EDUCATION, SCIENTIFIC-RESEARCH AND CONSULTING WORK IN AGRICULTURE OF SERBIA[1]

Drago Cvijanović

Professor, Principal Research Fellow, Institute of Agricultural Economics, Belgrade, Volgina 15 Street, 11060 Belgrade, Serbia, tel: +381 (0) 11 2972 858, e-mail: drago_c@mail.iep.bg.ac.yu

Abstract: Serbia has small number of producers[2] which have encircled production system (from primary production to processing), which do business successful, introduce marketing strategy and production standards, registered their products' mark of origin, succeed to export on EU market, use internet or has its own internet domain, etc. For creation of such, competitive and modern agricultural producer, there is necessity for production specialization, any kind of cooperation and better organization. In same time, there is more space for bigger financial support of state, as expert and consultative support „created" through strong partnership between public and private sector, i.e. tough and constructive cooperation of state and farmers sector, like as institutions of education, science, research and consultative work.

In the paper was given review of number and territorial dispersion of educational institutions, current scientific-research work and consultative functions in agriculture in Serbia, than was pointed out main problems in their functioning and previous work and also proposed concrete suggestions for overcoming of existing limitations, as for modernization /reorganization of those institutions, in a way to be more useful for agricultural producers.

Key words: ???

Number and territorial dispersion of educational, scientific-research work and consulting institution

The most shining star of Serbian economy and agriculture is science. In second half of past century, the science development, primarily scientific-research work in the field of social and technical-technological sciences (development of bio-technical sciences, agro-techniques, zoo-techniques) and surely in the field of agro-economic science, has contributed to modernization of agriculture and significant results in:

- Increase of production, size and quality of agricultural production, as well as
- Change of its production structure and economic/biological value (development of selection and hybridization in plant and livestock production).

Application of new knowledge, modern methods of production and technology in primary agriculture keeps going on nowadays, even more intensive (along with constant adjustment to changed climatic, i.e. agro-ecological conditions, energetic limits and along with constant respect of environment protection) and it reflects in: 1) development and implementation of qualitative (non-virus) highly productive seedlings of new fruits and grape sorts; 2) seeds of crop and vegetable cultures; 3) selection, registering and breeding of qualitative registered heads of cattle breeding.

In this point was shortly given review of number and territorial proportion: 1) secondary schools, 2) faculties, 3) scientific and research-developmental institutes, 4) laboratories and 5) expert agricultural offices, significant for agricultural development of Serbia. Regarding that basic carriers of new agro-technologies implementation in practice are scientific-research institutions and professional consultative office, more detailed analysis was dedicated exactly to them.

System of education in Serbian agriculture, with special accent on agro-economic science development

Educational system of Serbia within agriculture includes 25 secondary agricultural schools established by the state.[3] Expert education in agriculture can be got also in some other secondary schools of technical, chemical or general type. As for faculties, according to data in the Ministry of Science and Technological Development, out of 118 accredited higher education institutions in the Republic of Serbia, 4 faculties of agriculture stand out (3 with excellent international

[1] Paper represents a part of the research on the project *"Multifunctional agriculture and rural development in function of accessing the Republic of Serbia into European Union – 149007",* Ministry of Science and Technological Development of RS

[2] Cooperatives, enterprises, individual farmers, etc.

[3] Ministry of Education RS, Registry of Institutions, http://www.mp.gov.rs/ustanove/skole.php

reputation: Belgrade, Novi Sad, Čačak) and faculties of bio-farming, veterinary medicine and forestry[4]: Faculty of Agriculture – Belgrade, Faculty of Agriculture – Novi Sad, Faculty of Agriculture – Zubin Potok, Agronomic Faculty – Čačak, Faculty for bio-farming in Sombor – within „Megatrend" University – Belgrade, Faculty of Veterinary Medicine in Belgrade and Faculty of Forestry – Belgrade.

Besides these formal educational systems, increasingly are pronounced the effects of other institutions: research-developmental institutes, the activities of the MAFWM of RS, which organizes series of educational workshops, seminars, lectures, along with support of non-governmental institutions, educational institutions and similar.

Agro economic branch and the science in Serbia have been especially increased during second half of 20th Century and in the beginning of 21st Century, when had been established major of nowadays agro-economic cathedras, departments and institutes. The analysis of condition, according to research of Prof. Sevarlic and Danilo Tomic, PhD[5], influences on satisfying territorial and institutional dispersion of agro-economic branch and science in Serbia, which is today present on: Faculty of Agriculture in Belgrade (within endures the Institute for Agro-economy), Faculty of Agriculture in Novi Sad (within endures the Department for Agricultural Economics and Sociology of the Village), Faculty of Economy in Subotica (four years lasting program of studies under title Management in Agri-business, which teachers and associates were registered since 2005 in special organizational unit – Department for Agrarian Economy and Business), On every economic faculties in Serbia (Belgrade, Niš, Kragujevac, Priština), agro-economic subjects are basic parts of curriculum of various economic profiles, Agro-economic subjects teach also in the first (and the only one, for time being) private agronomic faculty in Serbia – Faculty for Biofarming (2000) in Sombor, Agro-economic disciplines exist also in all secondary and high agricultural and food-technological schools, Beside highly educational and independent scientific-research institutions (Institute for Agricultural Economics, Belgrade; Institute for Scientific Appliance in Agriculture, Belgrade), the scientific-research centers within big agribusiness companies were contributed to development of agro economic research in Serbia, among which especially emanated PKB Agroekonomik in Padinska Skela.

Research-developmental institutes and laboratories in agriculture

Great contribution to development of agro-economic science in Serbia gave for sure the **Institute of Agricultural Economics, Belgrade**[6]. It was established by Decree of FNRY Government, in August 1949 and in 2009 it celebrated 60' anniversary. During its existence, as one of the oldest and the most distinguished scientific-research organizations in the sector of agriculture, it has been following continuously agrarian economic problems, analyzing them and giving suggestions for successful development of this sector of economy.[7] During its work, IAE has realized numerous projects in the field of research on macro and micro economic level.

In this period, basic activity of the Institute is: macro-economic and micro-economic research in agrarian field, creation of local economic development strategies, consulting, education, statistical and information support and publishing. Besides, the Institute participates continuously in realization of long term projects (Ministry of Science and Technological Development and Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia). In its work, the Institute pays significant attention to young researcher's development, impelling improvement of young associates. At the moment, the Institute employs 29 employees, i.e. seven Ph.D., nine M.A., eight research assistants and five employees as support staff.

Special accent in IAE's work, in last few years, has been given to: Numerous studies, i.e. strategies of local economic development and strategies of agriculture development, which IAE had worked in cooperation with local communities (and still works), as in the Republic of Serbia, as well as in surrounding countries. Special importance in these numerous strategies has, for sure, „Agriculture development strategy of the city of Belgrade till 2015"; Activities in EU projects. IAE has been a partner or member of research team for two EU projects, concerning international cooperation within trans-national programs for South-East Europe: Tech Food and EU Water; Projects of quality standards introduction, creation of concrete investment project reports and technical documentation for new investments, market analysis of some food-agricultural products etc; The Institute organizes and participates in numerous domestic and international scientific meetings; IAE has also very exuberant publishing activity: numerous published monographs, thematic proceedings, the IAE is co-publisher of 3 journals, out of which are single out „Ekonomika poljoprivrede" and „Ekonomika".

Other, equally significant research-developmental institutes in agriculture of Serbia: Additionally will be quoted research-developmental institutes which has been (and are) very important for development and modernization of domestic agriculture. All quoted institutes in table 1 were accredited by the Ministry of Science (Law on scientific-research activity was determined that the Ministry of Science registered scientific-research organizations, which fulfill conditions for realization of scientific-research activity of

[4] Registry of accredited highly educational institutions, http://www.nauka.gov.rs/cir/images/stories/akreditacija/akreditovani_fakulteti_cir_16.pdf.

[5] Ševarlić, Tomić (2008): "Development, condition and perspectives of agroeconomic profession and science in Serbia" in proceedings „Agroeconomic science and profession in transition of education and agro-economy", Faculty of Agriculture in Belgrade, 2008, pages 39–41.

[6] http://www.nauka.gov.rs/cir/images/stories/akreditacija/naucni_instituti-cir_a.pdf
Institute was accredited as scientific institute within the Ministry for Science and Technological Development, by Decree No. 110-00-34/44, on 26.04.2007.

[7] Ivanović P. Srboljub and associates (Editorial Board) (1999.): 50 years of the Institute of Agricultural Economics (1949–1999) Belgrade.

Table 1. The list of registered (accredited) research-developmental institutes within the Ministry of Science and Technological Development of RS

Institute of Field and Vegetable Crops, Novi Sad (http://www.nsseme.com)
The Institute deals with basic and applied research, directed to making new sorts and hybrids of crop, vegetable, as well as numerous forage crops, industrial, medicinal and aromatic herbs. Beside scientific part, the Institute develops also commercially, i.e. lead business at the same time as scientific institute and seed company.
Maize Research Institute „Zemun polje", Belgrade (http://www.mrizp.co.rs)
This is leading institutions in the country in application of scientific-research work, which deals with creation, production and introduction of new high-yielding, quality maize hybrids and soybean cultivars for various agro-ecological conditions of growing, different needs and purposes.
Institute for Animal Husbandry, Zemun (http://www.istocar.bg.ac.rs)
The Institute deals with fundamental, applied and developmental research, international scientific and technological cooperation, transfer of new technologies, experimental production and similar. The Institute disposes with: new technologies for meat production, modern technological solutions for farms and mini-farms, abattoirs, dairies, forage mixing machine, than with complete nutrition technology for specific species and categories of domestic animals etc.
Fruit Research Institute Ćaćak (http://institut-cacak.org/index.php)
The Institute participates active in novelty implementation in fruit growing (world famous sorts of plum, which came out of this institute are: Èaèanska rana, Ćaćanska lepotica and Ćaćanska rodna). The basic activity of the Institute is scientific-research work in the field of fruit growing – research and experimental development in bio-technique sciences, and additional activity realizes within Department for Making and Keeping Seedling Material of Fruits.
Institute for Vegetables and Crops, Smederevska Palanka (http://www.institut-palanka.co.rs)
Professional jobs in the Institute imply organization of production and quality control of vegetable seeds, its processing, packaging and placement. The Institute disposes of around 150 ha of arable land, with possibility of irrigation, greenhouses and cloches for vegetable production, laboratory, mechanization and similar. Taking into consideration personnel and material organization of institute's work, number of made vegetable sorts and their placement on the market, there can be said that the Institute for Vegetable and Crops today represents leading scientific and productive institution in this region. Here point out that „the science in the Institute has never been purpose to its self, and that, ahead of us, had always been clear, practical and applicable goal – a new sort".
Institute of Agricultural Economics (http://www.iep.bg.ac.rs)
This Institute was already spoken about.
Institute of Scientific Application in Agriculture, Belgrade (http://www.psss.rs)
The Institute is a carrier and realize of several Ministry of Agriculture's programs, while the main accent has been put on consulting programs (Law on Professional Agricultural Office from 1991 authorized the Institute as coordinator of agricultural professional service). However, the Institute's activity is: research and development in bio-technical sciences, transfer of modern scientific-research achievements and applied research on farmers' properties, coordination and control of work, like as education of consultants in the Agricultural Professional Office in the Republic of Serbia.
Institute for Plant Protection and Environment, Belgrade
In its research programs and projects are present various fields, from plant protection, biology, chemistry, technology, phyto-pharmacy, toxicology, to environment protection, so this Institute is successfully fit for the most important tasks from the program of scientific and technological development of RS.
Institute of Pesticides and Environment Protection, Belgrade (http://www.pesting.org.rs)
The Institute is registered for research and experimental development in bio-technical sciences. It units research in the field of phyto-medicine, pesticides appliance and environment protection, and also provides services through examination of pesticides' biological efficiency, testing pesticides and fertilizers' characteristics and their remnants in grown plants, agricultural products and environment.

Source: Ministry of Science and Technological Development of the Republic of Serbia http://www.nauka.gov.rs/cir/images/stories/akreditacija/razvojni_instituti_cir_3.pdf.

general interest in the Republic of Serbia). Major institutes are located in Belgrade and Novi Sad.

Besides these research-developmental institutes, the Ministry of Science were registered few more institutions, as there are: Scientific Veterinary Institute „Novi Sad" in Novi Sad, Institute of Veterinary of Serbia in Belgrade, Institute of Land Belgrade; Institute of Forage Crops, Kruševac; Institute for the Study of medicinal plants, "Dr. Josif Panèiæ" Belgrade; Institute of Forestry in Belgrade; Institute of Lowland Forestry and Environment, Novi Sad; Institute of Hygiene and Technology of Meat, Belgrade; Institute for Water Resources „Jaroslav Cherni" in Belgrade.

Laboratories in Serbia: According to data of Accredited Body of Serbia[8], in the field of physically-chemical and biological research of production material in agriculture (animal food, seed, plant material, fertilizers, land, pesticides) were accredited massive number of organizations (institutes, independent laboratories and laboratories in offices for agriculture improvement at agricultural stations, agricultural professional offices etc.) in the field of physically-chemical research of food were accredited even 77 organizations.

Agricultural professional offices as the most efficient form of modern scientific/ professional achievements transfer in primary production

Agricultural consulting in Serbia is still in early developmental stage. The consulting in Central Serbia was

[8] ATS (http://www.ats.rs/index.php) is non-profit independent organization for determination of organizations' competence for doing business – evaluation of adjustment, established by the Republic of Serbia.

defined and financed by MAFWM of RS, and in AP Vojvodina – by Provincial Secretariat for Agriculture, Forestry and Water Management. The consultative work, defined by clause 2 of Decree on Conditions and Method of Incentives Use for Support in Conducting Business in Agriculture[9] encloses numerous jobs, first of all: tracking selected registered agricultural husbandries (education in the sphere of growing technology, standards and EU regulations), educational activity (giving references, professional advices, organization of lectures, seminars), introduction of new assortment and breed combine by performing demonstration experiment in plant and livestock production, control function (soil, seed, plant and livestock analysis) and similar.

Number of agricultural professional offices, consultants and selected husbandries: Those jobs in Central Serbia do 18 agricultural offices, which are registered at MAFWM of RS (the offices are located in Niš, Valjevo, Vranje, Kraljevo, Jagodina, Kosmaj, Kosovska Mitrovica, Kragujevac, Kruševac, Leskovac, Užice, Negotin, Novi Pazar, Ćaćak, Pirot, Smederevo, Stig, Šabac), where the Institute for Scientific Application in Belgrade is authorized for control business and coordination of these jobs. On AP Vojvodina area, the agricultural professional offices are under the authority of / financed by the Provincial Secretariat for Agriculture, Forestry and Water Management, while in the middle of 2009, the consulting was conducted through 13 agricultural offices[10]. On territory of Central Serbia, the consulting do 135 consultants, which „cover" 4.050 selected husbandries in 2009 (experimental and distinguished husbandries, chosen by voluntary principle)[11]. In AP Vojvodina area were registered 80 consultants in 2009, which cover around 3.100 selected husbandries[12].

Total number of selected husbandries in the Republic of Serbia in 2009, which „cover" consultants amounts 7.150, or just 1,6% of totally registered husbandries in the republic (according to data of Administration for Vault, the Ministry of Finances of RS, in Serbia was registered 440.650 agricultural husbandries until 31.08.2009 This percentage is significantly less (0,9%) if takes into consideration the number of statistically listed agricultural husbandries (778.000 with extremely unfavorable property structure, *Census* 2002).

Property and financing the professional offices. Agricultural professional offices of the Republic of Serbia (in a form of institutes, stations and offices) have functioned in social (public) sector until 2009. Since than, they have transformed from social to state property, which have meant that the state (MAFWM of RS and Provincial Secretariat for Agriculture, Forestry and Water Management) had become their founder. The agricultural professional offices finance dominantly from the budget (the republic, i.e. the autonomous province) and partly from own sources, realized on the market.

Analysis of basic problems and systematic mistakes in the field of education, scientific-research work and consulting in Serbian agriculture

Our scientists had created numerous high-yielding sorts and hybrids of crop and fruit cultures, by selection had been created numerous high-productive species in livestock breeding etc. However, the potentials and possibilities of science our farmers use insufficiently, while the appliance of innovations and modern achievements is on low level. For example, Chile, as leading producer and exporter of vegetable and fruit in the world invest enormous assets, each year, in technology and scientific research. The package techniques, bio-chemical treatments in production and logistics keep researching and constantly improving, along with expert selection of appropriate sorts. In Serbia, these researches intermit, and just several practical examples point out to application of high achievement of science and production technologies. Good example is, for sure, the informatics orchard of „Delta Agrar" in Èelarevo and modern, computerized cloche within concern „Farmakom M.B." Šabac[13].

It is obvious that there is no tough functional connection, in Serbia, between respective scientific potentials on faculties and institutes, as emitters of specific services, on one level, and individual farmers, cooperatives, agricultural enterprises, as their users, on the other. This is determined by World Bank research in 2006. Using the package of Knowledge Economy Indicators – KEI[14], the World Bank Report ranks 30 countries of Central and East Europe and Middle Asia according to *their capability to invest in*

[9] Decree on conditions and method of incentives' use for support in conducting entrusted business in agriculture for 2009 („Official Gazette RS" No. 20/09 and 45/09).

[10] (1) „Agrozavod", Subotica; (2) „Zavod za unapređenje poljoprivrede", Bačka Topola; (3) „Poljoprivredna stanica" Senta; (4) „Agroinstitut", Sombor; (5) „Agrozavod", Vrbas; (6) „Poljoprivredna stanica", Novi Sad; (7) „Poljoprivredna stanica", Ruma; (8) PI „Dr. Petar Drezgić", S. Mitrovica; (9) „Poljoprivredna stanica", Kikinda; (10) „Institut za poljoprivredu", Zrenjanin; (11) „Agrozavod", Vršac; (12) „Institut Tamiš", Pančevo; (13) „Poljoprivredna stanica Kovin", Kovin. The list of agricultural stations registered at Provincial Secretariat for Agriculture, Water Management and Forestry http://www.psp.vojvodina.gov.rs/index.php?t=0&pid=8

[11] Decree on determination of long-term working program of agricultural office on improvement of agricultural production for period 2009–2013. This Decree anticipates that the number of agricultural husbandries will increase from 4.050 (in 2009) to 6.750 in 2013.

[12] According to data of Provincial Secretariat for Agriculture, Water Management and Forestry in 2010, there is a plan to increase number of consultants to 100, and therefore proportionally increase of agricultural husbandries' number.

[13] The orchard stretches on 110ha and is covered with information system of frost protection, anti-hail network, waters by drop-by-drop system. The orchard has Global Gap and company „Delta agrar", as a part of „Delta holding"invested 5 million euros in it. Cloche within concern „FARMAKOM M.B.", Šabac stretches on 4,2 ha, heats by thermal waters, while production process is completely covered by computer.

[14] Package „Knowledge Economy Indicators" (Knowledge Economy Indicators – KEI) encircles: 1) economic relieves and institutional regime (support to investments in information and communication technology, environment which courage entrepreneurship, which provides free knowledge flow, covers laws reign, protection of intellectual property, anti-corruption strife, 2) education, 3) efficient innovation system (network of research centers, universities, private enterprises), 4) information structure (from radio to internet). Source: Public Financial Support for Commercial Innovation, January 2006, World Bank, page 49

Table 2. Comparison of ECA countries according to KEI and four pillars of National Innovative System

Countries in region	KEI	Rang KEI	EIR	Rang EIR	I	Rang I	O	Rang O	II	Rang II
Slovenia EU	7.88	3	7.01	5	7.91	3	8.58	2	8.00	4
Hungary EU	7.01	8	6.42	10	7.00	9	7.65	10	6.98	11
Czech Republic EU	7.00	9	6.01	13	6.92	10	7.10	15	7.96	5
Poland EU	6.86	12	6.36	11	6.15	14	8.32	4	6.60	14
Slovakia EU	6.70	13	5.96	14	6.70	12	6.65	18	7.47	7
Croatia	6.22	14	4.31	18	7.12	7	6.55	19	6.91	12
BulgariaEU	6.19	15	6.05	12	5.94	17	6.73	17	6.03	15
Romania EU	5.27	17	4.37	17	5.20	21	5.60	25	5.93	16
Serbia	**4.55**	**22**	**2.15**	**25**	**5.17**	**22**	**5.93**	**23**	**4.94**	**20**
BH	3.02	28	2.62	24	1.02	30	4.00	30	4.45	21
Albania	2.99	29	2.66	23	1.65	28	4.81	28	2.82	27

Legend: Category ECA (Europe and Central Asia) encloses following 30 countries: Albania, Armenia, Byelorussia, BH, Bulgaria, Croatia, Czech, Estonia, Finland, Georgia, Greece, Hungary, Israel, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldavia, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Tajikistan, Turkey, Ukraine, Uzbekistan

KEI – Knowledge Economy Indicators, EIR – Economic stimulation and institutional regime, I – innovation, E – Education, II – Information infrastructure

Source: Financial Support for Commercial Innovation (Europe and Central Asia Knowledge Economy Study Part I); http://www.worldbank.org/eca/kestudy), January 2006, World Bank.

innovations efficiently. Out of 25 countries which belong to category of post-communist countries, the best concerning total evaluation of knowledge economy are Estonia, Slovenia and Lithuania, and the worst are Bosnia and Herzegovina, Albania and Tajikistan. Serbia is on 17th position according to knowledge economy total rank (KEI), and observed in accordance to individual indicators of knowledge economy, Serbia got the worst mark for indicator of economic stimulations and relieves, and the best for education (that mark ranks Serbia on 23rd position among 30 analyzed countries)[15].

Reasons for insufficient implementation of existing knowledge in practice and lack of strong connection of scientific research on faculties and institutes with agricultural practice (enterprises, individual farmers, cooperatives) are numerous and some of them are quoted below.

I Problems in the field of education and agro-economic science: Educational system (from secondary school to college education) is drafted in a way that young personnel, after finished education, get very little of practical skills. At the same time, although the needs for expert personnel (especially agro-economists, agronomists) are significant, the possibilities to get a job are small, regarding that agricultural cooperatives for a long time have not solved property status, and number of successful agricultural enterprises, institutes and other organizations where they could get a job, was insufficient. In development of agro-economic science, as some of the leading problems, the authors Ševarliæ and Tomiæ, see: several-decades-lasting absence of scientific papers of major domestic agro-economists in international journals, absence of any papers' review, and increasingly less proportion of micro-agro economic research etc.[16]

II Problems in work of research-developmental institutes: In research work, big problems are: 1) insufficient financial value of the research by the government (this problem has been partially lessen), 2) unsolved business offices for some institutes and insufficient investments of the state into business offices' supplying and objects' reconstruction, 3) insufficient applied research realized at the institutes. Exactly this third problem deserves special attention. Although is more and more criticism addressed to science in Serbia that it functions as activity with an end in itself (functioning only through projects financed by the authorized ministry), there should point out that the reasons do not „lie“ in insufficient engagement of institutes' management or insufficient number of professional and inventive researchers, but in numerous „chronic“ problems Serbian agriculture meets in last decades.

Taking into consideration following precaution (suggestion, reference) of the World Bank, although constructive and absolutely correct, should be taken with reserve and clear limits for appliance in our country. The World Bank clearly warns the countries of Central and East Europe that they lag behind developed countries in the field of investments in development and research, and simultaneously send them to undertake the steps toward conditions improvement for increased investments in *commercial innovations (so called, transforming research and development into market success*), which is crucial for achieving sustainable and long-term economic growth[17]. The experts of World Bank point out that, despite of numerous

[15] Ibidem, pp 49–57 http://siteresources.worldbank.org/INTECA/Resources/KE_Study_Final.pdf

[16] Ševarlić, Tomić (2008): „Development, condition and perspectives of agro-economic profession and science in Serbia“ in proceedings „Agro-economic science and profession in transition of education and agro-economy“, Faculty of Agriculture – University in Belgrade, 2008, pages 44–45.

[17] Public Financial Support for Commercial Innovation (Europe and Central Asia Knowledge Economy Study Part I), Januar 2006, World Bank.

researchers and successful education, which have been inherited from communism period, will be hard for Central and East Europe countries to convert their potential advantages in commercially successful innovations unless *universities and research institutions will not cooperate closely with private sector, i.e. unless research system restructure concerning adjustment to economy needs*[18].

III Systematic problems in functioning of agricultural consultative offices: Although the agricultural consultative office should deal with implementation of agrarian policy in practice and to represent direct connection between the state and farmers, „existing system of agricultural stations is not capable to provide qualitative service to producers, because of inadequate structure, lack of equipment and financial support of the state, as well as insufficient personnel capacity"[19].These problems of consultative office are still unsolved, and as the result is evident incompatibility in agricultural practice between number of experts in consultative offices (especially number of direct consultants) and total number of agricultural husbandries and arable land (see item 13). Besides, the problem also lies in fact that consultative office mostly provides advices about application of *bio-zoo-technological knowledge* in production (by performing demonstration experiments in plant and livestock production, by providing laboratory services etc.) to selected husbandries. The possibilities of ACO to provide advices on market trends of production and prices of agricultural products, measures and decrees of MAFWM of RS, to support farmers in creation of business plans, associations, introduction of standards and similar – are very limited and they do not reach major farmers.

What is *the significance of consulting role to husbandries*, and how it lacks confirm data of small rural household's survey in Serbia, which is under sponsorship of UNDP, conducted during December 2006. This research has shown that „the need for information and advices is high rated among all respondents", but acquaintance of that service among small rural households in Serbia had been discouraging, which had confirmed the data that only 8% of respondents had a contact with consultative office, more than 40% of households had non acquaintance that such service existed, 24% of respondents had a need for these services, but without any clue to get them[20].

Suggested solutions for new role of educational, scientific and consultative institutions in agriculture of Serbia

Due to increase of competitiveness and forming of more efficient agricultural sector, it is necessary to work on further improvement and construction of institutions in the field of agriculture, i.e. it is necessary to accede, as soon as possible, to reorganization of educational system, scientific and research-developmental institutes, as well as consultative offices.

Solutions in the field of education and agro economic sciences: In the field of education is necessary to finish reform according to Bologna Declaration, in order to form unique European educational system. Aiming to achieve future successful development of agro economic science in Serbia, the authors Ševarlić and Tomić[21] specifically point out: 1) a need for publishing the scientific papers of our agro economists in prestige international scientific journals, 2) need to cherish a critical relations of researchers toward actual agro economic practice, than collegial dialogue, especially is necessary to reaffirm reviews institute, 3) the need to increased engagement of agrarian economists in project realization for increase of agribusiness firms' competitiveness and their promotion on international market.

Solutions in the field of research –developmental institutes: In future period is important for scientific, professional and educational institutions to connect tightly and mutually (as in the country, as well as in the region), as well as intensifying their cooperation with governmental sector, especially with sector of economy and needs of entrepreneurs and investors. Therefore is necessary *higher proportion of micro-economic research in agriculture (so called, applied research).* These researches perform according to determined needs of farmers, processors and other groups or individuals, aiming to gain and apply new knowledge in process of agricultural production, turnover and placement of agricultural products.

The World Bank report in 2006 on governmental support to commercial innovations[22], leads Central and East Europe countries, as well as Middle Asian countries to stop spending their, already limited governmental resources, on archaic innovation systems and start to impel private firms to involve in that process, as it is in the West. Previously mentioned doesn't mean that the state should completely stop to finance the researches, but, when they set aside the assets for those

[18] Average participation of research and development costs in GDP in analyzed countries of Europe and Central Asia (out of 30 countries, only several belong to developed EU countries) is 0,9%, which is far below target rate EU of 3% (these countries should realize until 2010). Two third of research and development costs in these countries, mostly post-communist, is covered from governmental sources. Totally opposite, in countries with high participation of research and development costs in GDP, like Japan, USA, Sweden, Finland, Ireland, Germany – participation of private (industrial) research is from 65% to 70%, while the government set aside only about 20–30% of assets for these research. Ibidem, page 3.

[19] Development Strategy of Agriculture in Serbia, Official Gazette RS, No. 78/05, page 28.

[20] Bogdanov Natalija (2007): "Small rural households in Serbia and rural non-agricultural economy", UNDP, Belgrade, pages 143–144. This project was carried out in cooperation with MAFWM RS and Program of UN for development (UNDP), during 2006/2007. Targeting group of the project (terrain research) were small rural households with inactive developmental potential, which can be mobilized by making adequate conditions for diversification of activities and income.

[21] Ševarlić, Tomić (2008): „Development, condition and perspectives of agro-economic profession and science in Serbia"in proceedings „Agro-economic science and profession in transition of education and agro-economy", Faculty of Agriculture – University in Belgrade, 2008, pages 49–50.

[22] Public Financial Support for Commercial Innovation (Europe and Central Asia Knowledge Economy Study Part I), Januar 2006, World Bank.

purposes, the accent should be on private enterprises' research. The role of state is also indisputable and inevitable in conducting structural reforms in order investments and innovation to bring profit. If the country has a lack of institutional frame and innovative/information infrastructure, or lack of appropriate economic policies and incentives set, insufficient connection of scientific institutions with private sector, inadequate educational system etc., funds used for support to research and development, as well as innovations can be misspent.

Resolutions in the field of consultative function: There are necessary key reforms to agricultural consulting of RS, in order to provide for consulting to encircle as bigger as possible number of producers-farmers. Consolidation of consulting is expected through adoption of Law on Practicing Consulting and Professional Activities in the Field of Agriculture[23], through defining rules of agricultural offices work, through Rules on Conditions and Practicing the Consulting Services, agricultural producers etc. In future period is particularly expected to be defined which are consulting and which are professional activities, number of consultants, their license (mentors and consultants) and education, who can be consultant, which are constant income resources of consultants and similar.

Consulting will have its full role when it could be in possibility to offer to major users, not only scientific results of bio-technological, zoo-technological and agro-technological sciences, but also agro-economic sciences, or when it will be able to provide following advises:

- providing market information connected to realized production level and price of agricultural products in the country and surroundings,
- informing farmers on agrarian policy measures,
- providing marketing services, first of all support in placement of products,
- providing financial and legal services, especially supporting producers in making business plans and requirements for banking credits, education on possibility to finance by mortgage and other credits etc.,
- education on advantages and opportunities of interest joining in associations, cooperatives, clusters, etc.,
- Informing the farmers on sustainable agriculture and environment protection.

Solutions in the field of laboratory: Serbia still has not National Laboratory for Food Control, and neither exist a firm or laboratory which deals with biological means of plant protection, which is important for organic production. In future period will be necessary to rationalize the system of massive number of laboratories, by forming less number of national referential laboratories and regional laboratories.

Conclusion

Constant economic growth owes more and more to technical-technological innovations and, so called, knowledge economy. Transition of economy (and agriculture) of Serbia concerning more significant application of knowledge, innovations and new technologies – implies numerous reforms in sector of education, science, research-developmental institutions and consulting. In all these reforms, the role of state is crucial, but not only as a financier. The state has to provide primarily institutional and economic frame for development of education and science (creating the environment which encourages entrepreneurship, provides free circulation of knowledge, information, which provides laws rules, protection of intellectual property, supporting investments in information and communicational technology). The role of state is to adjust the educational system to needs of economy, too (research centers, universities and private enterprises network) and information infrastructure.

Creation of competitive and innovative sector of agriculture cannot be imagined without strong connection of public and private sector, without strong connection of the state, education, science, consultants and farmers. Full application of bio-technical, zoo-technical, agro-technical and agro-economical knowledge in whole reproduction chain (starting from quality control and cultivation, protection and nutrition of plants, to final sale and consumption) is a path to creation of qualitative and certified agricultural products, to higher export and increase of export incomes.

In accordance to Bologna Declaration, there is expected ending of education reforms in future period, the reform of consultative agricultural office, more tough connection of all science, profession and education institutions mutually (as in the country, as well as in the region), and also intensification of their cooperation with governmental sector, especially with economy sector and needs of entrepreneurs and investors.

Literature

Bogdanov Natalija (2007): „Mala ruralna domaæinstva u Srbiji i ruralna nepoljoprivredna ekonomija“, UNDP, Beograd.

Ivanović P. Srboljub i sar. (uređivački odbor) (1999.): 50 godina Instituta za ekonomiku poljoprivrede (1949-1999) Beograd.

Nacrt zakona o obavljanju savetodavnih i stručnih poslova u oblasti poljoprivrede

http://www.minpolj.sr.gov.yu/index.php?option=com_content&task=view&id=1207&Itemid=72

Public Financial Support for Commercial Innovation, Januar 2006, World Bank

[23] Bill on performing consulting and expert businesses in the field of agriculture primarily anticipates that agricultural consultant can do consulting according to licence and after being registered in the Registry of Agricultural Consultants.
http://www.minpolj.sr.gov.yu/index.php?option=com_content&task=view&id=1207&Itemid=72

http://siteresources.worldbank.org/INTECA/Resources/KE_Study_Final.pdf

Strategija razvoja poljoprivrede Srbije, Službeni glasnik R. Srbije broj 78/05.

Ševarlić, Tomić (2008): „Razvoj, stanje i perspektive agroekonomske struke i nauke u Srbiji“ u zborniku „Agroekonomska nauka i struka u tranziciji obrazovanja i agroprivrede“, Poljoprivredni fakultet Univerziteta u Beogradu, 2008

Uredba o uslovima i načinu korišćenja podsticajnih sredstava za podršku u sprovođenju poverenih poslova u poljoprivredi za 2009. godinu, („Službeni glasnik RS“, broj 20/09 i 45/09)

Uredba o utvrđivanju dugoročnog programa rada poljoprivredne službe na unapređenju poljoprivredne proizvodnje za period od 2009–2013. godine.

Ministarstvo prosvete R. Srbije;
http://www.mp.gov.rs/ustanove/skole.php

Ministarstvo za nauku i životnu sredinu

http://www.nauka.gov.rs/cir/images/stories/akreditacija/akreditovani_fakulteti_cir_16.pdf.

Pokrajinski sekretarijat za poljoprivredu, vodoprivredu i šumarstvo
http://www.psp.vojvodina.gov.rs/index.php?t=0&pid=8

Uprava za trezor, Ministarstvo finansija R. Srbije;
http://www.trezor.sr.gov.yu/rpg-statistika-cir.html