

IV. Educational System in Agriculture

Educational System in Agriculture in the Republic of Macedonia

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Views on Education

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**Educational System in Agriculture in the
Republic of Macedonia**

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Abstract

The educational system of agriculture in the Republic of Macedonia is actual, since the Republic is an agrarian land with its comparative advantages for future agrarian development and its place in future relations with the EU, as well as with WTO in the field of agricultural and agricultural-food products. Having in mind this situation, the accent in this paper falls on high school education and higher education in agriculture, as well as education of farmers.

High school education in the Republic of Macedonia is going through a transitional period of permanent perfection, but in terms of quality and quantity, a satisfactory level has not been accomplished yet. This is reflected in the quality of high school education and the interests it attracts (interests for the profession).

University education in agriculture, as a continuity of high school education, has its positive and negative sides, and this is reflected in the number of enrolled and graduated students, as well as in the requests for agricultural experts from the economy. In the past years, a system of numerous directions has been conceptualized in the higher education. The content and regime of studying is compatible with the educational system of EU, and this gives many opportunities for wider educational and scientific communication with the EU.

In the educational system of agriculture, farmer's education did not take an important place in the educational politics. We believe that in future this question should be given a specific place through certain forms, in order to complete this question in the entire educational system.

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Introduction

This paper analyzes and evaluates the need for personnel in the high and university education in the agriculture profession, as well as the possibilities for employment in the private sector and the already transformed public sector.

Starting from the socio-economical, developing and other conditions in the state, the education of agriculture technicians and agro- engineers has been different so far. At different development phases, in accordance with the previous statements, a specialization and enlargement of the capacities were done, at various educational departments in the area of agriculture in former Yugoslavia and afterwards in the democratic and market oriented R.Macedonia as an independent and sovereign country.

Under influence of the scientific-technological discoveries in every economic area, agriculture branch was encompassed with a great speed. This is represented by great changes in the structure and dynamics of the production forces both in terms of material and subjective production factors.

Within this view, the agriculture in the world and in our country has passed several technical-technological revolutions, which had their own characteristics such as: leaving out the old processing and implementing a mass use of chemical materials in the agriculture production and afterwards there was a new development phase through use of modern achievements in the field of genetics and selection in stock breeding and plants production. In the so called future revolution there is the process of finding the best relations in the application of mechanization, chemicals, genetics and selection or briefly, finding organizational-economic solutions in agriculture through which rational usage of production factors and proper and dynamic agriculture development are ensured.

Thus, along the need for classical biotechnological departments for certain agriculture branches, agro economic branch has been formed recently, by which the agriculture is directed to securing optimal production-economic results.

All these implications have had their influence on having different directions in education in both high and university education for agriculture in Republic of Macedonia.

Subject and Research Objective

The basic determination of this kind of research means indication of the conditions and the possibilities for a contemporary educational system in agriculture in R.Macedonia. Having into consideration the system transitional phase, where so far the educational system has been directed towards the needs of the agro combinates completely as well as the ones of the other large agrarian associations, at present the determination is for the transformed agro combinates into enterprises where the property belongs to the share holders on one hand and the farmers on the other (individual agriculture producers). To sum up, it is evident that the situation has been changed and in those conditions it is important that the

education is directed towards educating personnel both for the large agriculture economies and for the smaller individual economies.

Having in mind the above mentioned research subject, the basic objectives this paper has are the following:

- Checking the educational level that the participants in the agriculture sector have and what kind of a system is needed for the future, in accordance with the development of the technical-technological innovations in agriculture on one hand, and the needs for a modern agro management on the other;
- An evaluation of the capability and the future employment of the graduated agriculture engineers and technicians in the public sector, in private farms and various institutions (stock exchanges, banks, insurance companies, local government, Ministry of Agriculture, Forestry and Water Economy, extension service etc);
- The condition with the farmers' education as well as the possibilities for organizing and conducting courses on state level, with department structure and subjects which will be suitable for complete satisfaction of the small individual agriculture economies' needs.

Data Sources

Data from the following sources will be used within the research:

- Official data published by the State Statistics Office of RM, for the number status and the gender of the agriculture technicians;
- Documentation by the Faculty of Agriculture in Skopje for graduated students according to years, departments and gender in the period from 1949 to 2002;
- Results from the survey conveyed within the frames of the Tempus project, which refers to the employment of the graduated students, their specialization, professional improvement and employment as well as the need for additional education;
- Results of the survey conveyed in the period between October and December 2002, at individual agriculture producers on the overall territory of the R.Macedonia, referring to the needs and wishes for vocational education.

Work Methodology

Having in mind the research subject, and in order to answer the established paper objectives, several methodological approaches are applied in this paper.

For establishing the kind of education as well as the employment opportunities, a survey was conducted in 1998 in the frames of the Tempus project using the SYSTEMATIC SAMPLE and proportion of 10%. Every tenth student from the graduated students list entered the sample. For the electing of the first student the method of random choice was used. A total of 475 students were included in the sample, which have graduated from the Faculty of Agriculture in Skopje and the Advanced School in Bitola.

During the survey conducted on the agriculture producers in terms of the suggested vocational education done in the period of October – December 2002, the SIMPLE RANDOM SAMPLE was used, 1044 agriculture economies were encompassed, the total statistical number of which is estimated around 50 000.

For the analysis of the survey data the following common statistical methods were used: average values, maximum, minimum, standard deviation, trends, relative numbers etc.

Educational System of Agriculture Technicians

The educational system in Republic of Macedonia starts with elementary education when the children are at the age of seven. The elementary school lasts for 8 years and it is compulsory for all the citizens in Macedonia. The absence from elementary education implies law measures to the children's parents. However, in certain rural areas (high mountainous ones) as well as in certain ethnical communities (Gypsies) we can find cases where children are not included in the elementary education.

When the children finish elementary school (at the age of fifteen) they continue with secondary education. The high education lasts for four years (rarely for three years). By completing the high education (at the age of 19) children gain the permission to enter the University.

Several branches, i.e. specialties are available in high education. One of them is the agriculture branch. Every year the Ministry of Education announces an enrolment for high schools, so according to data in Appendix A, an enrolment for a total of 1190 students in high schools has been announced for the academic year 2003/2004 for agriculture education in 10 cities in Macedonia for 6 different departments of agriculture education.

High agriculture education does not attract great attention in children so every year more than 30% of the free places remain unfilled. The largest numbers of children who enroll high agriculture schools are from the rural areas. Out of the enrolled students, around 10-15% do not finish their education due to various causes.

According to data shown in Appendix B we can see that an average of 600 students a year finish high agriculture school, where the largest registered number of 1 205 students was in 1987, and the minimum number of 343 students was registered in 1975.

When it comes to the graduated students according to their gender, from the data in Appendix B it can be seen that in the period between 1987 and 1994, the number of male students dominates, while in 1995 there is an increase of the number of female students and the number of graduated male and female students is equal.

The educational process in high schools in the past few years has been undergoing several changes and reforms. At this very moment a PHARE project is taking place for reconstruction of high agriculture schools. This project was started in 1998 and three pilot schools were included in its implementation. This project aims to decrease the total number of classes per week, change the relations between theoretical and practical curriculum, in favor of the practical one and optional subjects are introduced.

University Agriculture Education

The university institutions in the area of agriculture in R.Macedonia at present are the Faculty of Agriculture in Skopje, at the University Ss. Cyril and Methodius and the Faculty of Biotechnological sciences at the University St Kliment Ohridski in Bitola, which as a new formed one (in 2000) has a department of animal products processing.

The Faculty of Agriculture in Skopje, since its foundation in 1947 up to now has grown from a faculty with one department into a faculty with 10 departments, through its permanent orientation and improvements.

The determination of R.Macedonia for European integration in the education, means a preparation of professionals who will successfully be included in the European and world labor market, establishment of educational standards compatible with the European ones and their external revision, information exchange and cooperation with educational institutions from Europe and the world, provides greater mobility of the students and the teaching personnel in Europe and wider. This implies a need for redesigning of the studies and the subject programs whose model and structure should start from the principles of the modular curriculum, compatibility with the developed educational systems and interdisciplinary and multidisciplinary approach in the realization of the studies and subject programs.

Taking part in these changes and trends, the Faculty of Agriculture in Skopje within the frames of the University Ss Cyril and Methodius in Skopje, has achieved a significant activity and a programmed process of changes towards modernization of the curriculum-educational activity which means creating a new organization and structure for the departments, studies, study groups, study and subject programs as well as introduction of the credit transfer system as a mutual procedure which is implemented according to the European Credit Transfer System (ECTS).

Starting from the academic year 2001/2002, at the Faculty of Agriculture the graduation studies last for ten terms at the following ten departments, which have compatible curriculum programs with the European Union countries:

- Department of field crops production;
- Department of vegetable and flower production;
- Department of viticulture and fruit production;
- Department of livestock production;
- Department for agricultural machinery;

- Department of agricultural economics;
- Department of plants protection;
- Department for using, regulating and protection of the soils and waters;
- Department of eco-agriculture,
- Department for processing of the agriculture products.

By these changes it is expected that the needed number of new specialized professionals will be provided, who are required for their working engagements in the present and future family farming production as well as in the present and future small and middle food-processing capacities in R.Macedonia as well as for scientific-research work in the area of agricultural sciences at the Faculty, specialized institutions and the developing scientific-research units in several organizations in the area of agro-complex in R.Macedonia.

Having this concept of educational system, a solid basis for successful performance of the continuing education is created which will have an important place in the future educational system in agriculture.

New knowledge will be acquired through the forms of vocational education and the knowledge and professionalism will be enlarged. The vocational education is performed through training courses, seminars, distant education and other forms of continuing education. For a completed form of vocational education, in accordance with its type and volume of the gained knowledge, a corresponding certificate is awarded (diploma, certificate etc) where the kind and the shape of education and the volume and the type of the knowledge gained and professionalism are stated.

A research was conducted for the needs of this project, which referred to graduated students (total number, according to departments and gender) within the period from 1949 until 2002.

The results were estimated through linear and parabolic trend. It is obvious that the data analyzed by the parabolic trend have greater importance where in all three cases (total number of graduated students, male and female students) the standard error is smaller than the one in the parabolic trend, which can be seen from the below stated parameters in *Table 1*.

Table 1. *Results from estimation of parameters*

Trends	Parameters	Total number of students	Male students	Female students
Linear	a	56.24	67.64	-11.40
	b	1.81	0.59	1.23
	Standard error (Sy)	35.63	36.36	12.28
Parabolic	a	3.51	0.46	3.06
	b	7.46	7.78	-0.32
	c	-0.10	-0.13	0.03
	Standard error (Sy)	27.79	22.68	10.65

In the period between 1949 and 2002, the total number of graduated students at the Faculty of Agriculture is 5 732 students, 4 522 of which are male and 1 210 female.

The average number of students who graduated per year (total) is 106, 84 of which male and 22 female.

The minimum number of students who graduated per year appeared in 1949, which is only 1 male student, and the maximum number was in 1992, which was 205, when 147 were male and 86 were female students.

The standard deviation as a variation measure is 46 in the total average, 38 for male and 23 for the female average. The variations in the number of graduated students by years is big and depends on the various number of students at departments on one hand and the number of departments on the other.

The overall review of the numbers can be seen in Appendix F.

Evaluation of the Employment Opportunities for Graduate Agronomist in Certain Sectors and Enterprises in R.Macedonia

In the past the public sector (combinates, agricultural enterprise and cooperatives) employed 50% to 60% of the agriculture engineers, i.e. 1 900 agricultural engineers. The privatization of these organizations means, at the same time, production rationalization and decrease of the number of the employees. The forecast for the number of employments in this sector is very uncertain. Beside the activities in the primary production, the employment in the area of selling and marketing should be increased. Globally speaking, the forecast is that the total employment rate is decreasing. Still, the employers seek an educational system, which will be various and will encompass economic disciplines.

The individual agricultural sector, which takes around 80% of the agriculture capacities, has a dispose of poorly educated farmers and employs only 2% of the engineering personnel. Since the individual agriculture economies are small in their volume, this sector can offer employment conditions for the engineers in an indirect way such as technical advice, management consultations, managing the enterprises etc.

The private processing capacities are mainly small to middle enterprises, which create new posts, but still not enough to cover the personnel rationalization by the public sector. The employers choose personnel who are operative in the area of technology and quality control, commercial activities and marketing.

The number of enterprises, which deal with inputs purchases (seeds, fertilizers, pesticides etc), is increasing. These enterprises have to employ at least one agriculture engineer.

The public sector for agriculture education (agriculture high schools, faculty, institutes) also offers possibilities for employment, which are relatively limited.

The Ministry of Agriculture, Forestry and Water Economy and the other similar institutions employ about 420 engineers. Around 20% of the employees work on international projects (World Bank, Phare, IFAD) and on national projects (harmonization of the Macedonian and European Laws, health control). This

number of employees will not change a lot, but there is a need for employing personnel with more developed capabilities.

Table 2. *Employment opportunities with various employers*

Employer	Estimated current employment	Short-term estimation	Classes of future employment
Agriculture combinats	1 400	Decrease	Production manager Farmers' consultant
Enterprises		Increase	Production manager Laboratory quality control
Cooperatives	500	Sharp decrease	Sales person for Macedonia and export, marketing manager, business administration
Private farms Farms	50	Slight increase	Farm manager, a worker with a salary in production
Associations	20	Increase	Association manager, consultant and producers' trainer
Private firms Processors	50-100	Increase	Production manager Laboratory quality control Sales person for Macedonia and export, marketing manager, business administration
Inputs suppliers	150	Slight increase	Sales person, manager, producers' consultant
Ministry of Agriculture and similar institutions	420	Stable	Experts and agriculture programs coordinators, vets, inspectors, specialists
Education and science	350-460	Decrease	Same employment with increased capabilities
Water economy	45	80-120	Consultants for water usage
Consultancy Development agency	115	Uncertain	Consultants for the private farmers, agency managers, farmers' trainers
Other organizations	25-35	Decrease If the agency remains	Same
Agro stock exchange, banks, insurance companies, municipalities	15	Slight increase	Consultants and agriculture experts, brokers, sales persons, national parks managers

The consulting activities are supported by the Agency for Initiation of Agriculture Development. In this Agency about 115 graduated agriculture engineers are employed. At the same time a certain number of international consulting companies (Land O'Lakes, Vocca etc) employ around 40 engineers. The future of the Agency for Initiation of Agriculture Development depends on its financing and on the capability of its agents to adjust to the farmers' needs.

Water economy organizations employ about 50 engineers. The number of employed engineers can become bigger by increasing the melioration surfaces.

Other employments are offered by the Agro stock exchange, economical institutions, insurance companies, municipalities, national parks, etc.

All the employers emphasize that the engineers should have diverse education and are unanimous about the following:

1. The engineers should have technical knowledge, but also economy knowledge, as well as management and human resources knowledge. They must have a capacity for innovations and suggestions for developing projects.
2. Beside other specialization branches, an engineer must:
 - a) Understand economy mechanisms, the market and marketing principles, bank system, the methods of business administration, including the engineers who study primary and secondary production;
 - b) Receive information on the technical evolution and the new working methods;
 - c) Use a computer and speak one or two foreign languages;
 - d) Use modern means of communication, in order to motivate the personnel;
3. The education of the engineers must include long periods of practical work, in order for them to understand the rural world, the enterprise and its problems.
4. If the agricultural engineers complete their education and practice in this way, then they can successfully perform activities in the EU as well, through direct employment in some of its member countries on programs and various communication activities, which is a wide future opportunity.

The preview in *Table 2* gives an estimation of the future employment with various employers.

Individual Agriculture Producers' Education

With regard to the fact that in R.Macedonia there is not an organized system of additional education for farmers, for the sake of the objectives in this paper, and mostly for presenting the overall picture of the conditions in this sphere a survey with 1044 agriculture economies has been made. The survey was conducted in the period between October and December 2002 on the territory of the whole country, with the help of the first year students at the Faculty of Agriculture. The survey data were processed using Excel. The results show that:

- The number of members in one agriculture household is 4.7, while in working condition are 3.1
- On average every agriculture household has a disposal of 3.3 ha their own arable land, 1.3 ha rented or on average they use about 4.6 ha;

- In terms of the education level the results show the following condition:

Level of education	Number	%
Elementary not completed	63	6.03
Elementary education	272	26.05
High education	556	53.26
Advanced education	101	9.67
University education	52	4.98
TOTAL	1 044	100.00

- Answering the question if they have attended any course on agriculture, 913 farmers or 87.5% gave negative answer, and only 12.5% or 131 farmers gave a positive answer.
- When asked if they would like to attend a course on agriculture, 643 farmers or 62% gave a positive answer, while 401 or 38% of the farmers gave a negative answer.
- When it comes to the type of the course the main part of the farmers or about 48% wanted courses in animal production, 26% in plant production, 10% in agro marketing, 5% in bees breeding, 4% in mushrooms growing, 4% in farms book keeping and 3% in other types.
- In terms of the period they would like to attend the course in, they gave the following answers:

	Number	%
Winter	439	68.27
Spring	71	11.04
Summer	48	7.47
Autumn	44	6.84
Any time	41	6.38
TOTAL	643	100.00

- In terms of the lecturer they would chose, the greatest number of the farmers, i.e. 45% of them would accept any qualified lecturer;
- The last question of the survey refers to whether they are ready to pay for the organized course, 70% gave a positive answer and 30% of them are not prepared to pay for the organized course.

Having into consideration the above mentioned survey results, the need for activities done by the corresponding ministries for agriculture and education becomes immediate, in terms of taking measures for solving this problem, which means a construction of a system for additional education of the individual agriculture producers.

Even more, the investment in human resources is the basis for quality implementation of the rural development plan, in conditions when the new private sector in agriculture begins its own development and when crucial changes have been made in comparison with the past.

Special attention should be paid to the education of the women in the rural areas by improvement of their qualifications and introducing the management principles for small and middle enterprises.

The basic aim of the additional education in the rural areas should be the improvement of the already existing knowledge and skills of the farmers and other

people included in the agriculture activities, which has a further goal for faster development and structural adjustment of the agriculture, application of production practice compatible with environment protection, hygiene standards as well as securing fair income for the farmers.

Specific aims, which should be achieved by the vocational education in the rural areas, are:

- Improvement of the production quality at the farms;
- Implementing new technologies in the production;
- Building agriculture farms which will be directed more towards protection of the environment and nature and will respect the protection standards;
- Promotion and improvement of the rural activities for small and middle enterprises;
- Improvement of the managerial skill of the farm leaders;
- Increasing of the rural tourism and the local typical products;
- Development of the traditional crafts in the rural areas.

Conclusions

- The annual inflow of interested students in high agriculture schools is about 800, although there is an enrolment announced for 1 200 students, which shows that the interest for agriculture education is on a low level;
- The future conditions will be dimensioned in accordance with the relations conditions between R. Macedonia and the EU, which means favoring certain comparative conditions and activities for agricultural production in R. Macedonia to require activities application support in the agriculture schools as well, which will represent a basis and better guaranty for a successful effectualness of the agreed objectives in the educational policy between R. Macedonia and the EU.
- The current condition in the university education of agriculture professionals shows that we are at a crossroad. That means leaving out the traditional studying conditions and introducing new ones in accordance with the European orientation of R. Macedonia in future;
- The overall determination of R. Macedonia for education of highly educated professionals in the field of agriculture is 10 departments; the future will show which ones of them will be of bigger interest and which of less, according to the production, climate and economy conditions important for Macedonian agriculture;
- Putting into effect the university educational system in agriculture of RM is possible by a complete transformation of the curriculum and programs as well as their material support as a guaranty for their positive valorization, firstly support by various EU funds;
- Rating the employment possibilities will be a result of the employees' training in certain areas in accordance with the general, agrarian and the employment policy;

- Special and important place in the overall education system, contacts and other activities in future will be given to the farm production, having in mind that the complete political-economical system needs bigger effects in that field, and also bigger investments in the education system of different kinds (winter courses, seminars, workshops etc).

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Appendix A

Enrolment for students at high agriculture schools (academic year 2003/2004)

Municipality	Agricultural technician	Horticulture technician	Hydro-melioration technician	Agricultural technician	Tobacco technician	Production and tobacco processing	Total
Bitola	34	34	34	34			136
Valandovo	68						68
Kavadarci	68		34				102
Kumanovo	170			68			238
Prilep	68				68	34	170
Resen	34						34
Sv. Nikole	34						102
Skopje	68	34		68			102
Strumica	136						136
Tetovo	102						102
TOTAL	782	68	68	170	68	34	1 190

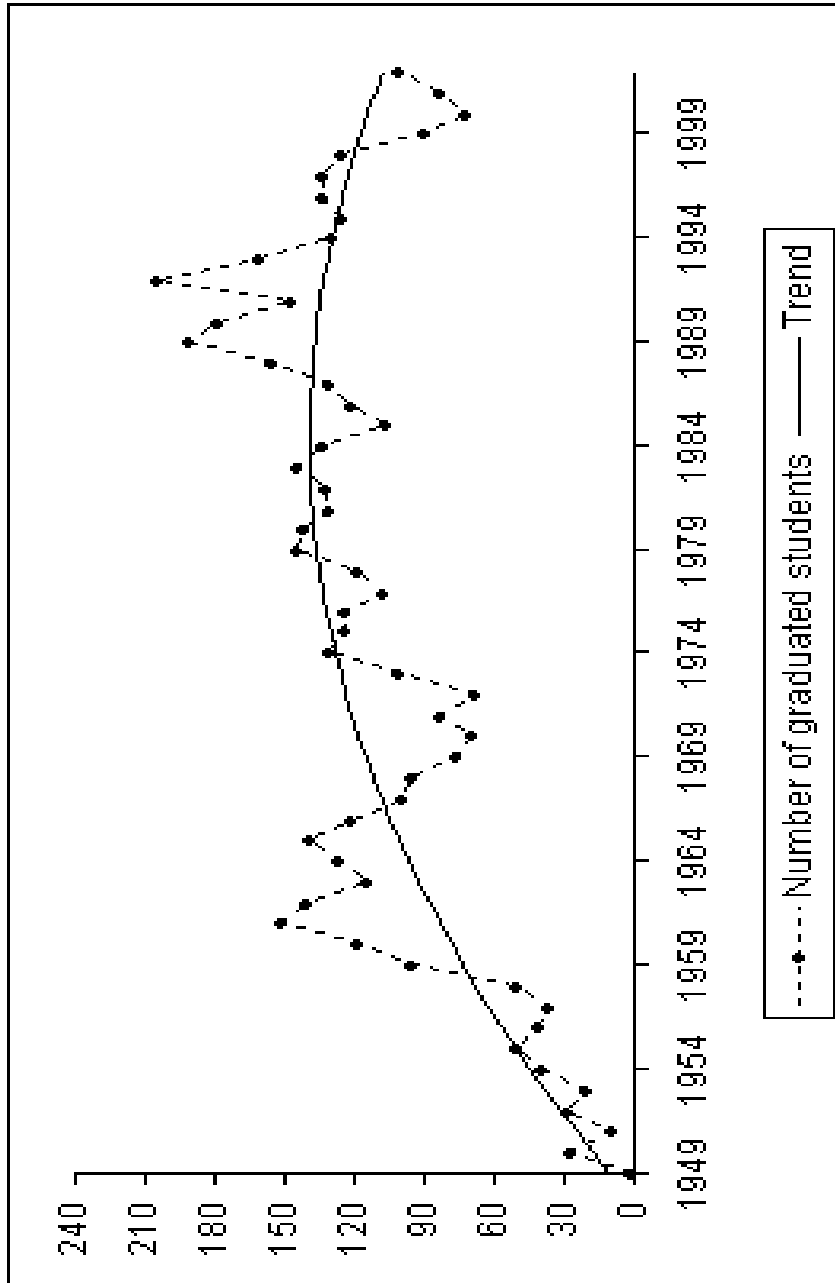
Appendix B

Students from high agriculture education in the period between 1966 and 2001

Year	Total high	Total		Male		Female	
		Number	%	Number	%	Number	%
1966	52 697	416	100				
1967	52 824	430	100				
1968	51 737	491	100				
1969	54 789	512	100				
1970	56 938	513	100				
1971	59 963	519	100				
1972	57 376	427	100				
1973	58 910	448	100				
1974	61 195	429	100				
1975	63 504	343	100				
1976	66 516	402	100				
1977	69 795	409	100				
1978	73 824	444	100				
1979	76 672	508	100				
1980	77 888	592	100				
1981	82 465	504	100				
1982	83 869	531	100				
1983	84 102	590	100				
1984	82 177	721	100				
1985	78 827	711	100				
1986	77 023	958	100				
1987	75 764	1 205	100	855	70.95	350	29.05
1988	74 239	1 101	100	763	69.30	338	30.70
1989	72 740	1 147	100	781	68.09	366	31.91
1990	71 505	981	100	617	62.90	364	37.10
1991	70 696	1 036	100	633	61.10	403	38.90
1992	70 250	548	100	336	61.31	212	38.69
1993	70 243	404	100	210	51.98	194	48.02
1994	72 248	388	100	211	54.38	177	45.62
1995	74 803	518	100	258	49.81	260	50.19
1996	77 817	594	100	269	45.29	325	54.71
1997	80 903	539	100	297	55.10	242	44.90
1998	84 059	487	100	260	53.39	227	46.61
1999	87 420	494	100	249	50.40	245	49.60
2000	89 775	546	100	261	47.80	285	52.20
2001	90 990	682	100	403	59.09	279	40.91
Average	71 848	599		427	57.39	284	42.61
Max	90 990	1 205		855	70.95	403	54.71
Min	51 737	343		210	45.29	177	29.05
St.dev.	11 043	233		233		70	

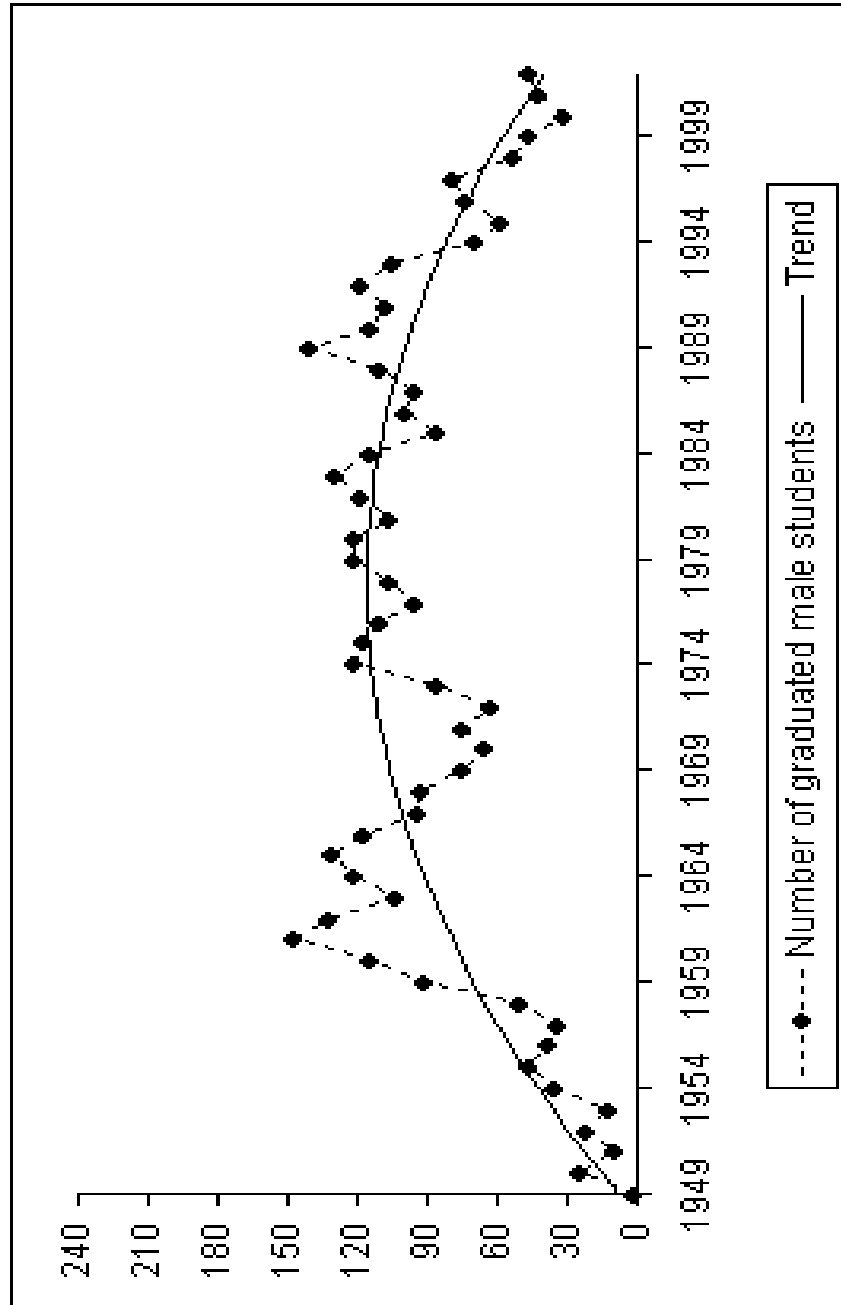
Appendix C

Number of graduated students – TOTAL- and the trend of graduated students



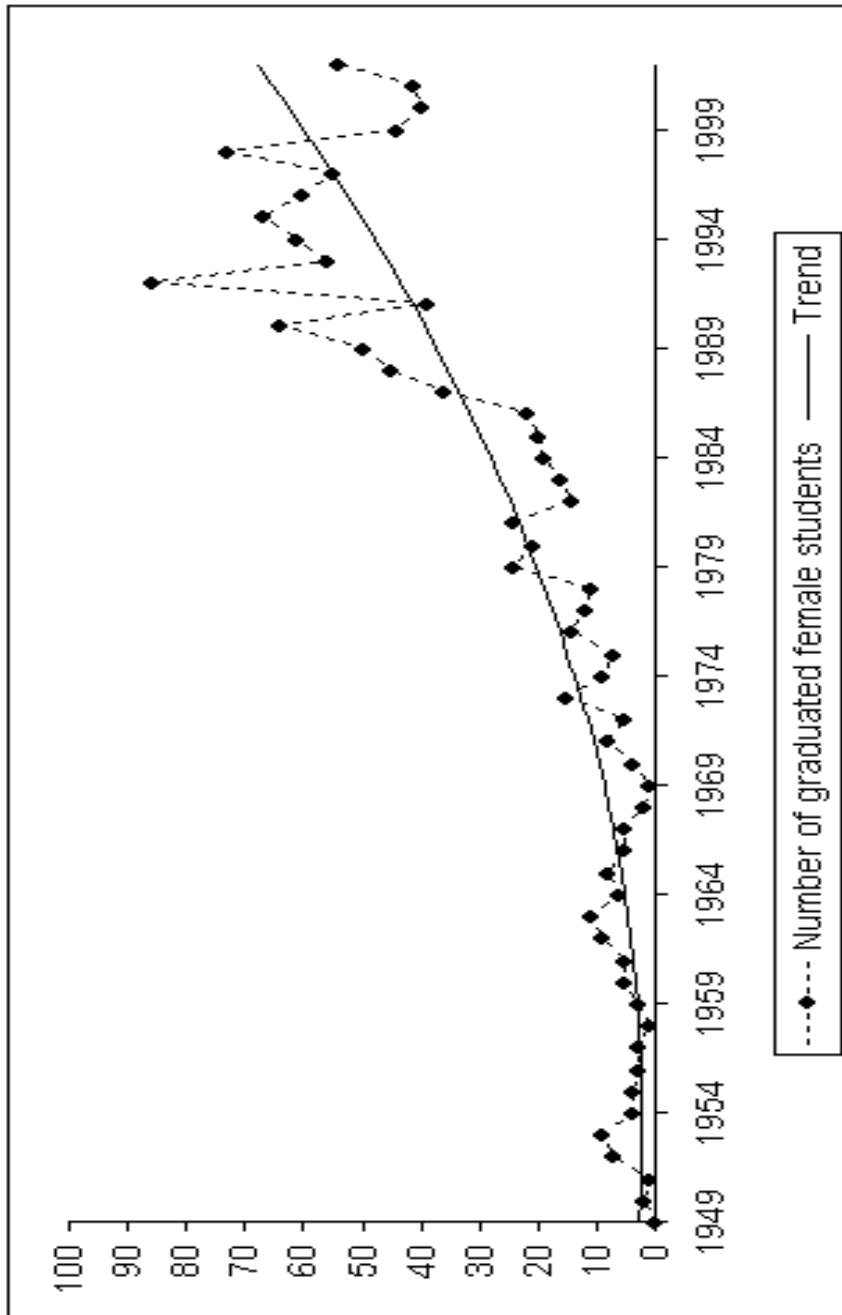
Appendix D

Number of graduated students – MALE – and the trend of graduated students



Appendix E

Number of graduated students – FEMALE – and the trend of graduated students



Appendix F

Graduated students from the Agriculture Faculty within the period of 1949-2003 according to departments and gender

Year	Field crops production		Viticulture and fruit production		Livestock production		General		Vegetable and flower production		Field		Tobacco		Mechanization		f Total	
	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f
1949							1								1	0	1	
1950							25	2							25	2	27	
1951							9	1							9	1	10	
1952							22	7							22	7	29	
1953							12	9							12	9	21	
1954							36	4							36	4	40	
1955							47	4							47	4	51	
1956							38	3							38	3	41	
1957							34	3							34	3	37	
1958							50	1							50	1	51	
1959							92	3							92	3	95	
1960							114	5							114	5	119	
1961							147	5							147	5	152	
1962	40		28	1	21	1	43	7						132	9	141		
1963	41	3	39	7	13	1	11							104	11	115		
1964	41	2	45	3	29		6	1						121	6	127		
1965	26		62	7	24		1	2						131	8	139		
1966	13		41	2	21		1					12	5	117	5	122		
1967	8	1	31	2	20		1	8			24	1	18	94	5	99		
1968	43	2	26		17			1			20	2	6	93	2	95		

Cont.

Year	Viticulture						Vegetable and flower production						Tobacco						Total	
	Field crops production		Livestock production		General		Field		Tobacco		Mechanization		Tobacco		Mechanization		Total			
	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f		
<i>cont.</i>																				
1989	45	8	45	17	46	15	5	10									141	50	191	
1990	45	22	28	19	36	15	5	8									114	64	178	
1991	45	15	24	11	38	10	1	3									108	39	147	
1992	61	40	20	5	34	27	4	14									119	86	205	
1993	40	23	24	14	40	14	1	5									105	56	161	
1994	24	30	23	9	20	16	2	6									69	61	130	
1995	28	37	11	8	16	12	2	4	1	6							58	67	125	
1996	25	30	15	4	29	17	4	3	6								73	60	133	
1997	26	17	18	8	15	9	15	14	5	7							79	55	134	
1998	28	20	8	13	12	10	2	12	3	18							53	73	126	
1999	21	16	11	11	10	6	4	4	0	7							46	44	90	
2000	10	14	7	5	7	6	6	6	2	9							32	40	72	
2001	13	12	9	4	13	6	6	10	0	9			1	0			42	41	83	
2002	8	13	11	14	13	11	7	4	6	12			2	0			47	54	101	
Total	1570	443	1191	265	839	220	742	114	67	163	71	4	39	1	3	0	4522	1210	5732	
																	Average	84	22	106
																	Max	147	86	205
																	Min	1	0	1
																	St.dev.	38	23	46

Views on Education

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Abstract

The essay highlights future challenges in higher agricultural education in general as well as their relevance to the present situation in Macedonia. A university must always aim at recruiting, keeping and promoting students, which show a high degree of original thinking and a strong interest in research to ensure continuance. The university must always strive for independence in society. A faculty of agriculture has to provide knowledge for both consumers and farmers; it must aim at recruiting students from ethnical or social minorities as well as from majorities in society.

The ongoing harmonization of Macedonian higher education with other European countries has to deepen. Research and development in small countries as Sweden or Macedonia are heavily dependent on international contacts. Students on especially postgraduate level ought to spend parts of the studies abroad. On the undergraduate level it will be necessary - without ignoring a good training in basic sciences - to stress the applied fields. Information technology ought to be used to a higher extent than today and the authors suggest the Faculty of Agriculture, Ss Cyril and Methodius University, Skopje to contact international sponsors, i.e. Sida (Swedish International Development Agency) in order to build up adequate resources in this area.

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Questions and Possibilities

Agriculture plays a key-role in Macedonian economical and social development. A successful agricultural sector depends heavily on higher education and research. Educational systems in harmony with the local society as well as the international arena will be the springboard to healthy economical development in Macedonia as it has been in many other countries in the western world.

Macedonian agriculture must now aim at placing itself on the European market as soon as possible. This aim can only be reached by increasing productivity and in particular by paying attention to the quality of agricultural, horticultural and oenological products to meet consumers' demands on a free market.

Up to the collapse of the Yugoslav nation Macedonia had access to a large market within Yugoslavia and where, within the prevailing economic system, items produced within the country had a clear advantage over import. This situation, rather agreeable to the Macedonian producer, does not exist any longer.

How could a University and a Faculty of Agriculture meet this situation and help the farmers to increase their competitive strength?

The outline of the essay will be as follow: In the next section, the concepts of social capital and adaptive rationality will be briefly presented. The third section contains an overview of present Macedonian higher education. The fourth section highlights challenges in future higher agricultural educations. The fifth section discusses the education for research and the essay will close with some conclusions and suggestions.

The Importance of Communication

Putnam: The concept of social capital

Some scientists argue differences between societies in economic development due to the relations between its citizens. "Social capital" will have heavy impact on the possibilities in societies to be successful. The ability to cooperate within a group, a community or a region will be highly important when discussing regional development.

Robert D. Putnam claims that social capital is one of three forms of capital: physical capital, human capital and social capital (Putnam, 2000, p 18). Social capital could be the level of trust, norms of interdependence, and networks of social commitments (Putnam, 1993, p 201). A "bank of favours" store favours in the society, and people rely on the basic knowledge, that favours will be profitable in the long run, even if they not seem to be this in the short run (Putnam, 2000, p 20). Trust seems to be "the oil" or "the catalyst" in people's daily life (ibid., p 21). Due to Putnam, density and weight of the local organizational environment will be an important part of a region's "social capital".

Thus, a successful, “horizontal” society is based on trust and confidence (Putnam, 2000, p 7ff).¹ It is also based on equity and engagement and could also be described as a sort of generalised reciprocity (independence) (Putnam 1996, p. 128, 206 – 208).

Of course, these theories will be imperfect in describing a society. Putnam’s tendency in picturing a society in “black and white” could easily become misleading. However, it has anyway a point in emphasizing the power of common people cooperating and trading with each other. Well-developed horizontal networks in all levels of society will simplify information flows. In economics, free exchange of information will be highly important for success. Markets work better with free availability of information.

Sørli and Nitsch: Adaptive rationality

In the daily life of farm, a wide range of aspects intervenes in ordinary decision-making, where daily routine work is only a part of these aspects. The overall economic development / development in important markets, as well as changes in the political environment and the daily family life are always important aspects to the farmer. Farmers strive, due to Nitsch, as much towards a qualitative satisfaction of own personal and family needs, as to optimizing economic outcomes of the farm enterprise (Nitsch, 1994a, p 36). I.e. the farmers face a situation of “complexity under uncertainty” (ibid., p 30; Nitsch, 1994b, p 161).

Nitsch refer to what Sørli call “adaptive rationality” to describe the farmer’s way of being rationale in decision-making. Rationality will be a result of the farmers’ vision of future development on farm, former experiences and experimentation on his/her own. (Sørli, 1982; Nitsch, 1994a, p 35)

In addition to his practical skill, the farmer must be able to handle planning, economic challenges, legislation etc. Practical skill is the ability to organize and get things done in time, and in a proper way. Orientation about the institutional environment could be knowledge in market conditions, agricultural policies, legislation and other institutional factors - all of them important in the decision-making on farm.

How do farmers receive this complex knowledge? Nitsch argues that these kinds of knowledge will newer be successfully taught in a school. People get to it by simply doing it. A kind of practical tradition or maybe living knowledge based on judgement and familiarity will successively develop at a farm. (Nitsch, 1994b, p 162) It could be called living knowledge, because it will be developed and carried by a human being, but not easily be described theoretically. To get it, you have to practise.

Farmers do not arrange pre-booked meetings, and communication is almost completely oral. Almost all relevant information about future activities comes from personal sources. Written information was according to Sørli's research

¹ From the Swedish preface to the book “Den ensamme bowlaren” (bowling alone). The preface is written by Olof Petersson and Bo Rothstein.

surprisingly unimportant in the decision-making process. Instead the importance of personal networks was emphasized. (Sørlie, 1982; Öhlmér, Göransson & Lunneryd, 2000, p 7)

Any advisory system ought to take theories of social capital in consideration and they should also be reflected in the educational system of advisors. In the work as successful farm advisors, empathy and the ability to communicate will be extremely important tools in effective problem-detection and problem solving. It is tools or skills commonly connected to societies characterized by high levels of social capital. To the farm advisors, it is a matter of education – the future main challenge to higher agricultural education in Macedonia.

The farmers feeling of pleasure in *experimentation* will be dependent on their ability to experiment, their freedom. Laws enforcing property rights will be extremely important in this context. The land reform in Macedonia has to be carefully completed. The capital market in the country has to be developed in order to mature. The agricultural market has to be liberalised. The market for input-commodities in agriculture has to be developed and diversified in order to strengthen competition and as an indirect effect, protect the single farmer as customer. The public bureaucracy has to be decentralised. Ethnical or social minorities have to be equally treated as the majorities. In this context it is important that farmers showing an interest in trying new methods of production, economic control etc. be strongly encouraged.

Present Situation in Macedonian Higher Agricultural Education

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The Ss. Cyril and Methodius University in Skopje was founded 1949 – at that time consisting of three faculties. Since the foundation the university has expanded a lot and consists nowadays of 24 faculties, ten institutes and other institutions. (Anchiev, 2000, p 5-99) The education is divided in three levels, undergraduate, postgraduate and PhD studies. The postgraduate level is divided in two programmes, one-year study in order to reach specialist degree, and two years studies in order to reach Master of Science.

In the frame of TEMPUS project, run by EU, a new educational organization has been created. The TEMPUS project is created to help Balkan countries establish new systems for university education in agriculture.

The undergraduate studies are a program four years. The students will receive the title of agricultural engineers. The program is specialized in: Field crops production, General production, Livestock production, Vegetable production, Agro management (e.g. Economic development) and Viticulture- and Fruit production. Since last year there are also a line of Agro-economics.

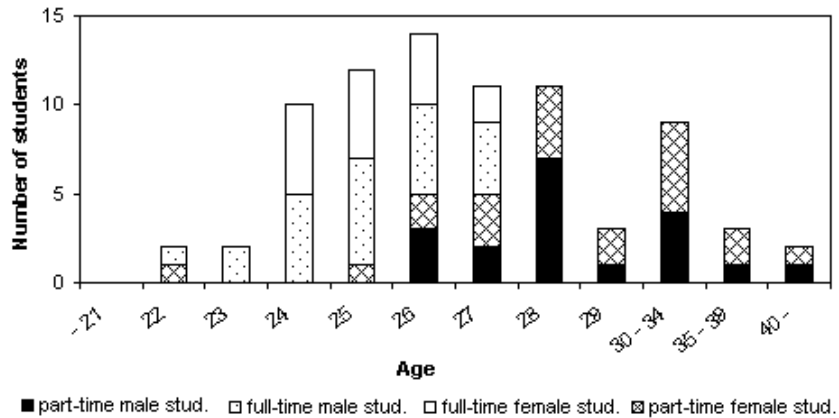


Figure 1. Graduated students at the Faculty of Agriculture by age and sex 2001.(Source: Novkowska, B., 2002, p. 22-25)

Totally 79 students graduated from Faculty of Agriculture in 2001, 40 was full time students, and 39, part time students (Figure 1). The new master program is on its second year. 46% of the students are female. Most of the full time students come almost directly from gymnasium or upper secondary school, and most of the older students are studying part time.

Since a year, a master program in agro-economy has been established in Ss. Cyril and Methodius University, Skopje. The new program is a result of the last year's co-operation with other European countries in the EU-run TEMPUS-program. When the MacSwede-project started autumn 2002, the content of the master program was still unclear.

The Master degrees will in future be divided into these lines: Agricultural mechanization, Agro-economics, Animal products, Field production, Fish farming, Fruit production, Genetics and Plant breeding, Herbolgy, Industrial crops, Irrigation, Pedology and Agrochemistry, Plant protection, Poultry production, Ruminants, Tobacco production and Fruit processing, Vegetable and Flower production, Viticulture production and Weed control.

There are two ways of specialisation in the agro economic postgraduate education, a business line and a line of rural development. The postgraduate education is two years; the first year is the same for the two lines while in the second year the students follow their own line.

The PhD level is not completely the classical PhD, but the program contains research as well as defence of a thesis. It takes normally 4-5 years, not less than 3.

Labour market

The forecast on labour market to these students in agriculturally related exams has not been especially bright. High unemployment rates has characterised this group of newly graduated agricultural engineers. The far-reaching specialization seems

to worsen the possibility for Macedonian agronomists to get jobs outside the food chain. People employing farm advisors, could admit that the newly graduated students are not so well prepared for the daily work at farm advising agencies. The need for practise and complementing education is obvious and an emerging task to develop.

General viewpoints on agricultural education

The dynamics of development in a society always seems to almost amaze us. Future seems to be hopeless to predict – a conclusion easy to accept when looking back on the last ten turbulent years in the republic of Macedonia. According to the dynamics of development in a society, it has to be seriously questioned how to educate students well prepared for their future task. Should agronomists be specialists or generalists? Should they work with large enterprises or support small family farms? Should they develop high quality food products or should they be specialists on producing staple food?

The value of applying different pedagogic systems in undergraduate education

In the article "Why problem-based learning? A case study of institutional change in undergraduate education" the authors says (Duch, B., Groh, S. & Allen, D., 2001):

The past decade has seen major changes in how we communicate, do business, access information, and use technology. How we teach must also change in order to prepare our students to cope with these new situations: students need more than ever to be able to pose questions, seek and find appropriate resources for answering these questions, and communicate solutions effectively to others.

A wide range of different pedagogic methods has been introduced in the period mentioned above. The year 1968 remains a significant point of time in the history of student movement. In following years the area of student learning in higher education developed rapidly with a substantial number of empirical and theoretical contributions from Great Britain, Australia, Sweden and the United States and other countries (Marton, F. et al, 1984, Ramsden, P., 1992).

The main focus in research and discussions concerning education and learning has been on:

- how the students learn
- the role of the examination

Modern experience evidently shows the importance of concentrating on how students learn. However, a study program on university level with a certain role in the development of the agricultural sector must also be constructed in co-operation with representatives from both the primary production, and from different parts of

the whole food chain. There is of course lots of specific knowledge depending on what kind of program we focus on, but there are always some competencies that are generalizable.

- Adapting to and participating in change
- Dealing with problems, making reasoned decisions in unfamiliar situations
- Reasoning critical and creatively
- Adopting a more universal or holistic approach
- Practising empathy, appreciating the other persons point of view
- Collaborating productively in groups or teams
- Identifying own strengths and weaknesses and undertaking appropriate emendation, e.g. through continuing, self-directed learning (Boud, D. & Feletti, G., 1991, p. 25)

In order to promote these competencies and skills there are many reasons to use different types of education methods. In the first place the method used must support a more student-orientated situation in the classroom. Today, in Sweden as well as in Macedonia, most university lectures are "one-man performances". A professor tells the students how things are and gives them answers on questions they have not raised. More focus is needed on the dialogue between teacher and students. However, in many universities and even in secondary schools many teachers implements new ways to increase learning and decrease teaching! One starting point for learning is to raise questions from different "realities" in the society. It can be a specific problem, a query or a puzzle that the learner wishes to solve.

Learning based on different problems is grounded in the belief that learning is most effective when students are actively involved and learn in the context in which the knowledge is to be used. (ibid., p. 13)

Problem-based learning, case method or project studies are all examples on pedagogic systems which brings reality into the classroom. They are more oriented towards the students and give many opportunities for questions, discussions and reflections!

The education in an international perspective - the Bologna process

There are strong forces in Europe to harmonize and to raise the quality of education known as the Bologna process after the Bologna Declaration of 19 June 1999. The European Ministers of Education wrote (Bologna declaration, 1999):

A Europe of Knowledge is now widely recognised as an irreplaceable factor for social and human growth and as an indispensable component to consolidate and enrich the European citizenship, capable of giving its citizens the necessary competences to face the challenges of the new millennium, together with an awareness of shared values and belonging to a common social and cultural space.

The importance of education and educational co-operation in the development and strengthening of stable, peaceful and democratic societies is universally acknowledged as paramount, the more so in view of the situation in South East Europe.

The educational system, teachers and students shall build bridges of understanding between nations and ethnical groups. Like in many European universities the student population in the Ss. Cyril and Methodius University, Skopje does not reflect the ethnic composition in Macedonia. In order to implement the Bologna process the education system has to be prepared for (Bologna declaration, 1999):

- Adoption of a system of easily *readable and comparable degrees*, also through the implementation of the Diploma Supplement.
- Adoption of a system essentially based on *two main cycles*, undergraduate and graduate. Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years.
- Establishment of a *system of credits* - such as in the ECTS system – as a proper means of promoting the most widespread student mobility.
- Promotion of *mobility* by overcoming obstacles to the effective exercise of free movement with particular attention to students, teachers and researchers.
- Promotion of *European co-operation in quality* assurance with a view to developing comparable criteria and methodologies.
- Promotion of the *necessary European dimensions in higher education*, particularly with regards to curricular development, inter-institutional co-operation, mobility schemes and integrated programs of study, training and research.

A Macedonian student in the European Union

Thanks to the TEMPUS project a new education system has been established at the Faculty of Agriculture in Skopje, according to the Bologna declaration, which will be a very useful tool to harmonise the education in Skopje with that of the European Union. This will give the Macedonian students opportunities to study abroad, and the university of Skopje to welcome European students. The teachers can also more easily co-operate with colleges in Europe. This European dimension will fasten the aim to get an international agricultural education and give the students entrance to a larger labour market.

About critical thinking among students, researchers and advisors

In every human relation you demand conditions that make you feel safe, inspired and appreciated. A learning situation will not be different. An environment that includes the above-mentioned circumstances will support a good learning process. Students that joins a faculty with a professional approach in meeting them with respect, based on their individual abilities, background and knowledge, will have a pleasant time in the university.

Macedonian agronomists know in deed how to irrigate, how to fertilize, how to intensify agricultural production. The students learn, so to speak, carefully how to make things right. But, do they learn to make the right things? Does the time at university, the context of university studies, provide these essential pieces of critical thinking for the students in the process of maturing as human beings? Do these educational programs which have been in use till now, encourage the use of common sense?

A common discussion about the role agriculture plays in the Macedonian society, i.e. for whom the farmers produce, will always be important among students. A deeper discussion about the impact of importing foodstuff to Macedonia will also be strategically important. Why maximise production (?), why specialise farms (?), why and when is it relevant to mechanise agricultural production? Are they eternal aims for all agricultural activity in any time and at any place on earth? When are these measures relevant and when are they not?

The political context seems also, at least until now, has been too sensitive to be critically treated in scientific research and education. Such a political analysis is from an economist's point of view of particular importance in a country as Macedonia in which agriculture plays such an important role in the daily life of the population.

Almost no humanistic subjects connected to agriculture are included in the curriculum. No agricultural history is taught, nor – as far as we have seen – any subject of the highly important field of “human and nature”, i.e. a subject about monitoring and to discussing different theoretical frameworks of the human relation to nature. Environmental issues will be increasingly important in agriculture.

The importance of “life long” learning

In the 50's and 60's you could get a university diploma, start your working period, in most cases over 35 years long, and to a great extent based on the knowledge and skills you got as a student. Today there is a more rapid development in most branches, including the agricultural sector. People working in the extension service, e.g. the training centres (TC) cannot catch up with the latest results from national and international research, without a vital contact with the faculty.

In many European countries continuing education plays a central role in the University education. Leadership requires the understanding of changes occurring

in the business landscape, interpreting the times and noticing trends. These may include trends in European Union policy or developments originating elsewhere in Europe. Continuing education at the universities must answer to the future needs of the society: individual, entrepreneurial, organisational and at local level. Continual change in society calls for the adoption of the concept of life long learning. This is strongly supported by the European Union, e.g. in its so-called White Paper, Teaching and Learning: Towards the Learning Society (European Commission, 1996).

Changes in policy in European countries have happened at different times. The "welfare state" role of Scandinavian countries and the ongoing changes, particular in the public sector, have brought challenges for university continuing education (UCE) in these countries in the last two decades. Big political changes in Spain and Portugal in the 1970s and after they joined the European Union led to developments in the UCE.

Continuing education was highly recognised in the former German Democratic republic but following German unification earlier achievements were more or less brought to a standstill. The level of UCE varies from university to university in Germany. More recently in the 1990s, political, economic and social changes in Poland, the Czech Republic, Bulgaria, Russia and other countries in Central and Eastern Europe have created new needs and new opportunities for UCE, which have in some cases been encouraged by EU TEMPUS Phare and Tacis projects. In order to meet these needs, leadership must initiate and provide opportunity for creativity. UCE's major success factors are sensitivity and quick response to signals received. Flexibility towards client-based needs and the ability to change course when necessary are also prerequisites for success.

UCE's task is to act as a "catalyst", a "locomotive" of social, cultural and economic change. Through research and development and experimentation, educational activities can be dynamically effective and affective to produce innovation and act as a motor of development. In this way, not only are today's needs provided for, but also tasks are sensed beforehand in order to work for the future. In all European countries, society expects a university to be a builder of the future and to produce widely experienced experts and wise decision-makers!

The student at the Faculty of Agriculture, Skopje

The Macedonian student of agriculture has to be ambitious to be successful. The courses are quite heavy, very specialised and detailed. The academic ambitions are in this manner satisfied.

The atmosphere at the dep. of agriculture in Skopje is warm and friendly. It seems to be easy to join the classes, to be a member of the groups. The hierarchy between students and lectors / professors could sometimes be obvious, but is seldom any bigger problem. The students could quite easily ask the lectors for help. The foundation of a successful creative academic environment is therefore already present at the Faculty of Agriculture.

The literature in the courses is often in Macedonian and maybe not always up-to-date. The literature seems to be very ambitious and detailed, but sometimes a bit selective in providing the wide range of different frameworks that has been developed over the globe.

Today the need of achieving a palette of different frameworks in a scientific field will be more important to learn about, than the issue of “how to do that and that in the right way”. The education should aim at teach the students to solve problems in a creative way.

In the future, international literature has to dominate the education, and the students will complement this by locally oriented information provided by the university and from the Internet. Literature is very expensive. Computer resources and availability to the Internet have to be strongly developed at the Faculty.

Postgraduate education aim at teaching the student efficient methods for doing research and handle scientific problems. The thesis ought, of course, to present interesting results. However it is important that it proves the student’s ability to deal also with scientific problems.

The scientific work will be important, i.e. to raise a question, to monitor a theoretical background according to the question, to clearly describe how you have done the research, to monitor the sources you have found in a proper way and to discuss the question you have chosen to rise. You can make any conclusion you want as far as it has an ambition to answer the question you have raised. The aim is, so to speak, not to tell the absolute truth but to learn a skill – how to deal with a problem.

Synthesis

In this paper we argue the importance for Macedonia to educate flexible generalists, well prepared for identifying and together with farmers and other actors in society (e.g. consumers) solve problems connected to the food chain. The important challenges for the coming agronomists will be to establish relations with entrepreneurs in enterprises, small-scale farmers, part time family farmers, consumers but also with the public bureaucracy in such a way as to open up for efficient problem detection and creativity.

The university will be an institution with the most important task of providing students a box of intellectual tools. These tools will by necessity have to be general, only a few of them could be specialized. The agro-economist will have to use tools that general economists all over the globe use as well. The agronomist oriented towards plant production will use tools, used by biologists from all over the globe. Tools could after some time be inadequate or blunt. Further education has to be preserved continuously as long as the person is working. The specialization has to be provided by the employers.

The very importance of harmonizing the Macedonian higher education with the other parts of Europe has as well been highlighted. We also believe that the university will have to play an active role in society as an intellectual “engine”.

The Education for Research

A university cannot survive unless its Governors and senior teachers strongly aim at creating a good atmosphere for research. After all, professors do not have an eternal life; all development at a university depends on recruiting young talented and independent students who can carry their predecessors' work further to higher levels of knowledge and understanding. As mentioned already in the introductory chapter international experience is today a necessity for all research students and in particular for those coming from small countries with limited resources. This can be achieved by combining continuous access to Internet with study periods at universities abroad.

Access to Internet should for obvious reasons be available already on the undergraduate level. Textbooks can give basic knowledge but may be obsolete to some extent already when they appear on the market. They are also often expensive. Further knowledge must be procured through libraries and here comes a problem. A scientific library has always been and is still considered as a viable source of current scientific information. However, a library filled of high quality journals may soon belong to a bygone time and might in the future be reduced to a number of shelves containing reference literature, the contents of which do not change too rapidly with time. The subscription costs of high quality international journals have mounted to horrendous levels and very few libraries can to day afford more than a limited selection. For a developing country it is thus necessary to "go for Internet" already from the beginning.

A library at a Faculty like the Faculty of Agriculture in Skopje ought to have sufficient numbers of computers attached to Internet. They should be available to as well undergraduates, postgraduates, as teachers. Such a facility - open even at odd hours - would imply an immense "take off" for both teaching and research. The Government should be urged to discuss with Donor Countries the funding and perhaps also the initial running costs of such an investment.

To support local farmers and stimulate them in developing their methods and utilize progress achieved in their niches of production a field research and demonstration organization (FRDO) can be of great help. The FRDO can make local experiments with new varieties, study new ways of utilizing fertilizers and methods for pest- and weed control etc. to the benefit of both economy and environment.

It is obvious that in a market economy different private enterprises as well as governmental organisations will be present (export companies, companies providing farm commodities etc.) It is our experience that such companies and organizations have a certain need of staff trained above the undergraduate level, will it be as experts on production or on marketing.

We foresee that in the future both the Government, private companies, farmers' organizations etc. will have a doctor's degree as a basic request for certain upper level posts. The university ought to plan for such needs in its planning of the postgraduate training.

Conclusions and Suggestions

The role of universities in society

A university has three major tasks, Education, Research and Information/Communication. Thus, the university plays a very active part in the development of the society. An aspect of this is the development of social capital and we argue that the academies in Macedonia should be a driving force in reflecting about and building social capital in the society. We see here a possible mission for future co-operation between Macedonia and Sweden.

A widened task of agronomy

We suggest that the faculty of agriculture give strong emphasis in its education not only to the primary production but also to the concept of the whole food chain. Whatever progress in production techniques, the consumer is the one who finally evaluates the product.

We feel that there is a need of more generalised studies. A general biological/economical base ought to be given during the first two years, followed by an agronomic specialisation during year three and/or during the master studies.

Pedagogic issues

We stress the importance of a continual development in pedagogy and openness to new pedagogic methods. The relation teacher –student should be that of a continuous dialogue. Life –long learning, i.e. a system for continuous upgrading of elder civil servants in official and/or private sectors should be introduced.

The critical mind of students must be trained and encouraged. Apart from presenting facts for the student the teacher's probably most important task is to equip the student with such intellectual tools as to make him a skilful "craftsman" in detecting, treating and solving problems.

Internationalisation

It is very important that the education at the faculty be harmonised with the rest of Europe, i.e. the systems applied or being applied within the EU. We suggest that this is a field where future co-operation between Sweden and Macedonia should lead to a continuous development of undergraduate and masters programmes in both countries.

Further introduction of international definitions of terms ought to be strengthened to facilitate an international academic exchange.

Recruiting issues

Sweden as well as Macedonia has ethnic minorities, the representation of which in higher education does not reflect their part of the entire population. We suggest a

discussion and a co-operation between the two countries to increase underrepresented parts of the population at the faculties, may it be sex or ethnicity.

Library and IT

The importance of good library facilities is a must at any educational institution. This is another task for the co-operation between our two countries. A basic collection of relevant reference literature, a sufficient number of computers and access to Internet is investment of outmost importance.

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