



Education and research briefing of agricultural mechanization in Vietnam

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Overview of the higher education and research institutions that offer Agricultural Engineering/Mechanization Programme, and the Programme settings in Vietnam

Briefing of Vietnam National University of Agriculture (VNUA) and specific Programmes/research focuses

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Overview of the higher education and research institutions that offer Agricultural Engineering/Mechanization Programme, and the Programme settings in Vietnam

- During 60s and 70s of the 20th century, Agricultural engineering training in this period was in service of mechanizing farm under Soviet-style by using large machines 50-80 HP (MTZ 50; MTZ 80) into production.
- After 10 hiring (1990), agricultural machinery in Vietnam mainly focused on small machines, manual labor due to fragmented paddy fields.
- Since 1996, training technical staff to guide farmers, help conduct the planning, design, implementation of industrial work with farmers in a scientific and sustainable way.

Overview of the higher education and research institutions that offer Agricultural Engineering/Mechanization Programme, and the Programme settings in Vietnam

- The engineers are required to comprehensively understand basic things of relevant scientific fields which include :
 - ❖ (1) **Basic things in the areas of basic science:** Systems theory, systems of agriculture, agricultural works system: Environment of plant and animal biology; Plant and animal physiology; Microclimate plant and animal ; Physiology of post-harvest products; Plant and animal nutriology; Animal behavior; Plant and animal of physics.
 - ❖ (2) **Technical areas of expertise include:** Planning, design for structures of plants and animals in nationwide and each eco-region; The work nature of agricultural raw materials; Mechanization of agriculture; Electrification of agriculture and electronic techniques in agriculture; Agricultural architecture and biological agricultural works; Pedology protection and science of water use; System of works for processing and preserving agricultural products; System of works for pollution treatment in the process of modernization, industrialization in agriculture, rural areas; Protection of agricultural environment and rural energy sources; Planning, layout agricultural works and population area.

Overview of the higher education and research institutions that offer Agricultural Engineering/Mechanization Programme, and the Programme settings in Vietnam

- Only one field Vietnam must find ways to resolve called planning, design for structures of plants and animals in the industrialized period taking into account climate change and deep integration of world markets since it is entirely new.
- They are required to have broad knowledge of the basic fields aforementioned such as plant and animal physiology, soil, water, and environment; at the same time master the theory and method of systems analysis.

Overview of the higher education and research institutions that offer Agricultural Engineering/Mechanization Programme, and the Programme settings in Vietnam

- In recent years, Vietnam has been implementing land consolidation, large rice paddies ... focusing on developing medium-sized machine 24-35 HP. At present, airplanes of China, Japan have been imported significantly into Vietnam.

Overview of the higher education and research institutions that offer Agricultural Engineering/Mechanization Programme, and the Programme settings in Vietnam

- With this situation, training program in agricultural engineering in Vietnam has caught up with real demands of practicality. Training product is agricultural mechanical engineers who can:
 - ✓ Work in factories, design workshops, manufactures machinery and equipment for food processing and preservation;
 - ✓ Repair, maintain and operate technological lines, machines and equipment in the factories, food manufacturing enterprises;
 - ✓ Work in business and transfer technological processes and equipment of food processing; consult, design and construct the factories install machinery, equipment.
 - ✓ Involved in researching and teaching in the institutes and research centers, universities, colleges, professional secondary school in the field of mechanical engineering.
 - ✓ Working in the State administration agencies

Overview of the higher education and research institutions that offer Agricultural Engineering/Mechanization Programme, and the Programme settings in Vietnam

- Perform training under applied career orientation: engineers can operate, maintain, repair, replace, manufacture ... associated with the practice.
- Applied research today is small and medium-sized machine associated with the demand of reality.

Briefing of VNUA and specific Programmes/research focuses

- In Vietnam, there are 2 faculties that train the agricultural mechanics resources. The first one belongs to Vietnam National University of Agriculture (VNUA), the second one, has been separated from VNUA since 1976, belongs to Forestry University in Ho Chi Minh City.
- The situation of training agricultural mechanics resources is the same, so VNUA will be represented to introduce here.

Briefing of VNUA and specific Programmes/research focuses

- Vietnam National University of Agriculture is formerly Vietnam National University of Agriculture, abbreviated VNUA) is a university specialized in agriculture located in Trau Quy town, Gia Lam district, Hanoi suburb and 12km away from the center of Hanoi.
- The University has 14 faculties, 9 departments, 13 institutes and centers with 29 graduate programs and 24 post graduate programs.
- Faculty of mechanical and electrical engineering is one of 14 faculties specializing in Agricultural mechanical engineering. Total number of students of Faculty is 649 students.



<http://www.vnua.edu.vn/eng/>





<http://www.vnua.edu.vn/khoa/codien/>



Briefing of VNUA and specific Programmes/research focuses

- There are 69 staff members including 7 Associate Professors, 18 Doctors, 30 Masters, 17 engineers and bachelors, 7 technicians and 1 technical staff.
- Staffs involving in research of the faculty are trained in the field of agricultural engineering, mechanics engineering, mechanical aerodynamic, mechanical maintenance and processing of agricultural products, rural area, industrial automation, electrical systems.
- The field of research focuses on agricultural mechanical engineering and post-harvest technology, mechanization of production, preservation and processing of agricultural products.

Table 1. Admission situation of agricultural mechanical engineering sector at all level in Vietnam National University of Agriculture from 2006-2015.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
University	160	206	51	115	100	96	114	150	176	135
Master'	7	8	9	12	14	15	12	14	11	2
Doctor	1	0	1	1	0	2	2	1	1	1

Briefing of VNUA and specific Programmes/research focuses

- General research orientations of the faculty include:
 - Study to design, newly manufacture and improve existing machinery, equipment for the purpose of serving mechanization of land cultivation, sewing, care and harvest. Particularly focus on mechanization of rice production and a few crops of corn, cassava, sugar cane, shallow tea, soybean, peanut ...
 - Study technology and equipment for storage and processing of agricultural products, food (paying attention to fine and deep processing of potential products and vegetables): rice, tapioca, arrowroot, potatoes, sweet potatoes, pineapple, litchi, longan, citrus, sprouts, leaf vegetables, tea, honey, meat, shrimp and sea fish.
 - Technology and equipment system for processing of animal feed aquaculture; mechanized equipment for farms, slaughter and preservation of livestock products and aquatic products.

Briefing of VNUA and specific Programmes/research focuses

- General research orientations of the faculty include:
 - Technology and equipment for processing of by-products of agricultural, forestry and aquatic products to create animal feed, feed mill, fuel and fertilizer.
 - Study, perfect and develop advanced systems that serve high-tech agricultural house.
 - Apply electric engineering and automation in the agricultural production and storage, processing of agricultural products.
 - New and renewable energy, make use of agricultural by-products to generate power.
 - Transfer technology and equipment serving for agricultural production and storage and processing of agricultural products.

Briefing of VNUA and specific Programmes/research focuses

- *Orient domestic cooperation:*

- Promote scientific research in movement through research project at levels, seminars, guiding of students in science research.
- Promote cooperation in scientific research between subjects in the faculty, among the faculties; Build multidisciplinary research teams; inter majors to be able to solve many problems of society.
- Promote research cooperation with research institutions, enterprises and business establishments of agricultural equipment to design, manufacture and market research results.
- Cooperate with local regions to capture the need for mechanization, automation of agricultural production, technology and equipment transfer or participate in research projects on demand.

Briefing of VNUA and specific Programmes/research focuses

- *Orient International cooperation:*
 - Promote research cooperation with universities, research institutes of the countries all over world and special areas such as Japan, China, South Korea, Thailand, and Bulgaria. ..
 - Learn experiences in the introduction of mechanization, automation to agricultural production and market research products.

Briefing of VNUA and specific Programmes/research focuses

- In term of the training program in agricultural engineering at VNUA:
 - ❖ Require general capacity of the training program:
 - Communicate with professionals, leaders, people who use mechanical equipment and use English in communication.
 - Understand social problems, the law of the State.
 - Plan and solve expertise problems independently or in a group, showing leadership abilities.
 - Design, manufacture products of machinery, food equipment to meet the market demand and applications in machine design.
 - Repair, maintenance and operate food machinery
 - Transfer technology, technical advances and new food machinery into production.
 - Detect problems, develop scientific research activities, and apply information of processing research results in the expertise field.

Briefing of VNUA and specific Programmes/research focuses

- In term of the training program in agricultural engineering at VNUA:

- ❖ Profession after graduation:

- ✓ Mechanical engineer working in factories, design workshops, manufacturing machinery and equipment for food processing and preservation;
- ✓ Mechanical engineer in charge of repair, maintenance, and operation of technological lines, machines and equipment in factories, food manufacturing enterprises;
- ✓ Mechanical engineers working in the business and transfer technological processes and equipment of food processing; consult, design and construct the factories install machinery, food equipment.
- ✓ Involve in researching and teaching in the institutes and research centers, universities, colleges, professional secondary school in the field of mechanical engineering.
- ✓ Mechanical engineers working in the State administration agencies

The need assessment, challenges and constraints faced of the higher education and research institutions for human resource development of agricultural mechanization in Vietnam

- The State's investment in recent years has been modest without paying more attention agricultural engineering, supporting policies of the State in mechanization programs of agricultural production mechanism show many inadequacies.
- Although the State has supported policies in term of interest rates to purchase machinery and equipment for agricultural production; in fact the access support is not simple.
- Loan procedure is also cumbersome with many steps from loan records to equipment and machine purchasing records. As a result, people are not eager to this issue.

The need assessment, challenges and constraints faced of the higher education and research institutions for human resource development of agricultural mechanization in Vietnam

- Local propaganda to farmers to make them realize positive effects of the mechanization of agricultural production is still limited. Support of the province in the application of mechanization in agriculture is insignificant.
- Cultivated land remains fragmented. Although many localities have directed drastically land consolidation, the results obtained are still not high. There still have been fragmented plots with complex terrain making it difficult to put machines into production.

The need assessment, challenges and constraints faced of the higher education and research institutions for human resource development of agricultural mechanization in Vietnam

- Life of farmers is also poor. Income from agriculture is still low; therefore, entirely new investment in mechanized equipment with 100% of capital of the farmer is very limited. Meanwhile, capital recovery is slow making farmer have without the capital to invest.
- Cultivation customs of farmers are difficult to change. The application of equipment into the production requires farmers to have intensive level of vertical expansion together with willingness to change cultivation customs.

The need assessment, challenges and constraints faced of the higher education and research institutions for human resource development of agricultural mechanization in Vietnam

- Market supplying devices, mechanization equipment of agricultural production are limited in number and type. Price of such equipment is high with uneven quality.
- The use of machinery in farmers is not yet synchronized. Today, the use of mechanization in agriculture is mainly based on experience, habits, without intensive training, guidelines in terms of technical operation, maintenance.

The need assessment, challenges and constraints faced of the higher education and research institutions for human resource development of agricultural mechanization in Vietnam

- Consequently, farmers encounter many problems in the treatment process. Machine-building technology of Vietnam is still poor and the products do not meet requirements. Competition of agricultural machines in China, Japan, and Thailand makes domestic production limited.
- Human resources development is limited since agricultural engineering students find it hard to seek work while salary is low.

The need assessment, challenges and constraints faced of the higher education and research institutions for human resource development of agricultural mechanization in Vietnam

- To promote the mechanization of agricultural production:
 - In addition to policies of the State, the local region should continue to implement the planning of cultivated land vigorously.
 - At the same time, propaganda should be conducted effectively to make people realize its effectiveness and actively implement land consolidation which creates favorable conditions to put machines into production.
 - Functional sectors focus on opening the training techniques of cultivation, maintenance, using agricultural machinery in order to ensure productivity and reduce post-harvest loss rate.
 - Besides, it is necessary to have mechanism for farmers to be applied scientific research results into production practices.

Suggestions for regional cooperation on higher education and joint research of human resource development of agricultural mechanization

- It is required to have information to investigate the needs of human resources in agricultural engineering, agricultural production to cooperate, share information, coordinate the investigation
- Countries in the region should cooperate in training (basic study in Vietnam and then continue further studies and internships abroad).
- Study to find appropriate learning models for students.
- Conduct research cooperation of high technology application in agriculture

Contributions from VNUA for such regional cooperation

- Appoint officers and students to participate in the workshops to research problems of the countries in the region.
- Organize scientific conferences, share technical expertise information and new research methods.

**Thank you
for your kind attention**