PROMOTION OF DEVELOPMENT OF HIGH TECH AGRICULTURAL ZONES IN VIETNAM: STATUS AND SOLUTIONS

Tran Ngoc Hoa[1]
Department on Science, Technology and Environment
Vietnam National Aseembly Office

Abstract:

Development of agriculture with application of high technologies (called afterwards as "high tech agriculture") is seen as a solution for Vietnam agriculture development in context of agricultural structure shift, international integration and response to disasters and climate changes. The actual development of high tech agriculture in USA, Netherlands, Thailand, China, Israel and other countries shows that these countries achieve record harvest values, namely 250-300 ton/ha of tomato harvest, 100-150 ton/ha of grapefruit harvest (10 times higher than traditional cultivation) and 1.5 million of flower twigs/ha. High tech agriculture cultivation gives an average value of USD120,000-150,000/ha per year in Israel or a value of USD40,000-50,000/ha per year in China (40-50 times higher than traditional cultivation). These figures are illustrations of efficiency of this trend of development with high tech agriculture models, high tech agriculture zones and incubators of firms. In this paper, the author deals with development of high tech agriculture zones which are taken as core component for development of high tech agriculture of Vietnam. The author shows the actual status of development of this sector as well as shortcomings and, at the same time, makes a recommendation of measures for settlement of difficulties and development of high techs.

Keywords: *Science-technology; Economy; Agricultural economy; High tech agriculture.*

Code: *19051001*

1. Actual status of high tech agriculture zones in Vietnam

Orientations of development of high techs in Vietnam get attentions from the Party and the State since 1996 which is reflected clearly by Resolution No. 02-NQ/HNTW of the Party Central Committee, Session VIII on stratecgic orientations of science and technology (S&T) development in industrialization and modernization period up to 2000; Resolution No. 26-NQ/TW on agriculture, farmers and rural area; Resolution No. 20-NQ/TW of the Party Central Committee, Session IX on S&T development for industrialization and modernization in conditions of socialist oriented

[1] Author's contact email address: tranngochoaqh@yahoo.com

market economy and international integration. At the same times, these guiding lines were legalized in Law on S&T, Law on High Technology, Law on Technology Transfer and special agricultural laws such as Law on Forestry Cultivation, Law on Agriculture, Law on Planting Cultivation, Law on Animal Husbandry, Law on Veterinary, Law on Plant Protection and Quarantine and others which have established the important legal framework for development of high techs in Vietnam including high tech agriculture as priority directions.

Implementing Decision No. 1895/QD-TTG on 17th December 2012 by the Prime Minister for approval of Program of high tech agriculture development under National Program of high techs; Decision No. 575/QD-TTg on 4th May 2015 for approval of Master Plan of high tech agriculture zones and regions up to 2020 and directions up to 2030; Decision No. 694/QD-TTg on 24th May 2017 by the Prime Minister[2] for decision of construction of 11 high tech agriculture zones. Among them, 3 zones are to be set up by the Prime Minister (high tech agriculture zones in Hau Giang and Phu Yen Provinces and Shrimp high tech agriculture zone in Bac Lieu Province); 8 high tech agriculture zones are to be set up by provincial governments (Thai Nguyen, Quang Ninh, Thanh Hoa, Khanh Hoa, Lam Dong, Binh Duong, Can Tho Provinces and Hochiminh City).

As governed by Law on High Technology (Item 2, Article 32), the high tech agriculture zones to be set up are assigned with main duties: (i) Research for application, pilot trials and demonstration of models of high tech agriculture production; (ii) Linkage of activities of research and application of high techs and production of high tech products; (iii) Training of high tech workforces in agriculture sector; (iv) Organization of fairs, exhibitions and shows of high tech agriculture products; and (v) Attraction of local and overseas investment sources and workforces for high tech development.

- *Action plans and implementation works of the high tech agriculture zones approved for 2016-2021 period:* By January 2019, 11 high tech agriculture zones get decisions for establishment where 6 of them had submitted the files of development projects for appraisal by Ministry of Agriculture and Rural Development (MARD) and, at the same time, conducted certain development works such as: (1) Preparation and submission of master plans for infrastructure development of high tech agriculture zones; establishment of functional blocks in the zones; set up of steering boards, management

[2] Decision No. 694/QD-TTg on 24th May 2017 by the Prime Minister where Shrimp high tech agriculture zone in Bac Lieu Province was added to Master Plan of high tech agriculture zones and regions up to 2020 and directions up to 2030.

boards and administrative rules; (2) Implementation of clearance works for construction sites; (3) Investments for completion of technical infrastructure facilities such as power supply, water supply, warehouses, waste processing systems, offices of management boards, issuance of rules and regulations, incentive measures and supports for local and overseas investment sources. Some of these high tech agriculture zones attracted participation of large sized firms such as Vietnam-Australia Shrimp company (Bac Lieu Province), VinEco Agriculture Investment-Production-Development Co. Ltd. (Quang Ninh Province). Among them, however, 5 zones did not get decisions for approval, 4 zones did not set up the establishment files for submission for appraisal by MARD (Can Tho, Binh Duong, Khanh Hoa Provinces and Hochiminh City) but conducted effectively some implementation works; 2 zones had completed formalities of establishment but were moved out from the list by Decision No. 575/QD-TTg because of being shifted to equitization status.

- *The high tech agriculture zones approved for 2016-2021 period:* Decision No. 575/QD-TTg had approved 12 high tech agriculture zones (including Hanoi, Lao Cai, Phu Tho, Son La, Nam Dinh, Hai Phong, Nghe An, Ha Tinh, Quang Ngai, Dac Nong, Baria-Vung Tau and Tien Giang Provinces). Up to now, only 6 of them had set up and submitted the files for appoval by competent agencies (Hanoi, Son La, Nam Dinh, Nghe An, Quang Ngai and Tien Giang Provinces) and the remaining provinces did not implement the works for establishement.

2. Overview of operational activities of some projects in high tech agriculture zones

- *Hau Giang Province High Tech Agriculture Zone:* Having been established by 2012, the Management Board just implemented some scientific research activities and set up some pilot models during 2015-20199 period including: one ministerial level project "Application of advanced cultivation techniques and modern seed production technologies for high quality rice varieties in Hau Giang High Tech Agriculture Zone", one provincial level project "Demonstration and set up of technical processes suitable for high quality rice varieties and productivity" as backgrounds for production development of Hau Giang High Tech Agriculture Zone; implementation of a pilot ptoject of Korean bio preparations for rice cultivation. At the presentime, many land areas remain uncultivated activities and many projects were not implemented.

- *Phu Yen Province High Tech Agriculture Zone:* Having been approved by 2013, some specific activities were implemented such as operational start of a cell cultivation lab, successful trial cultivation of Hoang Kim melon

variety in green houses and operation of drip irrigation systems (in coordination with Hochiminh City High Tech Research and Development Center); one ministerial level research project "Application of high techs in production of some valuable vegetables", 2 provincial level research projects "Research for completion of technological process and trial production of hydroponic cultivation models of vegetables" and "Research for application of automated systems of IoT based technologies for clean cultivation of ginger". In addition, there are some projects under preparation such as High techs for clean chicken breeding by Dong Loi Chicken Breeding Co. Ltd., Bio-Experimental station by Center for Application and Transfer of Technology, Phu Yen Center for Research and Development of High Tech Agriculture and Fruit Tree Development Project. Actually, 4 projects are conducting registration formalities for investment in the zone, namely projects of planting and supplying clean agricultural products by Phu Yen SmartAgri Co. Ltd., Anh Dao General Service Cooperative, Clean Biology Co. Ltd., and Sai Gon Package JSC. So, 5 years after approval by the Prime Minister, the high tech agriculture zone in Phu Yen Province has set up the master plan and conducted the initial activities for development of infrastructure facilities and implementation of some research projects. The work of land clearance, however, does not keep pace with development of other works which cause delay of some civil works and then the mobilization of capitals for some projects remains limited.

- *Quang Ninh Province High Tech Agriculture Zone:* Having been established by 2015, the zone gets supports from Quang Ninh Province People's Committee for clearance of 106 hectare of lands for implementation of investment by VinEco Agriculture Investment and Production Co. Ltd. The company made an investment of VND120 billiard for 6 green houses of total superficies of 4.1 hectare using Israeli technologies; an investment of VND35 billiard for construction of 07 high grade film covered houses of total superficies of 4.1 hectare and an investment of VND3 billiard for construction of 10 high grade net covered houses of total superficies of 4.3 hectare. The remaining projects are not implemented yet and Management Board is not set up yet because the zone did not get approval by the Prime Minister.

- *Thanh Hoa Province High Tech Agriculture Zone:* Having been approved by 2015, the zone has implemented some effective activities, namely trial models of Kim Hoang Hau melon cultivation with 1,000 m^2 per model by investments from Lam Son Sugar JVC. The trial models showed an annual harvest of VND180 million per model. By 2020, the JVC plans to make investments for 100 farmer households to realize this high tech agriculture

model. Another models of high tech agriculture are the breeding of cows in cooperation with milk processing plants of Vinamilk Group and TH Truemilk Group, and the organic cultivation of Taki melon and vegetable by Phong Cach Moi Trading and Construction JVC. The products are distributed through a chain of 30 supermarkets and shops in Hanoi and neighbour provinces and export markets would be targeted next.

- *Bac Lieu Province Shrimp High Tech Agriculture Zone:* Having been approved by 2017, the zone attracts the total registration of investment capitals of VND2,650 billion from 20 companies. Bac Lieu Vietnam-Australia Shrimp JVC already gets 315 hectare of land surface where they build 6 film covered houses of 9,000 m^2 per house, make 3 harvests per year and produce 300 ton of shrimp per hectare. As evaluated by experts the model of shrimp intensive farming gives a success rate of 75% with harvest of 20-30% of big size shrimps.

- *Hochiminh City High Tech Agriculture Zone:* 13 years after approval and 7 years of operation, Hochiminh City High Tech Agriculture Zone implements effectively various activities such as support, instruction, propagation of high tech agriculture models through demonstration shows, technology transfer, training, application research, test of stud production in natural conditions, operation of film covered houses and supply of studs of selected varieties. Actual works include:

+ *Scientific research:* 5 city level research projects were implemented for cultivation of orchid and vegetable, 119 grassroot level research projects were focused on cultivation of orchid, vegetable, fruit tree, ornamental fish, production of bio preparations including research and production of products from microbiological materials for high tech agriculture which are environment friendly and safe for users. Besides, firms making investments in the high tech agriculture zone also conduct their scientific researches such as production of safe vegetable according to VietGAP standards, processing safe foods from mushrooms and production of bio preparations and agricultural preparations;

+ *Test works and technology transfer:* Conducted tests give good results: 28 high quality varieties (16 varieties of orchid, 4 varieties of melon, 4 varieties of tomato, 1 variety of basil and 3 varieties of chili) are suitable for cultivation conditions in film covered houses. They produce 900,000 orchid plants of various varieties, 610,000 studs of vegetables and fruit trees, 59 tons of F1 seeds and 10,500 tons of products (mushroom, melon, cucumber, pumpkin, wax gourd and etc.) many of which were cultivated by hydroponic techniques, and more

than 10,500 ton of bio preparations. The products have high quality and meet food safety and export standards. Some products were exported to European markets. Producing processes of high tech agriculture were completed with 11 shows of models to meet quality standards of VietGAP and GlobalGAP;

+ *Transfer of technical advances:* The techniques of *in vitro* cultivation of orchid was transferred for 30 organizations, individuals and farmer households. Other techniques such as cultivation of melon and lingzhi mushroom, hydroponic cultivation, film covered house cultivation, pre-harvest and post-harvest processing operations, aquatic production and others were transferred for 1,700 farmers through 48 short term training courses. Supports were granted for more than 1,500 students and many of them got chances to pass practice in the high tech agriculture zone;

+ *Incubation of technologies and incubation of enterprises:* The center of incubation of high tech agriculture techniques attracts participation from 28 enterprises (3 enterprises passing pre-incubation stage, 13 enterprises passing incubation stage and12 enterprises passing post-incubation stage) in various fields such as bio-organic fertilizers, cultivation-processing of food mushrooms, pharmaceutical mushrooms, agricultural preparations and production of bio products. Consulting service and supports were implemented for incubation of organization and individuals in various fields such as vocational instructions, improvement of business plans and technological process, technical and financial support service, set-up of business networks. 17 technological incubator projects were implemented and they called organizations and individuals for investment in incubation programs for enterprises. 10 programs of incubation of enterprises were organized for more than 350 participants interested in development of high tech agriculture;

+ 5 programs of high tech agriculture shows and science tours were organized for more than 2,000 students from universities of Hochiminh City.

As shown by activities of some high tech agriculture zones, in initial stages they follow well targets and duties according to decisions of establishment. At the same time, these high tech agriculture zones implement both the transfer of lands and the development of infrastructure facilities. Many of them are successful in attracting effective investment sources from large firms such as VinEco, Vietnam-Australia Shrimp company, Vinamilk, TH Truemilk and etc. As assessed, the success generating factors are: (i)

Timely measures of local administrations to facilitate and support enterprises in legal formality procedures; (ii) Provided infrastructure facilities (roads, power, water and cleared lands) and incentive supports (finance, taxation and land leases); (iii) Active participation of enterprises in completion of technical infrastructure; (iv) Innovation in shifting production activities to application of high tech agriculture techniques and access to technical advances. It is worth to note, however, after 10 years of efforts for implementation, there is no high tech agriculture zone fully completed and integratedly operated and then no full size evaluation made for effectiveness of these high tech agriculture zones.

3. Shortcomings and reasons

First, *the legal framework for high tech agriculture zones is not concretized and integrated then leads to difficulties for implementation stages, namely various requirements for project plans for approval by competenent agancies, set up and appraisal of plans of construction of the zone, regulations of operation, suggested price of land lease, support policies for attraction of investment and etc. Then, after being approved, the projects need much time for completion of administrative formalities for land clearance, infrastructure construction and investment calls and etc. which affect the integrity and development of the zones.*

Some high tech agriculture zones get already the decision for establishment and even enter the operational stage but did not set up yet the plan of establishment (such as the case of Hochiminh City High Tech Agriculture Zone[3]); or some high tech agriculture zones already set up the plan of establishment but do not have it appraised (such as the case of high tech agriculture zones of Lam Dong, Khanh Hoa and Thai Nguyen Provinces).

Second*, the operational stage of some high tech agriculture zones have been implemented but the progress is very slow leaving large lands without being used.*

Up to now, among the 11 approved high tech agriculture zones only 4 zones started the operational stage but the rate of land use remains still limited with only a few main activities of research for application of high techs in agriculture and trials of some production models. Activities related to duties of high tech agriculture zones such as linkage for research, application of high techs, mass production of high tech products, training of workforces for high tech agriculture, organization of fairs, exhibitions and shows of

[3] It had been constructed according to Decision No. 3534/QD-UB on 14th July 2004 by Hochiminh City People's Committee.

products were not implemented. The rate of land use remains low in comparison to the approved plans (among the 11 high tech agriculture zones listed in Decision No. 575/QD-TTg only the one of Hochiminh City had the full use of lands according to the approved plan).

***Third**, the capital sources of investment for high tech agriculture zones remain low, social sources of capital are not mobilized, access to incentive policies and supports for investment gets difficult.*

Capital sources for infrastructure construction and development of S&T research facilities in high tech agriculture zones remain low in majority of cases (lower than 50% of targeted plans) and, once available, they are used mainly for infrastructure construction and cannot meet needs of S&T research and technology transfer works. As example, for the case of Hau Giang Province High Tech Agriculture Zone, a finance volume of VND339.3 billion was planned for 2016-2020 period but by 2018 only a volume of VND174.6 billion was released; or for the case of Phu Yen Province High Tech Agriculture Zone only a volume of VND222 bilion was released by 2018 from the planned volume of VND520 billion. In terms of capital structure, the capital sources come mainly from the State budget and the rate of mobilization of social sources of capitals remains very low. Many provincial administrations do not take proactive moves for issuance of incentive policies and supports to attract social sources of capitals, despite of some decisions made by the Government such as Resolution No. 57/2018/ND-CP on 17th April 2018 on incentive mechanisms and policies for investment for development of agriculture and rural areas; Resolution No. 55/2015/ND-CP, Resolution No. 116/2018/ND-CP (for amendment of Resolution No. 55/2015/NĐ-CP to stimulate collateral loans for projects of high tech application and clean agriculture production up to the rate of 70-80% of the total project value accompanied with incentive support measures. Particularly, by 2017, the Government issued the VND100,000 billion valued credit program for development of high tech agriculture. As evaluated by some local goverments, the access to these support measures remain low possible due to difficulties in legal formalities and the volume of loans, if provided, remains much lower than needed. According to data reported by the State Bank, only 29 agricultural enterprises qualify the conditions of loans, credit providing organizations make loans for 19/29 enterprises[4] and only 1/3 of credit packages had been released (about VND36,000 billion). Due to limited budgets, many high

[4] They are firms granted with the certificate for status of high tech agriculture enterprises by MARD in Decision No. 19/2018/QD-TTg on 19th April 2018.

tech agriculture zones do not have capital volumes enough for clearance of lands which leads to low implementation of works.

***Fourth**, technical infrastructure of high tech agriculture zones remains low developed and non-integrated. The time required for completed infrastructure is long and this affects implementation of research, production and business works of enterprises as well as mobilization of capitals for development of high tech agriculture zones.*

In majority of cases, the infrastructure system of high tech agriculture zones are under construction and it requires much time for completion. Many zones (as the case of Phu Yen Province) the lands are not fully cleared for development of infrastructure facilities then they cannot meet needs of enterprises in terms of warehouses and technical facilities for processing of agricultural products.

***Fifth**, the work of clearance of lands progresses slowly and, in some zones, is not implemented yet due to lack of finances.*

As it is noted in decisions for establishment of high tech agriculture zones, the sources of capitals include State budgets of central and local governments and mobilization of social sources but, in practice, the State budgets from the Government can meet less than 50% of estimated volumes and the mobilization of social sources of capital gets stuck because the policies are not really attractive for investment. Some zones, as the one of Hau Giang Province, is unable to set up the rules for land lease which are used next for calculation of land lease fees and other related incentive supports.

***Sixth**, the promotion of investment is not effective and the investment depends much on State supports.*

The promotion, event getting attentions, produces low effects including limited results in mobilization and calls for various forms of investment such as BOT, BT, PPP, ODA, Government bonds and other legal forms. There is almost no success in attracting strategic investors for production activities and cooperation in activities of production, processing and consumption of high tech agriculture products.

***Seventh**, the low attentions for the roles of S&T administrative agencies, the limited level of competence of administrative staffs and skills of production practice.*

As shown by real practice of activities of high tech agriculture zones, the agencies in charge of S&T deal only with evaluation of necessity and preparation of administrative formalities for issuance of decision of

extablishment by authority agencies while the real implementation of activities, after the decision of establishment issued, is mainly conducted by Management Boards. Therefore, the relation between local administrative agencies in charge of S&T and practical S&T activities in the zones is not taken as *a new form of S&T activities*. This new type of S&T activities needs investment for research, application of research results and evaluation of effectiveness of production-business activities of high tech agriculture zones which are needed for evaluation of State administration works. From another side, in process of implementation of high tech agriculture zones, the staffs of Management Board are appointed mainly as results of mobility and mobilization rules and they come from various units of provincial administration. They have different vocational bachgrounds with limited qualifications specifically required for high tech agriculture. Also the attraction of workforces gets difficulties due to lacks of specific policies for staffs in these zones. Farmers in the zones, passing no training courses for high tech agriculture skills, get difficulties when starting new production practice of high tech agriculture.

***Eighth**, the linkage of activities inside high tech agriculture zones remains low.*

The coordination between administrative levels and sectors for construction and development of high tech agriculture zones is not close and effective, particularly the coordination with S&T agencies, universities and research institutes in training of research staffs. The main form of organization of production activities in the zones relates to product processing activities by private enterprises without presence of other forms such as agricultural cooperatives, service supplying enterprises (financial loans, training of workforces, information technologies, procurement, design and realization of smart strategies for collective market access and promotion, market research, development of trademarks, research and transfer of technology and etc.). Without this solid platform, the output products of high tech agriculture zones do not have comparative advantages over the ones of traditional production. The lack of integrated links within high tech agriculture zones leads to low economic effects of the zones and low attractions for investment sources.

4. Proposal of solutions and recommendations

4.1. It is necessary to check, to review and to amend legal regulations found unreasonable to make them more integrate and feasible for implementation works, to attract investment sources from enterprises, organizations and individuals in agriculture sectors for scientific research, production and construction of infrastructure for high tech agriculture zones, namely:

(i) Studies for revision and amendment of Law on Lands in direction of recognizing ownership rights to assets, constructions and equipment for high tech agriculture production such as green houses, film covered houses and net covered houses. This would facilitate ensured transactions and mortgage for bank loans.

(ii) Issuance of documents to guide implementation of Resolution No. 58/2018/ND-CP on beneficiaries of supports, types of insurance covered risks, level of supports from central government budgets for local budgets and for application of high techs in agricultural production, particularly for key categories of products. The regulations are needed for extention of types of mortgage assets for loans and admendment of valuating schemes which should be closer to actual values of tangible assets (farms, green houses, film covered houses, net covered houses, irrigation systems and etc.) and intangible assets (S&T advances) for bank loans[5]. Measures are also needed to settle legal difficulties in access to credit sources according to Resolution No. 55/2015/ND-CP and Program of VND100,000 billion valued loans for high tech agriculture.

(iii) Application of the adjusted rate of 0% of value added tax for transfer of technology and IP rights (actually no taxable), for the list to be set up of machines, equipment, specific transport equipment (not produced yet locally), proposals for application of the rate of 0% of value added tax for enterprises which process, package and consume agricultural products with locally registered trademarks, application of the incentive tax rate or the rate of 0% of value added tax for mechnical-agricultural machines and equipment, extension of time for exemption of corporate income taxes for S&T reseatch contracts (actually not exceeding 3 years) to meet specificities of technological researches which require long time for research and trial works.

4.2. Supply of State budgets for high tech agriculture zones according to approved master plans as well as allocation of State budgets for land clearance and construction of infrastructure facilities; prioriries for development of infrastructure conditions for agricultural production and implementation of trials of digital technologies for value chains of agricultural products (producing, harvesting, processing, storing, consuming and logistics services). These measures would link sectors of activities, save costs and control toughly quality of products from production to consumption.

---

[5] Actually, this proposal has been included in Resolution No. 57/2018/ND-CP but it requires issuance of documents to guide the formality of issuance of the certificate of ownership to assets on agricultural lands as backgrounds for high tech agriculture enterprises to realize mortgage ensured transactions of investment loans.

4.3. Necessity to be proactive in shifting agricultural economic structure, issuing supports and measures to attract investments for high tech agriculture zones, enhancing quality and promoting export of agricultural products, developing market forecast and commercial promotion of agricultural products, offering priorities for integrated development of infrastructure for long term master plans for high tech agriculture zones, and enhancing links between high tech agriculture zones and local S&T administration agencies and universities-research institutes, all leading to propagation of application of high techs in agriculture.

4.4. Efforts to make agricultural enterprises consider high tech agriculture zones as comfortable environment for access to and renovation of technologies, orientation to production of commercial agricultural goods, enhancement of competitiveness and reduction of costs of products, cooperation in research and training activities for high tech agriculture, demonstration of models and products of high tech agriculture, and attraction of investment sources.

4.5. Enhancement of training and capacity building works for State administration staffs and enterprise managing staffs, organization of research and transfer of S&T advances, active decentralization of agricultural promotion activities and close coordination of training-research-promotion works to prepare high qualification staffs for high tech agriculture zones.

4.6. Enhancement of links among actors in high tech agriculture zones, particularly the relations with State administration agencies and universities-research institutes, development of related logistics services such as credit supply, training, technical services, commercial promotion, transfer of technology, all appearing as evidences of effectiveness of high tech agriculture zones and then leading to larger propagation of high tech application for agricultural production./.

REFERENCES

1. Law on High Techs, 2008.
2. Decision No. 575/QD-TTg on 04th May 2015 by the Prime Minister for approval of Master Plan of high tech zones and regions up to 2020 and visions to 2030.
3. Decision No. 694/QD-TTg on 24th May 2017 by the Prime Minister on addition of Bac Lieu Province Shrimp High Tech Zone into Master Plan of high tech zones up to 2020 and visions to 2030.

4. Ministry of Science and Technology, 2013. "Development of high tech agricultural zones and regions - experiences of China and Vietnam". *Proceeding of international round tables*, November 2013.

5. National Agency for Science and Technology Information, 2013. *Science-Technology-Economics Bulletin*, Issue September 2013.

6. Duong Hoa Xo, 2011. "Development of high tech agriculture by Hochiminh City", *Science Activities* Magazine, Issue October 2011, Ministry of Science-Technology.

7. Hai Ninh, 2006. "High tech agriculture - necessary orientation of agricultural production". *Vietnam Agriculture* Newspaper, *Science-Technology* Magazine, Issue May 2009, page 381.

8. Le Tat Khuong, Ta The Hung, Nguyen Gia Thang, Nguyen Van Tien. 2013. "Some experiences in development of high tech agriculture zones in China". *Vietnam Science-Technology* Magazine, Issue 13, 2013.

9. Nguyen Ngoc Quy, Dang Ngoc Vuong, 2011. "Application of science and technology in development of agriculture-sylviculture-aquaculture in sustainable directions". *Science Activities* Magazine, Issue July 2011, Ministry of Science-Technology.

10. Nguyen Thi Kim Sang, 2017. *Experiences of high tech agriculture development in some countries and lessons for Vietnam.*

11. Report of surveys of activities of some high tech agriculture zones. Institute of Policies and Strategies for Agricultural and Rural Development (IPSARD). Ministry of Agriculture and Rural Development, 2018.

12. Hieu Cong, 2017. "Package of VND100,000 billiards valued loans for high tech agriculture still difficult due to terms and conditions", see 03 August 2017, <https://news.zing.vn/goi-100-000-ty-cho-nong-nghiep-cong-nghe-cao-van-kho-do-cac-tieu-chi-post768538.html>.