

**VIETNAM** RESEARCHES, **DEVELOPS AND APPLIES POSTHARVEST TECHNOLOGIES TOWARDS A SUSTAINABLE AGRICULTURE** 

**January 20, 2023** 

## **About the speaker – Trang Nguyen**

Vietnam's agriculture in 2022

Vietnam researches, develops and applies postharvest technologies towards a sustainable agriculture

Nipa palm tree as a solution for the green development of local communities

## About the speaker – Trang Nguyen

### **Experiences**

- 2022: Intellectual Property (IP) Counsel, Dentons LuatViet
- 2021 2022: IP Coordinator, Rouse Legal Vietnam
- 2011 2021: Official, Representative Office in Ho Chi Minh City,
   IP Office of Vietnam (IP Vietnam)
- 2009 2011: Personal Assistant to Deputy General Director, British International School Vietnam

## About the speaker – Trang Nguyen

### **Publications & Appearances**

- Articles on Website of IP Vietnam: <a href="https://ipvietnam.gov.vn/">https://ipvietnam.gov.vn/</a>
- 2019: WIPO-WTO Advance Course on Intellectual Property in Switzerland, the World IP Organization and the World Trade Organization
- 2017: Research project in Turkey, LLM\_ANKARA
   "Transfer of Industrial Property Rights in Vietnam's IP Law and Implementing Regulations: some current issues"
- 2016: Study-cum-Research Fellowship Program in Japan, Japan Patent Office "IP Utilization and Support for IP Management in Japan's Small and Medium Enterprises Experiences for Vietnam" (archived)

Other theses can be found in:

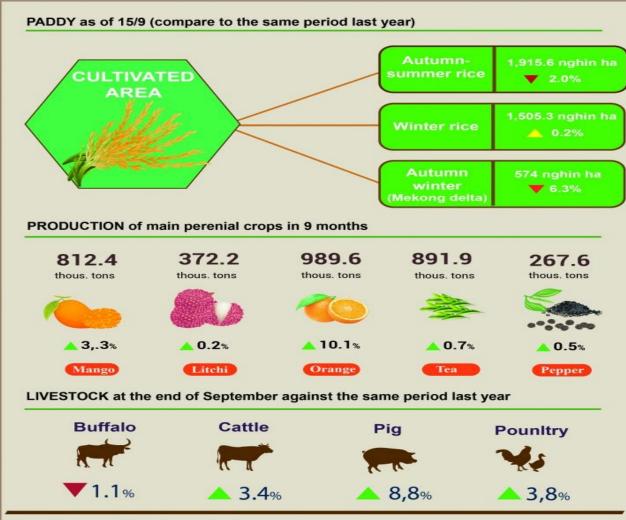
https://www.jpo.go.jp/e/news/kokusai/developing/training/thesis/







### **AGRICULTURE**



https://www.gso.gov.vn/en/data-and-statistics/2022/10/infographic-Source: agriculture-in-september-and-9-months-of-2022/

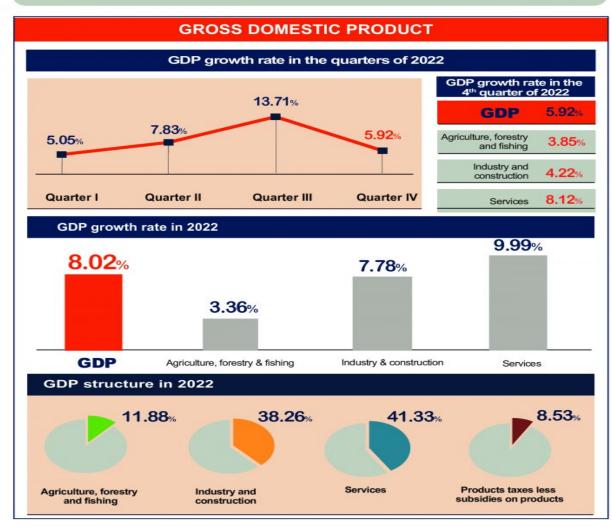




### **SOCIO - ECONOMIC SITUATION**

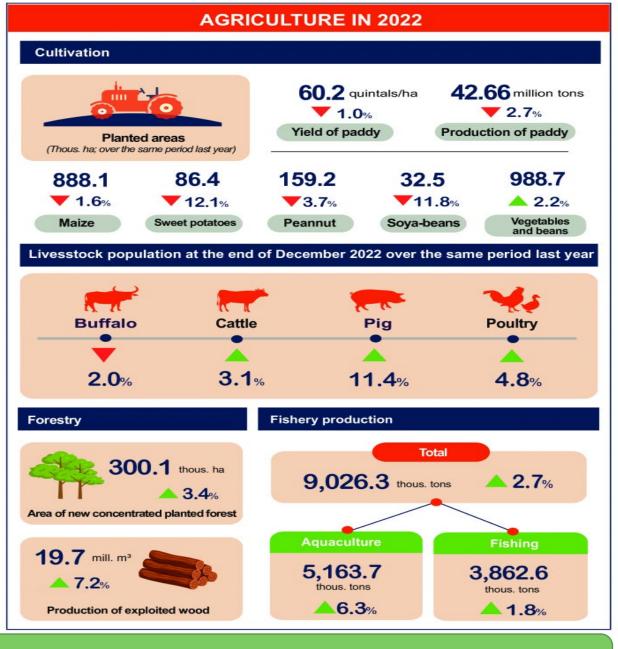


4th QUARTER AND 2022



Source: https://www.gso.gov.vn/en/data-and-statistics/2022/12/infographic-social-economic-situation-4th-quarter-and-2022/





Source: https://www.gso.gov.vn/en/data-and-statistics/2022/12/infographic-social-economic-situation-4th-quarter-and-2022/



- The rice area was estimated at 7.1 million hectares, reported a decrease of 127.7 thousand hectares compared to the previous year, due to the continued implementation of the Project on Sector Restructuring;
- Rice yield was estimated at 60.2 quintals/ha, down 0.6 quintals/ha compared to the previous year; rice production reached 42.66 million tons, down 1.19 million tons from 2021;

Source: https://www.gso.gov.vn/tin-tuc-thong-ke/2022/12/thong-cao-bao-chive-tinh-hinh-kinh-te-xa-hoi-quy-iv-va-nam-2022/



 Maize production was 4.41 million tons, down 0.8% compared to 2021, peanut production reached thousand tons, saw a 4.8% decline; soybean production stood at 52.2 thousand tons, reported 11.9% decrease; sweet potato production totaled 969.1 thousand tons, fell by 21.3%; vegetable and bean production amounted to 18.68 million tons, grew 2.9%;

Source: https://www.gso.gov.vn/tin-tuc-thong-ke/2022/12/thong-cao-bao-chive-tinh-hinh-kinh-te-xa-hoi-quy-iv-va-nam-2022/



- The area of plantation crops (such as rubber, coffee and tea) was 2,194.3 billion hectares, down 0.4% compared to 2021;
- The production of banana, orange, grapefruit, durian, pineapple and longan increased by 6.5%, 8.2%, 8.2%, 25%, 3.7% and 2.7%, respectively; the production of dragon fruit and mango decreased by 13.5% and 3.1% respectively;

Source: https://www.gso.gov.vn/tin-tuc-thong-ke/2022/12/thong-cao-bao-chive-tinh-hinh-kinh-te-xa-hoi-quy-iv-va-nam-2022/

## **General Information**

"Post-harvest losses are reported to be 1 to 2% of GDP, but with considerable variation between season, commodity, and region." – 2003 – <a href="https://un-csam.org/sites/default/files/2021-01/post-barvest%20Research%20and%20Developments.">https://un-csam.org/sites/default/files/2021-01/post-barvest%20Research%20and%20Developments.</a>

harvest%20Research%20and%20Development%20in%20Vietnam%20.pdf



## **General Information**

The agricultural post-harvest losses were up to 40-45% annually – Oct 2018

http://hoinongdan.org.vn/sitepages/news/46/72483/khoang-3000-3500-ty-dong-bi-mat-moi-nam-do-ton-that-sau-thu-hoach

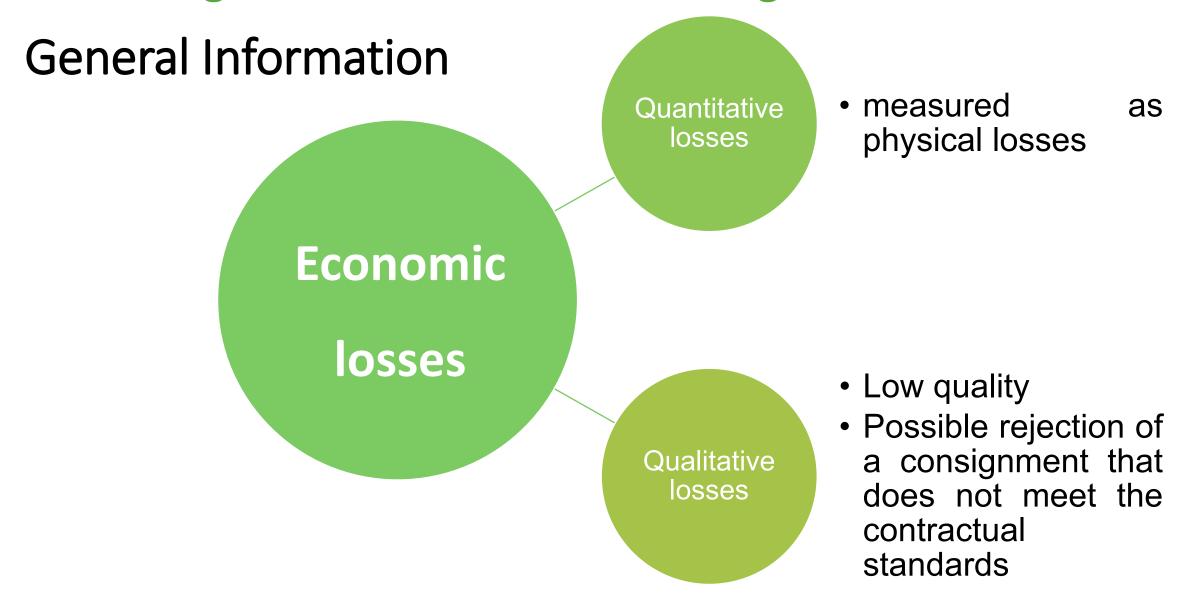
## **General Information**

• The post-harvest loss rate in Vietnam, which was about 20-25%, was higher than the world average rate reported as 10-15%. The loss rates in rice, livestock, fruit and vegetables were 14%, 20-25%, 20-25% and 30% respectively – Dec 2018

https://baotainguyenmoitruong.vn/giamton-that-sau-thu-hoach-ap-dung-congnghe-la-yeu-to-hang-dau-251970.html

## **General Information**

- The post-harvest losses accounted for a large number of 20-25%, with an estimated total loss of 8.8 million tons (equivalent to 3.9 billion USD) per year;
- The loss rates in leafy vegetables, fruits and root vegetables were 30%, 25% and 10-20% of production respectively;
- Rice and maize also had the post-harvest losses of 14-15% and 18% respectively. - 2020 http://portalold.ninhthuan.gov.vn/chinhquyen/sokhc n/Pages/Viet-Nam-Ton-that-sau-thu-hoach-tuongduong-3,9-ty-USD.aspx





Vietnam is towards a sustainable agriculture

Source: <a href="https://impact.economist.com/sustainability/project/food-security-index/explore-">https://impact.economist.com/sustainability/project/food-security-index/explore-</a>

countries/vietnam



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Select a country

### **Vietnam**

Asia and Pacific | Lower middle income

5.7%

Prevalence of undernourishment 22.3%

Percentage of children stunted

13.4%

Percentage of children underweight 2.1%

Prevalence of Obesity

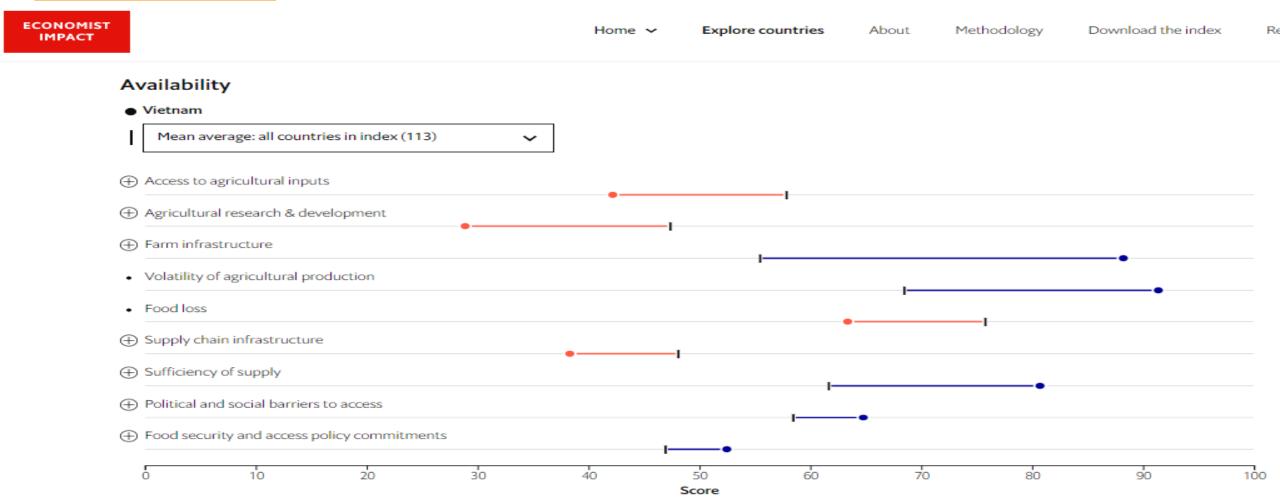
0.70

Human Development Index

Vietnam is towards a sustainable agriculture

Source: <a href="https://impact.economist.com/sustainability/project/food-security-index/explore-">https://impact.economist.com/sustainability/project/food-security-index/explore-</a>

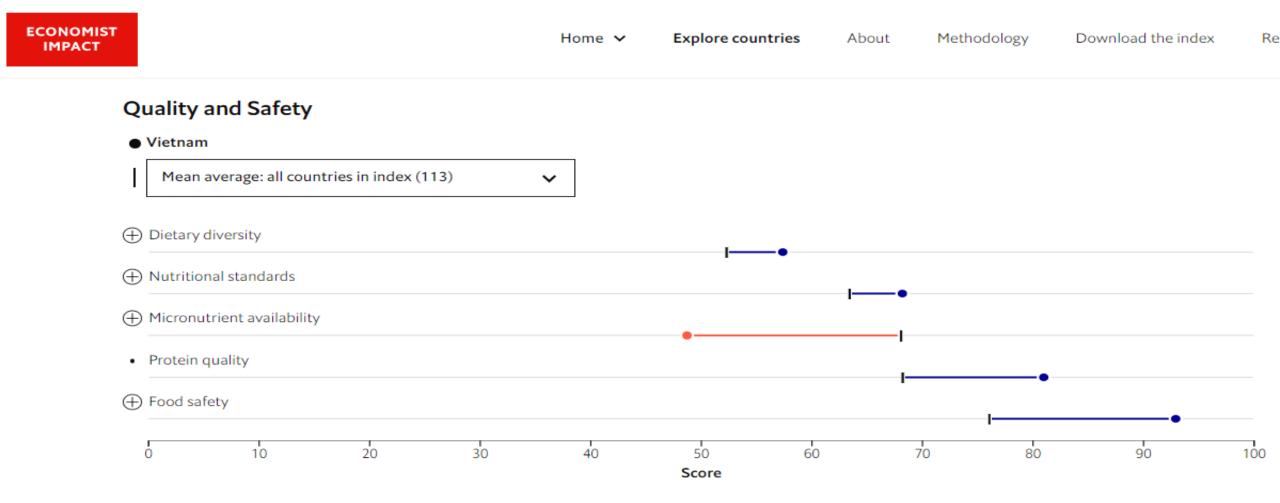
countries/vietnam



Vietnam is towards a sustainable agriculture

Source: <a href="https://impact.economist.com/sustainability/project/food-security-index/explore-">https://impact.economist.com/sustainability/project/food-security-index/explore-</a>

countries/vietnam

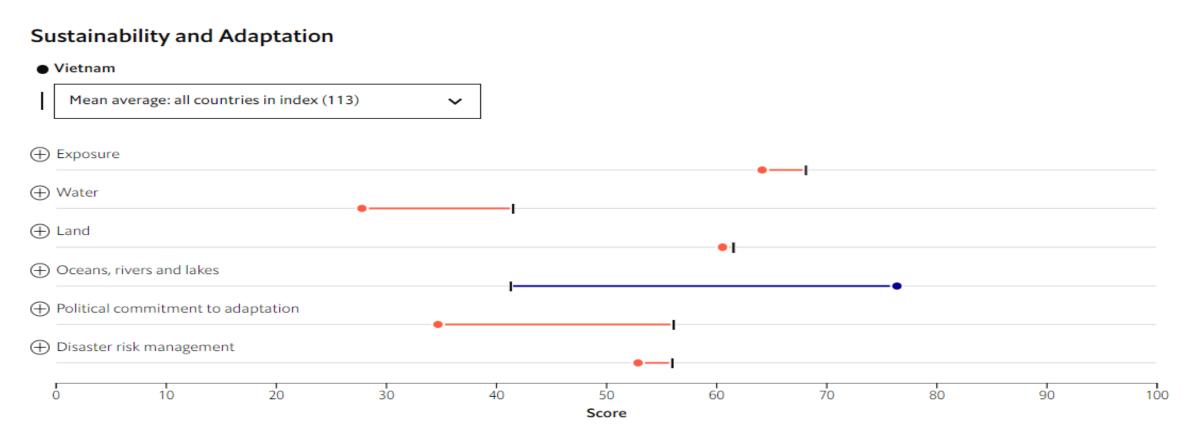


Vietnam is towards a sustainable agriculture

Source: <a href="https://impact.economist.com/sustainability/project/food-security-index/explore-">https://impact.economist.com/sustainability/project/food-security-index/explore-</a>

countries/vietnam







Vietnam is towards a sustainable agriculture

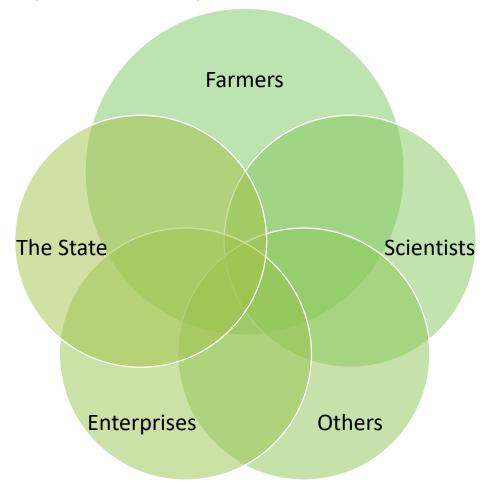








Farmers, enterprises, scientists, the State and others are all involved



## Farmers, enterprises, scientists, the State and others are all involved

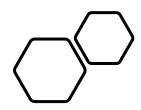
- The importance of public-private partnerships (PPP) in agriculture
- The need for joint efforts in research, development and application of postharvest technologies
- The uninterrupted collaboration in agricultural supply chain by removing barriers in production and transaction while boosting e-commerce and facilitating logistics for better quality control.

Farmers, enterprises, scientists, the State and others are all involved

Table: Patent/ Utility Solution applications of Vietnam relevant to postharvest technologies filed from 2020 to 2022

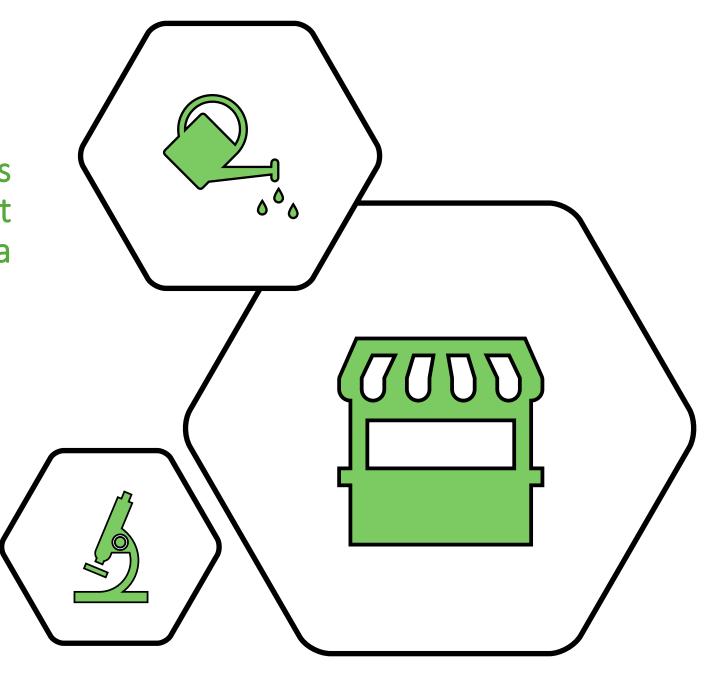
| Year                   | 2020 | 2021 | 2022 |
|------------------------|------|------|------|
| Number of applications | 624  | 436  | 143  |

Source: <a href="http://wipopublish.ipvietnam.gov.vn/wopublish-search/public/patents?1&query=\*:\*">http://wipopublish.ipvietnam.gov.vn/wopublish-search/public/patents?1&query=\*:\*</a>



Farmers, enterprises, scientists, the State and others are all involved

 There has been a lot of universities, institutes and other organizations or individuals in both public and private sectors paying attention to postharvest technologies



Farmers, enterprises, scientists, the State and others are all involved

https://en.ctu.edu.vn/introduction/general.html



Home Introduction News Academics Research Cooperation Units of CTU Admissions Events

The Mekong Delta (MD), with a natural area of about 4 million hectares and over 18.4 million people, is the biggest agricultural production area in the entire country and is considered the rice basket of Vietnam. Besides rice production, the MD is also rich in fruits and seafood for export. This is a rich land with beautiful scenery including colorful fruit trees all year round.

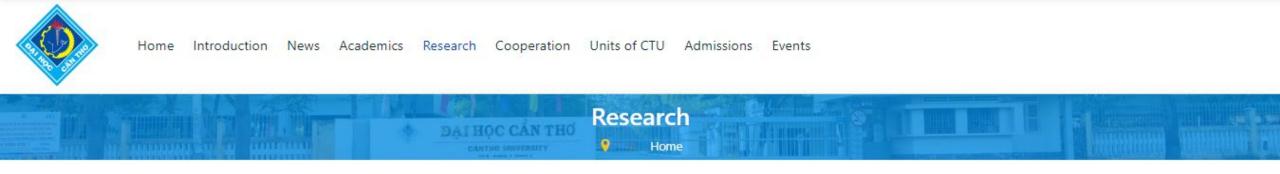
Can Tho University (CTU), an important state higher education institution in the MD, is the cultural, scientific and technical center of the MD and Vietnam. Since its founding in 1966, CTU has been improving and developing itself. It has an enrollment of about 54.000 undergraduate students; 3.000 students have been following Master programs; and around 300 students are Ph.D candidates. CTU has got over 2.000 staff members including nearly 1.200 teaching staff and 800 supporting staff. From a university with a few fields of study at the beginning, it has developed into a multidisciplinary university. Currently, it has nearly 100 undergraduates, 36 Master and 15 Doctoral training programs. Every year CTU receives students on internship programs from the U.S, Belgium, Japan and so on, or under agreements between their universities and CTU.

CTU's main missions are training, conducting scientific research, and transferring technology to serve the regional and national socio-economic development. In addition to its training responsibilities, CTU has actively taken part in scientific research projects, applying the advances in scientific and technological knowledge to solving problems related to science, technology, economics, culture and society in the region. From achievements in its scientific research and international cooperation projects, the university has developed a variety of products and technological production processes that benefit people's lives and promote export, thus helping the University gain prestige in national and international markets.

The University has established scientific and technological cooperation with many international organizations, universities, and research institutes. As a result of these cooperative projects, the staff's administrative capabilities and specializations have been upgraded. The facilities, experimental equipment, and scientific materials have also been added.

Farmers, enterprises, scientists, the State and others are all involved

https://en.ctu.edu.vn/research.html



### SCIENTIFIC RESEARCH AND TECHNOLOGY TRANSFER

CTU is constantly promoting scientific research within its institution and has made ecouraging achievements in scientific research development. Notably, most of CTU research activities aim at critical isseues in the development process of the Mekong Delta as well as the country of Vietnam in general. Its university staff members and students are greatly encouraged to take part in research and publication. In recent years, CTU professional staff have completed or been involved in implementing many State-level, Ministry-level, and university-level research projects. Many of the staff are highly regarded, and they effectively apply their management and training activities at the university as well as for regional and national socio-economic development. CTU lectures and students are very proactive and enthusiastic in scientific research and other creative activities. They actively take part in a lot of research and technology application projects at various levels and organize a number of seminars, workshops, expertise exchanges and similar activities. From achievemets in its scientific research and international cooperation projects, the university has developed a range of products and technological production processes that benefit people's lives and promote exports, thus helping the university gain prestige in national and international markets.

- → SCIENTIFIC RESEARCH
- → TECHNOLOGY TRANSFER

Farmers, enterprises, scientists, the State and others are all involved

https://en.ctu.edu.vn/research.html



Introduction News Academics

Research

Cooperation

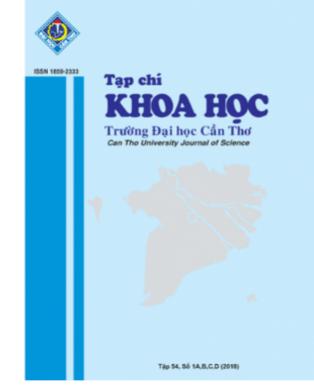
Units of CTU

JOURNAL OF SCIENCE

CTU Journal of Science granted by Ministry of Information and Communication by publication licence number of 101/GP.BTTTT dated on April 10, 2015. Currently, the Journal publishes 9 volumes per year, including 3 volumes in English issue.

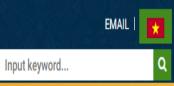
CTU Journal of Science is a multi-disciplinary journal that publishes scientific research results of lecturers, researchers, students and others inside and outside the University. Its content is divided into four specialized parts: (i) Natural Sciences, Technology and Environment; (ii) Agriculture, Fisheries and Biotechnology; (iii) Social Sciences, Humanities and Education; and (iv) Economics and Law. The Journal is applying the criteria of international journals such as online submission, evaluation and publication; two independent peer reviews; articles uploaded on the Journal's website, etc.

→ CTU JOURNAL OF SCIENCE









# ABOUT VNUA ▼ EDUCATION ▼ RESEARCH ▼ INTERNATIONAL COOPERATION ▼ FACULTIES AND ADMINISTRATION ▼ JOURNAL CONTACT

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A Home » Research Projects » International Collaborative Projects

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### INTERNATIONAL COLLABORATIVE PROJECTS

| No | Project Title   | Sponsors   | Start | End  | Project leader  |
|----|---|--|-------|------|---|
| 1. | Improving food<br>security for ethnic<br>minority households:<br>An evidence from<br>Son La<br>province, Vietnam  | International<br>Foundation for<br>Science, Sweden | 2021  | 2022 | Hà Thị Thanh Mai – Faculty of<br>Economics and Rural<br>Development<br>Email: hathanhmai@ vnua.edu.vn |
| 2. | Moving toward a<br>healthier diet:<br>Consumer intention<br>to eat more<br>vegetables and less<br>meat in Vietnam | International<br>Foundation for<br>Science, Sweden | 2021  | 2022 | Bùi Thị Lâm – Faculty of<br>Accounting and Business<br>Management<br>Email:btlam@vnua.edu.vn          |
| 3. | Farmers' perception<br>of land degradation in<br>marginal lands of Van<br>Yen district, Yen                       |  | 2021  | 2022 | Bùi Lê Vinh – Faculty of Natural<br>Resources and Environment   |

| Researc | h Strate | egy     |    |  |
|---------|----------|---------|----|--|
| Proced  | ires     |         |    |  |
| Researc | h Proje  | cts     |    |  |
| Achieve | ments    |         |    |  |
| Accade  | mic pub  | licatio | ns |  |
| Key lab | 3        |         |    |  |
| R&D Gro | oups     |         |    |  |
| Awards  |          |         |    |  |

Vietnam researches, develops and applies postharvest technologies towards a sustainable agriculture

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https://eng.vnua.edu.vn/re search/researchprojects/internationalcollaborative-projects



Farmers, enterprises, scientists, the State and others are all involved

#### ORGANIZATIONAL STRUCTURE

#### 1. DIRECTORATE

Director General: Vice Directors General:

Dr. Chu Van Thien Dr. Pham only Tuan Dr. Nguyen Nang Nhuong

MSc. Nguyen Duy Duc

### 2. FUNCTIONAL DEPARTMENTS

- Dept. of Administration & Personnel Management
- Dept. of Science, Training and International Cooperation
- Accounting office

### 3. RESEARCH DEPARTMENTS

- 1. Dept. of Measurement and Automation
- 2. Dept. of Technology and Equipment for Food Preservation
- 3. Dept. of Post-harvest Biological Technology
- 4. Dept. of Animal Husbandry Mechanization
- 5. Dept. of Agricultural By-products and Environment
- 6. National Electrical Mechanical Laboratory VILAS-019

#### 4. UNITS IMMEDIATELY UNDER THE INSTITUTE

- Center for Testing and Evaluation of Machinery and Equipment Center for Technology Transfer and Consultancy on Investment
- 3. Center for Development of Agricultural Engineering
- 4. Center for Research and Control of Food Quality
- 5. Research Center for Agricultural Machinery and Aero-hydraulic Machines
- 6. Research Center for Processing of Agro-products and Foodstuff
- 7. Center for Research and Technology Transfer in Agricultural Engineering in the Central (in Hue City)
- 8. Sub-Institute of Agricultural Engineering & Post-harvest Technology (in HCM City)

### **Functions and Tasks**

The VIAEP is a key national scientific and technological institution in agriculture. It is immediately under the Ministry of Agriculture and Rural Development and has functions as follows: research on fundamental, strategy, policies, public services; applied; research; post-graduate education; transfer of technology; international cooperation; production and trade in engineering and post-harvest technology for agriculture and rural development nationwide.

### Distinguished Achievements

1981 - Labour Order, the 3rd class

1985 - Labour Order, the 2nd class

1995 - Labour Order, the 1st class

1994, 1996 - Challenge Banners by the Government

2000 - Award by the Vietnam State

2001 - Independence Medal, the 3rd class

2008 - Independence Medal, the 2nd class











### ACHIEVEMENTS OF RESEARCH AND TRANSFER IN SCIENCE AND TECHNOLOGY

### Farm Power and Cultivantion

- . Small-sized tractor (15-20 HP) combined with agricultural attachments to serve land preparation for rice cultivation and dry land crop-care.
- . Technology and equipment for production of mat-type rice seedling in industrial scale
- . Rice transplanter with a capacity of 0.12-0.15 ha/h
- · Technological process and system of machines for sugar-cane cultivation, including sugar-cane leaf chopper, deep chiseling device, stump cutter, canal digger and fertilizer distributor
- . Machines and system of equipment for substrate production with a capacity of 0.5-2 tonnes/h, including automatic soft bagging equipment with different sizes to produce sugar-cane and forestry seedlings



Iron-cage against getting bogged down



Sugar-cane inter-row cultivator



Rice transplanter MC-6-250

### Crop-Care and Irrigation



Net-house with history equipment for producing



Mist irrigation system

- Sugarcane interrow cultivator combined with fertilizer distribution and ridge making with a capacity of 0.3-0.4 ha/h
- Models of net-houses for planting vegetables, flowers and seedlings with built-in systems of automatic drip/mist irrigation, and air
- Rotating spiral noria based upon stream water flow BXC-15 with a discharge capacity of 15 m3/h at a height of 10 m
- Stationary and mobile systems of sprinkling and drip irrigation

Vietnam researches, develops and postharvest technologies towards sustainable agriculture

Farmers, enterprises, scientists, the State others are all involved

applies

### Harvesting

- Rice combine threshers with a capacity of 0.9-1.8 tonnes of paddy/h
- . Rice combine harvesters with a capacity of 0.15-0.65 ha/h
- . Corn combine harvesters with a capacity of 0.3-0.5 ha/h
- Machines for shelling commercial corn with a capacity of 5-6 tonnes/h
- . Corn ocrea peeler and sheller with a capacity of 3-4 tonnes/h and high moisture content of corn at 25-35%
- Sugar-cane windrow cutter with a capacity of 0.1 ha/h and leave remover 1 tonne/h
- Machine for harvesting whole stalks of sugar-cane with a capacity of 10-12 tonnes/h (0.2 ha/h)
- · Peanut harvester with a capacity of 0.2 ha/h









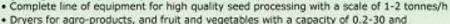
Peanut combine harvester

Corn combine harvester

Rice combine harvester

Sugar-cane combine harvester

### Drying, Storage and Processing of Agro-forestry and Aquatic Productions



- 50-1,000 tonnes/batch, respectively
- Cold stores, freezers with a capacity of 10-200 m<sup>3</sup>
- Models of preprocessing and storage (packing house) of vegetables, flowers and fresh fruit with a centralized scale of 10-15 tonnes/day
- · Coating technology for orange preservation
- · Preparations for fruit preservation
- Modified atmosphere packing (MAP) technology and cold storage technology combined with ethylene absorbent R3 to preserve fresh litchi
- · Technology and equipment for processing bitter tea in bags and in strips
- Technology and equipment for producing colophony and turpentine oil with a scale of 5,000 tonnes of products per year
- . Technology and complete line for processing animal feed with a capacity of 1-5 tonnes/h
- . Complete line for processing shrimp feed with a capacity of 200 kg/h
- Complete line for processing powder from raw fish for livestock with a capacity of 25 tonnes/day
- . Technology and equipment for processing salmon and sturgeon by smoked method
- · Technology and complete line for processing pharmaceutical CaCO3 from oyster shell
- Technology and equipment for producing organic fertilizer with a scale of 10,000-15,000 tonnes/year



Complete line for anim feed processing



Complete line for producing colophony and turpentine oil



Complete line for producing glue from lingzhi mushroom



Packing house



Complete line for slaughtering poultry

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### Mechanization in Animal Husbandry

- System of equipment for breeding chickens in coops with a farm scale of 2,000-4,000 heads
- System of equipment for slaughtering chickens and pigs with a scale of 150-250 and 20-30 heads/h, respectively.

### Post-Harvest Biological Technology

- Microbiological fertilizer with multigenus and multifunction for food crops, vegetables and auxiliary crops
- Technology for producing some microbiological preparations against aflatoxin and ochratoxin A on agro-products
- Technology for producing some enzyme preparations (pectinaza, phytaza, etc.) with a capacity of 1,000 liters/batch
- Technology for producing some preparations to create biological coating film for preservation of orange, mango, litchi and dragon fruit with a pilot scale





System for submerged fermentation combined with seration with a volume of 1,500 liter

### **Electricity and Renewable Ennergy**

- System of equipment for automatic control, monitoring for agro-products processing lines
- System of equipment for using renewable energy (wind, solar energy, etc.)
- · Ultrasonic cleaner
- Fluidized combustor using agro-forestry residues (rice husk, coffee pod, sawdust, corncob, etc.) as fuels with a capacity of 50-2,500 kg/h



Fluidized combustor

#### INTERNATIONAL COOPERATION

VIAEP is the coordinating agency for science and technology on ASEAN food and foodstuff, a fledged member country of Asia and Pacific Center for Agricultural Engineering and Machinery (APCAEM – ESCAP) and a member of the Federation of the Institutes of Food Science and Technology in ASEAN (FIFSTA)

In the cooperation framework with overseas and international organizations, VIAEP accomplished several remarkable projects as:

- Project on "Strengthen Capacity to Analyze Some Chemical Residues in Agro-products" funded by the US Government, 2003 -2009
- ADB project: "Improving Livelihood of Poor Farmers through Post-Harvest Technology" financed by Japan Fund for Poverty Reduction, 2005-2008.
- Project: "Village Level Processing-Empowerment through Enterprise Skill Development" financed by FAO, 2006-2007
- Project "Transfer and Install System of Solar Electric Generator Sponsored by Goede Scientific Fund, Federal Republic of Germany, for 4 Island Communes of Van Don District, Quang Ninh Province" Funded by Goede Scientific Fund, Federal Republic of Germany, 2011-2012
- Technical cooperation project "Transfer of Agricultural Machinery for Cuban Rice Production".
   Financed by the Government of Vietnam to Cuba

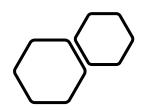






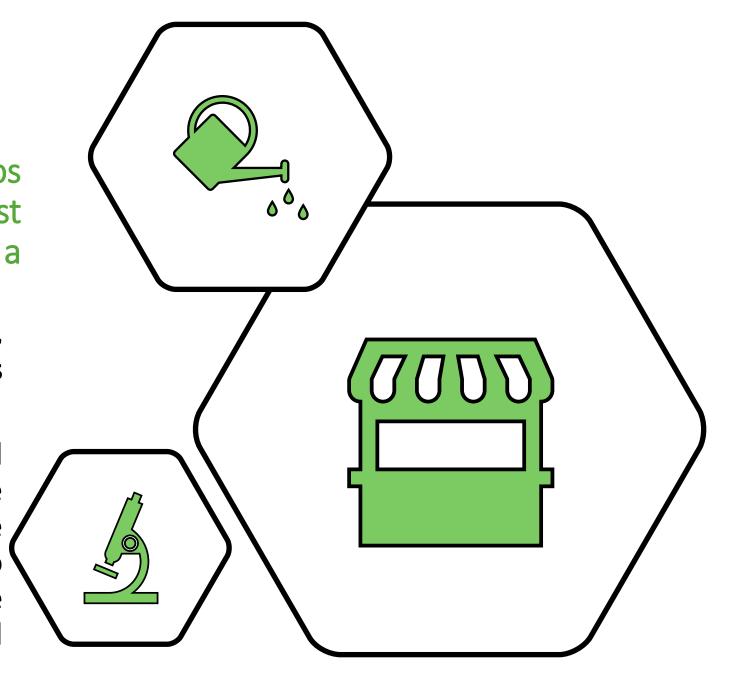
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 There have also been several activities to strengthen the capacity of Vietnamese farmers and marketers to reduce losses and improve quality in agricultural products.



Farmers, enterprises, scientists, the State and others are all involved

https://faatsd2022.iuh.edu.vn/faatsd-2022-program-m337

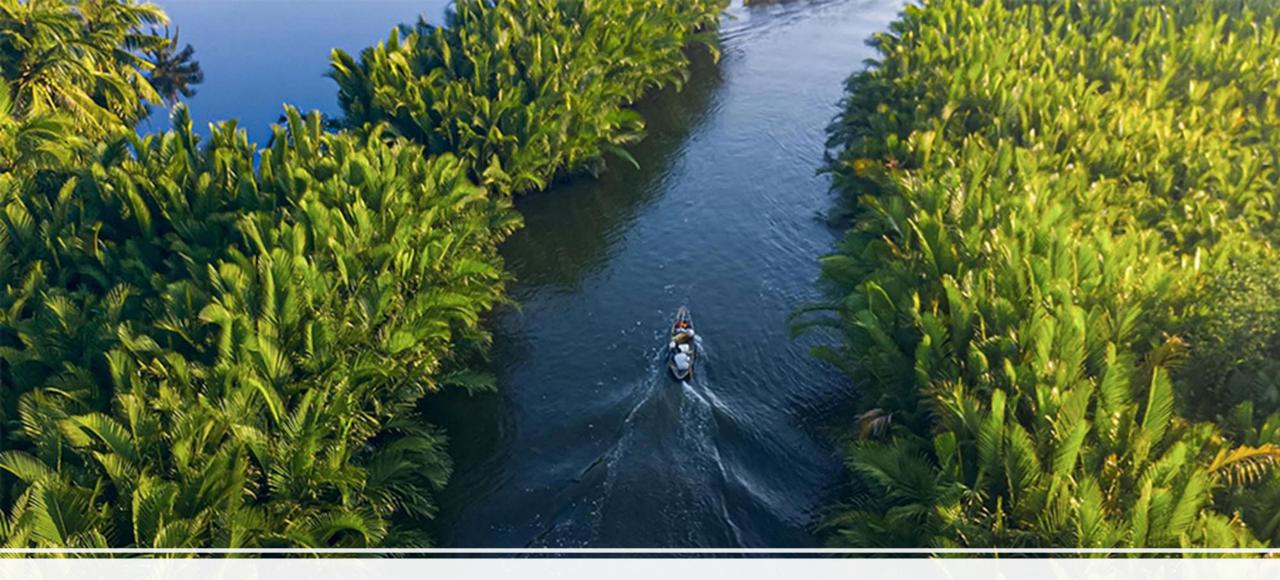


### 26th November 2022

Meeting Room E4: 7:30 - 12:30

### INTERNATIONAL CONFERENCES ON FOOD & AGRICULTURE ADVANCED TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT (FAATSD 2022)

| riceting Room E | 4. 7.00 – 12.00  |
|-----------------|--|
| 07:30 - 08:30   | Registration and opening ceremony  |
| 08:30 - 08:40   | Welcome Address by Vice Rector of IUH (Assoc. Dr. Dam Sao Mai)   |
| 08:40 - 08:50   | Address by Prof. Takashi Uemura, Osaka Prefecture University, Osaka, Japan   |
| 08:50 - 09:00   | Symposium Chairman Address (Prof. Latiful Bari)  |
| Chairman: Assoc | c. Prof. Dam Sao Mai; Prof. Latiful Bari   |
| 09:00 - 09:30   | Keynote Speaker 1  |
|                 | Dr. Nobuyuki Kijima  |
|                 | "Rational use of antibiotics as agricultural chemicals to ensure food security"  |
| 09:30 - 10:00   | Keynote Speaker 2  |
|                 | Dr. Md Tofazzal Islam  |
|                 | "The development of point-of-care detection of destructive wheat blast fungus using CRISPR-Cas technology"   |
| 10:00 - 10:30   | Keynote Speaker 3  |
|                 | Dr. Venkatesh Meda   |
|                 | "Investigation of Lentil Seed Behavior under Microwave and Microwave-Infrared Thermal Treatments and Their Impact on Modifying the Physicochemical and |
|                 | Functional Properties"   |
|                 |  |



Nipa palm tree as a solution for the green development of local communities

# Nipa palm tree as a solution for the green development of local communities

- Wherever the water flows, the nipa palm tree grows.
- Nipa palm leaves are tall and straight, used to cover the house from the sun and rain. Their roots and trunks are immersed in water, stabbing into ground to help keep the banks and prevent landslides.
- Nipa palm trees are also home of many typical aquatic species, providing an abundant food source and a source of livelihood for farmers in regions where they grow.





Nipa palm tree as a solution for the green development of local communities



- Processing the parts of nipa palm tree into finished products is difficult but modern postharvest technologies of Vietnamese researchers help.
- Combining development of enterprises relevant to nipa palm products with local ecotourism is a new direction with many potentials.



