

SOLUTIONS FOR AGRICULTURAL DEVELOPMENT WITH HIGH-TECH APPLICATIONS IN QUANG TRI PROVINCE TO 2030

Hoang Xuan Phuong¹, Nguyen Ba Long¹, Xuan Thi Thu Thao¹, Nguyen Van Thung²

¹Vietnam National University of Forestry

²National Institute of Agricultural Planning and Projecting

SUMMARY

Despite certain success been made recently, traditional agricultural production in Quang Tri province still encounters a lot of difficulties and limitations, need to apply technical advances, especially in high-technology to overcome these limitations. There have been initially successful models of applying high technology in agricultural production such as model of growing vegetables and fruit trees in net house; using advanced varieties, watering economically; Intensive shrimp farming model using probiotics; model of rice cultivation using fertilizers and biological plant protection drugs. The study identifies that some local animals and crops have advantages in high-tech application such as rice, coffee pepper, fruit trees, pig, cow, poultry, and aquaculture. To develop hi-tech agriculture in Quang Tri province, there should be synchronized solutions, in which important solutions are planning high-tech agricultural production zones - areas and identifying suitable technologies for each specific plant and particular zone. The study identified that by 2030 Quang Tri province will build 2 areas of high-tech agriculture and 33 areas of high-tech agriculture. At the same time, other solutions should be also conducted such as promulgating policies that support the development of high-tech agriculture; solutions for land, training human resources, forming models, creating linkages, organizing production and promoting propaganda about high-tech agriculture.

Keywords: Effective high-tech application model, high-tech application agriculture, suitable high technology.

1. INTRODUCCION

At present, agricultural production in Quang Tri province is mostly small and traditional farming; thus it's facing many disadvantages. For example being unable to meet the increasing demand for agricultural products with food safety guaranteed. Only developing high-tech agriculture (HTA) can help overcome the limitations of traditional farming. Quang Tri province has had guidelines and policies in the development of HTA, with many favorable conditions for the development of HTA; and in this area, there have been models of applying high-tech in agricultural production and obtained initial results. Therefore, research in development of HTA in the area is urgent and has sufficient scientific and legal basis.

2. RESEARCH METHODOLOGY

Research contents:

- Assessing situations of agricultural development and high-tech agricultural development in Quang Tri province in 2011 - 2018 period;
- Proposing solutions in developing high-tech agriculture in Quang Tri province in 2020 - 2030 period;

Research Methodology:

- Method of collecting secondary information, investigating primary data by questionnaires;

- Method of collecting, comparing, statistical analysis; SWOT analytical method and expert evaluation method.

3. RESULTS AND DISCUSSION

3.1. Development situations of agriculture, forestry and aquaculture

Agricultural development of the province has been generally oriented in the Socio-Economic Development Master Plan of Quang Tri province (approved by the Prime Minister in 2011); and then more detailed in the Agricultural Sector Development Plan (2014), in the Project "Restructuring the agricultural sector towards increasing added value and sustainable development (2013)". Despite the lack of detailed planning such as planning of concentrated breeding areas, planning of irrigation... agricultural production has still achieved positive results. The province has established a number of concentrated and specialized production im the areas, such as rice-growing area, pepper-growing area, coffee-growing area, fruit-tree-growing area... The details are as follows:

In 2018, gross output of the industry at compared price of 2010 is 3618.1 billion VND. The growth rate of agriculture - forestry - aquaculture in 2016 - 2018 period is 3.83% per year. The proportion of gross output of agriculture - forestry - aquaculture contributing to the total product value of the

province is only 20.59%.

Specific results of some main livestock and plants are as follows:

- Rice: In 2018, the total area of rice cultivation is 50.7 thousand hectares. In which, the area of high quality rice cultivation is over 30.6 thousand hectares, accounting for 64% of total planted area. Rice varieties of short-day, high quality and being adapted to climate change are put into production.

- Annual crops: Peanut with area of 3.58 thousand hectares, cassava with area of 11.88 thousand hectares, vegetables and flowers of all kinds with area of 6.76 thousand hectares.

- Long-term industrial crops: Coffee with area of 5,106 hectares, Rubber trees with area of 19,152 hectares; Pepper with area of 2,533 hectares;

- Animal husbandry has developed towards farming and family-farming. In 2018, number of

Buffaloes is 25,750; Cows and Bulls: 68,000; Pigs: 24,200, Poultry: 2.54 million.

- Area of forestry land in Quang Tri province is 253,856 hectares, the coverage is 50.1%.

- The total area of aquaculture is 3,343.5 hectares, in which fish farming area is 1,187 hectares; shrimp farming area is 1,187 hectares.

In general, in recent years, agricultural production has developed in the direction of actively exploiting potentials and advantages of eco-regions in the province. Crop structure has been changed step by step to enhance productivity and economic efficiency, specialized areas have been formed.

3.2. Situations of high-tech application in agriculture, forestry and aquaculture

In Quang Tri province has formed a number of models of applying high technology in agricultural production, specifically as summarized in table 1.

Table 1. Statistical results of some models of high-tech application

No.	Model	Place	Scale (hectares)	Results
1	High-tech agricultural production	Khang Nguyen commune, Hai Lang district	0.1	Melon: first crop output reaches 3 tons per 1000 m ² . Aquaponic vegetable: 1 - 1.2 tons per 1000 m ² , 10 - 12 crops per year.
2	Planting aquaponic vegetables and fruits	Thanh Cong and Vinh Trung commune	0.2	Output of 1.2 tons per 1000 m ² . Due to unfavorable weather, real output reaches only 70% of the expected value.
3	Planting melon, water melon with high-tech applications	Truong Son, Vinh Tu commune	0.22	Output of 3.5 tons. Lack of experience, it only reaches 70% as expected.
4	Planting vegetables in a net house	Nai Cuu, and Trieu Dong commune	1.2	Recently implemented, vegetables are growing and developing well.
5	Planting vegetables in a net house	Gio My commune, Gio Linh district	2.0	Bitter melon cultivation yield reaches 15 - 20 tons per hectares;
6	Planting high quality rice	In 5 districts	158	Rice grows and develops well, bringing high economic efficiency.
7	Planting pepper with economical watering	Gio An commune, Gio Linh district	5	Pepper grows and develops well, economical watering.
8	Planting clean pepper	Vinh Kim commune, Vinh Linh district	1.0	Pepper grows and develops well, products ensure food hygiene and safety
9	Plant pineapples on sandy soil	Trung Giang commune, Gio Linh district	4	Watered by sprinkler technology, plants have grown and developed well
10	Plant pineapples on sandy soil	Vinh Tu, Vinh Thai commune, Vinh Linh district	8	Watered by sprinkler technology, plants have grown and developed well

Source: Department of Agriculture and Rural Development.

In Animal husbandry, ISE Food Company - Japan has invested in building a high-tech chicken-for-egg-farm with scale of 1.2 million chickens in Vinh Linh district and

some other associated breeding models. Some models of high-tech shrimp farming are summarized in table 2.

Table 2. Statistics of results of building hi-tech shrimp models

No.	Model, technology	Place	Scale	Result
1	Raising White-leg shrimp in 2 stages	Hai Khe commune, Hai Lang district	- Nursery tanks: 2 - Pond: 2,500 m ²	- Output: 4 tons - Productivity: 16 tons per/hectare
		Trieu Lang and Trieu Phong district	- Nursery pond: 350 m ² - Pond: 2,500 m ²	- Season 1: Productivity: 20 tons per/hectare - Season 2: Productivity: 24 tons per/hectare
		Trung Giang commune and Gio Linh district	- Nursery tanks: 2 - Pond: 3,000 m ²	- Season 1: Productivity: 36 tons per/hectare - Season 2: Productivity: 32 tons/per hectare
		Vinh Thai commune, Vinh Linh district	- Nursery tanks: 2 - Farming ponds: 3,000 m ²	- Output: 8 tons - Productivity: 32 tons per hectare
2	Raising commercial white-leg shrimp in the form of intensive farming, using probiotics	Trieu Van commune, Trieu Phong district	- Farming pond: 3,000 m ²	- Output: 6.3 tons - Productivity: 21 tons per/hectare
		Trung Giang and Trung Giang commune	- Farming pond: 3,000 m ²	- Output: 6 tons - Productivity: 20 tons/per hectare
		Vinh Thach commune, Vinh Linh district	- Farming pond: 3,000 m ²	- Output: 4.5 tons - Productivity: 15 tons/per hectare
3	Raising commercial shrimp in 2 stages using Biofloc technology	Vinh Thach commune, Vinh Linh district	- Nursery pond: 300 m ² - Pond: 2,500 m ²	- Output: 5.2 tons - Productivity: 18 tons/per hectares
		Trieu Van commune, Trieu Phong district	- Nursery pond: 300 m ² - Pond: 2,500 m ²	- Output: 4.2 tons - Productivity: 15 tons per/hectare

Source: Department of Agriculture and Rural Development.

In aquaculture, high-technology has not applied much yet. A small number of households, enterprises who have tried high-tech agricultural production reached relatively high efficiency.

In Quang Tri province has 2 units of high-tech forestry seedling production by tissue culture techniques. Every year, these facilities provide about 1.4 million seedlings for the market.

The common features of these models are new construction, small scale, high technology applied partially, stage by stage, newly operated, not stable yet and insufficient information for full assessment, however, initial results have confirmed the success and efficiency of these models. In particular, economic efficiencies of some models are summarized in table 3.

Table 3. Economic efficiency of some plants with high-tech applications

Plants	Model	Productivity (ton/ha)	Total revenue (10 ³ VND/ha)	Total cost (10 ³ VND/ha)	Profit (10 ³ VND/ha)	Difference (10 ³ VND/ha)
Coffee	High tech production	4.50	182,250	64,200	118,050	34,620
	Traditional production	3.50	140,000	56,570	83,430	
Pepper	High tech production	3.50	297,500	85,400	212,100	47,900
	Traditional production	4.20	231,000	66,800	164,200	
Leafy vegetables	High tech production	30.00	180,000	55,000	125,000	78,000
	Traditional production	27.00	81,000	34,000	47,000	
Banana	High tech production	60.00	480,000	85,000	395,000	125,000
	Traditional production	45.00	315,000	45,000	270,000	

(Resource: Summary of survey results in 2018)

The survey results show that, not to mention other outstanding advantages, the efficiency of high-tech agriculture is superior to that of traditional agriculture, from 30 - 160%.

3.3. General assessment of High Tech Agriculture Development in Quang Tri

a. Advantages:

There are sub-regions with favorable soil and climate conditions for developing high-tech agriculture; a number of concentrated commodity-producing areas and high-tech agricultural production models have been established; a linkage between production and consumption has been created and successful and had a positive effect.

b. And disadvantages:

- Quang Tri is a poor province in which people have income but suffer from many adverse impacts of nature;

- There is not any planning for HTA in production areas. The province has not

identified advantageous plants and animals, and suitable high-technology for specific conditions of each sub-region;

- Building, reviewing and evaluating models is limited due to the lack of funding, lack of high-quality manpower;

- Consuming high-tech agricultural products is still difficult, depending mainly on enterprises (no market for products).

c. Opportunities: strong development of high-tech agricultural production models in the country and the world, the industrial revolution 4.0; policy and mechanism, market, capital flows...

d. Challenges: selecting plants, animals, and technologies which are suitable and meeting standards, creating products and raising the value chain of products; market competition, price...

3.4. Identifying objects with advantages of applying high technology

a. Rice is a key plant. Specialized areas of high quality rice are formed. Area of planting high-quality rice reaches 33,060 hectares, accounting for 65.2% of the total area. Values increased by 15 - 20% compared to conventional rice production. Hai Lang, Trieu Phong, Vinh Linh, Do Linh and Cam Lo districts have rice areas with many favorable conditions to build high-tech rice-growing areas.

b. Coffee: is a strategic and advantageous crop of basalt red soil in Huong Hoa district. Huong Hoa coffee product has a reputation for outstanding taste and is popular with consumers.

c. Pepper: Quang Tri province has very special fragrance and spicy, which is popular in domestic and abroad market. The districts which have favorable conditions to create high-tech pepper growing areas are Gio Linh, Vinh Linh, Cam Lo and Huong Hoa districts.

d. Fruit trees: Some typical perennial fruit trees such as Mat Moc banana in Huong Hoa, dwarf bananas in Da Krong, orange K4- area of Hai Lang.

e. Pig: Large area and people having a tradition of raising pigs are convenient conditions for pig raising. Development orientations are raising foreign pig breeds, and leaning hybrid breeds of Yorkshire, Landrace, Duroc, PiDu....

f. Oxen breeding: The quality of the ox herd is increasing, the number of Zebu cross breeds is about 28,000 accounted for 41.2% of the total herd. Oxen breeding has many favorable conditions for high-tech applications.

g. Poultry: Poultry herd is currently around 2.54 million; Poultry production still has many potentials, especially high-tech applications.

h. Aquaculture: In province, areas with favorable conditions for high-tech shrimp farming are mainly located in districts of Hai Lang, Trieu Phong, Gio Linh and Vinh Linh.

3.5. Solutions for developing hi-tech agriculture in Quang Tri province

3.5.1. Solutions for planning and applied technology

a) Planning the Northern Huong Hoa High-tech Agriculture Zone

The Northern of Huong Hoa district has favorable conditions for developing hi-tech agriculture, which is regarded as a small Da Lat of Quang Tri. Currently, the Provincial People's Committee is investing in building an experimental station in Sa Mu pass, Huong Phung commune, with an area of about 13 hectares. The Experimental Station will be planned to expand and upgrade to High-Tech Agriculture Zone with an area up to 30 hectares, having full functions of High-Tech Agriculture Zone as regulated.

b) Planning the High-tech Aquaculture Zone in Trieu Phong, Trieu Lang

High-tech aquaculture area is located in Trieu Lang commune, Trieu Phong district; Area: 15 hectares, Current status is the coastal wasteland. Main tasks: To carry out activities of research and application, test and perform high-tech aquaculture production models, high-tech breeding and aquaculture; training high-tech human resources in aquaculture... Technologies are expected to be applied: Farming according to advanced production processes (VietGAP, Global GAP...) and seed production using biotechnology.

c) Planning the FAM - Quang Tri High-tech Agriculture Zone

FAM - Quang Tri High-tech Agriculture Zone is located in Cam Tuyen commune, Cam Lo district. Scale of appointed area is 200 hectares. This high-tech agricultural area will be invested to grow fruit trees such as dragon fruit, passion fruit and melon. The used technology will be contemporary high technology such as seed production by tissue

culture; greenhouse production, drip irrigation or sprinkler system...

d) Planning High-tech Rice Planting Areas

By 2030, the province will have 04 high-tech rice growing regions, covering an area of 2,900 hectares.

Applied technologies:

- Biotechnology in breeding new rice varieties.

- The system of Rice Intensification (SRI); balanced fertilization, use of synthetic fertilizers, organic fertilizers, microorganism fertilizer; biological pesticides, integrated crop management (ICM); integrated pest management (IPM), integrated water management (IWM); economical irrigation technology;

e) Planning High-tech Coffee Areas

- The high-tech coffee region with area of 1,000 hectares is formed and, located in Huong Phung commune and neighboring communes, such as Tan Lien, Tan Hop, Huong Tan and Khe Sanh of Huong Hoa district.

Applied Technologies:

- As for seeds: use of new varieties that are of pest - resistant, high yield and good quality.

- Economical irrigation technology, using sprinkler or drip irrigation system.

- Automatic or semi-automatic disease control spraying systems.

- Investing in wet processing technology. Applying enzyme technologies in particle separation.

f) Planning High-tech Pepper Areas

4 high-tech pepper areas are formed in 4 districts of Vinh Linh, Gio Linh, Cam Lo and Huong Hoa, with a total area of 1,200 hectares.

- Implementing the process of propagating pepper of zero virus disease (Stunted disease). Using quality varieties like pepper of Vinh Linh, Trung Loc Ninh, India, new varieties of Sri Lanka.

- Strengthening integrated pest measures

(IPM), using probiotics (MT1, SH1, EM, Trichoderma...).

- Applying economical irrigation, sprinkler and drip irrigation technologies under the canopy.

- Applying technologies for processing: Using enzymes in preserving and processing high quality pepper.

g) Planning High-tech Fruit-tree Areas

A high-tech banana area is in Huong Hoa, covering 500 hectares. High-tech citrus growing area (orange, grapefruit, tangerine etc) is located in Hai Lang district, with the scale of about 500 hectares. High-tech pineapple growing area is arranged into 2 regions located in Cam Lo and Gio Linh district, with the scale of 300 hectares for each region.

Applied technologies:

- Biotechnology in breeding and propagating: propagation by extraction, grafting, tissue culture technology, DNA molecular marker technology.

- Probiotics in preventing pests, caring, pollinating...

- Technologies of net houses and greenhouses; Applying information technology, automation, sensor systems controlling light, humidity and temperature automatically; using technologies of water spraying, misting and dripping combined with automatic fertilizing according to the needs of plants.

- Probiotics in preservation; preserving by Ozon water, using Anolyte antiseptic solution.

h) Planning High-tech Vegetable and Flower Areas

High-tech vegetable and flower areas are formed in Huong Phung commune, Huong Hoa district, with the area of approximately 200 hectares.

Applied technologies:

- High class vegetable varieties (tomato, gherkin, sweet corn, celery, tiny tomato,

cabbage, beans, soybean vegetable etc), the tuber eating varieties (potatoes, kohlrabi...).

- New material technologies: building net houses, greenhouses, plastic houses.

- Technologies for growing vegetables like aquaponics, aeroponics; growing vegetables on the substrate. Applying technologies in processing soil and creating substrate: smoked rice husks, sawdust, coconut husks.

- Biological products to provide nutrition for vegetables in production (biological foliar fertilizer, EM, Trichomix...).

- Technologies of economical watering, through drip irrigation, sprinklers...

- Informatics technology, mobile phone, computer to control and monitor temperature, humidity, water in greenhouses, net houses... to control time of planting, flowering, fruiting...

- Probiotics in preservation; preserved by Ozon water, antiseptic solution of Anolyte.

- Preserving fruits and vegetables by Ozon water, antiseptic solution of Anolyte, membrane technology, irradiation, cold drying, cold storage, automatic temperature and humidity control.

i) Planning High-tech Shrimp Breeding Areas

6 high-tech shrimp breeding areas are arranged in 3 districts of Trieu Phong, Vinh Linh and Hai Lang, with the total area of 220 hectares.

- Production of parents: applying genetic technology, selecting breeds, creating clean and resistant parents; using parent flocks of clear origin.

- Using industrial pellets in combination with biological products;

- Technology of raising: intensive shrimp farming, super intensive farming in greenhouses, net houses, following the procedures of VietGAP, BAP/ACC, ASC...

k) Planning High-tech Pig Breeding Areas

04 high-tech pig breeding areas are

arranged in Hai Lang, Cam Lo, Vinh Linh and Huong Hoa districts.

Applying closed pen type, with cooling system and odor control system, automatic sensors system to adjust temperature, rearing on biological pads etc); Applying Probiotics products, Producing according to VietGAP process, biosecurity procedures...

Regarding breeds, applying artificial insemination to develop super lean pig breeds such as Duroc from the US, Landrace from Denmark, Yorkshire...

l) Planning High-tech Poultry Breeding Areas

05 high-tech poultry breeding areas are arranged in Vinh Linh, Dakrong and Cam Lo districts; Trieu Phong and Hai Lang, each region has a scale of 50,000 heads.

- Using chicken breeds of Dong Tao, hybrid fighting, J-Dabaco, Minh Du, H'Mong, Luong Phuong, Tam Hoang...

- Using a variety of amino acids, vitamins, digestive enzymes, organic minerals.

- Applying diagnostic and veterinary technologies: ELISA, PCR, kits for diagnosing chicken disease.

m) Planning High-tech Beef, Dairy Cattle Breeding Areas

1 high-tech dairy cattle breeding area is planned to be in Northern of Huong Hoa. 02 high-tech beef cattle breeding areas are arranged in Trieu Phong, Gio Linh.

Applied technologies:

- New breeds: Zebu, Brahman, Hereford, Druoghmaster, Red Angus, Belgium Blue Blanc (BBB).

- Technology of rearing and transplanting cow embryos; technology of producing frozen sperms in an artificial insemination for bulls; technology of mounting electrical chips to increase conception rates in cattle artificial insemination.

- Technology of Total Mixed Ration (TMR) for oxen; developing new grasses such as

Elephant Grass, Va06, Mulato, Super BMR, Sweet Jumbo hybrid grass...

- Technology of self-contained cattle ranch, with automatic control system of temperature, light, humidity, automatic feeding and drinking line; using automatic milking system.

- Measurement and diagnosis technologies: ELISA, PCR, the kits for diagnosing disease; using high-tech produced vaccines;

- Biotechnology, using probiotics in environmental treatment, animal manure treatment.

3.5.2. Solutions for Mechanism and policy

- For high-tech agricultural production areas: Providing funds for investment in building technical infrastructures; at least 30% of the total approved estimate.

- Enterprises that have investment projects in high-tech agricultural product processing facilities; high-tech slaughtering facilities are supported with 60% of the investment cost and not exceeding 15 billion VND per/project to build waste treatment, transportation, electricity, water, factories and equipment within project.

- Enterprises that have investment projects on agricultural product preservation facilities are supported by the State budget with 70% of investment cost but must not exceed 2 billion VND per/project.

- Enterprises that have high-tech shrimp farming investment projects are supported with 50% of the total construction cost and not exceeding 3 billion VND per/project to build infrastructure for waste treatment, transportation, electricity, water, factories and equipment purchases.

- State budget support for investment in water-saving irrigation systems is 50% of investment cost for projects approved by competent authorities. The support level must

not exceed 20 billion vnd per/project.

- Supporting 100% funding for vaccine purchases for high tech breeding establishments.

- High-tech agriculture enterprise that directly provide vocational training for workers is supported with 02 million/month/labor, 03 months support period.

- Supporting 50% of advertising and branding costs for provincial high-tech agricultural products.

- Funding support for scientific research projects and technology copyrights purchase: 80% of implementation funding, but not exceeding 300 million VND per /topic/copyright/technology.

- Supporting enterprises in implementing pilot production projects with high-tech applications: 70% of the funding but not exceeding 1 billion vnd.

- Enterprises with plant propagation by tissue culture are supported with 80% cost for building infrastructure, equipment and environmental treatment, but not exceeding 05 billion/vnd per project.

- Enterprises investing in high-tech zones, regions and projects shall be supported with a maximum of 300 million VND per/hectares to build infrastructure, equipment and environmental treatment.

- Province budget supports 50% of first-time seed/breed purchasing cost: industrial crops (coffee, pepper), fruit trees (mango, avocado, citrus); aquatic breed; beef cattle breed, pig and poultry breed.

- Facilities that have investment projects of developing high-tech seeds/breed production, high-tech agricultural production and processing, are supported with 100% of interest rate when borrowing loans from bank, the maximum loan term is 36

months. Total loan entitled to interest rate support shall not exceed 3 billion VND per farm project, cooperative team, cooperatives; not exceed 10 billion VND per/project for enterprises.

- State budget supports enterprises and cooperation with 100% of funds for building a number of high-tech application models in preserving and processing coffee, pepper and fruit trees.

3.5.3. Solutions for Land

- Land concentration and consolidation should be promoted so that High-tech agricultural production farms, enterprises with big size can be established. The Provincial People's Committee provides financial support for measurement, updating, adjusting cadastral records and issuing land use right certificates.

- Allocating land and applying the most preferential land rent rate for enterprises that lease land for HTA production.

- Prioritizing the land allocation for concentrated animal husbandry areas, allocating land for planting crops as animal feed.

3.5.4. Solutions For Training and Using Human Resources In High- Tech Agriculture

- Training and improving capacity of farm owners, cooperatives, agricultural production enterprises in terms of techniques, production management skills (finance, labor, technical processes...).

- Selecting young technical staffs and agricultural managing staffs to send for training and retraining in science and technology, high-tech agriculture and management science.

- Educating, training, propagandizing about models of HTA so that enterprises, people can learn and follow successful models of applying high-tech in production.

3.5.5. Solutions about Creating Models of Applying High-tech

- Creating models of HTA production with big scale and applying complete and synchronized high-tech, reviewing and assessing models for necessary lessons.

- Carrying out scientific research projects and building trial production and testing models in agriculture. Focusing on the use of new varieties and superior hybrid varieties, advanced farming methods, biotechnology.

- Focusing on research, crossbreeding and importing new varieties with dominant advantages; studying to build and complete high-tech cultivation process and high-tech intensive farming process; building demonstration models linking production, processing and consumption of high-tech applied products, applying VietGap, GAP and HACCP standards.

3.5.6. Solutions for building links, advanced production organizations

Building links in HTA production areas, includes cross links and vertical links. Firstly, cross links are forming cooperatives and large sample fields so that households can produce one type of product together, follow one process to create a centralized production area, which has large-scale, large volume of agricultural commodities and uniform quality.

Secondly, vertical links are created at the same time. They are links among farmers, cooperatives and enterprises in production, processing and consumption of High-tech agricultural products, in forms such as direct contracting, or farmers participating enterprises in the form of capital contribution by land so that enterprises can be active in goods supply for partners and ensure product consumption for farmers.

3.5.7. Solutions on promoting propaganda and advocacy

Developing websites on applying high-tech in agriculture; broadcasting programs of high

tech agricultural production on the provincial television and radio station and in Quang Tri newspaper in order to provide information about local high-tech agricultural areas, types of products, origins of products, technologies being applied etc for enterprises and people.

4. CONCLUSIONS

4.1. Conclusions

a) In Quang Tri province, in general, agricultural production is mainly traditional method, small size, fully exploiting available resources. In the province, there have been some initial models that apply high technology in production such as growing plants in greenhouses, net houses; watering with sprinkler or dripping, bio-fertilizing, and intensive shrimp breeding in 2 stages etc and initially have gained certain success, very likely to be replicated.

b) Advantageous crops and animals suitable for hi-tech applications in sub-regions of the province are rice, coffee, pepper, fruit trees, vegetables and flowers, raising pigs, raising poultry, raising beef cows, dairy cows and aquaculture.

c) In order to develop HTA in the area of Quang Tri province, it is necessary to synchronously carry out a number of solutions as follows: First is planning areas and zones for High-tech Agriculture, identifying appropriate high technologies for each region, each plant in consistent with the conditions of each region; Second is the province issuing policies to support businesses and people in investing in applying high-tech in production (focusing on supporting infrastructure construction, high technology application...); Third is the land solution, focusing on creating a land fund for production and being given the highest preferential treatment when renting

land for HTA production; Fourth is training and using human resources; Fifth is modeling and replicating models; Sixth is building links, types of advanced production organization; and Seventh is promoting propaganda for people to know about HTA.

4.2. Recommendations

- The Land Law should be amended and supplemented to create a favorable legal corridor for the accumulation and concentration of land to form high-tech agriculture zones, areas.

- The People's Council, People's Committee of Quang Tri shall soon promulgate supporting mechanisms and policies in order to step by step applying high-tech in agricultural production, firstly focusing on identified High-tech areas and zones.

REFERENCES

1. National Institute of Agricultural Planning and Projection (NIAPP), National master plan for development of high-tech agricultural zones and areas till 2020, with the orientation to 2030.
2. Decision No. 321/2011/QĐ-TTg dated March 2, 2011 of the Prime Minister on approving the Master Plan on socio-economic development of Quang Tri province up to 2020.
3. Resolution No. 17/2009/NQ-HĐND dated July 30, 2009 of the People's Council of Quang Tri province on the Development of some key plant varieties, animal breeds and aquatic breeds in the 2010-2015 period and the development of animal husbandry of Quang Tri province in the 2010-2015 period, with the orientation to 2020.
4. Decision No. 2211/QĐ-UBND dated October 15, 2014 of the People's Committee of Quang Tri province on approving the Planning on agriculture sector development in Quang Tri province till 2020.
5. Decision No. 32/2009/QĐ-UBND dated December 15, 2009 of the People's Committee of Quang Tri province on Implementing policies on development of major plant varieties, animal breeds, aquatic products and animal husbandry in Quang Tri province in the period of 2010-2015, with the vision to 2020.

GIẢI PHÁP PHÁT TRIỂN NÔNG NGHIỆP ỨNG DỤNG CÔNG NGHỆ CAO TRÊN ĐỊA BÀN TỈNH QUẢNG TRỊ ĐẾN NĂM 2030

Hoàng Xuân Phương¹, Nguyễn Bá Long¹, Xuân Thị Thu Thảo¹, Nguyễn Văn Thương²

¹*Trường Đại học Lâm nghiệp*

²*Viện Quy hoạch và Thiết kế nông nghiệp*

TÓM TẮT

Sản xuất nông nghiệp truyền thống ở Quảng Trị hiện nay mặc dù đã đạt được những thành công nhưng còn gặp phải rất nhiều khó khăn, hạn chế, và phải ứng dụng công nghệ cao thì mới có thể khắc phục được những hạn chế đó. Trên địa bàn đã có những mô hình bước đầu thành công trong việc ứng dụng công nghệ cao vào sản xuất nông nghiệp như mô hình trồng rau, cây ăn quả trong nhà kính, sử dụng giống tiến bộ, tưới nước tiết kiệm; mô hình nuôi tôm thâm canh sử dụng chế phẩm sinh học, mô hình trồng lúa sử dụng phân bón và thuốc bảo vệ thực vật sinh học... Nghiên cứu chỉ ra một số cây trồng vật nuôi trên địa bàn có ưu thế trong ứng dụng công nghệ cao như lúa, cà phê, hồ tiêu, cây ăn quả, chăn nuôi lợn bò, gia cầm, và nuôi trồng thủy sản. Để phát triển nông nghiệp ứng dụng công nghệ cao (NNUDCNC) trên địa bàn cần có những giải pháp đồng bộ, trong đó giải pháp quan trọng là quy hoạch các khu, các vùng ứng dụng công nghệ cao đồng thời xác định công nghệ phù hợp với từng cây con, ở các khu, các tiểu vùng cụ thể. Nghiên cứu xác định tới năm 2030 tỉnh Quảng Trị sẽ xây dựng 2 khu NNUDCNC và 33 vùng NNUDCNC. Đồng thời cần thực hiện các giải pháp khác như ban hành cơ chế chính sách hỗ trợ phát triển NNUDCNC; các giải pháp về đất đai, về đào tạo nhân lực, xây dựng mô hình, xây dựng liên kết và tổ chức sản xuất và đẩy mạnh tuyên truyền vận động về NNUDCNC.

Từ khóa: Công nghệ cao thích hợp, hiệu quả mô hình ứng dụng công nghệ cao, nông nghiệp ứng dụng công nghệ cao.

Received : 11/9/2019

Revised : 15/10/2019

Accepted : 22/10/2019