

ON EFFICIENCY OF APPLICATION OF TECHNICAL ADVANCES TO AGRICULTURE: THE CASE OF RICE PRODUCTION IN ATHANH BÌNH – HỒNG NGỰ OF ĐỒNG THÁP PROVINCE

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1. Problem

The Mekong Delta is the main supplier of rice in Vietnam providing the basis for food security. In the Delta, Đồng Tháp is an agricultural province with 82.7% of its population living in rural areas and most of its farming area is used for growing rice. In the past few years, agricultural authorities have carried out various programs and projects to help peasants apply technical advances to rice production, which brought about encouraging changes in the agriculture. Many farming households in Thanh Bình-Hồng Ngự region have tried to apply technical advances through various movements, such as “three increases plus three decreases,” “IPM” and “a must plus five decreases,” with the result that they gained better productivity and income. However, there are many obstacles and difficulties to this effort. This paper will analyze the efficiency of application of technical advances in the rice production and factors that affect the efforts by farming households, thereby suggesting measures to improve the rice production in Thanh Bình- Hồng

Ngự districts of Đồng Tháp Province.

2. Methodology

a. Objectives: The study aims at assessing the situation and efficiency of the application of technical advances to rice production, thereby offering some suggestions to help improve the efficiency in Thanh Bình- Hồng Ngự.

b. Data collecting method: Secondary data are collected from reports by local agricultural authorities, statistical yearbooks of Đồng Tháp, related studies, and opinions of experts from Đồng Tháp Department of Agriculture and Rural Development and Agricultural Extension Center. Firsthand data are from direct interviews with 364 farming households selected randomly according to stratified sampling method based on such criteria as farming area and degree of technical application. In addition, a workshop has also been held to gather information according to the PRA approach.

Table 1: Characteristics of surveyed farming households

Site		Samples	As %	Production pattern	Gathered information
District/Town	Commune				
Thanh Bình	Tân Bình	82	22.53	Traditional pattern, new strain, IPM, in-row sowing, three decreases-three increases, one must-five decreases	Resources of household, access to information about technical advances, benefit from technical advances, efficiency of rice production by household and related policies
	Tân Phú	118	32.42		
Hồng Ngự	Thường Thới Tiền	74	20.33		
	Thường Lạc	40	10.98		
	Tân Hội	50	13.74		
Total		364	100		

Source: Survey of 364 farming households, November 2009

c. Analysis method: To achieve preset objectives, the study uses descriptive statistics with research indicators (arithmetic mean, percentage, and frequency) and financial indicators (cost, income, net income, income-to-cost ratio, and net-income-to-cost ratio); and expert method.

3. Research results and discussion

a. Resources of household in surveyed sites: The resources of farming households show themselves in such indicators as farming area, labor, education, and experience, etc.

Table 2: Characteristics of resources of farming household

Indicator	Unit	Mean
Land area per household	1,000m ²	15.52
Rice-growing area per household	1,000m ²	15.43
Household size	Person	4.51
Labor for rice growing	Person	2.24
Education	Year	6.87
Rice-growing experience	Year	18.94
Participation in training course	%	48.08
Proportion of households in need of capital	%	74.72

Source: Survey of 364 farming households, November 2009

Research results show that total land area is pretty large and most households use it for growing rice. Rice-growing labor accounts for some 50% of household members. The education of the household is low (grade 7), which limits their ability to absorb technical advances. Years of experience and participation in training courses in technical

advances are rather high, which supports their rice production a lot. Proportion of households in need of capital, however, is high (74.7%). They can get loans from various sources, both formal (banks and credit funds) and informal ones (supplier of farming materials, co-operatives, acquaintances and usurers), with an average loan of VND19,400,000 per household.

b. Application of technical advances by household:

- Popular rice-production pattern: Of 364 interviewed households, 269 ones (73.9%) are applying technical advances to rice production and 95 rely on experience.

Data gathered from Thanh Bình- Hồng Ngự show that “three decreases plus three increases” is the most popular model among peasants (54.4%) followed by in-row sowing (50.27%), IPM (27.4%, new strain (20.33%) and “a must plus five decreases” (2.75%). The “3-decrease plus 3-increase” model is applied widely because, according to many peasants, it helps reduce 30% - 50% of the volume of seeds, some 30% of quantity of urea fertilizer and pesticide, thereby reducing production cost. As for the in-row sowing, peasants say that this technique helps reduce quantity of seeds, improve the yield, and make rice field even. Particularly, the in-row sowing machine makes labor productivity increase by 10 times allowing peasants, especially those who have larger farming areas, to cut cost. They also realize that the IPM helps them control diseases effectively and cut expenses on pesticides (because they only use pesticides after investigating carefully their rice fields). These techniques indirectly increase the household income because number of damaged rice

Table 3: Application of technical advances

Technical advances	Application		Non-application		Total	
	Frequency (household)	As %	Frequency (household)	As %	Frequency (household)	As %
3 decreases plus 3 increases	198	54.40	166	45.60	364	100
In-row sowing	183	50.27	181	49.73	364	100
IPM	100	27.47	264	72.53	364	100
New strain	74	20.33	290	79.67	364	100
1 must plus 5 decreases	10	2.75	354	97.25	364	100

Source: Survey of 364 farming households, November 2009

plants reduces, which lead to higher output). As for peasants who use new strains, they say that the old ones produce rice of low quality and selling prices. As for the “a must plus five decreases” model, the number of peasants applying this technique is small because it has just been carried out in a pilot project, but many experts and peasants hold it in high regard and think it will be applied on a larger scale in the near future.

Realities show that peasants can apply various models at the same time to their rice production. When applying two models, they usually combine “three decreases plus three increase” with in-row sowing techniques (15.6%); IPM with in-row sowing (5.5%), and IPM with “three decreases plus three increase” (5.3%). When selecting three models, they apply “three decreases plus three increase” with in-row sowing and IPM (14.5%); “three decreases plus three increase” with in-row sowing and new strain (10.8%) and other combinations. Some peasants try to apply four or five techniques but they are only a minority.

The following table shows sources of information about technical advances for peasants.

Table 4: Access to technical advances

Source	Frequency (household)	As %
Mass media	199	54.67
Agricultural extension officials	177	48.62
Employees of plant protection companies	115	31.59
Acquaintances	82	22.52
Officials from associations of peasants	50	13.73
Experts from institutes or universities	11	3.02
Trade and exhibition fairs	9	2.47

Source: Survey of 364 farming households, November 2009

Many surveys of rural economy reach the same conclusion that peasants' knowledge is not high enough. That is why agricultural extension programs become urgent because they help disseminate information about technical advances among peasants. Of course, peasants can get such information from various sources. The survey in Thanh Bình-Hồng Ngự shows that 54.67% of peasants get such information from agricultural extension

programs supplied by the mass media (television, radio and newspaper). This is understandable because such programs can reach remote areas with contents appropriate to peasants' knowledge at convenient time. In addition, agricultural extension officials and employees of plant protection companies are also important sources of information when they can reach 48.62% and 31.59%, respectively, of surveyed peasants. Other sources of information for peasants are acquaintances, officials from associations of peasants, experts from research institutes, and trade and exhibition fairs.

c. Satisfaction and ability to apply technical advances:

The survey of peasants who take part in training courses reveals that they appreciate chances to exchange experience and information when taking part in such courses. Moreover, they can ask agricultural extension officials a lot of questions and they can understand technical documents because most contents are presented in form of pictures, drawings, verses, or proverbs related to production.

Talking about the ability to apply technical advances, most peasants estimated it at a high and promising level. However, realities show that the application of knowledge from training courses to production is not encouraging enough. Explaining this situation, some peasants said that instructions from the documents might be appropriate to general conditions in the whole province but not workable in this particular district. However, some agricultural extension experts were of the opinion that many peasants failed to carry out exactly technical instructions because of their limited knowledge or resources.

d. Efficiency of technical application models:

- Efficiency of rice production by peasants applying technical advances:

Analyses of financial data show that the efficiency of application of technical advances is even and higher than the one produced by traditional farming. Ratio of net income to cost of all models is higher than 1 in the winter-spring crop, and equals some 0.4 in the summer-fall crop; while the ratio of net income to cost in the two crops is 0.77 and 0.25 respectively. This means that the efficiency of application of technical advances is rather high. Particularly, the IPM can help peas-

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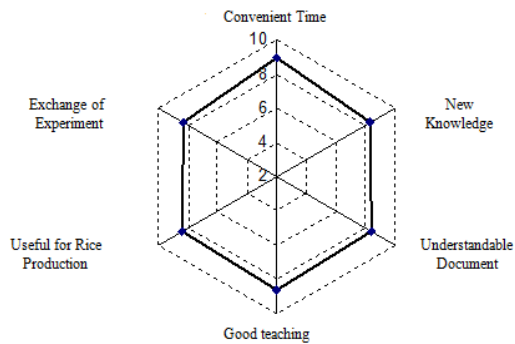


Figure 1: Degree of satisfaction when taking part in training course: 1 (not good) – 10 (very good)

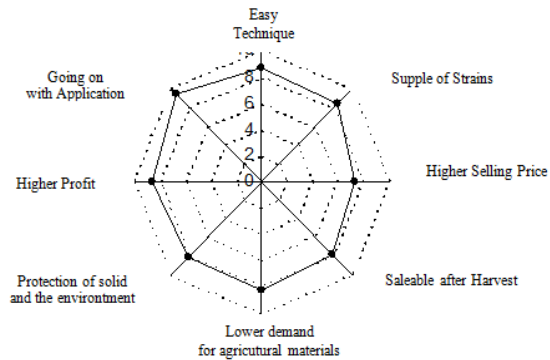


Figure 2: Estimated ability to apply technical advances: 1 (not good) – 10 (very good)

Table 5: Efficiency of rice production according to models

Indicator	Experience		New strain		IPM		In-row sowing		3 decreases plus 3 increases	
	Winter-spring	Summer-fall	Winter-spring	Summer-fall	Winter-spring	Summer-fall	Winter-spring	Summer-fall	Winter-spring	Summer-fall
Cost (1,000)	1.81	1.886	1.663	1.66	1.599	1.75	1.657	1.745	1.642	1.762
Income (1,000)	3.208	2.362	3.474	2.343	3.53	2.444	3.511	2.402	3.478	2.465
Net income (1,000)	1.398	476	1.81	683	1.931	694	1.854	657	1.836	703
Income/Cost (time)	1.77	1.25	2.09	1.41	2.21	1.39	2.11	1.37	2.14	1.40
Net income/Cost (time)	0.77	0.25	1.09	0.41	1.21	0.39	1.11	0.37	1.14	0.40

Source: Survey of 364 farming households, November 2009

ants gain the highest efficiency in the winter-spring crop while the “3-decrease plus 3-increase” model produces the same effect in the fall-winter crop.

- Efficiency by degree of application of technical advances:

In the surveyed site, many peasants combine different models. To estimate the efficiency ac-

cording to degree of application, the author selects the following patters of combination of the models for comparison: application of one model (3-decrease plus 3-increase model); combination of two models (3-decrease plus 3-increase with in-row sowing models); and combination of three models (3-decrease plus 3-increase with in-row sowing and IPM models).

Table 6: Efficiency by degree of application of models

Indicator	Experience		3-decrease plus 3-increase		3-decrease plus 3-increase with in-row sowing		3-decrease plus 3-increase with in-row sowing and IPM	
	Winter-spring	Summer-fall	Winter-spring	Summer-fall	Winter-spring	Summer-fall	Winter-spring	Summer-fall
Cost (VND1,000)	1.81	1.886	1.624	1.789	1.675	1.792	1.669	1.854
Income (VND1,000)	3.208	2.362	3.482	2.604	3.503	2.55	3.59	2.649
Net income (VND1,000)	1.398	476	1.858	815	1.827	758	1.921	795
Income/Cost (time)	1.77	1.25	2.14	1.46	2.09	1.42	2.15	1.43
Net income/Cost (time)	0.77	0.25	1.14	0.46	1.09	0.42	1.15	0.43

Source: Survey of 364 farming households, November 2009

Results show that in the winter-spring crop, the application of various models helps peasants enhance the efficiency. This reflects itself in the ratio of net income to cost based on degrees of application of technical advances. This ratio is 0.77 when no advance is applied; 1.14 when one model (3-decrease plus 3-increase one) is applied; 1.09 when two models (3-decrease plus 3-increase with in-row sowing ones) are applied; and 1.15 when three models (3-decrease plus 3-increase with in-row sowing and IPM models) are applied.

In the summer-fall crop, however, when peasants apply only one model (3-decrease plus 3-increase), the efficiency is higher as compared with application of various models. Generally, application of technical advances always brings about a higher efficiency in comparison with traditional farming techniques.

e. Advantages and difficulties in application of technical advances:

- Advantages: (1) Agricultural materials are abundant and always available; (2) Peasants have a lot of experience and eager to learn about technical advances; (3) Supply of agricultural information is much more effective; and (4) Local authorities and research institutes support the application of models.

- Difficulties: (1) Most peasants lack necessary capital and access to formal credit because of banking regulations about security; (2) Diseases get widespread and complicated affecting badly the productivity and efficiency of rice production; (3) Peasants' access to market for farm products is limited. They can only do business with small traders and usually have to accept low prices; and (4) Infrastructure needed for rice production is not well developed, especially the irrigation system.

4. Conclusion and suggestions

a. Conclusion:

Results of the survey and analysis show that application of technical advances to rice production in Thanh Bình – Hồng Ngự has the following features: (1) Supply of information about technical advances to peasants is diverse and abundant; (2) Most peasants feel satisfied with training courses and believe in their ability to apply such advances; (3) Peasants are eager to learn about technical advances and apply them to their rice production; and (4) The application helps peasants improve

the efficiency of rice production.

b. Suggestions:

- When applying technically advanced models, peasants must comply with recommended instructions to obtain better efficiency.

- Peasants should form supporting groups to improve their access to formal credit and markets for both inputs and output.

- Local authorities must beef up their predictions and take timely action to deal with epidemics and plant diseases.

- Local authorities and banking institutions must adopt new policy on supplying credit to rice producers.

- Agricultural authorities should supply continuously information about technical advances and training courses in order to enhance peasants' knowledge and skills, thereby improving the efficiency of rice production.

- Local authorities should build and upgrade rural infrastructure to support the rice production and help peasants get access to markets ■

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