Original Article

HIGH-TECH AGRICULTURAL ECONOMIC DEVELOPMENT AND MANAGEMENT: EXPERIENCE IN VIETNAM

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Abstract

In Vietnam, the application of high technology to the agricultural production process has been formed and developed in the Northern Delta, the Central region, the Central Highlands, and Ho Chi Minh City. The article reflects the experience of managing and developing high-tech agriculture worldwide and draws reference values to build, manage and develop hi-tech agriculture in our country. Thereby meeting the increasing demand of the people in terms of quantity, quality, types, and more affluent high-tech agricultural products.

Keywords: Management, development, high-tech agriculture, Vietnam.

1. INTRODUCTION

1.1. The concept of high-tech agricultural technology

High technology is a technology with a high content of scientific research and technological development, which is integrated from modern scientific and technical achievements to create products of high quality, outstanding features, and added value. High growth, environmentally friendly, plays a vital role in forming new production and service industries or modernizing existing ones.

High-tech activities include research, development, search, transfer, and application of high technology, training of high-tech human resources, high-tech incubation, and high-tech enterprise incubation.

High-tech products are created by technology, with outstanding quality, features, high added value, and environmental friendliness. High-tech agricultural development is the application of advanced technologies and techniques to all stages of the farm production process to create products with high productivity, quality, efficiency, and safety. food safety is competitive with traditional products. Includes the following principal contents:

Selection of advanced technologies in plant varieties, animal breeds, advanced farming and breeding technologies, irrigation technology, post-harvest technology - preservation, processing, step-by-step application of biotechnology and technology information into management, branding, and market promotion.

High-tech agricultural production creates products with characteristics of each ecological region, achieving high productivity and economic efficiency per unit area, with high competitiveness in terms of product quality. The same type on the market has the conditions to expand the production scale when needed.

A high-tech agricultural area is a concentrated agricultural production area applying scientific and technological advances to produce a farming commodity product.

The hi-tech agricultural zone is a high-tech park that applies research achievements and high technology to select, breed, and breed plants and livestock breeds for productivity, quality, disease prevention, and treatment. Planned pets; created materials, machinery, and equipment used in agriculture; preserved and processed agricultural products; developed agricultural enterprises with high technology applications and high-tech services for agriculture.

According to the Law on High Technology, the hi-tech applied agricultural zone has 05 essential functions: applied research, Tests, High-tech demonstration, Human resource training, and Producing high-tech application products. In which the function of testing, demonstration, and production of high-tech products is standard, the remaining two processes depend on the characteristics of each agricultural zone.

1.2. Classification of hi-tech agriculture

The application of high technology to agriculture has led to the birth of many new agricultural products such as hi-tech agricultural farming, hi-tech agricultural enterprises, hi-tech agricultural stations, hi-tech agricultural zone, and high-tech agricultural zone.

1.2.1. Form of high-tech agricultural farming

High-tech agricultural farming is a production model that applies high technology and techniques in agriculture but mainly focuses on the production stage. In this model, modern farming techniques are often used, such as:

Growing plants without soil is an artificial method of supporting plants, replacing the role of the earth, and actively providing plant food through nutrient solutions.

The technique of growing plants without soil has the advantages of less plant disease development, no need to disinfect the ground, less spraying of pesticides, and reduced costs, ensuring the product is clean because it is not contaminated with chemical residues and heavy metals. Provide adequate, balanced, and timely nutrients for plants; actively adjust the pH of the environment, saving fertilizer and water. Be proactive in seasonality, proactive in disease prevention, easy care, and collection. Use of barren soils as growing media such as sand and gravel. Growing plants without soil are one way to conduct clean agricultural production. Techniques for growing plants without soil include the following main methods:

The hydroponics method is one of the techniques for growing plants without soil. Plants are grown directly into the nutrient solution, an advanced technique of today's farming. Choosing the right natural environment for plants to grow is the use of nutrients suitable for the growth and development of plants.

Growing plants by the hydroponic method have the advantage of being able to adapt to different growing conditions quickly; reduces labor because there is no need to work the land, water, plow, weed, the elderly and children can all participate; high productivity due to being able to cultivate many crops in a year; Immaculate, high-quality product. Besides, this method has limitations such as applying only to short-term vegetables and flowers, relatively high cost, significant investment capital, and high technology. Three hydroponic systems are being used today: non-reflux hydroponics, reflux hydroponics, and nutrient-thin film hydroponics (NFT).

Aeroponics is an improved hydroponics method; it is the method where the roots are not dipped directly into the nutrient solution but must go through a periodic misting pump system, thereby saving nutrients and maximizing the roots' breathing.

Growing plants on the substrate is a technique where the plants are grown on different media types and provided with nutrients through the watering solution on the substrate. There are many substrates such as sand, gravel, peat, shavings, rice husk, and bagasse; The substrate is both plant support and a part of the water and nutrients provided to the plants. The technique of growing plants on the substrate has the following advantages: optimal nutrient supply for plants; controlled moisture and nutrients; advantages in sterilization and easy replacement of media between periods; Saves production space and water by being reused. Besides, this technique has limitations such as low nutrient storage capacity due to low root volume and difficulty controlling pH.

1.2.2. Hi-tech agricultural enterprise

The concept of a hi-tech agricultural enterprise, also known as a high-tech agrarian enterprise, is an enterprise applying high technology in agricultural production to create agricultural products of high quality, productivity, and added value.

A high-tech enterprise must first satisfy the conditions of a high-tech enterprise, which are:

Producing high-tech products is encouraged to develop.

The average total expenditure of the enterprise for three consecutive years on research and development activities must reach at least 1% of the total annual revenue, and from the fourth year onwards must reach over 1% of the total income; The average turnover of the enterprise for three consecutive years from high-tech products must get at least 60% of the total annual turnover, from the fourth year onwards must reach 70% or more; The number of employees of enterprises with university or higher qualifications who directly conduct research and development must get at least 5% of the total number of employees; Apply environmentally friendly, energy-saving measures in production and manage product quality up to prescribed standards.

At the same time, high-tech enterprises must also meet the following conditions: Application of high technologies is prioritized for investment and development. Conduct research and experiment on applying high technology to agricultural production; Produce products of high quality, productivity, value, and efficiency.

Each high-tech enterprise has its field of operation with its technologies and techniques suitable for production objects. Still, in general, high-tech agricultural enterprises have the following advantages and disadvantages:

Advantages: Applied science and technology model and production scale suitable to the enterprise's ability to invest, produce and consume agricultural products; Independent and autonomous operation helps enterprises to adjust production direction flexibly to market requirements and corporate capital.

Disadvantages: Mainly focus on production stages; investment cost for a unit of production area is high. It is challenging to create many products; The ability to spread and transfer technology is complex.

1.2.3. Hi-tech agricultural zone

Hi-tech Agricultural Park, also known as Hi-Tech Agriculture Park. The concept of a high-tech park is understood as follows:

For developed countries, the hi-tech park has two main functions: serving to enjoy the landscape and improving people's understanding, changing the way of rest, and creating conditions for daily workers in the office exposed to manual labor.

For developing countries: The formation of high-tech zones with the primary production objective. People display high-value agricultural products and production equipment with high gray matter content in the high-tech agricultural zone. It also performs training and technology transfer functions.

In Vietnam, a high-tech park is a high-tech park that focuses on research, training, transfer, and application of scientific and technological achievements to the agricultural sector.

Thus, the high-tech agricultural zone is a defined territory, not too large in terms of area, but applying modern science and technology to production, so it gives high productivity and quality of agricultural products, great competitiveness, and high economic efficiency. . Collectively, the high-tech park has the main functions as a place to demonstrate scientific and technological innovations; a place to gather talents and attract investment; is a place for technology innovation, technology incubation, and training.

The high-tech zone is a closed area for agricultural product production - processing - consumption. It is one of the new forms of agricultural territorial organization; its role is as the nucleusagriculturalrian development in the direction of high technology application, as a model of agricultural organization in the order of sustainable development, supporting, leading, and orienting investors and cooperatives. , individual farmers learn and apply research results to production. In the early 1980s, the United States had more than 100 high-tech zones; In the UK, in 1988, there were 38 science and technology gardens with more than

800 participating businesses. In Finland in 1996, there were 9 NCNCs. In the 1980s, Israel built the first 10 R&D zones; China now has more than 500 zones and 4000 centers of high-tech applications in agriculture across the country.

High-tech agricultural production activities in these zones have advantages such as ensuring continuous synchronization in activities; concentrated goods, control of the quality of farm products, reduced infrastructure investment costs for an area unit; enjoying preferential policies of the State such as low cost of land rental and export tax on farm products, support for science and technology, and labor support. In addition to the advantages, the formation and development of hi-tech parks face difficulties such as high investment capital, slow recovery, low-capital enterprises can hardly participate, and not being suitable for some customers. Seedlings require ample isolation space.

1.2.4. High-tech agricultural production areas

High-tech agricultural production area, also known as high-tech agricultural production area, is a concentrated agricultural production area, applying high-tech research and development achievements to the farm field to perform production tasks. Export one or a few agricultural products, commodities, and strategic exports based on the results of selection and breeding of plants and animal breeds for high productivity and quality; disease prevention and control; planting and raising livestock with high efficiency; using modern materials, machines and equipment in agriculture; preservation and processing of agricultural products and high-tech services in agricultural production, to create a large and concentrated amount of farm products.

This is a popular and mass-produced form of production with practical significance in countries with large and developing agricultural land areas like Vietnam. This high-tech agricultural production area is suitable for seedlings that need an ample isolation space; taking advantage of the natural, socio-economic conditions of the region (gathering a large production area, attracting human scientific resources) can apply many modern farming techniques to plants. With specific characteristics, it will create a sizeable agricultural production area to use high technology in agricultural production. The production in this form also faces limitations such as asynchronous technology application, so the product quality is not high, not meeting market requirements. The agricultural product market is unstable, and the economic efficiency is not high.

Currently, the whole country has initially formed several agricultural production areas to apply high technology in products, such as areas specializing in producing vegetables, fruits, food, flowers, and tea in Lam Dong orchid production areas, vegetable production area ... according to VietGap process in Ho Chi Minh City with income increased many times compared to conventional production.

2. EXPERIENCE IN MANAGEMENT OF INVESTMENT ATTRACTION IN HIGH-TECH AGRICULTURE IN SOME COUNTRIES.

2.1. American

In the United States, since the beginning of the twentieth century, the US government has applied technological advances to agriculture to increase productivity and start the golden age of American agriculture.

In the early 80s, the United States had more than 100 science and technology zones dedicated to agriculture. The measures used by this country are: using high-tech irrigation equipment, focusing on research and development of new varieties, planting biotech crops with the largest area in the world, and researching variable plant varieties—gene change.

A growing trend in the United States is a shift between large crop-intensive farms, traditional agricultural producers, and science-based production, research, and development, such as potato production. Western hybrids have high virus resistance, small-stemmed bananas, and high yield.

2. 2. Japanese

In 1961, Japan was preparing to build a science city at Zhubo, 60km from Tokyo. Construction began in 1964, and Zhubo University was inaugurated in 1974; by the 1980s, the city's population had reached 150,000, with 6,500 research staff and 9,000 students. The science city has universities, research institutes, parks, and apartment complexes. There are more than 50

teaching and research units, 15-16 units: Institute of technology, agricultural engineering, environment, mulberry, land planning, pastoral works, biological works, animals, varieties, and gene stores.

Mainly focus on land-saving technologies such as increased use of chemical fertilizers; improving the management and irrigation techniques for rice; hybridizing and putting into mass use disease-, insect- and cold-resistant varieties, bringing agricultural production to intensive farming and increasing productivity. Japan is also very responsive to this issue when establishing the National Institute of Agricultural Sciences at the state level, strengthening research links between scientific institutes with universities and agricultural extension associations to tighten and improve management.

2.3. Israel

In the early 80s of the 20th century, Israel built ten high-tech agricultural zones with record revenue of 200,000 USD/ha. Greenhouse technology for tomato yield 300 tons/ha, four times higher than field planting. Israel has only 360,000 hectares of arid agricultural land, lacks irrigation, and is distributed across many climates. Still, it has produced enough food for the whole country and exports. In the last five decades, Israel's agricultural production value has always exceeded 3.5 billion USD/year, of which exports accounted for over 20%. Currently, an Israeli farmer produces enough agriculture to feed 100 people.

This success is because the Israeli Government has developed a national plan to establish a high-tech agricultural zone in a turnkey fashion, including the following stages: planning, project development, and participation—management of high-tech farm projects. Israel is currently the world leader in budget allocation for research and implementation of CNC applications in agriculture. The Israeli Ministry of Agriculture supports and controls all agricultural activities, including maintaining high standards for crop and livestock products, and sets out plans to promote and develop agriculture through research and marketing activities. For many years, Israeli agriculture has been strictly controlled by the Government through production subsidies and water consumption norms for each crop. The country has held production norms and quality of several agricultural products such as vegetables, milk, eggs, chicks, and potatoes.

3. EXPERIENCE IN VIETNAM

Firstly, the construction of hi-tech agricultural zones is also the implementation of the State's supporting role for agriculture, farmers, and rural areas in the spirit of Resolution No. 26-NQ/TW at the Central Conference. The 7th Central Committee of the Xth Congress and the State's documents such as the Law on High Technology, the Project on High-Tech Agriculture Development to 2020 and a Vision to 2025, Decree No. 61/2010/ND-CP stipulating several incentives and additional investment support of the State for enterprises investing in agriculture and rural areas. The hi-tech agricultural park will be a bridge, receiving technology from research projects of scientists and universities to build a perfect technology model, thereby transferring it to businesses, agriculture, farms, cooperatives, and households.

Secondly, in the development of high-tech agriculture, the breakthrough field is defined as biotechnology, which has created transgenic plant varieties with the characteristics of resistance to herbicides and pests; in vitro plant tissue culture technology. High technology in cultivation and control of external factors suitable for the growth and development of crops is first of all the technology of growing plants in a greenhouse, now known as a greenhouse due to the use of a membrane roof polyethylene replaces glass or net house. The technology of growing hydroponics is based on the provision of nutrients through water aeroponics - nutrients are provided to plants in the form of misting and techniques for growing plants on substrates. - Nutrition is mainly provided in liquid form through inert media. Growing plants on solid media (solid media culture) is an improved method of hydroponic growing technology. Water-saving irrigation technology in the form of semi-permeable drip and sprinkler irrigation combined with fertilizer application. Irrigation technology can be applied in many conditions, such as greenhouses, net houses, crops in the field, etc. Israel is a country that has successfully and effectively used irrigation technology for agriculture and irrigation systems, greenhouses, and net houses.

Third, the State's supportive policies to develop hi-tech agricultural zones. The procedure is considered the legal basis for implementing measures for socio-economic development in general and agricultural development in particular. Policies have a significant influence on the formation and development of high-tech agriculture. The development policy of high-tech agriculture is set forth by the Agriculture sector leaders in collaboration with relevant sectors to establish and orient the product to the development trend of the world Agriculture industry. This policy creates favorable conditions for producers to apply modern scientific and technological achievements to agricultural development.

Thus, for the practical application of high technology to production, it is necessary to have policies that are strategic, correct, and consistent with the general development trend of the times; Technology applied in production is also increasingly developed according to the development of science and technology of humanity.

Fourth, besides the prefixes, the success, and development of high-tech agriculture and the operation of other factors such as technical facilities, capital, land and topography, climate, and hydrology. Most of the high technologies applying water in agriculture have the common feature of free arable land; land-saving work is put first—a priority investment budget for research and deployment of high-tech applications in agriculture.

Investing in training and developing human resources to master high technology in agriculture. Developing policy formats to create hi-tech agricultural zones.

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