

HIGHER EDUCATION IN THE SERVICE OF THE CAPACITY BUILDING IN HUNGARIAN AGRICULTURAL INNOVATION

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Abstract

Without any doubt, agricultural raw material and food production (and the related branches, e.g. rural tourism, services) are the main fields of economic activities which are able to utilize the resources of the rural areas the most and which need fresh, innovative ideas and initiatives to maintain their economic viability and market competitiveness, as well as to vitalize local communities and keep population in the rural areas, by providing viable livelihood and income.

The Rural Development Policy is built on three overarching objectives, one of which is innovation. The first of six common priorities of the Rural Development Programs is “Fostering knowledge transfer and innovation in agriculture, forestry and rural areas.” In this regard, the crucial role of agricultural education is indisputable. Therefore in the Catalyst project (Capacity building in agricultural innovation services in CEE countries), we focus on the promotion of innovation transfer, by combining science-based approach with knowledge resulting from everyday practice and experiences. Eight institutions from six European countries decided to work together to create training curriculum and teaching tools and materials for future innovation advisors. In order to realize the project objectives, thorough understanding of the Hungarian agricultural education system for innovation is needed. During the project work we have prepared interviews with extension-related stakeholders such as farmers, farmer organizations, researchers, research institutes, farm

advisors, consultants, local action groups, technology providers, agricultural VET providers, chamber of agriculture, etc. In this paper not only the agricultural education system is presented but situation analysis of the innovation-related Hungarian agricultural education is summarized based on the results of interviews.

Keywords: *agri-innovation, education, brokering, capacity building*

JEL Classification: *I23, Q16*

1 Introduction

1.1 Current Hungarian higher education in the light of market expectations

In the globalizing world, the role of agriculture is changing. The multi-legacy of the agrarian economy requires new tasks to be solved. Due to the diversification of the agricultural area, areas such as sustainability, environmental protection, rural development, food processing, irrigation, trade, green economy etc. have become important. With the development of science and technology, new challenges emerge in education, and knowledge becomes an increasingly economic factor (Magda et al. 2008). To help students deal with complexity and uncertainty of agriculture, a whole-system approach is essential (Francis et al. 2011). The European Union strives to make its economy the most competitive and knowledge-based in the world. This can only be achieved through innovation, which is not satisfactory in Hungary at regional or corporate level (Marselek et al. 2005).

In Hungary, the quality and popularity of agricultural education has been eroded in the last two decades. The technical and teaching staff has deteriorated, the number of agricultural students has fallen, as well as the skills and knowledge of those who enter the training. The decline in the prestige of agricultural education is partly caused by difficulties in working and partly by low income levels in the sector (Magda et al. 2017).

According to the Hungarian higher education strategy (“Fokozatváltás a felsőoktatásban”) and the Hungarian Central Statistical Office (2016), at present, the age structure of people employed by the agricultural sector is unfavourable, their level of education is below from the expected level. (In 2016, 31 per cent of farmers were over the age of 65, while those under the age of 35 were only 5.3 per cent.) It is indispensable to ensure the competitiveness of agricultural enterprises training of professionals with high level of up-to-date knowledge. The needs of enterprises in the field of agricultural commodity production for the graduate agricultural engineers reflect 21st century expectations, which

is a challenge for agrarian higher education. The dual training model between the agricultural and food industry enterprises and higher education institutions is slowly evolving. The importance of agricultural technology is growing, as the validation of “ground to table” principle requires a higher level of information technology, automation and robotization.

As a priority area of higher education, the strategic objectives related to agricultural education are the following: promoting and raising the prestige of livelihoods linked to agriculture; in the medium term, increasing the share of applicants to agrarian higher education to 10% among the total number of applicants; the introduction of new dual forms of training, and – in proportion to rising international demand – the expansion of foreign language programmes; strengthening agrarian education centres, clear assignment of the profile of existing training sites, and the reasonable structural sectoral consolidation of them.

In February 2017, the proposal of the Hungarian State Secretary for Education was published about the development of the national agricultural education and training. The proposal outlined the ‘problem map’ of the policy area. In conjunction with each other, VET (Vocational Education and Training) and higher education faces content, structure and funding problems, the technological and innovation environment is lagging behind, and, the social and age-based judgment of career paths is negative. The labour market and skilled personnel supply are in danger, the competitiveness of the sector is low. The strategic action plan, sketched in the document, contains the following elements:

- Development of the educational structure and content
- Concentration of the educational and innovation capacities
- Transformation of funding system
- Development of infrastructure
- Development of the background of practical training
- Promotion of agricultural career paths
- Internationalization.

The expected results of the above detailed measures are specified as follows: the proportion of applicants reaches 10% of all applicants, and the number of graduates will increase by 20% until 2020; Hungarian agricultural university will be included among the Top100 agricultural universities within 10 years; the number of foreign students and educators will double; the corporate relationship system is widening and deepening, with viable connection established with the Top20 domestic companies; R&D&I revenues will double by 2020. According to the document, for the successful fulfilment of the objectives – in addition to the cooperation of sectoral actors, the concentration of educational and research

capacities, and the establishment of knowledge centres meeting local, regional and sectoral needs – there is a need for an internationally competitive, comprehensive agrarian university that coordinates research in this field. The other two approaches regarding agricultural higher education are the interdisciplinary universities of science, and the smaller, specialized universities. In the framework of the integration, the agricultural faculties operating in Keszthely, Kaposvár, Kecskemét, Gyöngyös and Nyíregyháza would join to the Gödöllő-Budapest headquarter (currently called Szent István University). At the time this article was written, nothing had been done about the intended integration: not only the actual conversion, but the policy decision itself has yet to be made.

1.2 Structure of agricultural higher education

In Hungary, agricultural higher education is provided by 14 institutions: 11 state (public) universities and 3 state (public) universities of applied sciences. Currently, 28 types of agricultural academic programs are accredited, 12 on bachelor, 18 on master, 3 on undivided master level and 3 in the framework of higher vocational education. 6 academic majors are only represented on bachelor, 12 on master, 3 on undivided master level and 3 in VET (Vocational Education and Training) (the rest are present on multiple levels). In total, there are 54 bachelor, 52 master, 6 undivided master and 16 VET programs launched by the universities.

Table 1 Number of different agricultural academic programs in the Hungarian higher education by the level of degree

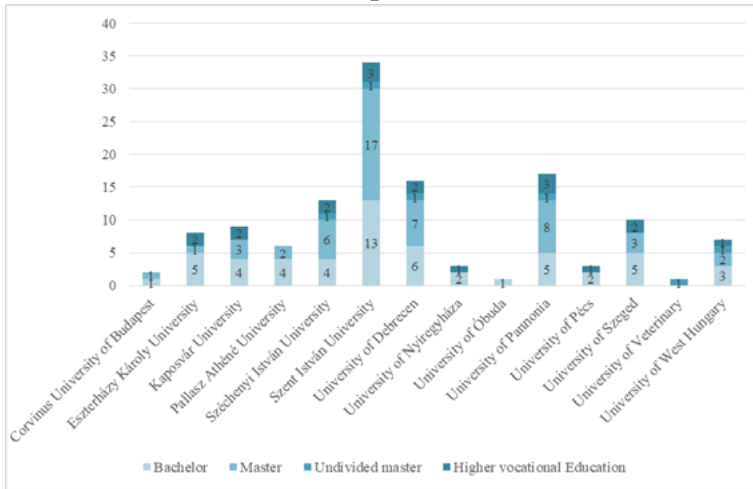
	BSc	MSc	Undivided master	Higher vocational education
Agricultural Assistant				8
Agricultural Biotechnology		4		
Agricultural Engineering	10		4	
Agricultural Environmental Management Engineering		4		
Agricultural Instruction	1			
Agricultural Water Management Engineering		0		
Animal Husbandry Engineering		5		
Animal Nutrition and Feed Safety Engineering		3		
Crop Production Engineering		2		

	BSc	MSc	Undivided master	Higher vocational education
Equine Husbandry and Equestrian Sport Management	1			
Food engineering	4			
Food Safety and Quality Engineering		4		
Food Science and Technology Engineering		2		
Forestry Engineering			1	
Horticultural Engineering	5	4		
Land Surveying and Land Management Engineering	2			
Landscape Architecture		1		
Landscape Management and Garden Construction Engineering	1			
Master's Degree in Organic Farming		2		
Mechanical Engineering in the Agriculture and Food Industry	6	1		
Nature Conservation Engineering	5	4		
Plant Protection		5		
Rural Development Engineering	10	9		
Stud farming				5
Sustainable Animal Nutrition and Feeding		0		
Veterinary Medicine			1	
Viticulture and Oenology Engineering	4	0		3
Wildlife Management Engineering	5	2		

Source: Own edition, based on Educational Authority (2017).

Figure 1 showcases, how many types of agricultural programs are provided by the different universities, divided into the level of education, but regardless to the educational variant (full-time/part-time) and financing (state-funded/self-financed), because the latter attributes multiply the amount of elements and lead to redundant information (calculations based on the data of Educational Authority 2017).

Figure 1 Number of types of agricultural programs by the level of degree at the recognised higher education institutions of Hungary in the February and October 2017 admission periods (miscellaneous)



Source: Own editing, based on Educational Authority (2017).

The highest level of education is the doctorate (PhD or DLA) degree awarded by universities. At present, 7 universities provide 15 PhD programs in the agricultural research fields (Table 2). Doctoral schools with environmental science profile shall not be separated entirely from agricultural sciences as well, and there are many other interdisciplinary connections which blur the boundaries between the different scientific branches and disciplines.

Table 2 Agricultural doctoral (PhD) schools by research field at the Hungarian universities

	Animal husbandry	Food sciences	Forestry and wildlife management	Plant breeding and botany	Veterinary sciences
Kaposvár University	Doctoral School of Animal Science				
Széchenyi István University	Wittmann Antal Crop-, Animal- and Food Sciences Multidisciplinary Doctoral School	Wittmann Antal Crop-, Animal- and Food Sciences Multidisciplinary Doctoral School		Wittmann Antal Crop-, Animal- and Food Sciences Multidisciplinary Doctoral School	
Szent István University	Doctoral School of Animal Science	Doctoral School of Food Sciences		Plant Science Doctoral School, Doctoral School of Horticultural Sciences	
University of Debrecen	Doctoral School of Animal Husbandry	Doctoral School of Food Sciences		Kálmán Kerpely Doctoral School	
University of Pannonia	Festetics Doctoral School			Festetics Doctoral School	
University of Veterinary					Doctoral School of Veterinary Science
University of West Hungary			Roth Gyula Doctoral School of Forestry and Wildlife Management Sciences		

Source: Own edition, based on Hungarian Doctoral Council.

In 2013 additional 43 vocational schools were added under the supervision of the Ministry of Agriculture. This act affected 59 schools with 26 000 students. The former National Agricultural Advisory, Education and Rural Development Institute (NAKVI) used to be in charge of the operation, while these institutions acted as independent units. Thereby a unified agrarian vocational training institution system was established. The Ministry of Agriculture strictly defines the content of courses and the examination requirements. (Regulation 56/2016 (VIII.19.) of Minister of Agriculture)

However Székely and Fieldsend (2013) summarize the main deficiencies of the courses in the vocational schools: not practice-oriented, sometimes with inadequate length and content, with numerous and often very specialized topics, and at the same time not including enough training on farm business management. Looking at some private sector adult training organizations, in spite of the compulsory registration, they do not meet the standards. The trainees are either students (with or without future farming ambitions), or farmers and forest holders attending the courses because they are subsidized.

Under the Ministry of Human Capacities, education of advisory is carried out in 10 universities, in the framework of different Bachelor, Master and postgraduate programs, training courses, modules and subjects (Figure 2).

Figure 2 Universities providing agricultural advisory education in Hungary



Source: Own editing based on Ministry of Agriculture, 2017.

At most universities courses on advisory services are optional or obligatory (mainly in some master programs' curriculum).

It should be emphasized that the universities are the locations and provide the knowledge base of the seven Regional Advisory Centers of the Farm Advisory System and of several of the Territorial Advisory Centers after the integration of the agricultural colleges into the universities.

2 Data and Methods

One of the aims of the CATALyst project was to create a situation analysis of agricultural innovation services in Europe, for that reason a complex questionnaire was compiled. The structured interviews followed three topics: Innovation and trainings; Innovation capacity and Innovation and partnerships. The methods of interviewing were live interview (in person, group discussion) and phone interviews with variable duration from 35 to 150 minutes.

Within the ‘Innovation and trainings’ section of the interview – which focused on agro-innovation process and possibilities - we discussed the situation of Hungarian agricultural secondary education, higher education and vocational trainings with two farmers, two researchers, two research institutes, three consultants, one agricultural VET provider, two local action groups, one input provider, one applied researcher, product developer/technology and product provider company, and one representative of the Chamber of Agriculture. According to the answers weaknesses and strengths of agricultural education can be identified.

3 Results and Discussion

3.1 Situation analysis of the Hungarian agricultural education system

On Table 3, the consensual strengths and weaknesses of the Hungarian agricultural education system is summarized.

Table 3 **Weaknesses and strengths of the Hungarian agricultural education system**

WEAKNESSES	STRENGTHS
<p>Secondary education Students with weak capabilities (no general skills) No rural development education Underpaid, demotivated teachers</p>	<p>Secondary education State program for demonstrational farms Modern educational infrastructure (but this potential is not fully exploited.) Provision of practical knowledge for farmer students</p>

WEAKNESSES	STRENGTHS
<p>Higher education Decreasing number of students (low prestige) Decline in quality No practical education (disfunctional Bologna system) Too theoretical, and do not give enough confidence and creativity R&D money devoured by wages and utilities</p>	<p>Higher education Theoretical education provides deep insight High number of scholarships Postgraduate programs</p>
<p>Vocational trainings Trainings commercialized Some VET centres privileged on political basis</p>	<p>Vocational trainings Practical courses are popular Agricultural trainings are available countrywide Significant number of good examples exist: - NAK Nonprofit Ltd. (which is the private organisation of the Hungarian Chamber of Agriculture) provides quality education with practitioner-teachers - HCA 80 hours plant protection – pest management course (which is mandatory for purchasing pesticide, because of the 43/2010 Ministry of Agriculture act on plant - protection that declares the need for the so-called 'Green Paper'. The vocational schools can provide 'group advisory' through HCA. National programs for Local Action Groups</p>

Source: own editing based on stakeholder interviews, 2017.

4 Conclusion

A wide range of programs is provided by the institutions of agricultural education in Hungary, covering all the professional fields related to agriculture. However, neither the secondary nor the higher education fulfils its potential, and both are suffering from the decreasing number of students and the decline in quality. Agricultural higher education is facing several challenges which hinder its international competitiveness and reduce the innovation capacity of the sector. Policy makers' response to the arising problems is outlined in different general and specific strategic documents and proposals, but concrete actions just barely have taken place in the recent years.

Upcoming reorganization of the agricultural higher education is expected which presumably will be partially based on the concentration of education and innovation capacities.

The market of VET programs is diverse, and often steeped in politics. According to the interviewed stakeholders, the discovered weaknesses of agricultural education system directly affect the farmer society's receptivity and ability for innovation in an unfavorable way.

However, there are certain initiatives (private and/or state supported) that intent to aim at enhancing the prestige of the agricultural sector. The 'agrarian specialist of the year' event shows the excellence of the agricultural profession in many categories, which makes the profession attractive to young people as well. Salaries of those who have agricultural degree (BSc/MSc) working in agricultural administration are quite high compared to the average Hungarian earnings that also makes agricultural studies attractive. Stakeholders' opinions, however, suggest that competence-based learning should not only be supported by the preparation of specific competence tables, but should thoroughly distinguishes the practice-oriented BSc and the more theoretical MSc studies. Practical education should focus on the application of experimental learning as visualization and experiments are the best methods to provide students with practical knowledge. Besides theoretical classes, living examples have to get a higher importance in educational structure in general but more pronouncedly in BSc level courses. For this purpose, the development of trial farms is essential, so BSc students would be able to find a job in production right after graduation.

Although the range of MSc trainings covers all areas of expertise (there are 18 master programmes to choose from), but training curricula lack the subjects that would develop soft competences. According to stakeholders' opinion, these soft competencies besides theoretical knowledge would assist to strengthening the generation of innovation in agriculture. However, this change in education would require trainings for teachers and also a complete change of teaching approach.

The greatest potential for reforming teaching methods lies in the VET system, as there are already existing good-practices. It would be advisable to incorporate some elements of these good-practices into the higher education as well in order to boost capacity building in the Hungarian agricultural innovation.

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