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Improving startup capacity in the high-tech agricultural industry in Vietnam

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Abstract

The COVID-19 outbreak has brought unprecedented challenges, which are forecast to have significant impacts on Vietnam's economic development this year. Based on the current situation, we explore the potential impacts of the COVID-19 pandemic outbreak on the Vietnamese economy. This research is accompanied by a significant degree of uncertainty. Specifically, during the COVID-19 pandemic, predictions were re-examined and revised every week since the beginning of the pandemic outbreak. We hope this publication can help businesses prepare for, cope with and overcome a risky and volatile environment.

Keywords: startup capacity, high tech, agriculture, Vietnam

1. Introduction

1.1 General situation

The COVID-19 outbreak has brought unprecedented challenges, which are forecast to have significant impacts on Vietnam's economic development this year. Based on the current situation, we explore the potential impacts of the COVID-19 pandemic outbreak on the Vietnamese economy. This research is accompanied by a significant degree of uncertainty. Specifically, during the COVID-19 pandemic, predictions were re-examined and revised every week since the beginning of the pandemic outbreak. We hope this publication can help businesses prepare for, cope with and overcome a risky and volatile environment.

Furthermore, Vietnam's economy depends heavily on other economies. Therefore, scenarios and predictions related to the impacts on Vietnam's economy also correlate with the impacts on the economies of other countries after the COVID-19 pandemic outbreak. In 2021, to cope with the COVID-19 outbreak, Vietnam has applied the most stringent prevention and control measures. This has affected the growth rate in consumption, investment and import-export of Vietnam.

However, entering 2022, restrictive measures are gradually eased, business activities are returning, and Vietnam's economy and trade have significantly improved. Vietnam's economic growth rate in the first quarter of 2022 increased clearly, first quarter GDP reached 92.175 billion USD, up 5.03% over the same period last year, higher than China's economic growth rate (4.8%) and Singapore (3.4%).

1.2 Urgency

High-tech agriculture is a trend that Vietnam is aiming for and promises to be a big step forward for the country's agriculture. We must promote the development and application of high-tech agriculture in the agricultural sector, combining new technologies and production progress to improve efficiency, create a breakthrough in the quality of agricultural products, and satisfy customers. The growing needs of society and ensuring sustainable agricultural development, this is the urgency of the topic.

Emphasizing high-tech agriculture is considered a key and central solution. Solve challenges in developing high-tech agriculture (save costs, increase productivity, lower costs and improve the quality of agricultural products, protect the environment).

Determining the importance of technology-based agriculture to help change the country's agricultural picture, bringing Vietnam's agriculture to integrate and develop in the era of the 4.0 industrial revolution, 4th Conference, Executive Committee The 12th Party Central Committee issued Resolution No. 06-NQ/TW, November 5, 2016 on effectively implementing the process of international economic integration, maintaining political and social stability in the country's context. We participate in new-generation free trade agreements that emphasize orientations for modern agricultural development and high-tech application such as: "Modernization and commercialization of agriculture, shifting strongly to agricultural development." In-depth industry, large production, based on science and technology, with high productivity, quality, competitiveness and added value. Transforming agriculture from mainly food production to developing diversified agriculture suitable to the advantages of each region"... According to the report of the Ministry of Science and Technology in 2019, thanks to the application of science and technology in production, the agricultural production structure continues to be adjusted in the direction of promoting the advantages of each locality, region, and region. the whole country, associated with domestic and international market needs, adapting to climate change. Many businesses have invested in large-scale concentrated production zones with modern technology associated with factories, storage and processing facilities for agricultural products with high export value. In the field of cultivation, we have promoted the transformation of crop structure and applied advanced production processes. Due to good pest control work, the output and quality of many crops with economic value have increased.

1.3 Target

Vietnam is a developing country, agriculture still plays an important role in the economy. However, the explosion of information technology; The process of international integration requires higher quality agricultural products; Along with the shrinking land area due to urbanization and climate change while the population increases, the demand for food is constantly increasing... these are huge challenges for agricultural production.

Solving these problems, according to experts, developing high-tech agriculture is an inevitable trend and the answer to developing the country's agriculture. High-tech agriculture is an agriculture that appropriately applies new and advanced technologies to production to improve efficiency, create breakthroughs in productivity and quality of agricultural products, and satisfy increasing demand. of society and ensure sustainable agricultural development.

Developing high-tech agriculture and scientific and technological innovation is considered one of the key and central solutions. Applying science and technology to solve challenges in agricultural development with the advantages of technologies such as: Biotechnology, greenhouse technology, drip irrigation technology, sensor technology, automation, internet of things... helps agricultural production save costs, increase productivity, lower costs and improve the quality of agricultural products and protect the environment. On the other hand, high-tech agriculture helps farmers be proactive in production, overcome seasonality, reduce dependence on weather and climate, and meet market demand for agricultural product quality.

Rapid changes in science and technology and climate change

have had a strong impact on our country's traditional agriculture. Along with that are more stringent requirements in the production process of agricultural products during the integration period. The application of science and technology in agricultural production is becoming an inevitable trend to create a breakthrough in productivity, quality and economic efficiency in agricultural production, and contribute to environmental protection. school. Thus, the concept of High-Tech Agriculture was born (NNCNC).

According to the report, advances in science and technology contribute over 30% of added value in agricultural production and 38% in the production of plant varieties and livestock. The level of loss of agricultural products has decreased significantly (rice is below 10 %,...). The level of mechanization in land preparation for annual crops (rice, sugarcane, corn, vegetables) reaches about 94%; Rice harvesting stage reaches 50% (delta provinces reach 90%).

Commenting on the contribution of science and technology to the development of agriculture in our country, many experts and scientists generally believe that science and technology is truly one of the important solutions contributing effective, creating breakthrough changes in agricultural production development, serving the restructuring of agriculture and improving people's lives.

Unlike traditional agriculture, high-tech agriculture is an agricultural industry that applies new modern technologies to production, including: agricultural industrialization, automation, information technology, material technology new materials, biotechnology and crop varieties and livestock breeds with higher productivity and quality. Especially high-tech agricultural products have outstanding quality, features, high added value, and are environmentally friendly. Therefore, our country currently has more than 400 centers, companies, businesses and units operating in the field of high-tech agriculture. At the same time, every year, many new units are established or opened. expand the scale of operations. In addition, many corporations and companies in other technology fields have begun implementing investment projects related to this field. Therefore, the labor market of the high-tech agricultural industry is always potential and highly competitive.

With that trend, the issue of training, developing and using human resources goes into depth and quality, with professional capacity, skills and appropriate skills to develop the country's agricultural industry to be competitive. compete with countries around the world.

2. Theoretical basis

2.1 High-tech agricultural industry

High-tech agriculture, also known as CNC agriculture, is agriculture that applies new technologies to production, including: Agricultural industrialization (mechanization of all stages of the production process), automation, information technology, new materials technology, biotechnology and plant varieties and animal breeds with high productivity and quality, achieving high economic efficiency per unit of area and development. Sustainable development based on organic farming.

In Vietnam - a country that is developing in all aspects, it can be seen that the use of robots or high-tech equipment in jobs is very popular today. Bringing high technology into our lives helps us improve modern life, bringing more conveniences to us. However, the process of international integration requires increasingly high quality agricultural products, along with the

shrinking land area due to urbanization and climate change while population increases, so the demand for food increases. constantly increasing... are huge challenges for the agricultural production industry.

In agriculture, the concept of "high technology" was formed and widely used as the combination and application of the above technologies to improve efficiency in agricultural production to create a breakthrough in productivity and quality. quantity of goods, satisfying the increasing needs of people, especially ensuring sustainable agricultural development.

For agricultural development, applying high technology is an inevitable trend and the answer to speed up the country's agriculture. High-tech agriculture is an agriculture that properly applies advanced technology to production to improve efficiency, create breakthroughs in productivity and quality of agricultural products, and satisfy the increasing needs of society. society and ensure sustainable agricultural development. Developing high-tech agriculture is considered one of the key solutions. At the time of technology 4.0, high technology is considered an important factor for national development, science and technology applications solve development challenges in agriculture with superior features of technology. Technologies such as greenhouse technology, biotechnology, self-irrigation technology, sensor technology, etc. help increase agricultural productivity, both save costs and improve quality. quality of agricultural products and environmental protection. Not only that, high-tech agriculture helps farmers be proactive in production, overcome seasonal factors, reduce dependence on weather, and meet market demand for quality agricultural products.

2.2 Opportunities and challenges of high-tech agriculture

Opportunity

- Can create advantages for late-comer countries like Vietnam compared to developed countries because they are not limited by cumbersome scale and large inertia; creating conditions for Vietnam to make a rapid breakthrough, surpassing other countries even though they started later
- The application of new technologies allows to promote labor productivity and create the ability to increase income levels and improve the quality of life for people
- Ability to transform production, management and governance systems for domestic businesses
- In the field of defense and security, technological developments can shorten (or also increase) the gap in potential of different national forces.

Challenge

High technology also poses many challenges for Vietnam, specifically:

- The challenge of having a full awareness of the nature and impact of the 4th Industrial Revolution and the ability to think, manage and coordinate the integration of technological and non-technological elements, between real and virtual, and between people and machinery
- To join the trend requires development based on long-term accumulation of many basic research fields oriented in the field of science and technology, especially physics, biology, science and technology. studying computers and artificial intelligence, new technology fields, researching breakthrough technologies
- Research and development has become an important key

to determining socio-economic development; it is necessary to link scientific research and production more closely.

- Increasing social frustration due to the penetration of digital technologies and the information sharing dynamics typical of social media
- Raises major issues about job creation, environmental pollution, social ethics, and technological risks
- Taking place at an extremely fast pace will certainly put Vietnam at risk of falling further behind in development compared to the world and falling into a passive position in dealing with the downsides of this revolution.

2.3 Impact factors

2.3.1. Large-scale production

From a cost perspective, large-scale production will save initial investment costs. Theoretically, this comes from the theory of economies of scale by British economist Alfred Marshall. This theory is stated as follows: "Economies of scale is a concept used to refer to the gradual decrease in average costs in the long run as the scale of output of the enterprise increases and all investment factors increase. everything changes". To put it more simply, for example, when investing in a pesticide sprayer, instead of each household having to invest in a machine on a small crop area, we can take advantage of that machine for large-scale production. Larger scale but the investment cost is still just such a machine.

In terms of revenue, science and technology is a highly intellectual product, so it can obviously be said to invest in science and technology in general and the application of science and technology to agricultural production in particular. requires a significant amount of capital. Each farmer household cannot have enough resources to invest alone in science and technology. Modern machinery and equipment that help increase crop or livestock productivity are beyond the affordability of each household. If production is fragmented and small-scale, how can the agricultural products obtained compensate for the costs invested in initial machinery and equipment? On the contrary, investing on a large scale and producing on a large scale will bring in revenue worthy of the costs spent.

2.3.2. Use large capital resources

Developing agriculture towards the application of technology requires the use of capital, first of all to invest and purchase modern technological equipment to serve high-value agricultural production. After that, in order for agricultural production to be able to apply technology, it also requires investment capital for construction, completion of technical infrastructure systems, costs for maintenance, environmental treatment...

Besides, to apply technology in production effectively, the costs of training workers cannot be ignored.

Having to spend investment on many items as mentioned above plus the requirement to produce on a large scale leads to another condition of applying technology in agricultural production which is the requirement of large capital.

2.3.3. High quality human resources

A factor that plays an extremely important role in applying technology to production is the human factor. High-quality human resources will be able to adapt more quickly to advanced technology, master technology to operate

effectively, and thereby develop further. On the contrary, human resources with poor professional qualifications and skills will become a major barrier in applying high technology to agricultural production as it will be much more difficult for them to access and operate technology. new high, so the production process will be less efficient.

Besides the capacity and qualifications of the producer, the factor of the manager or those who make plans and policies are also extremely important factors. When this factor does not work effectively, it can cause many inadequacies and difficulties for businesses, the industry or the entire agriculture. Therefore, for the process of applying high technology and agricultural production to take place effectively, it is necessary to have management resources with high professional qualifications and capacity.

In addition, wage policy is a particularly important part, closely related to other policies in the socio-economic policy system, directly related to macroeconomic and market balances. labor market and the lives of salaried people, contributing to building a lean, clean political system that operates effectively and efficiently, preventing and combating corruption. Wage policy in our country has undergone four reforms (in 1960, 1985, 1993 and 2003), but there are still many shortcomings and cannot meet the requirements of practice and the lives of the majority. Salary earners still have difficulty; Wages in the corporate sector have not yet kept pace with the development of the labor market; Wages in the public sector are still low compared to the business sector and the development requirements of officials, civil servants and public employees; The salary adjustment of working people is still not independent of the adjustment of pensions and preferential benefits for people with meritorious services; The realization of the Party's policy on monetization of non-salary benefits is still slow.

Wage policy in the business sector has gradually been implemented according to the market mechanism under State management. The State gradually reduces administrative intervention and salary management through regulating the regional minimum wage as the lowest floor to protect vulnerable workers. Change the mechanism for setting the regional minimum wage, from being determined by the State to being based on the results of three-party negotiations. The regional minimum wage is adjusted to be relatively consistent with socio-economic conditions and the capabilities of businesses, gradually improving the lives of workers. Enterprises can decide on salary policies according to general principles, ensuring harmony of interests between employees and employers in the context of an underdeveloped labor market, bargaining capacity of employees and Employee representative organizations at the grassroots level are still limited. The role of trade unions in deciding on enterprise wage policies has been gradually strengthened, ensuring publicity and transparency in the process of promulgating policies and paying wages to workers. The State guides and supports capacity building, connects supply and demand and provides information for workers and employers to negotiate. The salary policy in the SOE sector has been renewed in accordance with the Party's policy on arranging, restructuring, and improving the operational efficiency of SOEs; Separate salaries of managers from employees, linked to the production and business efficiency of the enterprise.

With the efforts of the entire political system, the process of reforming our country's wage policy has achieved many positive results, but there are still many limitations and

inadequacies such as: Wages in the public sector are still low. low, does not ensure the life needs of cadres, civil servants, public employees and their families, the design of the payroll system is still complicated, not suitable for job positions, titles and leadership positions, It is still average and level, and does not really create motivation to improve the working efficiency of workers. Setting the salary level as a multiplier with the minimum wage does not clearly show the real value of the salary. In many cases, the salaries of upper-level leaders are lower than the salaries of lower-level leaders, not clearly showing the administrative hierarchy in public service activities.

2.4 Advancement in high-tech agriculture

Science and technology have contributed over 30% of added value in the agricultural sector and 38% of added value in plant seed production.

During the period 2016-2020, localities implemented over 2,732 high-end science and technology tasks, of which high-tech agriculture accounted for 30.87%, science, technology and technology accounted for 30.87%. Technology accounts for 26.99%, social sciences accounts for 18.02%.

In recent times, the high-tech agricultural industry has developed and grown quite well, affirming the value of many agricultural products in the domestic and international markets.

In the period 2021-2030, the high-tech agriculture industry will prioritize the effective implementation of national science and technology programs, focusing on key products of the high-tech agriculture industry, profitable products local position.

In particular, the industry focuses on researching and developing processing technology, preservation technology, and promoting digital transformation to create breakthroughs in quality and increase added value, improving the competitiveness of agricultural products. Vietnam.

Competing capability

According to experts, the projects of rural youth have many unique and highly creative features, such as paintings made from leaves, "handmade" soap products from natural materials, and medical services. community tourism service by incorporating indigenous resources into the business model.

However, although this year's project resources have improved compared to previous years, there are still some financial difficulties in restoring business operations after the COVID-19 epidemic, and difficulties in human resources when there is no project. suitable personnel in expanding the market for products/services, technological difficulties in production and modern online sales support tools for rural youth models.

At the training session, experts proposed solutions to increase the competitiveness of young people doing business in rural areas. That is, promoting the implementation of reducing business costs for young people, especially in rural areas, first of all unreasonable costs arising from state management, preventing and repelling illegal acts. generates unofficial costs for young people to develop the rural economy.

State policies need to create appropriate institutions, develop the science and technology market, support training and develop human resources for rural youth, and equip them with high-level education and knowledge. Basic for young people. Create an environment to encourage, form and

develop local youth links; Strengthen vertical and horizontal links and cooperation; Establish customer relationships and strategic partnerships to develop production and sales for each other.

3. Research Methods

3.1 Data sources

In high-tech agricultural research, it is extremely important to access and have some complete data for reporting. Therefore, in addition to focusing on the theoretical basis, our team also needs to find out appropriate data sources related to our topic. Here are some data sources taken from reputable websites that we I found something like:

- Link: www.tintucnongnghiep.com
- Link: <http://www.Mard.gov.vn>
- Link: <http://nongnghiep.vn>
- Link: <http://agriviet.com>
- Link: <https://www.nextfarm.vn>
- Link: <https://dangcongsan.vn>

3.2 Collection method

During the research process, collecting data takes a lot of time and costs as well as effort. However, this is an extremely important part, laying the foundation for research and analysis to proceed smoothly.

Secondary data collection method

Primary data is data that is not yet available, collected for the first time, collected by the researcher himself. In fact, when secondary data does not meet research requirements, or cannot find suitable secondary data, researchers will have to collect primary data. (Source: Wikipedia)

The method of collecting relevant secondary data requires search work, including two interconnected stages:

Step 1: Determine whether the type of data you need is present in the form of secondary data.

Step 2: Locate the exact data you need.

Primary data collection method

Observation method (observation)

Method content

- Observation is a method of collecting data by controlled recording of events or human behavior. This data collection method is often used in combination with other methods to cross-check the accuracy of the collected data. Can be divided into:
 - Direct observation and indirect observation:
 - Direct observation is conducting observation while the event is taking place.
 - Indirect observation is observing the results or effects of behavior, not directly observing the behavior.
 - Disguised observation and public observation:
 - Disguised observation means that the subject being studied does not know they are being observed.
 - Observation tools: people, devices.

Mail interview method (mail interview)

Method content

- This data collection method is done through sending prepared questionnaires, with stamped envelopes, to the person who wants to investigate by mail. If everything goes well, the investigation subject will answer and return the questionnaire to the investigation agency also by mail.
- Applicable when the person we need to ask is difficult to

face, because they live too far away, or they live too scattered, or they live in a reserved area that is difficult to access, or they belong to the business world and want to be met through security. secretary...; when the issue to be investigated is difficult and private (for example: family planning, income, expenses , etc.);

Telephone interview method

Method content

When conducting this data collection method, the investigator will conduct an interview with the subject being investigated by phone according to a pre-prepared questionnaire.

Applicable when the research sample includes many subjects who are businesses, or people with high incomes (because they all have phones); or the research subjects are scattered in many areas, then interviewing by phone has a lower cost than interviewing by mail. It is recommended to use a combination of telephone interviews with other data collection methods to increase the effectiveness of the method.

Personal interviews

Method content

- When implementing the data collection method through direct personal interviews, the investigator directly meets the subject being investigated to interview according to a prepared questionnaire.
- Applicable when the research phenomenon is complex and needs to collect a lot of data; When you want to poll the audience's opinion through short questions that can be answered quickly.

3.3. Data analysis method

The data sources of the group mentioned above include reputable websites specializing in reporting news on the agricultural industry and the high-tech agricultural industry, which are applied to help people and workers in the agricultural industry update news. every day as quickly as possible.

Includes all the basic information about plant varieties as well as methods to achieve high efficiency in agriculture as well as high-tech agriculture.

Market marketing of high-tech agricultural industry: Agriculture is an industry with specific features that create unique characteristics of agricultural marketing. Such as: *large quantities, perishability, differences in varieties, seasonality, dispersed production, processing according to consumer needs...* These characteristics make agricultural marketing become into a complex system:

- The products of the agricultural industry are mainly food. With the characteristic that demand is extremely diverse and abundant and tends to fluctuate from quantity to quality, products for direct use to processed products.
- Agricultural products are natural products necessary for human health. Each product has a unique taste and color. This characteristic requires agricultural marketing to pay attention to nutrition and safety for users. There are flavors and colors but must not change the natural nature of the product. Appropriate storage and processing technology and public disclosure of shelf life.
- Agricultural products are highly seasonal and local. This characteristic often leads to unbalanced supply and

demand. At the beginning and end of the season, supply is often less than demand. Meanwhile, in the middle of the season there is often more supply than demand. This often causes disadvantages for producers and consumers. Therefore, agricultural marketing needs to pay attention to seasonality, planning for storage, processing and preservation of products, bringing products from areas of surplus to areas of shortage.

Increase product value: perform some intermediate steps such as classifying, standardizing, preserving off-season supplies, packaging, reasonable packaging, preliminary processing, refining or changing the method of serving and supplying products. The effect can increase the value of agricultural products many times.

Risk analysis of high-tech agricultural industry

The high-tech agricultural industry faces dual risks

Natural climatic conditions are heavily affected by the increasingly developing society, leading to environmental and air pollution, which has a great impact on the natural agricultural industry.

In recent years, many large corporations, businesses and even large banks and investment funds have been shifting capital to invest in high-tech agriculture as a "movement" => causing negative impacts. Not a small negative impact on the industry and heavy losses. We need to limit these impacts on the industry so that we can develop agriculture in Vietnam, applying the most advanced technology to optimize production in both Vietnamese and foreign markets.

As we know, Prime Minister Nguyen Xuan Phuc has emphasized the spirit of promoting high-tech agriculture, which is to calculate supply and demand, assign investment carefully, and not rush to follow the trend of avoiding risks. damages, resolving bottlenecks in a positive way, with the spirit of socialization rather than subsidized investment.

3.4. Research process

Step 1: understand the actual situation and identify problems that need improvement in the high-tech agriculture industry.

Step 2: analyze problems based on the situation and clarify the needs of the agricultural sector when there is a shortage of high technology

Step 3: Collect statistics on areas that need to introduce high technology into agriculture

Step 4: Investigate, collect, process and research further to appropriately apply high technology to agriculture to increase productivity and crop quality.

Step 5: Present research results on CNC high-tech agriculture

Step 6: Conclusion and research recommendations

Step 7: Complete the research

4. Research results and discussion

4.1 Industry characteristics

Applying high and advanced technology to traditional agriculture => increasing profits.

Improving agricultural efficiency and quality, creating a breakthrough in productivity => satisfying the increasing needs of society, domestic and foreign markets.

Large scale and high level of concentration

Concentrated mainly in areas with favorable natural conditions, a long tradition of agricultural production, and convenient transportation and consumption.

The level of high-tech agriculture is divided into 4 levels:

Modern technology, Advanced technology, Medium advanced technology, Medium technology.

Huge investment capital for technology (building new production factories)

Cultivation and animal husbandry processes are strictly controlled

Applying the latest technological achievements => to achieve high productivity in production

Optimize human resources, reduce natural disaster risks

Developing new fuel sources, new energy, organic fertilizers, and natural plant protection drugs.

The nature of the work requires human resources with a lot of knowledge about the industry as well as outstanding skills.

It is important to be thoroughly trained to easily access high technology in the agricultural industry.

4.2 The situation of the high-tech agricultural industry compared to other sectors of the Vietnamese economy

The application of high technology in agriculture has been increasingly replicated throughout the country. Commonly applied high-tech models include: greenhouse, greenhouse, and net house systems combined with digital technology applications for automatic or semi-automatic control; BigData, IoT, AI applications in crop management and care; livestock, economical irrigation technology including drip irrigation, semi-automatic or automatic mist irrigation based on time or measured humidity and temperature; Applying soilless farming techniques: hydroponics, growing plants on substrates.

Many key product groups at national and provincial levels have a very high level of scientific and technological application applied from the seed production, farming, and processing stages such as: Shrimp, pangasius,... Dozens of large enterprises Applying high and advanced technology on par with the region and the world such as: TH (dairy), Dabaco (livestock), Nafoods (fruit growing and processing), Masan (slaughtering and processing), South Central (shrimp), Ba Huan (eggs), Vingroup (vegetables)... many farming areas, many high-tech product processing factories have been completed in recent years. This has increased the value of agricultural production and sustainable development.

Leading the way in developing high-tech agriculture is Lam Dong province. The area of high-tech agricultural production in 2020 reached 60,200 hectares, an increase of 17,116 hectares compared to 2015, accounting for 20% of the cultivated area. 19 high-tech agricultural areas have been formed and 2 areas have been recognized as meeting high-tech agricultural production criteria with an area of 308 hectares. The entire province currently has 12 enterprises recognized as CNC agricultural enterprises with a farming scale of over 286.8 hectares, mainly vegetables, flowers and about 3,200 dairy cows; 31 cooperatives, 59 CNC agricultural production farms, 154/253 enterprises implementing investment projects on CNC applied agricultural production, 5 enterprises certified for organic farming and 15 enterprises and applied farms Smart technology uses the Internet of Things (IoT) sensor system. Many production areas have generated revenue of 500 million VND to 2 billion VND/ha, and some can reach 8 billion to 24 billion VND/ha.

Regarding attracting investment in the field of CNC agriculture: As of the end of 2020, the results of implementing the 100,000 billion credit package have accumulated loans reaching 66,560 billion VND and

outstanding debt of about 27,500 billion VND (more than 13,400 customers have outstanding balances). debt) (Ministry of Agriculture and Rural Development, 2021). Has attracted many corporations and companies to invest in CNC application agriculture such as Vingroup, NutiFood, Dalat Hasfarm... Through project implementation and partial state funding support, businesses have proactively mobilize capital to apply advanced technology in the production process. In 2020, there were 17 projects with a total investment of over 20,000 billion VND started and put into operation (an increase of 04 projects in quantity and about 6,000 billion VND in investment capital compared to 2019) (Ministry of Agriculture and Rural Development , 2021).

4.3 Strengths (S) and weaknesses (W) of fast

Outstanding features of high-tech agriculture include:

Advantages

- Cultivation and animal husbandry processes are strictly controlled
- Building new agricultural enterprises
- Apply the latest scientific and technological achievements
- Optimize human resources, reduce natural disaster risks
- Developing new energy sources, organic fertilizers, and natural plant protection drugs. Save land area-
- Avoid spreading pests
- Isolated from the outside environment and weather
- Make sure the tree can grow well
- Provide plants with adequate nutrients and necessary water
- Adjust photo lighting appropriately
- Automatic control
- Helps reduce labor and operating costs significantly
- Prevent water loss
- The environment can be adjusted according to each stage of plant development

Posting area

- The quality of our planning is not appropriate, forecasts in planning are inaccurate, planning is higher than market demand, that is, planning but not in accordance with actual market demand, leading to regulation. The planning is very high, although production has not met the planning requirements, the products are still not sold. Another problem is that the planning adjustment work is still slow and not timely. The planning evaluates like that but it is necessary to adjust the planning, so we have adjusted the planning.
- The organization and implementation of planning still has many limitations, the situation of investment exceeding planning and investing according to current trends is very common. A specific example is that the coffee area exceeds 145.4 thousand hectares compared to the plan . plan, equivalent to 29.12%, rubber trees exceed 965,000 hectares according to plan... .
- Infrastructure systems serving agricultural production such as aquaculture, animal husbandry, farming or even infrastructure serving service industries in rural areas to attract labor, to mobilize labor to reduce In terms of labor in agriculture, our investment has not yet met the set requirements due to many reasons, including the fact that investment capital is very difficult, even in mountainous areas.
- The issue of organizing agricultural production still has

many shortcomings, the average arable land area per capita is very low, while we are required to industrialize and modernize agriculture, with small and medium scale production. fragmented, mainly household economy. Therefore, it is very difficult for us to bring industry and science and technology into agriculture.

- The processing industry is developing slowly, the application of science and technology to production has not been focused, mainly relying on experience. Market development and branding for Vietnamese agricultural products is still limited. Some main markets for Vietnamese agricultural products are unstable.
- State management still has many shortcomings, mechanisms and policies are slowly adjusted to meet practical requirements, especially forecasting, warning market signals, and adjusting planning orientation.

4.4. Challenges (T) and Opportunities (O)

Challenges (T) in the high-tech agricultural industry

Currently, our country is facing 6 major challenges in the high-tech agricultural industry:

Firstly, policy barriers still have many shortcomings, for example, credit policies supporting the development of high-tech agriculture with cumbersome and complicated regulations and procedures... make it difficult for businesses to access resources. this capital.

"Investigation results of the Institute of Policy and Strategy for Agricultural and Rural Development show that up to 70% of businesses complain of difficulty accessing credit" - Mr. Ha Van Thang (businessman) said.

Second, capital barriers are due to the fact that high-tech agriculture requires a huge amount of capital to build infrastructure, invest in the production of plant varieties and livestock, train human resources, sell products, and especially import. device.

Third, the barrier of human resources is due to lack of quantity and weak quality. According to forecasts, in 2020, Vietnam lacks about 3.2 million trained agricultural workers.

Fourth, small land barriers. High-tech agricultural production requires large-scale land in a location favorable for production and circulation.

Fifth, the consumption market for high-tech agricultural products is still limited and unstable, leading to low production efficiency of some products, not commensurate with the level of investment.

Sixth, barriers to research and technology transfer. Many businesses want to be provided with part of the equipment and production lines by domestic production facilities to reduce costs, but they are not satisfied. Businesses still have to receive most of the plant varieties, technical solutions, and farming methods transferred from abroad.

The special thing is that the high-tech agriculture industry is not affected by weather or climate => High-tech agriculture can adapt and take measures to protect agricultural products whenever natural disasters or natural conditions occur. naturally occurring (greenhouse effect,...)

In return for the above barriers and challenges, the income in the industry is very high (up to billions of dong) if successful and conversely, if not successful, it will lead to very heavy losses.

At the conference, delegates shared support policies and priorities for the high-tech agricultural sector of the central government and the city, offered solutions for market development, and services to support technological activities.

high in agriculture.

The seminar also summarized the problems and difficulties of businesses when applying high technology in the agricultural sector in Hanoi to inform authorities at all levels to continue evaluating, summarizing, and adjusting the mechanism. Policy mechanisms create an investment environment consistent with reality to support. Thereby, encouraging and supporting organizations, investors, businesses, cooperatives, and farmer households in applying high technology in agriculture...

There are 5 advanced technologies applied in high-tech agriculture:

Information technology applications

This is the use of IoT Sensor application. Sensor devices are connected to smart devices and are automatically controlled throughout the agricultural production process to respond to climate change and improve the climate in greenhouses.

Use dual barcode technology to manage the production process from input, growth and development of plants and animals, origin to output into specialized products. IoT solutions mostly focus on helping farmers access the production supply chain faster and easier, by ensuring productivity, increasing profits and protecting the environment.

Business analytics have shown that the number of IoT devices in the global agricultural industry reached 70 million in 2020, reaching a growth rate of 20% annually. The scale of global smart agriculture is predicted to triple before 2025, at 15.3 billion USD (compared to 5 billion USD in 2016).

New material technology

This is the use of new materials such as heavy steel frames replaced with polymer plastic frames that are more durable than steel; Glass is replaced with transparent mica which is very durable and does not break; High-quality plastic misting sprinklers replace rusty copper and steel faucets; The trellis and planter pots are replaced with plastic pots that are both reasonably priced, durable and lightweight.

Use synchronous LED lighting systems in high-tech farming to optimize the growth and development process, replacing normal lighting to save energy and increase photosynthetic efficiency.

Use lightweight, porous substrates containing treated nutrients to replace soil in plants to avoid pests, or use aeroponic hydroponic technology to isolate the natural environment and actively apply synchronous technology.

Using photovoltaic cells (Solar cells) to effectively use space, reduce energy costs, most equipment on farms/businesses or large gardens is powered by solar power and solar battery packs. God.

Robotics & automation technology

That is the use of many stages in production, harvesting and processing, using robots instead of people taking care of plants and animals, which is increasingly popular in places where there is a shortage of human resources or labor costs are too high.

Use drones and satellites to collect data from garden farms to analyze and make recommendations for better farm management. Currently, the agricultural industry has updated drones to sow seeds, spray insecticides, spray fertilizers, map fields, and predict landslides, deforestation, and forest fires.

..

Use automatic mist irrigation equipment when the temperature in the garden is too high and the humidity is low. Robots in the agricultural sector are increasing production capacity for farmers in many different ways.

In fact, on dairy farms, robotic systems are now often deployed to milk milk. Although robots are only responsible for a small percentage of the overall dairy farming process, the European Union has predicted that about 50% of all European livestock herds will be milked by robots by 2025.

Biotechnology

The use of new plant and animal varieties created by biotechnology such as cell tissue culture and editing of genetic defects.

Using growth regulators of natural origin and from microbial technology or biological fermentation such as GA3, NAA, Amino Acids, vitamins B1, B6, B12....

Use organic fertilizers and biological pesticides such as abamertin, BT, *Bauveria* antagonistic fungi, and biofilms to filter gas for disinfection; diagnostic kits for plant, livestock, poultry and aquatic diseases, environmental cleaning products for barns, ponds and fish tanks; Biological products to preserve fresh fruit and vegetables for a long time and ensure quality during preliminary processing, preservation and processing....

Notably, biological products combined with nanotechnology increase efficiency. For example, a new form of nano fertilizer can replace sunlight for dragon fruit and chrysanthemum plants when flowering, reducing production costs and greatly improving economic efficiency.

Artificial intelligence technology

Using artificial intelligence technology applications, it is possible to create many software and machines to collect information connecting all things, process big data (Big Data), thereby providing management options. produce safely in the direction of organic agriculture from the production garden to the dining table.

Advanced countries are thoroughly using this technology to manage crop and livestock production, harvest, preserve and process them in smart agriculture, bringing economic efficiency and environmental harmony. with nature.

Although artificial intelligence integrated into drones has been tested and applied for a long time, it has only recently been applied to the agricultural sector. However, this has made it possible to increase the speed of spraying pesticides on plants up to 5 times compared to other types of machinery, and planting by plane helps to significantly reduce labor costs for farming operations. compared to the traditional way.

With the application of advanced technology mentioned above to achieve high quality in high-tech agricultural production, Vietnam has the opportunity to export high-quality finished products abroad, especially are Southeast Asian countries . Accompanied by favorable natural conditions, our country increases its ability to develop more than other European countries. Expanding strong export markets.

4.5. Advanced solutions

To quickly develop CNC agriculture, we need to focus on the following main tasks:

- Select, create and propagate plants and animal breeds for high quality productivity;
- Disease prevention;

- Cultivation and animal husbandry are highly effective;
- Creating materials, machinery and equipment used in agriculture;
- Preserving and processing agricultural products;
- Developing agricultural enterprises applying CNC;
- Developing high-tech agricultural services to serve agriculture;

Thus, CNC agriculture can be understood as: properly applying the most advanced techniques in selecting and breeding new plant and animal varieties, caring for and nurturing plants with new advanced technical equipment.

“Reality shows that companies must invest in the processing industry, because if they do not invest in processing, competition becomes more difficult.

To continue to expand and dominate the market, improve business competitiveness, the Steering Committee for International Economic Integration believes that businesses need to anticipate and take advantage of opportunities for shifting capital flows. invest

Vietnamese businesses need to apply the mindset of always creating value; develop specific action plans, prioritize programs that create value for businesses such as green growth, need to evaluate sustainability, etc. With the organizational aspect, innovation needs to be associated with the organization, linked to the strategy for systematic operation. In particular, creative and startup culture is the environment that creates the premise for creative innovations in processes, products and technology.

In addition, in the context that Vietnam is promoting integration in the economic field in many aspects, businesses need to increase competitiveness to expand and exploit international markets.

5. Conclusions and recommendations

5.1 Conclusion

Developing high-tech agriculture is expected to create a breakthrough in agriculture, creating a premise for forming specialized large-scale commodity production areas with high income. However, it is clear that the main subject carrying out this process belongs to all actors in the agricultural production process, in which farmers play a pivotal role. Therefore, it is necessary to improve mechanisms, policies, and focused support programs to help farming households easily access and apply high technology in production. Furthermore, it is necessary to promote information, propaganda and training activities to change households' awareness and understanding of the benefits and application conditions of agricultural production models applying technology. High; Strengthen links and share resources and information between actors in key agricultural value chains to serve the development of our country's agriculture towards modernization, safety and sustainability. High-tech agriculture in Vietnam in recent years has had certain achievements. Agricultural production has applied modern technology in many stages of the production process such as: using drones to spray pesticides, , rice sowing aircraft , using automatic seeding robots, using robots equipped with sensors to collect and analyze data and then make appropriate crop care decisions...

5.2 Suggestions and recommendations

In recent years, agricultural development in general and high-tech agriculture in particular have been issues of special

concern to our Party and State. However, the development of high-tech agriculture still faces many difficulties in production technology, lack of land on a large scale, and limited consumption markets, which need to be solved soon. Assessing that the process of agricultural development, farmers, and rural areas still have certain shortcomings, limitations, and inadequacies, experts believe that those inadequacies lie in the institutions and legal policies of the state. . Therefore, it is necessary to continue to research and find solutions to continue promoting rapid and sustainable development of agriculture, farmers, and rural areas, especially applying high technology to production, contributing to the development of agriculture, farmers, and rural areas. Implementing the goal of building and developing a strong and prosperous Vietnam. These inadequacies exist in the state's institutions and legal policies. Therefore, it is necessary to continue to research and propose solutions to continue promoting rapid and rapid development of agriculture, farmers, and rural areas. sustainability, especially applying high technology to production, contributing to the goal of building and developing a strong and prosperous country.

5.3 Sustainable solutions to improve the start-up capacity of businesses in the industry

- Thanks to the application of new technology in using LED bulbs to light chrysanthemums instead of using incandescent bulbs, the family has saved about 70% of electricity consumption.
- Mobilizing private resources in the form of public-private partnerships in investing in infrastructure for high-tech agriculture, especially information technology infrastructure associated with applied agricultural zones and areas high technology, industry clusters and technology innovation start-up incubators.
- Need to focus on investing in applied research to quickly improve domestic technological capacity, design, manufacturing, and application of technology for agricultural production; Implement preferential policies for importing and mastering the world's advanced technology.
- Strengthen science and technology communication activities to inform the market of new, highly effective science and technology products and equipment produced domestically. Research institutes, universities... need to build information channels to widely promote their products, connect to capture market demand, and connect with the media to bring scientists closer to businesses.
- Expand international cooperation in science and technology; proactively promote the formation of technology partnerships with advanced countries to access new technology, train human resources, promote technology transfer and develop the science and technology market

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