APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY ON THE DEVELOPMENT OF AGRICULTURAL PRODUCTION IN VIETNAM

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ABSTRACT

Information and communication technology (ICT) in agriculture, also called "smart agriculture" or "electronic agriculture" - is becoming a new trend, dramatically improving the agricultural landscape all over the world. The image of struggling and outdated farmers is becoming outdated; instead, farmers apply modern technologies and techniques to trade and production. Agro-forestry production is the most important production sector for Vietnam’s development. In Vietnam, the application of information technology in agriculture is at the beginning. In particular, the most widely used ICT in the field of crop production is the use of plastic house system, including the automatic system in the control of the plastic house, the control of the irrigation system combined with fertilizers, adjustable humidity and temperature, solar ...; The supply chain management systems focus on supply chain management and distribution systems of several large corporations, large scale livestock and cattle farms, and aquaculture farms.

Key words: Information and communication technology (ICT), smart agriculture, agriculture

INTRODUCTION

Some Features about Agricultural Production in Vietnam

Vietnam is an agricultural country and agriculture contributes 20% of its GDP. Currently, more than 60% of the Vietnam population live in the rural areas and consider agricultural production as their main source of income. Vietnam has favorable soil and climate conditions for agricultural production with many of the world's leading agricultural and aquaculture products. By becoming the world's leading exporter of rice, pepper, coffee and basa fish, Vietnam has demonstrated its strength in the world's agricultural product map. Vietnam has many opportunities to promote and take advantage of its agriculture. In 2016, export turnover of agriculture, forestry and fisheries of Vietnam reached a record US$ 32.1 billion, of which, agricultural products account for half, estimated at US$ 15.1 billion.

However, Vietnam is still exporting raw materials, no brand name of agricultural products are well known in the domestic and international markets. The main reason is that Vietnam's agricultural sector is still fragmented and small businesses still prevail. In addition, the agricultural production is still popular small dispersed, mainly based on the household economy; The over-trained labor force of over 70% is still simple and traditional, untrained.
Finger 1. Agro-products export data are aggregated from the export value of commodities: vegetables, cashew nuts, coffee, tea, pepper, rice, rubber, cassava and cassava. (Source: General Department of Customs)

Table 1. Agro-product export, 2016

<table>
<thead>
<tr>
<th>Order</th>
<th>Name of product</th>
<th>Export volume (Ton)</th>
<th>Total (Bilion USD)</th>
<th>Position on the world</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coffee</td>
<td>1.781.642</td>
<td>3.34</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Rice</td>
<td>4.835.718</td>
<td>2.17</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Rubber</td>
<td>1.254.248</td>
<td>1.67</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Pepper</td>
<td>177.893</td>
<td>1.34</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Cashew</td>
<td>346.844</td>
<td>2.84</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Tea (Black tea)</td>
<td>130.904</td>
<td>0.217</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Others (fruit, vegetable, flower, cassava root…)</td>
<td>-</td>
<td>3.523</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>15.1</td>
<td></td>
</tr>
</tbody>
</table>

ICT FOR AGRICULTURAL PRODUCTION IN VIETNAM

In Vietnam, the application of information technology in agriculture is at the beginning. In particular, the most widely used ICT in the field of crop production is the plastic house system, including the automatic system in the control of the plastic house, the control of the irrigation system combined with fertilizers, adjustable humidity and temperature, solar ...; Supply chain management systems focus on supply chain management and distribution systems of several large corporations, large scale livestock and cattle farms, and aquaculture farms.

Advantages

At present, the combination of ICT for agricultural production will help farmers to easily follow the progress of their crops and determine the reproductive stage of the crops for accurate calculation and demand of water and fertilizers. It also assesses the sensitivity of crops to pests and diseases. "ICT is an opportunity for farmers to become operators of digital enterprises, all of which contribute to increased crop productivity, and improvement in the quality of their
Vietnam has many advantages to apply ICT for agricultural production:

- Vietnam has a large area of agricultural land (26,791.58 thousand hectares, 2015, estimated to increase to 27,038.09 hectares by 2020) to facilitate high-tech agricultural production;
- Many localities have young youths who are well educated to participate in agricultural production. This is the agricultural labor force that can easily access and apply ICT for hi-tech agricultural production;
- The young farmers can actively explore, learn and apply new technologies to farm their own produce;
- Many corporations have invested in applying ICT in agricultural production in order to increase productivity and reduce labor cost. These are the models for farmers in Vietnam to learn for building their own farms. They use modern agricultural production models from Israel, Japan, Holland ...;
- Domestic and foreign agricultural companies in Vietnam tend to associate with farmers in production. This creates good conditions for farmers to participate directly in hi-tech agricultural production system;
- Farmers are facilitated by the Government to participate in training, visiting ICT models in agriculture to apply for themselves. Advanced technologies in the world are delivered and applied effectively, such as biotechnology, information technology, drip irrigation, hydroponics and postharvest technologies;
- The Government of Vietnam is giving priority in the development of high-tech agriculture, especially ICT for agricultural production;
- Many countries with modern agriculture in the world are approaching and promoting investments in Vietnamese agriculture (Japan, Korea, Holland, America...). This is an opportunity for Vietnam to have modern agricultural farms applying ICT; and
- Getting the help of foreign organizations in building production models applying ICT

Disadvantages

In addition to the above advantages, the application of ICT in agricultural production in Vietnam has some difficulties such as:

- Area of agricultural land is small and is not concentrated in distribution; Mostly agricultural land are concentrated in the households (nearly 50% of the land area). It is very difficult to apply ICT within small land areas;
- The labor force in the agricultural sector tends to decrease and becomes old due to the shift of young workers into industry and services;
- Nearly 70% of farmers have traditional farming practices and it needs long time to change their habits and shift to modern agriculture; and
- The application of ICT to agriculture in Vietnam has "just started", mainly applied in the sector management agencies. In recent years, some large enterprises have applied ICT in agricultural production such as Vinamilk, TH True Milk, VinEco ... For most farmers, the application of ICT is limited. Only a few farmers who having strong financial capability can apply ICT on their farms. Most are still the story of the future.
The model of cantaloupe production applying ICT increases 10% of yield in comparison with normal production in Vietnam.

Production of vegetables using Israel technology of VinEco in Vietnam.

**ORIENTATION OF ICT DEVELOPMENT IN AGRICULTURAL PRODUCTION IN VIETNAM**

**Training human resources from farmers**

Thanks to ICT, farmers have access to scientific and technological advances so that they can select, apply and improve their productivity and labor efficiency. ICT will help them quickly access to high and new technologies. Therefore, they can learn, innovate and improve the agricultural production process. So, farmers need to be trained to apply scientific and technological advances to production.

**Building quality human resources**

In order to start up smoothly and efficiently high-tech agriculture, the farmers have to learn by themselves to improve their production skills and learn how to use new technologies and apply them in their production.
Enhance ICT knowledge for farmers by competitions

One of the ways for farmers to understand the role of ICT as well as the fastest access to ICT skills is to attend competitions. Therefore, the Central Vietnam Farmers' Association has organized the contest "Farmers with Information Technology". This is a contest to find and honor the skilled farmers who use and apply ICT effectively in agriculture. Thereby, to step up the application of information technology in agriculture and rural areas throughout the country, stepping up the development of "intelligent agriculture".

REPLACE OF ENDING

In general, the main benefits of ICT bringing to agriculture are information enhancement, productivity enhancement, managerial capacity improvement, market search, risk reduction,... However, ICT also creates a "fresh" approach to agriculture by attracting young laborers to enter the agricultural field. The International Cocoa Organization (ICCO) representative said at a seminar on "The application of information technology in value chain development" in Kenya in 2012 - since the ICT application of agriculture, the youth start liking to work and mind more to agriculture.

Previously, agriculture was still associated with less attractive features such as low productivity, low income, low level of labor and financial risk. Due to the limited job prospects, young people often leave the countryside to seek employment opportunities elsewhere. Meanwhile, with access to information technology, innovation and risk-taking, young people are the "missing link" to promote the agricultural economy. Now, with the support of ICT, farming becomes more attractive thanks to good production techniques, the ability to apply modern technology, effective market-oriented strategies and more sustainable income generation opportunities. These will be convincing factors to attract young people to agriculture, creating a strong momentum for agriculture in the future.