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IMPACTS OF COMMUNITY-BASED SEED PRODUCTION AND SUPPLY TOWARDS SUSTAINABLE AGRICULTURAL PRODUCTION IN AN GIANG PROVINCE

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ABSTRACT

Community-based seed production and supply program in An Giang province had started since 2001, during 14 years (2001-2014) of implementation, about 15,115 farmers were trained and practiced in seed production, and 187 seed production clubs and 29 seed production enterprises were established with the participation of 5,464 farmers. The area for multiplying seed had increased year by year: 2,200 ha in 2004, 12,659 ha in 2008, 14,090 ha in 2010 and 25,544 ha in 2014; corresponding to the increase of certified seed production from 9,700 tons (2004) to 66,568 tons (2010) and 169,321 tons (2014), met the seed demand for the province's production from 30% (2004) to 90% (from 2008 to 2014). Due to the market demand and competition, from the 2011, communities' seed quality testing was required and concerned. Until 2014, 11,192 tons of certified seeds met the national seed quality standards, this contributed greatly to the increasing of province's yield from 5.74 t/ha (2004) to 6.46 t/ha (2014). In addition, nearly 50 promising rice lines selected by farmers were released for adaptive tests and use. The community-based seed production program through "seed club" has improved significantly economic efficiency for farmers by seed security for rice production in An Giang province.

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1 INTRODUCTION

Seed is an essential material in agricultural production and it becomes the key factor on yield and quality of agricultural products (Du, 2008; Thinh, 2011). According to Bui Ba Bong, from 2002, rice yield in Vietnam had always led the highest position among the Southeast Asian countries; above achievement is due to many factors including rice variety, using certified seed, etc. (Chin, 2011). Improving seed selection and using certified seed for rice production is an essential requirement to increase the yield and quality of rice, reduce costs, and ensure the success in competition after Vietnam joining WTO (Chin, 2008).

An Giang is well-known as a rice production province. In order to promote agricultural development by increasing productivity, quality, efficiency, competitiveness and meeting the demand of the market, the sector of agriculture has implemented technical solutions, including seed quality. A train-

ing program on "Participatory plant breeding and seed production" *so-called* "Community-based seed production and supply" was implemented in cooperation between the Mekong Delta Development Research Institute (MDI) and the provincial authority. The An Giang province acquired the technical training program in the form of sending technicians to attend training of trainer ToT and workshops organized by MDI and then they implemented the trainings for farmers in combining on-farm practices for development and expand during 2001-2014. The program achieved positive results; this study was to assess the impacts of this program to rice production in An Giang province.

2 METHODOLOGIES

2.1 Site selection

Farmers who attended in training courses on "Seed production and breeding skills" were given the certificate by provincial agricultural Extension Center. After the training, a group of farmers (10-30 farmers) that were passionate in seed production were supported to establish a seed club with the decision of Commune People's Committee. Each village established at least one seed club to produce and supply good quality seeds for other farmers in their community. This study surveyed and interviewed farmers at 216 seed clubs and farmer's seed enterprises of 11 districts in An Giang province.

2.2 Data collection and analysis

To collect data for this study, we linked and worked with staff of the Agricultural Extension stations to gather data on quantity of seed production and supply through crop seasons/year from 2004 to 2014 with a seed production form.

All information and data gathered were synthesized by the Agricultural Extension Center by applying Microsoft Excel software for the descriptive statistical analysis. Average values from the analyzed data and information were used to show the development trend and the program's impacts to rice production of An Giang province.

3 RESULTS

3.1 Technical training

Farmer's field school (FFS) training approach was used for training farmers from 2001 to 2010; the agriculture sector had organized 525 training courses on seed production with the participation of 13,160 farmers, in which 380 sections on seed selection and breeding, 57 sections on advanced seed selection and breeding skills (producing foundation seed), 88 sections for updating knowledge in producing certified seed (2 days) for seed club members who are passionate in seed selection and breeding.

Comparing to the previous period, during the period 2011 – 2014, there had been a change in the members of seed club, with the successor of a younger team. Thus, training on seed production is always maintained; for instance, 54 training courses were organized (1,955 farmers) focusing on updating information on seed production (farming processes, inspection, testing, harvesting and storing), marketing strategy, taking care of the seed business (quote from the Ordinance on plant varieties), etc.

Table 1: Number of training courses about seed production from 2001 to 2014

Year	Number of training			Number of participant
	Seed selection and breeding (producing certified seed)	Producing foundation seed	Updating knowledge on producing certified seed	
2001 - 2010	380	57	88	13,160
2011 - 2013			28	1,090
2014			26	865
Total		579		15,115

3.2 Seed production network and seed supply capacity of informal system

An Giang province is known as the most successful program of community-based seed production in the Mekong Delta, there is at least one seed club in each village. During the period of 2001 - 2010, there was an increasing trend in the number of seed clubs such as 64 seed clubs (704 households) in 2004, 177 seed clubs (2,353 households) in 2006, 216 seed clubs (3,339 households) in 2008, and 221 seed clubs (3,429 households) in 2010.

In period of 2011 - 2014, due to the declining of commodity rice's price, the demand of seed was decreased, led to the reduction in the number of seed clubs but the number members of strong seed club were increased such as 208 seed clubs (3,810 members) in 2011, 206 seed clubs (4,404 members) in 2012, 188 seed clubs (4,564 members) in 2013 and 187 seed club (5,463 members) in 2014.

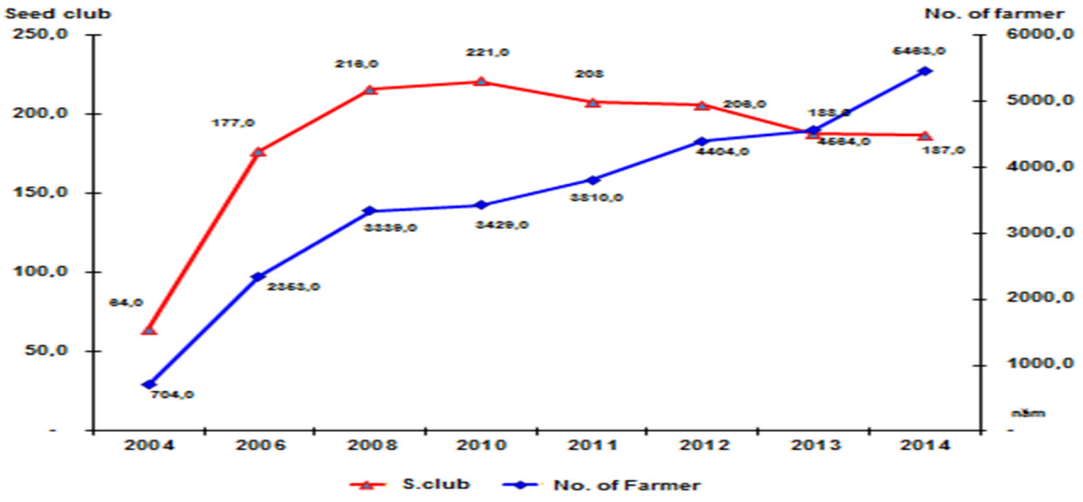

Fig. 1: Number of seed clubs and members in An Giang province, 2004 - 2014

Corresponding to the increasing in the number of members in the seed clubs, the area for seed production had been increased as well, 2,200 ha in 2004 (meeting 30% of demand for production), 9,722 ha in 2006 (meeting 50% of the demand) and 12,659 ha in 2008 (meeting 90% of the demand) and the rate has been stable until now.

Table 2: Production area and seed production of seed clubs, 2004 – 2014

Year	Area (ha)				Seed production (ton)	Meeting rice area (%)
	Winter spring	Summer autumn	Autumn winter	Whole year		
2004				2,200*	9,700	30*
2005	3,148	2,979	1,563	7,690	31,012	40
2006	2,808	3,226	3,688	9,722	38,150	50
2007	3,499	3,445	2,140	9,084	48,917	75
2008	4,469	4,758	3,432	12,659	64,295	90
2009	5,297	4,705	3,363	13,365	64,152	90
2010	5,315	5,076	3,699	14,090	66,568	90
2011	6,072	5,746	5,082	16,900	93,919	90
2012	7,193	7,186	5,260	19,639	116,696	90
2013	8,704	7,101	6,238	22,043	136,864	90
2014	8,847	9,025	7,672	25,544	169,312	90

* *Only meeting for winter spring crop 2004 - 2005*

3.3 Seed quality and business activities

Results of the seed production program in the period 2004 - 2014 show that the community-based seed supply system satisfied seed requirement for rice production of the province; it met the local farmer's expectation on seed quality guaranty. In addition, some seed clubs and seed enterprises made the buying/selling contracts with the local traders in and out province.

Activity of seed supply during period 2011 - 2014 developed towards commercialization in expanding the market and seed business in An Giang province; in 2014, 29 seed production enterprises registered with seed trademarks, and developed a total area for seed production of 4,440 ha. These enterprises have contributed to the improvement of quality seed supplying to local market and guarantee production for seed club members through contracts. Furthermore, they also contributed to the increasing the number of farmer's seed enterprises involved in seed production system in the Mekong Delta in recent years (DCP, 2014).

Table 3: Seed production areas of the seed clubs and seed enterprises in An Giang province from 2011 to 2014

No	Name	Address	Area (ha)			
			2011	2012	2013	2014
1	Cho Moi Seed Limited Liability Company	Cho Moi	500	690	720	690
2	Binh Minh Seed Company	Tri Ton	500	18	103	91
3	Thanh My Tay Seed Production Club	Chau Phu	150	452	487	351
4	Hai Truong Seed Limited Liability Company*	Tri Ton	105	140	316	222
5	Tu Lieu Seed Production Farm	Tri Ton	50	55	26	
6	Hung Hanh Seed Company	Thoai Son	100	89	90	111
7	Dong An Seed Production Club	Tinh Bien	100	135	112	45
8	Phu Nong Seed Production Club	Chau Thanh	90	65	44	66
9	Tien Nong Seed Limited Liability Company	Chau Thanh	20	50	70	36
10	An Phu Seed Production Club	An Phu	20	24	31	27
11	Phu Hung Seed Limited Liability Company	An Phu	50	41	48	57
12	SD Seed Limited Liability Company	Tri Ton	134	50	292	110
13	Vam Nao Seed Production Club	Cho Moi	50	100	90	110
14	Vinh Trach Seed Production Cooperative	Thoai Son	5	6	5	
15	Thuan Phat Nong Seed Limited Liability Company	Tri Ton		24	107	55
16	Nguyen My Seed Company	Chau Phu		230	269	259
17	Phu Kim Seed Limited Liability Company	Tri Ton		62	197	304
18	Hon-10 Seed Production Club	Tri Ton		30	17	
19	Sau Ri Seed Limited Liability Company**	Chau Phu		207	196	230
20	Thien Phuc Hung Seed Limited Liability Company	Chau Thanh		15	4	70
21	Mam Xanh Seed Limited Liability Company	Chau Thanh		26	25	75
22	Tran Hien Kim Cuong Seed Company	Chau Thanh			4	205
23	Vinh Qui Seed Company	Chau Phu			122	83
24	Binh Phat Seed Club	Chau Phu			29	22
25	Truong Nhat Seed Production Club	Chau Phu			40	32
26	Hung Thanh Seed Club	Chau Phu			75	155
27	Ngoc Chin Son Seed Company	Tri Ton			24	19
28	Tan Chau Seed Selection and Production Club	Tan Chau			15	
29	Phu Tan Seed Company	Phu Tan			22	34
30	Tuyet Hong Seed Company	Phu Tan			15	156
31	Chi Tam Seed Production Club	Chau Phu				69
32	An Thanh Seed Production Club	Chau Thanh				720
33	Nam Phuong Seed Limited Liability Company	Chau Thanh				36
	Total		1,874	2,509	2,875	4,440

*: *In 2013, changed from Hai Truong Seed Club to Limited liability Company*

**: *in the end of 2012, changed from seed club into Limited company*

Table 4: Production areas and productivity of certified seed quality by testing in the laboratory and inspecting on the fields, 2012 - 2014

Year	Inspected areas (ha)	Amount of seed met QCVN:01-54 (ton)
2012	1,249.7	6,688.4
2013	1,627.7	7,465.2
2014	2,433.2	11,192.0

Establishing new seed enterprises opened a competitive environment in seed quality; since 2012, seed testing - inspection, and postharvest processing technologies (seed cleaning and classifying) have been more concerned by the seed clubs and seed enterprises. Therefore, the quality of certified seed produced by community met to the QCVN: 01-54.

Through interview seed clubs, it is reported that seed with qualified inspection, certified seed, increased the price about 50-100 VND/kg (depending on the size and area of samples tested); however, the price of certified seed was not higher than previously not inspection. The reasons could be the increasing in number of enterprises and traders within the province leading to the competition in seed quality, and the improvement in knowledge

and awareness of farmers. These indicated that the amount of seed sold depended on the seed quality and the reputation of seller/enterprises (Du, 2008). This is also one of the decisive factors in seed management (Lang, 2012).

3.4 Seed selection and breeding

Along with seed selection activities, through trainings, some passionate farmers who attended seed selection and breeding skills training have selected several new lines and varieties from available material (rehabilitation), from segregating varieties (F2-F5) provided by the research institutes and University. Until now, farmers in An Giang province has selected several lines/varieties relatively pure and promising (F8).

Table 5: Number of lines/varieties selected by farmers until 2014

No.	Variety	Farmer breeder	Address	Notes
1	NV1 – NV15	Tran Thanh Hung	Tinh Bien	15 varieties
2	TC1 - TC26	Hoa Si Hien	TX.Tan Chau	26 varieties
3	AP2010		An Phu	Selected from IR50404
4	OE6 – OE8	Danh Van Duong	Thoai Son	3 varieties, high yield
5	Hong Ngoc Oc Eo	Danh Van Duong	Thoai Son	Red and aromatic rice
6	Selected from IR50404's population	Dao Van Sang	TP.Chau Doc	High yield

3.5 Impacts of Community-based seed production program towards provincial rice production

3.5.1 Impacts towards application of new technologies

Studies in the Philippines and Bangladesh indicated that using of quality seed contributes to an increased in rice yield of 8-10% (Hossain *et al.*, 2003). The supplying of certified seed produced by farmers in recent years in An Giang province has contributed to the success in implementation of "3 Reductions 3 Gains" program of the province. DARD (2014) reports that proportion of application the "3 Reductions 3 Gains" increased, reached 86.8% in 2008, 88.1% in 2010 and 93.4% in 2011.

Seed is a biological factor which is crucial in increasing productivity and product quality, a prerequisite to involve and promote practices and other advanced technologies in the production process (Du, 2008). The success of socialization of seed production program in An Giang province is an initiative for promoting and applying the program "1 Must 5 Reductions" in order to reduce greenhouse gas emissions with the target of 37.2% of farmers applying the new practice (DARD, 2014).

Table 6: Application of "3 reductions, 3 gains" and "1 must, 5 reductions" from 2008 to 2014 in An Giang

No.	Program	Ratio (%)					
		2008	2009	2010	2011	2012	2013
1	3 Reductions - 3 Gains	86.8	86.9	88.1	90.0	92.1	93.4
2	1 Must - 5 Reductions			0.7	17.4	28.4	37.2

In addition, "seed" or the use of certified rice seeds are gained concerns in developing rice production under the "big field" of An Giang province and other provinces in Mekong Delta.

3.5.2 Impacts towards rice yield

Improving rice varieties and using certified seed for production in the Mekong Delta are an essential need to increase productivity and quality of rice, reduce production costs, and ensure upper hand in competition after joining the WTO (Chin, 2008). According to SO-An Giang (2013) the development of community-based seed production has contributed greatly in increasing annual productivity in the province from 5.74 t/ha (2004) to 6.46 t/ha (2014) (Figure 2). This result shows that An Giang province obtained the highest averaged rice yield in the Mekong Delta.

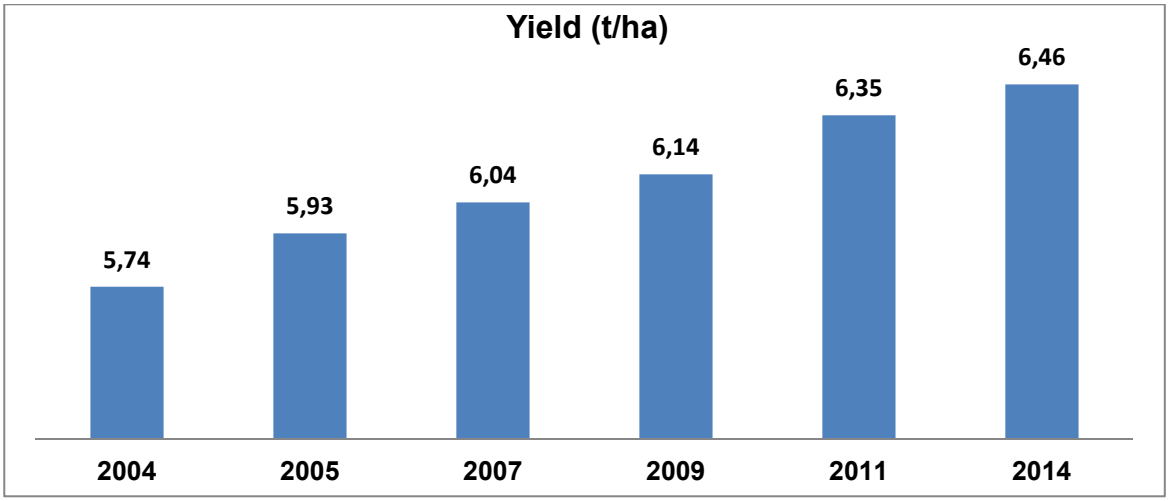

Fig. 2: Averaged rice yields of An Giang province by years (2004 – 2014)

4 CONCLUSIONS

The implementation of the training program on community-based seed production and supply through "seed clubs" has contributed significantly for improving household's income and seed security for rice production in An Giang province. During the period 2001 – 2010, the ability to provide seed for rice production in An Giang province was enhanced; many seed clubs and farmer's seed enterprises were established and expanded markets for seed distribution. There was a significant improvement in both seed quality and seed production areas; certification on seed quality was supplied in accordance to the national standards of seed quality to communities within the province. The community-based seed production and supply of good seeds has been a basic component to develop the programs on "3 reductions - 3 gains", and "1 must do - 5 reductions" applying in the large field model of An Giang province.

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