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**DEVELOPMENT OF HUMAN CAPITAL AS A TOOL FOR
IMPROVING PRODUCTIVITY OF AGRICULTURAL SECTOR –
CASE OF SERBIA**

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Abstract

New trends in global economy require greater capacity of the agricultural workforce. In order improve agricultural productivity it is needed to increase the level of human capital of the agrarian population. Human capital is accumulated knowledge, created in the long term process of human resources development, which begins in early stages and last all through the life, which is especially true for agricultural business. During transition Serbian economy went through major changes, with agriculture trailing to other sectors of the economy. Each farmer is producing only around 3,000 € gross added value per year, which is substantially lower than in other sectors. This paper will analyze what innovative activities are used worldwide in agriculture and give some possible solutions for investments in human capital and development of human resources in order to increase the level of competitiveness. Finally we analyze Serbian agricultural education system and give some instructions for improvements,

Key Words: agricultural sector, productivity, human capital, education, reform

Competitiveness in Agriculture

Enhanced productivity and increased levels of production in agriculture are needed in the current spike of economic crisis threatening global efforts to reduce poverty. Greater commercialization of agricultural systems and increasing trade liberalization dictate a need for greater capacity on the part of the agriculture workforce and rapid increase of productivity. Productivity is a synonym for competitiveness in agriculture and it can be increased by introduction of new knowledge, investments and growing efficiency of production.

Due to scarce statistical information from Serbian economy, in this paper we have used the change in gross value added as a tool to derive change in productivity. By using data of gross value added and the number of employees we have calculated gross values added per employee in different sectors of Serbian economy, as seen in table 1. Among lowest in nominal values, each employee in agriculture creates value added of around only 3,000€ per year. Productivity level in agriculture which initially increased in 2006 has rapidly fallen during two following years, so that average productivity dropped by 1% in agricultural sector over period of 4 years.

Table 1 – Gross yearly value added per employee at basic prices, 2005-2008 (in 2002. dinars)

Economic sector	2005	2006	2007	2008
<i>Agriculture, hunting and forestry; Fishing</i>	214133	252094	227250	206159
<i>Non-agricultural sectors</i>	329539	339635	350331	365840
Mining and quarrying	488943	543641	408924	517128
Manufacturing	330558	334807	348905	366830
Electricity, gas and water supply	583516	548184	598992	612064
Construction	208014	234356	250574	250538
<i>Services sectors</i>	454577	503835	555953	582177
Wholesale and retail trade	275337	303550	370533	375609
Hotels and restaurants	111109	96612	121144	111222
Transport, storage and communication	714353	932431	992672	1144137
Financial intermediation	1420798	1681166	1981359	2265165
Real estate, renting and business services	2108087	2184871	1767482	1820535
Other services	290254	295086	304676	308374
<i>Total</i>	364016	404019	426995	432713

Note: 1€ equals 60 dinars (in 2002 prices)

Source – own calculations according to Serbian Statistical Office

In Serbian economy there were significant changes during transition, which resulted, according to official data of Statistical Office of Republic of Serbia (2008) with share of agricultural sector in creation of gross value added to fall from initial 15.1% in the year 2002 to 11.5% in year 2008. Such results show that there is a need for change.

Global Innovative Activities

As noted before, modern agricultural business needs to adapt to changes on the global market in order to become more competitive. Efforts to increase productivity include innovations on several levels: policy, institutional, program and household level.

At **policy level** governments are required to promote educational systems that are open, flexible and capable to compete in current global economy. Three major trends are occurring in developed economies during last few decades.

First, a shift from public to private institutions (universities, advisory services and media) was promoted. In Serbia that is still not the case, because most institutions are still state owned. Global shift of power from public to private in agribusiness development, made governments worldwide to recognize private sector as important and establish close links with them as their primary partners.

Second, definitions of rural policy with their policies and programs have been evolving. Instead economies of scale firms today compete by giving more attention to quality, productivity, and flexibility to adapt to dynamic and diverse markets and rapidly changing technology. Schultz (1981) developed concept of human capital and found that US farmers had greatly increased output with less land, labor, and capital mainly by working smarter. Schultz also demonstrated that the returns to human capital were higher than the returns to physical capital.

Finally, increased importance of human capital brought institutional reforms. In EU the Common Agricultural Policy (CAP) has since adoption in 1992 undergone through enormous changes. Trade-related concerns have been highly influential in this ongoing reform process with other factors also helping change the CAP in a second way, with the CAP now embracing a wider range of goals and instruments. The positive approach and its emphasis on jointness implies that multifunctional policy goals can be achieved through policies aligned directly with farming activities (Ramniceanu, Ackrill 2007).

At **institutional level**, agricultural education “system” institutions must continue adapting to the changing environment and needs of the sector. That can be made by a better fit between the supply of trained workforce and a demand that is constantly changing; flexible approach to occupational profile of trainees, to cater to the needs of a changing and advanced technology; placing emphasis on training for productivity improvement; and finally on reform in the infrastructure of educational and training institutions and programs, especially as regards their relevance to a changing world and their effectiveness in it (Rivera & Alex, 2002). On the same time firms and individuals have only two basic choices in increasing competitiveness: lower costs, mainly wages; or increased value added over increased human capital (Marshall 2001).

At **program level** there are several innovations required. Program sustainability implies to the fact that education at extensions, media, formal and non-formal courses does not last forever. After its completion, it is necessary to provide monitoring and evaluation which will focus on results and client satisfaction. In that way it will be possible to measure the effectiveness of education and training made in the past. Development oriented training should go beyond the teaching of research and extension staff and management. Basic education must include elements of new technologies like biotechnology, e-technology and others, which cover managerial issues, risk management and market requirements. These varied educational areas will eventually lead to wider knowledge of agricultural workforce, so enabling them to understand how to become competitive on the market.

At **household level** the incentive of a rural household to change its farm organization is determined by the trade-off cost and expenses characterizing each of the farm types. For example, the advantages of individual farming include lower transaction costs associated with reduced inefficiencies. Unlike that, mass farming organizations may

achieve economies of scale in risk management, input purchasing and marketing. Leaving collective has its 'entry costs' to start up an individual farm. These costs are affected by institutional reforms and market liberalization processes.

While the role of capital market imperfections during transition has been well recognized, no study formally models or empirically estimates the impact of human capital on the agrarian structure in transition economies. An improved understanding of the impact of heterogeneity of economic agents on the agrarian structure would allow the design of policies that enhance both farm efficiency and regional development.

In general all four levels of innovations include improvement of human capital. To be able to correctly and efficiently organize development of agrarian human resources, we have to look at the structure of workforce and educational systems.

Sources of knowledge in agriculture

Since Becker (1964) and Drucker (1968) researches, knowledge is recognized as a fourth economic pillar alongside those of land, labor, and capital. In a knowledge economy, resources such as skills, expertise, and intellectual acumen are often more critical than other economic resources such as land and labor and even capital, because it is difficult to measure its levels.

Increase of productivity based entirely on reduction of workforce and lower wages, which has often been the case in transition countries, is not sustainable in the long term. For that reason we will target on increase of human capital levels as a tool for increase of productivity. Human capital determines farming and, in general, managerial skills of rural households. Workforce in agriculture may be divided in four major categories. They include:

- workforce currently employed in agriculture
- self-employed or working on farms
- workforce preparing to enter the workforce and
- workforce in transition from one agricultural job in farming or support services to another.

According to Rivera (1998) the entire above named agricultural workforce is educated through a variety of educational systems, and they are:

- Formal agricultural education, science, and technology system of curricula provided by mainstream education institutions
- Non-formal agricultural and extension education system of programs provided to farmers and rural audiences through knowledge-transfer services
- In-service training and development system of programs provided by private organizations and public agencies for their employees

- Mass-media/distance learning system that provides an independent and continuous supply of information

Such division of labor and educational systems in agriculture served to Rivera and Alex (2008) to create framework of the process of creation of human capital in agricultural systems, which is presented in Table 2.

Table 2 – Sources of knowledge for different workforce in agriculture

		Sources of knowledge			
		Schools	Extension Services	In-Service Training	Mass Media and Distance Learning
Categories of Agricultural	Unemployed	Curricula and programs	Special youth programs		
	Farmers		Advisory and training programs	Market	Rural magazines Tele-centers
	Institutional Support Personnel		Training for private extension personnel	Agricultural in-service training and study tours	Distance learning and certificate programs
	People in transition	Adult education Vocational skills development			Distance learning and certificate programs

Source: Adapted to Rivera and Alex (2008)

Each educational knowledge source needs to remain vigorous, but at the same time it is important in these knowledge and information providers to develop networks and linkages. Agricultural schools have their programs, universities have their curricula, but it is not enough to complete school to be competitive. Education is a life long process which needs to be continued outside of formal education and training systems, through private and public workforce organizations (i.e., the shadow education system), and the non-formal educational support programs-such as the acquisition and transmission of rural knowledge and innovation.

Training is important to build individual capacity to operate effectively within the sector as well as to build specific capacity in individuals to further organizational objectives. For the latter, training must align with an organization's goals in the form of development-oriented training, not ad hoc or survival-type training (Gooderham & Lund, 1992). Agricultural education and training institutions need to extend their curricula by

developing courses that in addition to agricultural production provide relevant education and training in areas such as agricultural business, farm management, entrepreneurship, marketing, organizational skills and knowledge, management, and program development. This is a new concept which tends not only to create agricultural specialists. It rather makes a trend where completed agricultural scholars are able to participate on the market, be productive and have entrepreneurial initiative.

Serbian Case

Serbian agricultural educational system is organized in a set of agricultural schools and faculties. Complete educational system is under supervision of Ministry of Agriculture which is responsible for formulation and implementation of educational programs. Unfortunately there is no clear strategy which would define curricula that would connect formal education and real market needs in agriculture. Curricula in secondary and tertiary educational institutions need to change and include subjects that cover market needs like management, planning, trade and marketing. It is also crucial to introduce environmental courses and integrate them with contemporary knowledge in informational technologies, social sciences and humanities.

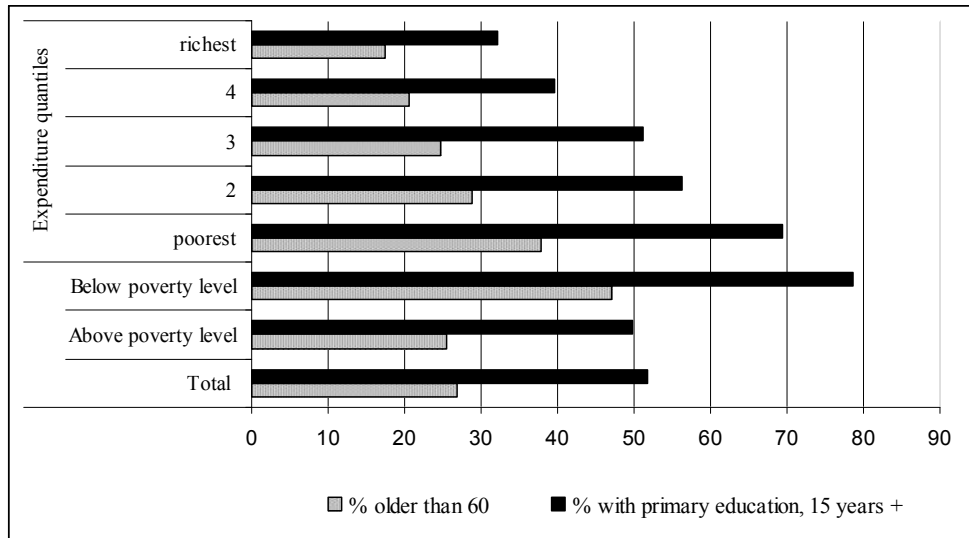
Agricultural schools in Serbia are mostly oriented on education and training of agricultural technicians, low level managers in agricultural companies and for public services. Most of the land is, however, harvested by small family farms. It is needed to adapt educational programs in schools to serve private agricultural sector. Most of the countries in transition have already successfully implemented the change, and Serbia may use their positive and negative experiences for overcoming its own market failures. More attention has to be placed on agriculture management and practical skills. It is necessary to build such an educational system that will satisfy the needs of modern market economy and perform a scanning of complete agricultural educational system, and moreover, as noted before, allow privately owned schools in this sector (Government of Serbia 2005).

According to Ministry of Agriculture (2004) most important for human capital are employees' qualification structure and the level of knowledge they have. Qualification structure of productive workers in Serbia is adapted to mass production, which is inherited from the socialism period, instead to specialist production which requires higher level of competences and continuous training. Despite global reforms in education, there are no indications that there is a planned concept of education and specialist training of rural population.

According to 1998 census of population, nearly half of Serbian population is living in rural areas. Compared to previous censuses younger population is moving from rural to urban areas. In graph 1 we can see the level of human capital amongst rural population. It is visible that population belonging to lower level expenditure

quintiles are mostly older than 60 years of age and have only primary education or less. This proves the necessity of making efforts to increase education level, especially training and lifelong learning for adult population.

Graph 1 – Human potential of rural families, by expenditure quintiles



Source: Serbian Statistical Office (2008, pg 145)

Efforts made by governmental and non-government organizations to perform fundamental changes in complete educational system should as the effect make balance on the level of quality of education in rural and urban areas. Increased quality of education should support the process of sustainable rural development and suitable for urban population. During transition in Serbia, there is a significant decrease of industrial production, companies are going bankrupt, which as a result decrease of employment of rural population who were not involved in agricultural operations. Attention has to be made on orientation to market needs, shift from industrial to agricultural production, and stimulation of education and training and adoption of new competencies of unemployed population.

Conclusions

Training and education is a life-long process. For that reason we must look at all levels of that process, from policy makers to households. We must understand that changes in education program and holding seminars for improvements in food industry are not sufficient. Education is required for a person to be well organized in food industry, but not enough for the knowledge to be applied efficiently. Training in house is essential for enhancing acceptability of education, followed by a wide span of other knowledge sources.

Centralized and authoritarian approach to education, which was present during last few decades, has to be the core of reforms, allowing private capital to enter and improve its quality. Current reforms in agricultural schools have to lean on curricula which combines teaching and practical training of local farmers, and especially on continuous education of elderly population. An accent has to be placed on solving high unemployment levels among rural population, with reorientation of human resources by offering them several training programs that would help increase productivity of agrarian sector which is at present trailing in Serbian economy.

Low levels of human capital in agrarian sector, with over 50% of rural population having only primary education or less are the key reason for low productivity and weak competitiveness of the sector. Urgent institutional reforms are crucial for agrarian sector to achieve sustainability in the long term, and not become the black hole of Serbian economy.

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