and they are Khmer ethnic, made up 4.5%.

Obviously, trainees' education is poor and this would lead to the fact that farmers were difficult to acquire new knowledge while attending FFS.

It is a fact that lack of basic education acts as the biggest barrier for farmers to acquire new knowledge, to apply science in agricultural production. The reason is without education farmers may not know how to maximize profits from the money they invested in agriculture. Another consequence is that they would face difficulties in applying new technologies. However, according to a research by Chi and Thanh, 2012, farmers who completed elementary and secondary education are best suitable for technology transfer training courses in agricultural production. Therefore, the education background of farmers who joined the FFS was enough for them to acquire new knowledge and to apply these knowledge into agricultural production.

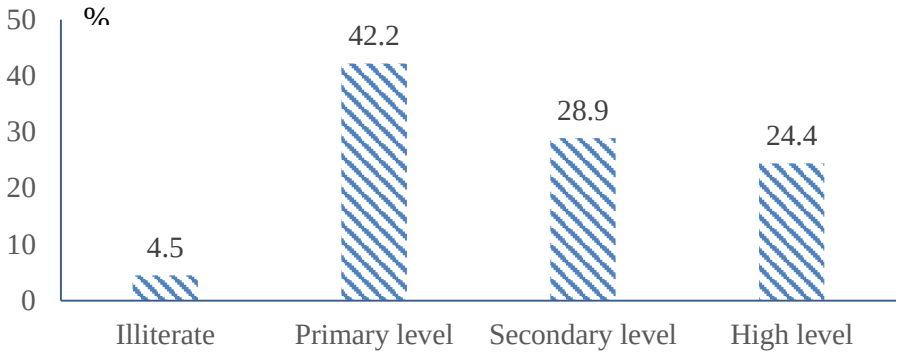

Fig. 2. Education background of trainees of the FFS

Source: Survey on 90 farmers who joined FFS training courses

3.1.3 Income of households

Results showed that household's average income before and after joining FFS was huge different. Before joining FFS, household's yearly average income was only 2,086.3 USD/year, compared to 2,318.0 USD/year earned by farmers who joined the training course. In which, Vi Thanh town had the highest average income/ year/ household both before and after the training course which were 2,381.1 and 2,799.2/year respectively). While Chau Thanh A district had the lowest average income/year/household before and after FFS which were 1,716.7 and 1,919.0 USD/year respectively).

Table 1. Average income (USD/year) of households before and after FFS

District	Before joining FFS	After joining FFS
Chau Thanh A	1,716.7	1,919.0
Vi Thanh	2,381.1	2,799.2
Phung Hiep	2,161.0	2,235.9
Average	**2,086.3**	**2,318.0**

Source: Survey on 90 farmers who joined FFS training course

However, in order to compare household's income before and after the training course, income from both agricultural and non-agricultural production should be calculated. The mentioned above income was contributed from growing rice, other crops and fruit... while in fact this was only a part of the total income of households.

3.2 Results of pre-tests and post-test of the training course

3.2.1 Results of test at the beginning of the training course

At the beginning of the training course, there was a set of relevant questions to measure the trainees' knowledge. Similarity at the end of the training course, researchers also built up a questionnaires to see if trainees improved their knowledge after attending the training. Checking the farmers' knowledge via tests done both at the beginning and in the end of FFS, is a good method to measure the farmers' knowledge improvement after joining FFS. Results showed that, at the beginning of the training course, about 55.6% of farmers had poor knowledge, made up the highest ratio, then 43.3% of them were average, none of them was ranked good while only one among them was ranked excellent. However, according to results of test done in the end of the training course, 64.4% of trainees ranked Excellent, 33.3% of them ranked Good, only 2.2% ranked Average, made up the smallest group while none of them ranked Poor. Results showed that, after joining FFS, trainees' knowledge of agricultural production had been improved. In addition, during FFS, they could gain first-hand knowledge of crop composition conversion and up-to-date knowledge of climate change negative impacts. According to research results, there's big changes in knowledge of farmers before and after joining the training courses. This is shown by T - test (Sig. = 0.003).

Table 1. Ratio (%) of ranking levels of pre and post tests of FFS trainee course

Levels of evaluation	**Pre-test**	**Post-test**
Excellent	1.1	64.4
Good	0.0	33.3
Mean	43.3	2.2
Weak	55.6	0.0
T- test		
Average score	40.0	79.7
Std. Deviation	11.2224	8.1712

Source: Survey on 90 farmers who joined FFS training course

3.2.2 Results by research areas

According to Table 2, knowledge improvement of trainees' from different research areas had no statistical meaning with $\alpha = 5\%$. In which, farmers from Chau Thanh A district had the biggest improvement as their average score increased from 34.8 to 81.6 (46.8 points), then Vi Thanh town with the difference of 43.2 points and the lowest was Phung Hiep district (only 41 points). According to research on the situation of crop composition conversion, Chau Thanh A is the district where farmers conversed rice crop to fruit crop the most. And the farmers here also applied new technologies on agricultural production more than farmers from the other two districts. As the result it is easier for farmers from Chau Thanh A to acquire new knowledge from FFS as compared to farmers from Vi Thanh town and Phung Hiep district.

Table 2. Average score of tests taken at the beginning and in the end of FFS by research areas (unit: point)

	Chau Thanh A	Vi Thanh	Phung Hiep	Sig.
Pre-test	34.8	36.5	36.6	0.164
Post-test	81.6	79.8	77.6	0.139
Increase	46.8	43.2	41.0	0.590

Source: Survey on 90 farmers who joined FFS training course

3.2.3 Knowledge improvement results by education background

According to Table 3, average score of test taken at the beginning of the training course by farmers who attended high school was lowest (35.5 point) while farmers who didn't go to school had the highest average score (37.4 points). For results of test taken in the end of the course, group of farmers who didn't go to school had the lowest average score (74.9 points), 78.5 was the average score of farmers who attended high school, group of farmers who attended primary school only scored the highest (80.6 points). For farmers who attended secondary school, their knowledge improved significantly with score increase of 45.8 points (as the highest), followed by group of farmers who attended primary school (increase of 43.3 points), group of farmers who were illiterate had the lowest score increase (37.4 points). Among 31.3% of trainees who had relatively improved their knowledge, many of them were often absent from the training class then they might have missed some content introduce in the FFS. Therefore, the difference between test results (tests taken at the beginning and in the end of FFS) and knowledge improvement by education background have no difference with $\alpha = 5\%$ (with Sig. = 0.390, 0.217 and 0.468 respectively).

Table 3. Trainees' average score (tests taken at the beginning and in the end of the training course) by education background (unit: point)

	Illiterate	Primary school	Secondary school	High school	Sig.
Pre-test	37.4	37.2	34.3	35.5	0.390
Post-test	74.9	80.6	80.1	78.5	0.217
Increase	37.4	43.3	45.8	43	0.468

Source: Survey on 90 farmers who joined FFS training course

These results also match with the results produced by research of Nhan, and et al (2013). Study on knowledge improvement of trainees who joined FFS training course (training course about strengthening farmer capacity on rice breeding and seed production in Hau Giang province in 2012) showed that, trainees had significantly improved their relevant knowledge. For tests taken at the beginning of the course, 100% of trainees had Average or Poor results while for tests taken in the end of the course, results have been improved with 100% of them had Good or Excellent results. Results of knowledge improvements also reflected trainees' education background.

3.3 FFS training impacts on agricultural production

3.3.1 Agricultural production composition at households

According to Fig. 3, before FFS training, there were 5 households who grew 2 rice crops - 1 other crop a year, 1 household who did 1 crop of rice - 1 other crop - fish (accounted for the lowest ratio) while 84 of households growing 3 crops of rice a year.

After FFS training, there were only 3 households who converse their crop composition from 3 rice crops a year to 2 rice crops - 1 other crop a year while 5 households (who grew 2 rice crops - 1 other crop a year before remained unchanged). Results showed that farmers who joined the FFS training still hesitated to converse their crop composition on rice land. It was a fact that after the training course farmers' awareness on crop conversion had been improved however they still hesitated to apply what they'd learnt in reality. Therefore, there should be pilot project on crop conversion for them to see the improvement then they would be more willing to converse their crop composition for increased productivity.

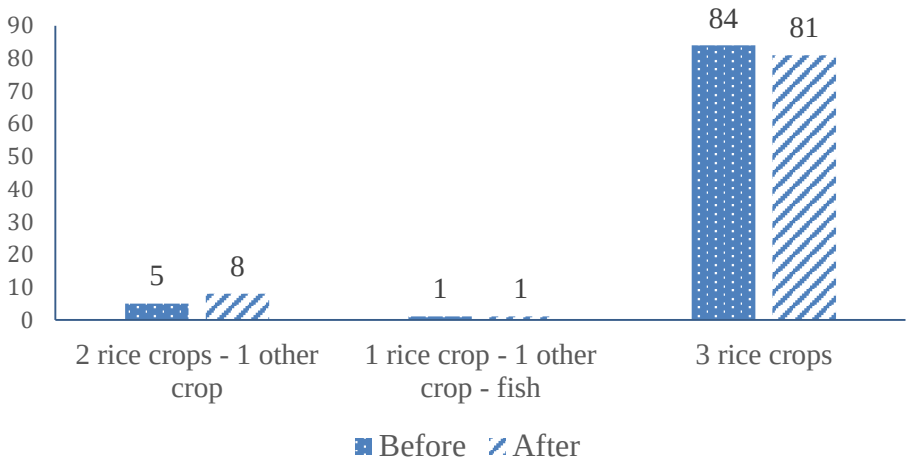

Fig. 3. Production composition on rice land before and after FFS training

Source: Survey on 90 farmers who joined FFS training courses, 2017

3.3.2 Impacts of FFS training on agricultural production

Research results showed that the FFS training courses had no impacts on how the farmers select rice varieties, accounted for 40.9% of farmers, then crop diversification made up 28.2% and new technology application was 4.7%, the lowest ratio. Crop composition conversion under 30% made up the highest ratio, 22.2% then above 75% accounted for 20% among 4 options in the survey. After the training, most of the farmers answered that they would apply new technology in agricultural production, accounted for the highest ratio. In which, 58.1% of them chose the option from 30% to less than 50%, for the option of 50% - < 75% the ratio was 42.9, 30% among them chose above 75% option while only 4.7% thought that they wouldn't change. For applying new knowledge on crop variety selection, about 34.9% of farmers chose the option from 50% to less than 75%.

3.3.3 Impacts on costs and profit of rice crops

Table 4. Costs and profits of growing rice before and after FFS training courses (unit: USD/ha)

Crop	**Before FFS training**		**After FFS training**	
	Cost	*Profit*	*Cost*	*Profit*
Winter-spring crop	770.4	717.6	739.6	766.0
Summer-autumn crop	832.1	488.7	770.4	515.0
Autumn-winter crop	823.3	374.2	827.7	431.3
Total	**2,425.8**	**1,580.5**	**2,337.7**	**1,712.3**

According to Table 4, the total cost of 3-rice-crop production before FFS training courses is higher than that after the training (2,425.8 USD/ha and 2,337.7 USD/ha respectively and the difference was 88,1 USD/ha). Similarity, profit earned from 3-rice-crop after the training courses was also higher that that before the training (1,712.3 USD/ha and 1,580.5 USD/ha respectively and the difference was 131,8 USD/ha). Whereas, Winter-spring crop production cost was the lowest (739.6 USD/ha), then Summer-Autumn crop which was 770.4 USD/ha and the highest was Autumn-Winter crop (827.7 USD/ha). Profit earned by Winter-Spring crop was higher than the other two crops, then Summer-Autumn crop and Autumn-Winter was the lowest (766,0, 515,0 and 431,3 USD/ha respectively) (Table 4).

According to research on farmers who joined FFS and farmers who didn't, there were big differences among cost and profit of the two groups. Results were shown in Table 5.

Table 5. Agricultural production cost and profit of invested and earned by farmers who joined FFS and who didn't (unit: USD/ha)

Crop	FFS trainee		non FFS trainee	
	Cost	*Profit*	*Cost*	*Profit*
Winter-Spring crop	739,2	765,6	748,0	832,0
Summer-Autumn crop	770,0	514,8	796,4	391,8
Autumn-Winter crop	827,2	431,2	788,0	365,4
Total	**2,336.4**	**1,711.6**	**2,332.4**	**1,589.2**
Profit margin		**0.73**		**0.68**

Source: Survey on 90 farmers who joined FFS training course and 90 others who didn't, in 2017

According to Table 5, for farmers who attended FFS, their average agricultural production cost was higher than that of farmers who didn't (2,336.4 USD/ha, 2,332.4 USD/ha respectively, difference of 4 USD/ha). However, profit earned by growing rice of FFS trainees (1,711.6 USD/ha) was higher than that of non FFS trainees (1,589.2 USD/ha) with the difference of 122.4 USD/ha. For profit margin, farmers who joined FFS had the profit margin of 0.73 while that of farmers who didn't joint FFS was 0.68.

3.3.4 Farmers to converse their crop composition on rice land

According to Fig. 4, only 3.3% of farmers conversed their crop composition on rice land after the FFS training. And for the farmers who did, they only converse their crop composition on a small size of land to test the result and most of the case they replace rice crop by growing cereals or other crops. Up to 96.7% farmers who didn't converse their crop composition even after joining the FFS.

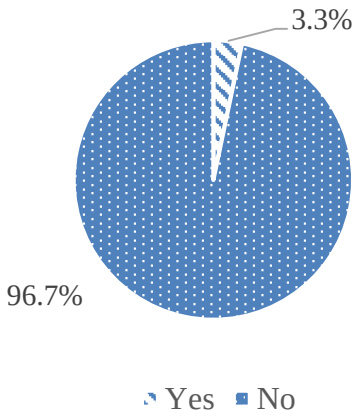

Fig. 4. The ratio of farmers who conversed crop composition after FFS training

Source: Survey on 90 farmers who joined FFS training course 2017

Currently, crop composition conversion in the Mekong Delta has to face with numerous difficulties. One of the reasons is the irrigation system. Without a good irrigation system in every area, sometimes it is difficult to provide enough water for other crops on rice land or the shortage of water during dry season. However, results from discussion with farmers showed that finding market for their products and price are two most important factors for farmers to consider whether to diversify their crop composition or not.

3.3.5 Impacts of FFS training courses on the farmers' capability

Fig 5 shows the impacts of FFS training courses on the farmers' capability. According to Fig 5, after the courses, 32.2% among farmers who joined the courses were more confident to apply new technologies on agricultural production, made up the highest ratio while 26.4% of them thought that the courses helped increase their capability of land management and plant diseases prevention.

However, even after the courses the farmers' capability of finding market for their products, market connection remain limited, accounted for 1.3%. Besides, about 41.1% of farmers thought that the FFS training courses also helped them improve their production capability, accounted for the highest ratio. Then 39.1% of them thought that the courses helped them gain their livelihood while only 19.8% among them answered that the training courses have changed their point of views in the roles of women.

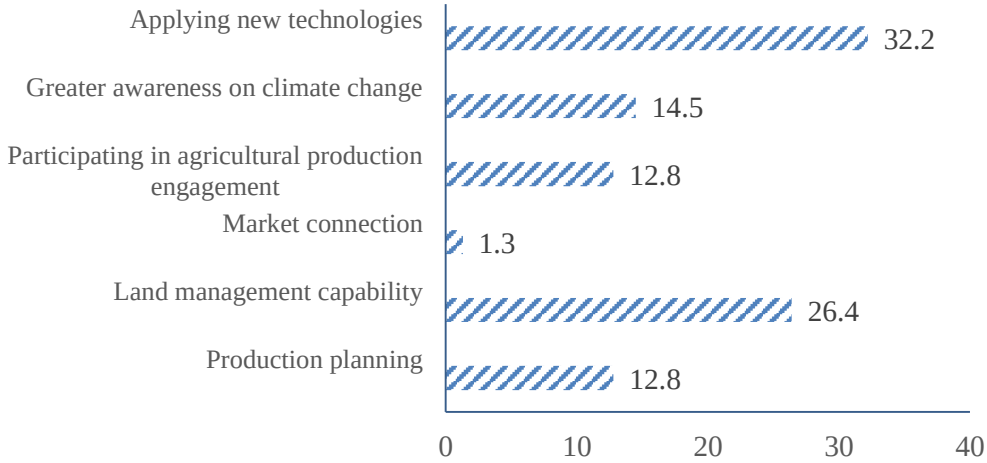

Fig. 5. Percentage of trainees' feedbacks on learnt fields after FFS training courses

Source: Survey on 90 farmers who joined FFS training courses

4. CONCLUSION

Research results showed that, farmers who joined FFS training had significantly improved their relevant knowledge. Results of tests taken at the beginning and in the end of the training course were quite different with α=5%. The yearly average income/ household after the FFS training was higher compared to that earned by farmers before joining the training. In addition, cost of growing rice has been lowered while profit has increased after the farmers joined FFS training courses. Cost invested and profit earned by farmers who attended FFS were higher than that of the farmers who didn't. FFS training courses received positive feedbacks from trainees. After the course, the farmers all agreed that they were now more confident to apply new technologies and newly acquired knowledge in agricultural production. Besides, they could also improve their management skills after the FFS training course. However, the ratio of farmers who converse their crop composition remained low even after the training.

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