

HIGHER AGRICULTURAL EDUCATION AROUND THE BALTIC SEA: PROBLEMS AND SOLUTIONS

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Abstract. *As agricultural sector is of fundamental importance for every country and even is one of guarantees of its sovereignty also higher agricultural education is similarly relevant. This paper analyses and compares some important questions (problems) of higher education (the first cycle or bachelor level) in agriculture. Paper is mainly based on the experience of five Universities located around the Baltic Sea: Latvia University of Agriculture (LLU), Swedish University of Agricultural Sciences (SLU), Aleksandras Stulginskis University (Lithuania) (ASU), Estonian University of Life Sciences (EMU) and University of Warmia and Mazury in Olsztyn (UWM) (Poland). Totally 2661 students studied in analysed programs in 2014. History of higher agricultural education in region is 150-200 years long and rich in traditions. Further described questions were analysed and compared: interpretation of the term “higher education in agriculture”, prestige of agricultural education in every specific country and motivation for young people around the Baltic Sea to study agriculture; their dreams for future job possibilities and real places of work as well as employers’ expectations from graduates of agricultural programs; the number of students in Agricultural programs and possible reasons for drop-out are searched. Regulations for enrolment and matriculation as well as funding of studies, and possibilities of internationalization of education in agriculture are compared. Organization of study process and teaching aids as well as students’ characterization is given. Length of studies at the bachelor’s level and some peculiarities in curricula including diverse length of practice and different demands for bachelor’s theses are compared. Quality control of study programs is examined. Problems with teaching staff for agricultural students of next generations are reflected. At the end of paper a little insight in future development plans of agricultural programs are outlined.*

Key words: *bachelor’s degree, previous knowledge, bachelor’s thesis, praxis, motivation.*

INTRODUCTION

Agriculture is of fundamental importance for every country despite the small percentage from the gross domestic product produced by the sector. Statistical data (2011) shows that depending on the country in Baltic-Scandinavian region crop and animal production, hunting and related service activities constitute 3.6% in Poland, 3.2% in Lithuania, 2.2% in Estonia, 2.0% in Latvia, 1.0% in Finland and 0.4% in Sweden from the gross value added (at the basic prices). Nevertheless, agriculture is important for every country’s sovereignty and it is best of all said by Jean Jacques Rousseau: “If you own all the wealth of the world, but you have nothing to eat – you are dependent on others. Trade creates wealth, but agriculture offers freedom”. Together with the development of sector gross added value is produced by decreasing number of people, but most of them live in rural areas and take care not only for production, but also for the environment and community. Employment in agriculture from the total employment in six above mentioned countries ranges from 3.3% in Estonia to 12.4% in Poland.

By the year 2050, the Earth will need to feed 2 billion people more than it is at present [1] and this is the greatest challenge for the sector. The main resource for production – agricultural land – when calculated in ha per capita is better provided in the region around the Baltic Sea if compared with many other parts in Europe and the whole world. Utilised agricultural area (2011) per capita in European Union is among the biggest in Lithuania, Latvia and Estonia (0.92, 0.88, 0.71 ha per capita, respectively), but also in Sweden

(0.33 ha per capita) it is 1.6 times bigger than that in Germany. At the same time climate scientists forecast that Baltic-Scandinavian region can have some benefit from the global climate change, which can be mostly limiting factor for agriculture in many other regions of the world [2]. There is a great potential to develop diversiform agricultural sector also in future.

Agriculture nowadays can develop successfully only if well educated professionals and staff are available. European Commission emphasises the role of science, innovations and education for successful development of agriculture in immediate and more distant future [1],[3].

Several authors have analysed development of agricultural education in a specific country (e.g., [4]-[9]), but during last years analysis and comparison of daily problems of higher agricultural education in several countries, including Baltic Countries, is not done. In addition, despite the fact that European Universities follow Bologna process regarding the levels of education (Bachelor, Master and Doctoral), national peculiarities still exist.

The aim of this paper is to compare and analyse some important questions (problems) of higher education (the first cycle or bachelor level) in agriculture in countries around the Baltic Sea: Latvia, Lithuania, Estonia, Sweden, and Poland.

MATERIALS AND METHODS

This paper is mainly based on the experience of five Universities located around the Baltic Sea: Latvia University of Agriculture (LLU), Swedish University of Agricultural Sciences (SLU), Aleksandras Stulginskis University (Lithuania) (ASU), Estonian University of Life Sciences (EMU) and University of Warmia and Mazury in Olsztyn (UWM) (Poland). Several universities are providing higher agricultural education in Poland, due to this literature sources were used as well (e.g. [9]). Information was summarized by authors of this paper using official documents of specific university usually provided in national language, and interviewing staff and students. Mainly bachelor level education is described. Analysis and synthesis, monographic method and interviews of experts were the main methods used.

RESULTS AND DISCUSSION

Brief history of higher agricultural education development

History of higher education in Agriculture in Baltic – Scandinavian region dates back to 19th century. The very first (even in the scale of the whole Europe) was Department of Agriculture in old Vilnius University (Lithuania) established at the Faculty of Physics-Mathematics in 1819. In Poland, higher Agricultural education was established in the early 19th century: Institute of Agronomy in Warsaw-Marymont was founded in 1816, but it started to work in 1820. In Estonia, the first was Tartu Veterinary School founded in 1848 (education in veterinary medicine is not analysed in this paper), but Department of Agriculture was established at Tartu University only in 1919. Also in Sweden higher education in agricultural science has been offered for over 160 years at the Ultuna (Uppsala), but Alnarps Institute was founded in 1862, which was closely followed by the Department of Agriculture at Riga Polytechnic School (Latvia) in 1863. Agricultural education in Olsztyn has been offered since 1950-ties.

During 150-200 years of higher agricultural education development, many changes were passed including institutional and program changes.

How differently do we interpret the term “Higher education in Agriculture”?

Initially, it was designed to analyse undergraduate level or Bachelor’s degree, or first cycle education related to plant production (agronomy) and animal production (zootechnics or animal husbandry) in this paper. However as it turns out, the content hidden under the term „Agriculture” differs depending on the country as well as institutions and/or faculties involved in education. In Latvia, it is agronomy (field agronomy as well as horticulture), animal husbandry and entrepreneurship in agriculture. All above mentioned is taught in Faculty of Agriculture of LLU in Jelgava, which is the only place in the country to obtain this type of education. In Lithuania, it is possible to study programs *Agronomy*, *Agricultural Technologies and Management*, *Landscape Architecture*, and *Quality and Safety of Food Raw Materials* at the Faculty of Agronomy of ASU (Kaunas), but Faculty of Animal Husbandry (not analysed in this paper) is established at the other institution: Lithuanian Veterinary Academy. In Sweden, all programs connected with agriculture are studied at the SLU, but there are involved three faculties in two study places: Faculty of Landscape Architecture, Horticulture and Crop Production Science (based in Alnarp), Faculty of Natural Resources and Agricultural Sciences

(based in Uppsala), Faculty of Veterinary Medicine and Animal Science (based in Uppsala). Six programs are related to agriculture and they include such fields as agronomy, animal science, economics and management, rural development and food science. In Estonia, no more faculties exist. Instead of this Institutes are established at EMU and two of them are responsible for education in agriculture: Institute of Agricultural and Environmental Sciences (responsible for bachelor's degree in crop production and horticulture) and Institute of Veterinary Medicine and Animal Sciences (in charge of the bachelor's degree in animal husbandry, not analysed in this paper). In Poland, currently 6 agricultural universities are functioning, including University of Warmia and Mazury in Olsztyn, Faculty of Environmental Management and Agriculture. Agricultural education can also be found on the agricultural departments at other Universities, which are in total 19 in Poland.

The classification in academic and professional programs at undergraduate level is more characteristic to Latvia, where three different program types in higher education are established: academic programs that offer bachelor's degree, programs of the 2nd level higher professional education offering professional qualification and Professional bachelor's programs that offer professional bachelor's degree and professional qualification. Agricultural education went through all these types and now the Professional Bachelor's program Agriculture (240 ECTS) has been developed (since 2011) that combines the best from both previously realized programs (academic bachelor's and 2nd level higher professional education programs) [6]. Students after graduation acquire professional bachelor's degree in agriculture and one chosen professional qualification: an agronomist specializing in either field crops or horticulture, or a zootechnician (i.e. animal husbandry expert) in breeding, or a manager of an agricultural enterprise. Such program offers academic knowledge as well as practical training and internship in farms or other agricultural enterprises. Development of such the so called "umbrella type program" (under umbrella of professional bachelor's degree four professional qualifications can be chosen) was connected with the demand of Agricultural sector which needs more practically trained specialists [6],[7]. In Lithuania (240 ECTS) and Estonia (180 ECTS), education is academic, but in Sweden it depends on the program: bachelor's program *Agricultural and Rural Management* (180 ECTS) is more professional during the two first years and more academic during the third year. Also, this program offers bachelor's degree as well as a professional qualification. Specialization is chosen during the 3rd year (animal production, crop production, business administration or technology). All other agricultural programmes (270 ECTS, 4.5 years) in Sweden have a strong academic foundation and in reality are closer to master's level than to bachelor's level although it is not a complete master's degree according to Swedish regulations. In Poland (UWM; 210 ECTS), the first cycle education is academic, but graduates do not obtain the bachelor's degree; for them the title "engineer" is conferred.

Prestige of agricultural education around the Baltic Sea

Everyone who studies or teaches agriculture is proud of that. But prestige of education in agriculture is not very high in all cases. Despite the very high international rating of SLU, Swedish colleagues recognize that "education in agriculture is not so well known for either society or young people. It is probably valued more by society than by young people in general." In Latvia, the situation is interesting due to the fact that even secondary school teachers do not recommend highly successful learners to study agriculture saying that they are capable of doing more than simply studying agriculture. It gives evidence about lack of understanding from society, what modern agriculture means and that substantial knowledge is needed for successful business, and that this business can be very cost-effective in reality. It is a problem for Faculty of Agriculture of LLU to educate society on this issue. Lithuanians believe that agricultural education is becoming more and more prestigious judging by the increased number of students at Faculty of Agronomy of ASU. But about Estonia the answer is direct: "unfortunately education in agriculture is not considered prestigious by society and young people". In Poland, the reason of relatively low popularity of agricultural studies in the future may contribute relatively little payment for this type of university graduates. The report of Sedlak & Sedlak (2012) (http://sedlak.pl/en/Salary_reports.html) on the salaries of graduates of various specializations in Poland shows that agricultural graduates are the second least-paid, while the first ones are those who have graduated from pedagogical establishments.

What is the motivation for young people around the Baltic Sea to study agriculture and what do they want to do after studies?

In Sweden, the *Agricultural and Rural Management* students are very interested in agriculture and want to learn more. They all are already connected with agriculture, because that is a requirement for entering the program. In other degree programs (270 ECTS) motivation of students is different: some of them come

from a farm, or are very interested in animals, others are interested in environmental or poverty issues, and see an education in agronomy as a chance to learn more about these issues and a way of gaining the tools to make a difference for poverty, global warming, feeding the world's population. Food science students have a special interest in food, product development, health. Plant/soil students are interested in agriculture and environmental science. About 50% of Lithuanian students are connected with farming and their main motivation is to get good job after obtaining bachelor degree or to return to their own farm. Similar is the primary motivation of students in Latvia from which 60-70% depending on the year are already related to agricultural enterprise – a farm, Ltd, farmers' cooperative. As the main reasons for coming to Faculty of Agriculture they mention the perspectives of acquired education for good job possibilities and the circumstance that they are from a farm and have to continue to manage it after their parents' retirement. In Estonia, about half of the students are personally linked to agricultural production or at least rural life. Some students are interested in food production systems in general. Unfortunately some students have chosen this field randomly (which means that their motivation is low and they often leave the program during the first year). About 20-30% of students come from families who own the agricultural enterprise and they plan to implement their knowledge in their family farm. According to F. Rudnicki [9], in Poland, agricultural studies mainly take the children whose parents are farmers, the successors of farms.

It seems that the broadest look on agriculture and its importance (poverty problems, global warming, feeding the world's population) have Swedish students, but for those in Latvia experience in his/her parents farm sometimes is not a contributory factor, but vice versa – obstructive for progress because students want to learn only things particularly needed for their own farm in a current situation.

When the students are asked to tell about their plans for future, Latvian students mostly want to be managers of agricultural enterprises or specialists in such enterprises, a small part of them expresses a wish to work as advisors or in governmental institutions, very few – in scientific institutions, and nobody or sometimes only one – in institutions connected with agricultural education. Several (approximately 10%) students also want to continue studies at the next (master) level. Answers from Lithuanian students are not expanded, but it is known that during the 4th study year 80-90% from them already have jobs in agricultural sector. In Estonia, most students aim to go to work at the agricultural sector or state institutions, some want to continue at their family farm and about 50% of graduates want to continue studies in master's level. As for Sweden, there are two level multi-shaped programs analysed. Also, the wishes for future jobs are different. The *Agricultural and Rural Management* students (BS level) want to work in their own agriculture company or in the agriculture field as a farm manager, farm foreman, teacher, advisory officers in several areas as animal production, buildings, crop production and economics, sellers of insurance, feed or equipment, product engineering, technician, consultant, bank clerk, animal welfare inspector, etc. Only a few want to continue education in Master's course. When speaking about students in other programs (270 ECTS), not many students want to be farmers after finishing their education at *Agriculture program – Economics and Management*, rather they want to be advisors to farmers, either at a bank, as accountants, or for the state, at a department or a county administration. Some want to work as controllers at firms within the agricultural sector, such as a grain or dairy cooperative. Almost all agronomy-economy students combine a MSc-degree (120 ECTS) with their agronomy-degree (270 ECTS). Most students from the program *Agriculture program – Food Science* are interested in product development in food industry, quality control, food industry jobs, some want to work for governmental agencies, R&D, some want to continue with Master's course – this number is increasing. Students from the program *Agriculture program – Soil and Plant Sciences* are interested in advisory activities, government activities, R&D, activities in developing countries, some continue with Master's course – also here this number is increasing.

What do employers expect from graduates of agricultural programs?

Higher education in European Union is a result-oriented. Graduates from the agricultural programs have to demonstrate a set of knowledge and comprehension, have to achieve definite skills and competences. All this is formulated for every program, but as so many programs with relatively various contents are included in this survey from five countries, we do not repeat here everything, but concentrate on similarities at bachelor's level. Everybody without a reference to the country, university or study program has to obtain specific knowledge in agriculture mainly based on biology, technology, economics, and available resources. They have to know laws and regulations in agriculture, to combine theoretical knowledge with praxis, and demonstrate the ability to make assessments within the area of agricultural operations with regard to cross-disciplinary

aspects of production, marketing, the environment, function, ethics and society. They have to be able to work independently and to use scientific achievements into agricultural production, to read critically and discuss scientific or other literature in agriculture, to take responsibility for production process and results. They have to have the ability independently identify their need for additional knowledge. Some programs (e.g. in Latvia and Lithuania) identify their ability to continue studies in the next level (master program). At the end it can be summarized that our graduates are aimed to be creative, open-minded, socially active, responsible and capable of free communication personality, high quality specialist who can work at agricultural enterprises, state institutions and local authorities, advisory services, agro-environmental and science institutions and as entrepreneurs capable of doing competitive business.

Number of students in Agricultural programs

It is hard to compare the number of students in agricultural programs among analysed countries because in some only one university is involved (Latvia, Sweden, Estonia), but in others – two or more Universities or other Institutions (Lithuania, Poland, see above). Although the number of students in agricultural programs did not form a big proportion from all the students at university and college level in the whole country (e.g. in Latvia this proportion currently is 0.4%, but in Poland – 1.7%), this number is stable year by year in Latvia and Estonia, a little bit fluctuating in Sweden or even persistently increasing in Lithuania during the last six years (2009-2014; from 66 applicants in 2009 up to 262 applicants in 2014 at the Faculty of Agronomy). In Poland, a clear reduction in the number of students in agriculture is observed during last 30 years. Currently, it is observed that agricultural studies mainly take children of Polish farmers, the farms’ successors. However, in recent 20 years the number of people working in agriculture decreased approximately twofold and the number of farms is decreasing [9].

An interesting indicator is also a proportion of graduates from the number of students admitted in the first year. In Latvia, this proportion in analysed situation (Table 1) was 58% in 2014. In Sweden – depended from programs and in bachelor’s program it was 65%, but on average in other programs which require studies for 4.5 years (270 ECTS) it was 47%, in Estonia and Lithuania it is about 40%, but in UWM (Poland) about 86%.

Table 1

Number of students in Agricultural programs

Country and number of programs	Number of students in 2014		
	1 st year students	Totally in programs of Agriculture	Graduates
Latvia (one program)	111	374	64
Lithuania (four programs)	262	820	102
Estonia (two programs)	80	182	32
Sweden (bachelor’s program one)	51	194	33
Sweden 270 ECTS programs (five)	157	840	74
Poland, <i>University of Warmia and Mazury in Olsztyn</i> (one program)	65	251	56

When comparison is made between the number of the 1st year students and graduates (Table 1), some idea about dropout during studies arise. Dropout always is a significant indicator for a study program, but given signals can be various: students made a wrong choice or they are simply passers-by without any specific interests, they are not prepared well enough at the secondary school and it is hard for them to follow one or some subjects, they are not ready for self-dependent work or self-dependent life in a student hostel, etc. The survey of students and teachers in different countries showed that there are some problematic fundamental study subjects which can cause difficulties at university: chemistry is mentioned by Latvia, Estonia and Sweden, biology by Latvia and Estonia (in Estonia, an additional stress is placed especially on genetics), mathematics is singled out by Sweden and Latvia and physics – by Latvia. In Lithuania, at secondary school students at their 16 have to make a choice what subjects will be important for the studies at university, and they make some mistakes choosing subjects which do not help to study in programs related to natural sciences. These mistakes are corrected at the University, taking extra classes in problematic cases for small extra payment.

This seems to be a problem for both parties (secondary schools and universities) to co-operate in order to equalize the education process and make it possible for secondary school leavers to continue successfully education at the university.

Regulations for enrolment and matriculation

Students in all countries are admitted to the programs according to the results achieved at the secondary school. Entrance examinations are not demanded by university. In Latvia, Estonia and Lithuania the so called state-centralized-exams are organized at the end of the secondary school, and applicants participate in the competition with these results. Sometimes, the final grade at secondary school can be utilized. In Latvia, the results of state-centralized-exams of Latvian and foreign languages are required as well as the result of state-centralized exam or final grade at secondary school in biology. Additional points in competition can give the result of centralized exam or final grade in chemistry. In Estonia, results of state-centralized-exams in Estonian language and mathematics are required. In Sweden, admission to the agriculture programmes requires general and specific entry requirements based on courses from the Swedish upper-secondary school. For bachelor's program (180 ECTS) he/she has to be a holder of Swedish upper-secondary school certificate and at least a minimum grade of "Pas" in the upper-secondary school project etc. In addition, a professional experience in farming is required for the bachelor's *Programme in Agricultural and Rural Management*. It is the only case from analysed in this paper when professional experience is required for entering the agricultural program. When entering other programs (270 ECTS), specific subject are designated: Swedish or Swedish as a second language, English and Mathematics.

Financing of studies around the Baltic Sea

In all the countries the state budget is the main payer for agricultural studies, but some differences exist from country to country. In Sweden, only the state budget pays for education in agriculture even for foreign students if they are citizens of the EU or European Economic Area (EEA). In Latvia, state budget pays totally for 213 students every month. Students have to compete for those places according to their weighted average grade. During the last years 80 places are reserved for admission of the 1st year students and they compete for them with their grade at secondary school and have to meet other entering requirements. Those who failed to obtain budget financed place have to pay for studies themselves. Rotation of students according to their success in studies from budget financed place to self financing and the other way round is organized after each semester. All the part time students have to pay for studies themselves. A similar situation is in Lithuania where students can study in budget financed or self financed places. In Estonia, full time higher education is free of charge and currently there are no part time students. In Poland, the situation is different: full time students study free of charge (i.e. by state budget funding), but part-time students are co-financed by state budget and students themselves.

Length of studies at the bachelor's level and some peculiarities in curricula

In Latvia and Lithuania despite the difference of programs (academic in Lithuania and professional bachelor's program in Latvia) the study length is 4 years achieving at least 240 ECTS. The development of bachelors program *Agricultural and Rural Management* at the SLU was interesting due to the fact that initially it was a two-year-course, for some time even one-year-course, but since 2010 it is a three-year long program. Students can finish the program also after two years earning a professional qualification with the Higher Education Diploma in Agricultural and Rural Management (vocational degree) presently. Other analyzed programs are 4.5 years long and students after earning 270 ECTS can graduate from them with Degree of Master in Science of Agriculture or study a little longer and obtain Master's Degree. Bachelor's program in Estonia is classical according to Bologna process, i.e. 3 years long (180 ECTS), but one in Poland is 3.5 years long (210 ECTS).

In Latvia, Lithuania, Estonia and Poland all the study subjects are divided into three main groups: 1) General education subjects; 2) Subjects of the major field; 3) Field professional or deeper specialization subjects. Also, free elective subject courses are offered in small amount (e.g. 9 ECTS in Latvia, 12 ECTS in Lithuania and 8 ECTS in Estonia). In Sweden more options are given to students to combine the list of study subjects. Practical experience even from applicants just graduated from university is often required by employers. Amount of field practice included into curricula depends on the program and country. In Sweden, practice is required as matriculation requirement for BS program, but in other programs (270 ECTS) it is included in the group of elective study courses at the amount of 15 ECTS. In Latvia, practical experience is given within the

study program during the two different kinds of practice (totally 39 ECTS): 1) field practice under guidance of teaching staff (10.5 ECTS) and internship in farms or other agricultural enterprises (28.5 ECTS). In Latvia, it is considered that praxis, especially internship in farms is among the most important components of curricula of the program *Agriculture* [7]. Despite the academic trend of agricultural programs in Lithuania, Estonia and UWM (Poland), field practice is also included into programs at the amount of 19, 15 and 6 ECTS, respectively. Nowadays students have to have good English so that they can read about the latest scientific achievements and for better comprehension of modern Agriculture, as well as for successful exchange studies. Unfortunately, knowledge of English is insufficient for approximately 50% of students in the program *Agriculture* in Latvia. Classes in amount of some ECTS of professional English (or German) are offered in Latvia as well as in Lithuania and Estonia (6, 3 and 4 ECTS, respectively). Polish information tells that “the student must obtain a pass with a modern foreign language at the B2 level of the European Framework of Reference for Languages” and courses of foreign language in the amount of 8 ECTS are included in curricula. Language course is not included in curricula in Sweden. The reason of such differences can be found in the peculiarities of history of included countries – students and even teaching staff from comparatively new European countries (Poland, Latvia, Estonia, and Lithuania) still need to improve their English language skills for successful co-operation in education and science in Europe and world. In Sweden, master level studies are organized in English for both, Swedish and foreign students. At the same time only some courses or modules are offered in English for ERASMUS exchange students in other countries.

To finish the program preparation and defence of different size bachelor’s theses are demanded (Table 2). Only Estonian students can make a choice between working out the theses and passing bachelor’s examination, but students in Poland have to carry out theses and to pass diploma examination.

Table 2

Brief insight into the demands for bachelor’s theses depending on country

Country	Amount in ECTS of bachelor’s* theses	Demanded content
Latvia	18	Literature review and depending on chosen specialization – field or vegetative, or laboratory experiments; studies in animal breeding or nutrition; analysis of actual farm management
Sweden	15	Literature review; in addition, students can also do experiments, interviews, questionnaires, case studies, behavioural studies, visual tests, laboratory tests etc.
Poland* (UWM)	15*	Compulsory Literature review; preferable project or experiment based thesis
Lithuania	12	Final thesis can be theoretical or experimental. Independent simple research work is advisable
Estonia	10	The field-work based theses are preferred, but due to lack of experiments there are many literature based reviews as well

*– in Poland, Engineer theses

Organization of study process and teaching aids

Study process is mainly organized traditionally. Students have lectures, practical and laboratory works, case studies, projects, tasks, exercises, computerised exercises, field studies; they have to prepare term works, to write and present reports orally. There are not recognized evident differences among universities. All those works might be aimed at enhancing critical thinking, problem-solving and decision making skills in students, but success of all mentioned possibly more depends on teacher’s personality and talent, but not on university itself. Also, modern teaching aids such as multimedia, interactive-boards, modern equipment in laboratories for experiments, different computer programs for data processing and simulation of processes are used.

Possibility of internationalization of education in agriculture

Nowadays in the era of postmodernism, internationalization processes in the whole world are very strong It concerns also the higher education. More and more foreign students from Asia and other parts of the world want to study in Europe. On the other hand, e.g. Latvia faces a problem of decreasing number of total population including young people who want to study at Universities. A similar situation is described in Poland – gone

are the days when for some programs in agriculture, e.g. gardening, there were 10 applicants for one place. Currently, some Polish universities do not run studies in this direction because of lack of applicants.

Is it possible to attract foreign students in Agricultural programs at the analysed universities at bachelor's level? Mostly the bachelor's level studies are offered in the national language. In English only courses for ERASMUS exchange students are offered in Latvia, Lithuania, Estonia and Poland. None of mentioned countries has regular foreign students. In Latvia in addition, it is believed that agriculture is region-specific (climate, crops, soils etc.) and it is hard to teach the same curricula for next agronomists in Latvia and e.g. India. In Sweden, master level studies are offered in English and it means that foreigners can study without a language barrier. Also, a solution is found in master level with the curricula offering the program *Agroecology* for students from all over the world with globally significant content at SLU, Alnarp. LLU, EMU, ASU and UWM are designing studies for foreign students in future.

What are students in six countries around the Baltic Sea?

Young people are quite similar all over the world: some are excellent, but some – lazy, some are socially active, but some love their own farm and feel best of all in-between crop fields or animals. A very nice characterization of Swedish students is given by Johan Toren: “The students often report projects, tasks and exercise orally to all students and they do it very well. They are very active in discussions at lectures and seminars. ... Our students are very verbal, active, and enjoy presenting orally and using power point with high quality!” Active, inquisitive students are the dream of every teacher. Latvian students are not very active questioners, but when they need to present power point presentations, they do it very well. They love Latvia very much and only some dream about international studies or career.

We all can agree that activity of students during classes is directly connected with the competition for the study place: in years when more applicants with better grade compete for study places, coming students are more active and motivated to study hard. But, for instance, in Poland “the number of study places offered by Polish universities and colleges far exceeds the number of young people leaving secondary education schools and aspiring to study. This is difficult, because the school's or university's the *raison d'être* is to educate someone. Therefore, the basic problem of universities is to tap candidates including the ongoing problem of growing demographic low college-age youth” [9]. Also, in Latvia the number of secondary school-leavers is decreasing with every year and it means that competition for study place is not very high.

Graduates from bachelor's programs at work

In Latvia, it is required to follow the actual job situation of graduates for three years. 90-95% of them have job in the agricultural sector or continue studies at the next level. Demand for agronomists and animal husbandry experts (zootechnicians) from state authorities, advisory service, agricultural companies is continuous and Faculty of Agriculture cannot meet this demand due to the reason that most graduates return to their family farms or companies. In Lithuania, graduates from Faculty of Agronomy are successfully employed by agriculture and food industry, agriculture and rural development, infrastructure of business and public administration spheres. Estonia does not have such statistics yet (but in 2 years the state will start evaluating the efficiency of their teaching by evaluating the graduates and then the budget of university will depend on the number of graduates actually working in agriculture). But as mentioned before, 50% of them continue education at the next level. According to the investigation of F. Rudnicki [9], in Poland the principal place of work for graduates is a farm and institutions and companies with respect to agriculture and rural areas. According to research results conducted by University of Warmia and Mazury in Olsztyn, in 2014, on the fate of graduates showed that out of 64 people who have finished the Faculty of Agriculture and Environment in 1999: 15% are employees at universities, 10% are working as teachers in secondary agriculture schools and vocational agriculture schools, 15% work in banks, 15% work in their own companies, 15% work in the agricultural environment, 10% are employed in state institutions related to agriculture, 5% are employed in public administration, 5% are employed in police and military, 5% are managers of agricultural enterprises, for 5%, their current professional paths could not be determined (some of them went abroad).

Swedish graduates have different job possibilities depending on the agriculture related program they graduate. Those with vocational degree (120 ECTS) or BS degree (180 ECTS) in *Agricultural and Rural Management* mainly work in their own agricultural company or in the agriculture field as a hired specialist. Those who graduate from 270 ECTS programs have different occupation. Holders of “Degree in agricultural science – economics and management” can look forward to a broad labour market. They are competitive outside the agrarian sector as well, and often find employment with banks, accountancy firms, real estate

agents, auditing companies etc. also with no agrarian link. In Latvia, such specialists are also taught at LLU, but in Faculty of Economics and Social Sciences. Holders of “Degree in agricultural science – animal science” find employment at various companies, organisations and public authorities with a link to animal food production, or animal-related in other ways. Examples are the following: an animal husbandry advisor, animal welfare officer, geneticist, feed developer, teachers of animal science, construction advisors etc. Holders of “Degree in agricultural science – rural development” can find employment in international (e.g. the Council of Ministers) as well as Swedish national (e.g. the Department for Rural Affairs) and regional contexts (such as the Rural Economy and Agricultural Societies). Holders of “Degree in agricultural science – food” can be found at different levels within the food industry, not only in primary production but also further down the processing chain. Several authorities (such as the Swedish National Food Agency) and organisations working with food quality and food inspection also employ food graduates. In Latvia, such specialists are also prepared at LLU, but in Faculty of Food Technology. Holders of “Degree in agricultural science – soil and plant science” are employed within the traditional agrarian sector. Examples are advisory and monitoring tasks with companies and authorities involved in agricultural issues. The demand for graduates specialising in soil and plant science is considerable, and at the moment SLU cannot meet the demand.

Quality control of study programs

All the study programs have to pass quality assurance in which experts (mainly foreign ones) and official national authority is involved. If experts’ conclusions and national authority decision is positive, the approval for the program is given for 6–7–8 years depending on the country. At present, all surveyed programs are approved for the longest possible term. Quality control systems are also changing persistently with the aim to improve them.

Who will teach agricultural students of next generations?

Higher education at university level has to be science based and high quality staff is needed for that. The question about the possibility to find new teaching staff in cases when previous educators would like to retire is important. This problem is frequently connected with prestige of sector and very prosaically – also with reasonable funding of education. It is sometimes hard to find teachers with appropriate competence in a specific field. In Sweden, it is easy to find new teachers for general basic science courses, but a problem is to find them for the specific agronomy courses. The most obvious example is technology, where there is a risk that the ambition to include more or at least strengthen the technology content in the study programs is complicated because of lack of teachers with appropriate competence. In Latvia, the most reason why young people do not like to choose a career of teacher or researcher is uncompetitive salaries if compared with those in the Agricultural sector. In the situation when mostly all European countries try to strengthen education and research for better development of national economy funding for higher education in Latvia is only 83-85% (depending on year) from the minimal necessary. But there are enthusiasts who like teaching and research, and confidence exists that students will be taught also in future in Latvia. In Lithuania, in agriculture studies problems with teaching staff do not exist. It is reasoned with quite big number of PhD students defending their theses (more than 10 a year) and many scientists at agricultural research institutions who also can work for the University and teach agricultural subjects. EMU similarly to LLU have big problems to attract young people as teachers. In Latvia and Poland ageing of teaching staff is observed, but reasons for that are diverse. In Latvia, it is lack of young people who want to be teachers, but in Poland according to regulations, professors can work for the state university up to the age of seventy and younger applicants for professor’s place cannot get it.

Plans for future development

All the programs have undergone developmental changes in the past, but they are never finished because nowadays life is rapidly changing and agricultural programs have to meet demands of Agriculture Sector and society, supervisory body and accreditation experts, students and teaching staff. Every university is designing how to improve. SLU is planning to make some changes in programs developing them more corresponding to Bologna system: 3 (bachelor level) + 2 (master level) years. The content of study courses is designed to be surveyed and improved in LLU, but ASU is starting to develop a completely new program *General Agriculture* with the length of 3.5 years (instead of four years). EMU wishes to improve the practical aspects of studies and collaboration with farmers. ASU and LLU are dreaming of a joint program with foreign universities. EMU, ASU, LLU and UWM is discussing stronger internationalizing, firstly at least promoting the number of exchange students in different programs (e.g. ERASMUS etc.). All surveyed universities aim to increase

the quality of teaching in terms of study materials and methods, teaching aids etc. Also, infrastructure is in continuous perfective maintenance.

CONCLUSIONS

Despite similar aims and achievable study results, analysis and comparison of bachelor's level higher agricultural education at five different universities (LLU, ASU, EMU, SLU and WMU) in the countries located around the Baltic Sea showed a great diversity in study programs which all belong to the family "Agriculture". This paper and our co-operation during preparation of it is a good beginning for further co-operation in order to exchange experience for improvement of our study programs.

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