APSTRACT

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Contents

Editors' welcome

Welcome to numbers 3 and 4 of the 4th volume of Applied Studies in Agribusiness and Commerce (APSTRACT). This Official Periodical of the International MBA Network in Agribusiness and Commerce (AGRIMBA) has been established to provide an opportunity for publication of reviewed papers presenting original research findings, techniques and comments dealing with all aspects of the agribusiness and commerce. Subjects considered appropriate for publication in the APSTRACT include scientific papers, PhD and MBA dissertation summaries, MBA international news, interim reports of AGRIMBA and reviews. The APSTRACT provides timely communication of results of basic and applied research, as well as reviews and syntheses of information, principles, conclusions, and interpretations on key issues of agribusiness and commerce. It encourages publication of reports and summaries on the findings and conclusions of PHD and MBA studies conducted by students of International MBA Network.

In this number selected papers of 113th EAAE Seminar "THE ROLE OF KNOWLEDGE, INNOVATION AND HUMAN CAPITAL IN MULTIFUNCTIONAL AGRICULTURE AND TERRITORIAL RURAL DEVELOPMENT" are also presented. The well defined mission of the Seminar was to promote partnerships between research communities and strengthen the contribution of research to economics growth, food security, and sustainable development by providing an international platform for strategic dialogue among stakeholders. EAAE Seminar was held on 9th – 11th December 2009 in Belgrade, Serbia and studied territorial competitiveness, factors of development and the role of agriculture in rural area. Role of human and social capital in building up agro-regional identity, institutional reform and competitiveness were considered and studied the role of innovations and knowledge infrastructure. The Seminar has encouraged activities in management and investment in human capital, extension and agricultural R&D activities and monitored the progress made in the knowledge triangle - research, education and innovation - which are core factors in European efforts to meet the ambitious Lisbon goals in Balkan region. R&D is particularly important to improve the ability of countries to address their social, economic, environmental and management challenges for the future.

In order to create a publication series that is widely read and cited, board of editors, including guest editors Prof. Zorica Vasiljevic and Prof. Danilo Tomic have considered manuscripts of any reasonable length in a range of categories from brief technical comments to monographs, as described in the Instructions to Authors. Manuscripts were judged on the basis of their scientific competence, their contribution of original data, ideas and interpretation, and the degree to which new findings are integrated with existing knowledge and technology.

Debrecen, 30th of May 2010.

Editors

ROLE OF INNOVATIONS AND KNOWLEDGE – INFRASTRUCTURE AND INSTITUTIONS

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Abstract: There is a well known saying: Research converts money into knowledge, innovation converts knowledge into money.

The knowledge-based economy has four pillars: innovation, education, the economic and institutional regime, and information infrastructure. Transformation towards a knowledge-based economy will necessarily shift the proportion and growth of national income derived from knowledge-based industries, the percentage of the workforce employed in knowledge-based jobs and the ratio of firms using technology to innovate. Progress towards a knowledge-based economy will be driven by four elements: human capital development, knowledge generation and exploitation (R&D), knowledge infrastructure. Increased investment in these four areas will certainly have an impact. National experience, however, suggests that an incremental approach will not work. Nations that have achieved accelerated growth in outputs and capabilities have acted decisively, targeting investments in areas of strategic opportunity. The organizational and infrastructural improvement of research requires supranational cooperation and the promotion of the free movement of knowledge. Therefore, the EU decision on the establishment of the European Institute of Innovation and Technology (EIT), which ensures that the GDP proportion for research and development (R&D) shall achieve 3% stipulated by member states in the long run, is particularly welcome.

Key words: Innovation, knowledge, infrastructure, institutions

Introduction

The concept of innovation has been interpreted in several ways. Its generally accepted definition by the World Bank is the following: the use of new ideas, new technologies or new ways of doing things in a place or by people where they have not been used before.

A related saying from the last century states that research converts money into knowledge – i.e. a body of knowledge, and innovation converts knowledge into money again. *Figure 1.* presents the structure of traditional innovation models.

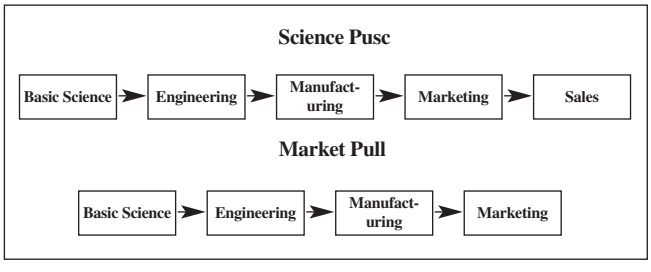


Figure 1. Traditional models of innovation

The first step of knowledge-generated innovation is basic research, which is manifested, through applied research activities and engineering design, in concrete products or services. Marketing tools can support the distribution of these concrete products or services for the general public, thus new products and services are passed on to the end user.

The traditional innovation model has a marketing-induced variant as well. In this case, improvement is generated by market demands and new products reach consumers after the production process.

In the 90s, the above mentioned characteristic separation of innovation models was replaced by the so-called coupling model of innovation which came into the limelight. The concept of this model is that research from beneath and market demand from above exert a simultaneous effect on the realization of new products and services. This is illustrated by *Figure 2*.

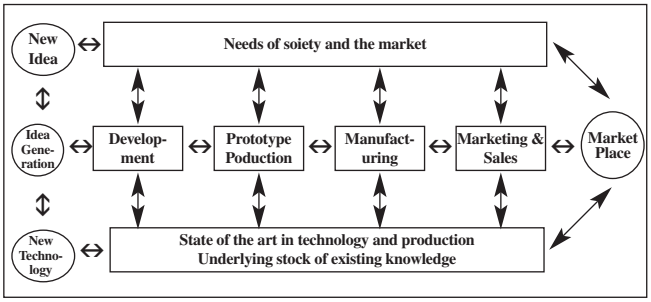
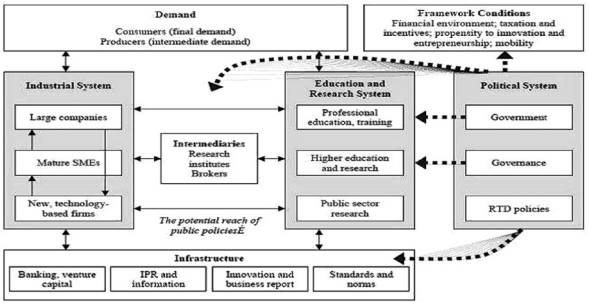


Figure 2. Coupling model of innovation

The national model has been introduced by the innovation theories of the XXI. century, as it is illustrated on *Figure 3.* This model suggests that not only research and markets generate demand for new products and services, but also the actors of national economy receive increasingly significant roles. It can be fundamentally stated that innovation is

demand-oriented, by this is meant demands generated by buyers and producers. However, demand and conditions for innovation provided by the country also play significant roles. Preferential taxation, support, the promotion of entrepreneurship and mobility are priorities. *(Figure 3.)*



Source: Erik Arnold and Stefan Kuhlman, *RCN in the Norwegian Research and Innovation System*, Background Report No 12 in the Evaluation of the Research Council of Norway, Oslo: Royal Norwegian Ministry for Education, Research and Church Affairs, 2001. Also available at www.technopolis-group.com

Figure 3. A National Innovation System model

Political regimes can indirectly promote innovation through their own infrastructure, and thus financial institutions, international investors, highly sophisticated and controlled information flow, e.g. the publication of open invitations to tenders, patents, innovations and their compliance with national and international standards can play key roles.

Politics can promote innovation not only through the instruments of its infrastructure, but directly or indirectly on governmental level. Its own research network, education system, especially in higher education induce the generation of demands for new products on one hand; on the other hand, they gear the assessment of market demands.

Practically, institutions of higher education and research represent an intermediate stage for industry and agriculture implementing innovation activities, for existing SMEs and large enterprises.

As a new element in our century, plenty of new companies are set up in order to exploit the research findings of innovation. These are called start-up or spin-off enterprises in daily practice.

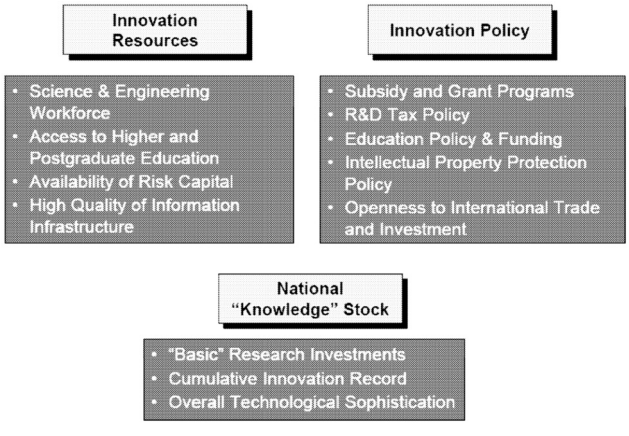


Figure 4. The Innovation Infrastructure
Source: Scott Stern 2005

While innovation and knowledge can provide joint support merely for the creation of patents and innovations, infrastructure and organization forms can incite and support actual realization, implementation. *Figure 4.* shows the key elements of innovation infrastructure. The resources of innovation are based on fundamental and applied research resources, higher education and continuing training, primarily on invested capital and on the essentially significant structure of information worldwide.

Resources can be supported or inhibited by the innovation policy of current governments. These resources also include positive elements such as scholarship, research support, beneficial tax policy in relation to research development, state support for education, protection of patients and innovations stipulated by laws and also an open attitude by governments towards international "innovation trade" and investment. Innovation resources and innovation policy develop an international knowledge base jointly and it is measurable in basic research findings, cumulative innovation reports and the technological development level of a given nation.

Therefore, a knowledge based economy has four main pillars: 1. innovation, 2. education, 3. economic and organizational regime, 4. information infrastructure. Today innovation has accelerated inconceivably. New products and services, based on previous investments, have improved the knowledge base, especially in the area of chemistry, biology, space and nuclear research by an unprecedented, fast and extensive information and technological explosion. Naturally, various countries will improve and introduce innovation to different degrees.

In Hungary, innovation is based on 3 key pillars. Besides innovative enterprises, universities and research institutions play fundamental roles in this area. Our findings indicate that in EU countries and therefore in Hungary the process of innovation is to be concentrated in some larger regional centres. These knowledge centres shall also be competitive on the global market. In Hungary, besides 5–6 highlighted research universities which have already proved their competitiveness by international standards, the existence of 2–3 institutions per region for vocational and tertiary training is appropriate to present and disseminate the application of innovations. The relation of innovation and higher education is demonstrated in a survey by OECD, MSTI in 2006. *Figure 5.* shows the relation between Business Expenditure on R&D (BERD) as a proportion of GDP and Higher Education Expenditure on R&D (HERD) as a proportion of GDP.

Relation between Business Expenditure on R&D (BERD) as a proportion of GDP and Higher Education Expenditure on R&D (HERD) as a proportion of GDP.

Figure 5. clearly presents that developing countries, together with some ex-COMECON nations are on the bottom left part, also including a rich country such as Italy.

In the middle general part we can see EU and OECD countries, while countries of high level R&D are in the right upper section. Generally, a higher amount of money is coupled with higher level R&D generated by industries.

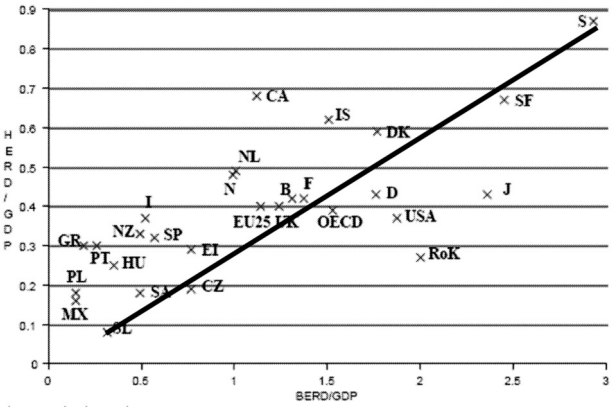


Figure 5. HERD/GDP vs BERD/GDP
Source: OECD, MSTI 2006

Figure 6 demonstrates the correlation between the economic wealth of nations and their "citation intensity". The graph shows the ratio of citations per unit (person) versus per capita GDP for the 31 nations. Wealth intensity is given in thousands of US dollars at 1995 purchasing-power parity.

The correlation is similar to data on *Figure 5*. Also, northern states, such as Finland, Sweden, Denmark and the Netherlands are highlighted in citation intensity while developing countries are placed in the bottom left third of the graph.

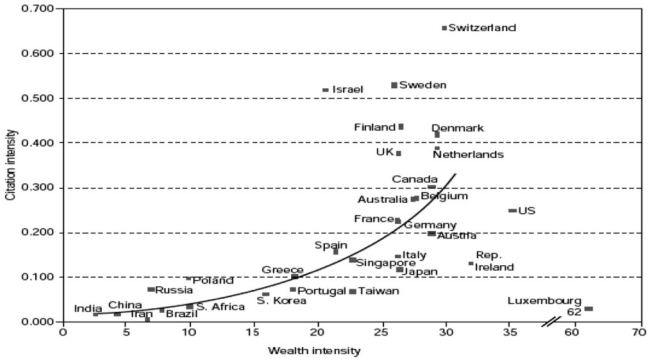


Figure 6. Link between citation and wealth intensities
Sources: Thomson ISI, OECD and the World Bank

What does this correlation suggest? Innovation and knowledge base are successful if the related organization and infrastructure are available and countries support fundamental research and the dissemination of research findings with extensive resources in national or international cooperation.

Solution on EU level

The regulation of the European Parliament and the European Council states the significance of generating a new, community level initiative to complement national policies and to promote the integration of higher education, research and innovation in the European Union.

This new institution is the European Institute of Innovation and Technology; **EIT.** The organization aims to strengthen the innovation potentials of members states and the community and thus to contribute to sustainable European economic growth and competitiveness. All this is implemented by promoting and integrating high-quality higher education, research and innovation. Under this regulation, the task of the European Institute of Innovation and Technology is to cope with long-term challenges emerging in the EU, with especial regard to trans – and /or interdisciplinary areas. It also seeks to promote periodical dialogues with civil society. Furthermore, its key task is to place higher education, research and innovation activities in business context and to promote their application in industrial areas, to establish and to support starting enterprises and utilizing spin-off enterprises.

The European Institute of Innovation and Technology (EIT) prepares a 7-year innovation plan by 30 June 2011 at the latest and then one every 7 years and submits them to the Committee. The innovation plan identifies long term priority areas for the EIT and includes an evaluation on the social-economic impacts and potentials related to added value production. The establishment of the organization has been a significant milestone in the fifth-freedom rights, namely in the implementation of the free movement of knowledge. Its operation contributes to the boost of EU research and development, rectifies deficiencies of private financing and approximates the GDP proportion of 3% stipulated by member states for R&D.

EIT (European Institute of Innovation and Technology) is a worldwide, significant milestone in the dissemination of knowledge-based innovation among nations and is the infrastructure for the dissemination of innovation results.

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

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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: Agriculture of Serbia, System of education, Research-developmental institutes

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
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[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.

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REGIONAL IDENTITY IN RURAL DEVELOPMENT: THREE CASE STUDIES OF REGIONAL BRANDING

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Abstract: Within the globalizing world, regions and their identities are subjected to great pressure. At present, places are engaged in a process of "territorial competition" in an integrated world economy. The identity of the region can be used as a starting point to brand a region and differentiate it from others. In the regional branding process, the region as a whole becomes a product or brand and offers a "basket" of regional products and services. Regional branding is aimed at creating a more distinctive image or reputation, which helps to increase regional competitiveness. This paper discusses the possibility of regional identity as a mobilizing force for rural development, by studying best practice examples of regional branding. Using the grounded theory approach, we conducted interviews in three case regions: West Cork (Ireland), Groene Woud (the Netherlands) and Pajottenland (Belgium). The study of these cases led to the formulation of critical success factors on the organization of regional branding. Comparative analysis of the cases demonstrates the importance of passionate initiators as ambassadors of the region and the advantage of a well-coordinated internal network in the region. Next to that, the internal marketing of the region is considered an important critical success factors

Key words: regional identity, regional branding, rural development

1. Introduction

Globalization processes expose most parts of the world to similar influences (*Simon,* 2004). As a consequence, people and companies are less bound to a particular region. The "pull to sameness", leading to convergence (*Taylor* 1999: 162), loosens traditional cultural boundaries and lifestyles and results in "uniformization". Regional identity becomes threatened. People may start to feel insecure as their traditional cultural underpinning weakens.

This cultural insecurity leads people to look for recognizable points of reference in their own surroundings. Differences between regions are emphasized, and region-specific features, such as scenery, regional products or cultural-historic heritage, are assigned more value and used to fix identity. These "forces making for difference" (*Taylor* 1999: 162), which lead to divergence, return the processes of globalization to place-specific forms. In this way, globalization and localization are not opposite, but rather part of the same development: glocalization. (*Simon,* 2004). Glocalization results in a shift of focus to the regions, and a regional approach to politics, science and society (*Wiskerke,* 2007).

Rural areas share these trends of globalization and localization, particularly in the agricultural sector. Globalization, coupled with modernization, has created specialized, integrated and larger-scale agricultural enterprises. Modernization processes in the agricultural sector have consequences on the economy (e.g., oversupply, cutback of internal market instruments), ecology (e.g., nitrate surpluses and pesticide residues) and the social sphere (e.g., isolation, bad image). These side-effects of modernization put pressure on modern agriculture (Van *Huylenbroeck,* 2006). Modernization has also resulted in rural restructuring: there is a transformation from an economy centered on agriculture and manufacturing to a more service-centered economy, and likewise from production to consumption (*Floysand* and *Jakobsen,* 2007).

Localization is the rural inhabitants' response to modern agriculture and the changing needs and expectations of society. Place of origin is becoming more prominent, as seen from labels like Protected Denomination of Origin (PDO) and Protected Geographical Indication (PGI) (*de Roest* and *Menghi,* 2000). More and more regional products and rural tourism arrangements are entering the market. In newly emerging approaches to rural development, the region is seen as the level of integration and identity takes a central theme (Leader+, 2008).

1.1. Identity and region formation

Identity is part of the institutionalization of regions, the process through which regions come into being (*Paasi,* 2002). The concept of identity is ambiguous and dynamic.

Kruit et al (2004), and *Ernste* (2005) indicate that identity is a multi-complex concept that is difficult to grasp. It also relates to an abundance of topics. Spatial identity must relate to the individual's personal identity, and it is a social construct as well. People attribute "meaning" to the observed characteristics of a place, making the environment more than just a random collection of physical and material elements. They identify themselves with a certain area, not only with the landscape, but with a whole set that encompasses culture, sociality, morality, tradition and the social system specific to that region (*Raagmaa,* 2001). Identity is not the same as the history or biography of a region, nor is it tradition or folklore (*Ernste,* 2005). It is a dynamic concept, subject to ongoing social processes.

Paasi (2002, 2003) differentiates between the "identity of a region" and "regional identity". The identity of a region refers to those distinguishing physical, cultural and historical features that make one region different from another. Regional identity (or regional consciousness) refers to the extent to which people identify themselves with the region as the whole of institutionalized practices, discourses and symbols. While these exist simultaneously as part of the process of social reproduction, this distinction helps us to understand and analyze both the structure and power elements hidden in discourses on regional identity and individual regional consciousness (*Paasi,* 2002).

As mentioned above, identity is closely interrelated with region formation, and the rise of regional identity must be seen in the broader context of region formation (*Simon,* 2004). There are two major perspectives regarding the formation of regions: a structurally oriented perspective and an agency-oriented perspective. In structurally oriented perspectives, the rise of the region is considered to be a logical outcome of broader trends and pervasive developments, such as globalization, flexibility of production, state restructuring, and urban expansion (*Lagendijk,* 2007). In agency-oriented or social-constructivist perspectives, regions are seen as social constructs, defining and shaping themselves as part of, and through, different social and discursive practices (*Lagendijk,* 2006). *Paasi* (2002), one of the founders of the constructivist approach, describes region formation as a process of institutionalization. Here, institutionalization is the outcome of four simultaneous and interconnected working forces: i) territorial, ii) institutional and iii) symbolic shaping, and iv) internal and external recognition or identification.

Lagendijk (2007) facilitates study of the construction of regional identities by linking both structurally and agency-oriented perspectives together in a framework. This linkage is seen as part of an evolutionary process in which the region first becomes privileged, then achieves coherence once institutionalized. It begins with a limited set of pervasive economic, political or social driving forces creating some "windows of change" (structurally oriented perspectives). These various windows are then converted or translated into specific forms of policy-making, as well as practices and performances at both the individual and organizational levels. Finally, these "new" practices and ways of policy-making become regularized and institutionalized in new forms of regional governance (agency-oriented perspectives). Once regions have a recognized position, they receive an established role in the territorial structure, and thus have a regional identity.

1.2. Regional branding

Places are currently in "territorial competition" in the context of a world economy that is becoming more and more integrated (*Hospers,* 2004). Although many places offer the same "product" – territory, infrastructure, educated people, and an almost identical system of governance – they must compete with each other for investment, tourism, residents and political power, often on a global scale. To stand out from the crowd and capture significant mind- and market share, place branding has become essential (*van Ham,* 2008). Place branding or place marketing is a promotional strategy that includes all activities that increase the attractiveness of an area as a place for working, living and spending free time (*van Ham,* 2001). Place branding can be applied in cities or countries, and it can also be adapted to regions. Regional branding is aimed at creating a more distinctive image or reputation, which helps to increase regional competitiveness (*Maessen* et al., 2008). Regional branding markets the qualities of the region in the broadest sense: landscape, nature, cultural heritage, regional products, regional gastronomy, traditional quality products, and so forth (de *Bruin,* 2008). In regional branding initiatives, the identity of the region and the regional identity, as defined by *Paasi* (2002, 2003) serve as a basis for the regional brand or mark used to promote the region (*Sonneveld,* 2007). Regional branding stimulates the regional economy, creates added value for the regional products and services, and can break through existing restrictions of sector-oriented approaches to rural development (*Hegger,* 2007).

As mentioned above, the countryside has experienced a transformation from production and consumption and has become a commodity that can be bought and sold (*Floysand* and *Jakobsen,* 2007, *Kneafsey* et al., 2001). Regional branding rides this trend of "commodification". Regional branding goes beyond commodification and can be equated with mode IV of the culture economy, a concept developed by *Ray* (1998) and adopted by *Kneafsey* et al. (2001). In the cultural economy approach, cultural identity is used to attempt to localize economic control in order to (re)valorize place. Culture economy includes those strategies to transform the local knowledge into resources available for the local territory, i.e., the recognition (or construction) and valorization of local knowledge (*Ray,* 1998). The culture economy model has four modes. Mode I can be compared with the commoditization put forward by Floysand and *Jakobsen* (2007) and *Kneafsey* et al. (2001), among others. Mode II activities emphasize the incorporation of cultural resources into a territorial identity in order to promote the territory to the "outside" (*Kneafsey,* 2000). In Mode III, the

territorial initiative sells itself internally, to the communities, businesses, groups and official bodies of the local area. Mode IV, which emphasizes the normative capacity of the culture economy, can operate within each of the other three modes. Mode IV suggests that a local economy, during re-examination of the territory's indigenous culture, may choose to pursue "alternative" development paths (*Ray,* 1998). The local culture then becomes more than an instrument to fuel trade in the global economy, and instead is rediscovered as the source of local wisdom and ethics. Both internal and external selling of the region are enclosed in Mode IV.

Lee et al. (2005) state that the internal marketing of the region to itself, as a part of regional branding, is a way of creating social capital. Social capital – with respect to rural development processes – could be defined as the capacity to get things done collectively. It is embodied in the ability of individuals, groups, organizations and institutions to engage in networks, to cooperate, employ and use social relations for common purpose and benefit (*Tisenkopf* et al., 2008). When a region markets itself internally, a stronger sense of shared identity emerges, which fosters trust and cooperation that can be mobilized for developmental benefits (*Ray,* 1998).

2. Material and methods

The aim of the current research is to discover the factors that create success and failure in regional branding processes, to understand how these processes take place, and to map the complexity of the matter. Because the research question stated above expects qualitative answers based on subjective data, case analysis has been based on the grounded theory approach. Grounded theory involves a consequential induction from empirically collected data in order to build theoretical frameworks. These empirical data, in the form of transcripts of semi-structured interviews, are analyzed through the process of coding (*Strauss* and *Corbin,* 1998). The central concepts that form the basis for a theoretical framework are derived from relating and abstracting the data categories (*Devillé,* 2008). The collection and analysis happens simultaneously, and the theory developed should explain most parts of the process studied. One important aspect is constant comparison, which implies comparing data from different respondents, comparing data with the category and comparing a category with other categories (*Charmaz,* 2000). Analytic interpretations of data, developed throughout the research process, are used to inform and refine the developing theoretical analysis.

Empirical data collection in this research is done through the method of purposeful or theoretical sampling, which involves searching for information-rich data (*Baxter* and *Eyles,* 1997). The cases are selected based on their suitability for illuminating and extending relationships and logic among constructs (*Eisenhardt & Graebner,* 2007). Sample size is determined by the need to involve as many experiences as possible for the development of the conceptual framework, and saturation occurs when no new themes emerge. This research includes all stages of the regional branding process, from the very beginning to the mature stage. The criteria were formulated, and the cases selected, to cover different stages of this process and to ensure informative results *(Table 1).*

Table 1: Criteria for case selection

	West Cork	Groene Woud	Pajottenland
Way identity is perceived and used	++	+/-	+
Development of the region	+	+/-	-
Stage of the branding process	Mature	Intermediate	Very beginning

Research began by contacting and interviewing key informants of the region. These key informants then referred to other possible interviewees (snowball sampling), which could be farmers, entrepreneurs, local guides, mayors, chairmen of local societies, teachers, and the like. Topics of the interviews were the region, the region's agriculture, regional development and regional branding processes. The international cases, namely West Cork and Groene Woud, served as exploratory case studies. These regions were examined on-site during one week each. Factors of success and failure of these cases are then verified in the Belgian case study, Pajottenland. This region, which started only recently with a regional branding process, can be observed in detail due to its close proximity.

3. Results and discussion

3.1. Regional branding process in West Cork

West Cork is the southern region of Ireland, with Cork as its capital. It is a rural area of 320,000 hectares of mainly grassland, has mountainous scenery, and is surrounded by the sea. Other distinguishable characteristics are small villages with colored houses and fuchsia hedges that border narrow meandering roads. Many people from outside the region have chosen to live and work in West Cork in order to improve their quality of life. These "outsiders" pointed out some unique regional advantages to the original inhabitants. The passion and pride of the inhabitants for the region and its food products emerged out of conversations with various inhabitants. The peripheral location of West Cork impedes access to external markets, but on the other hand, it contributes to a more pronounced regional identity and collaboration among the inhabitants. Many respondents stressed the importance of the connection with the soil and the awareness of the food they are consuming. In this regard, small-scale family farms that provide genuine food make a substantial contribution to the territorial identity.

Like the rest of Ireland, West Cork has been receiving European support for rural development since 1992. The West Cork Leader Co-operative Society started in 1995 to

use the unique image and identity of the West Cork region as the key driver of the rural development strategy of the region. The basis of the regional branding strategy, the Fuchsia brand, is seen to assist broader development, rather than as a mere marketing strategy. Through images (calendars, posters, brochures, and the like) the Leader Co-operative raises the inhabitants' awareness of the exclusive qualities of the region. The Leader co-operative, a project agency with seven young and dynamic staff members with a private-sector ethos, now co-ordinates the development process as well as the branding process. Their European and national funds are spent on wages of the staff of the Leader Co-operative, communication of the brand and the branding concept, and capital investment in individual entrepreneurial projects. These entrepreneurs can be farmers, artists, hotelkeepers, restaurant owners, retailers, and so forth.

3.2. Regional branding process in Het Groene Woud

Het Groene Woud is a rural area of 35,000 hectares located between three Dutch cities: 's Hertogenbosch, Tilburg and Eindhoven. The very flat landscape is characterized by small agricultural parcels framed by lines of poplars and a few nature reserves. The core of the region consists of 7,500 hectares of forests, swamps, heath, and agrarian landscapes. Typical to the area are picturesque villages with small chapels. Het Groene Woud was only named in 2005, when the area was recognized as a "National Landscape". A National Landscape is an area in the Netherlands that has a unique combination of agricultural area, nature and cultural heritage. A couple of entrepreneurs started the branding process of Het Groene Woud as a reaction against the increasing influence of the green movement, which was found to be threatening. One of the interviewees mentioned that "the P of profit deserves as much attention as Planet and People". In 2005, a group of these entrepreneurs traveled to West Cork in Ireland to learn from a region more experienced in region branding.

The interviews with the inhabitants of Het Groene Woud did not give evidence of much intrinsic passion for the region, nor of regional pride. This probably has to do with the recent, rather artificial demarcation and recognition of the region as "National Landscape Het Groene Woud". The entrepreneurs want to make money by branding the identity of the region, because they expect customers to pay more for products with a regional brand. The development process of Het Groene Woud is led by a number of enthusiastic entrepreneurs (mostly farmers) that wanted to cooperate. The entrepreneurs used the available Leader funds to hire a project agency that drew up and implemented a business plan for their projects. All projects include several regional partners, as Leader funds are not used to support individual project partners: financially supported projects must be able to continue without this support. To resolve the lack of coordination between the different projects, the same project agency was asked to draw up a business plan for the region as a whole, based on the view of the different stakeholders.

3.3 Regional branding process in Pajottenland

Pajottenland is a rural region located in the southwest of the Belgian province of Vlaams-Brabant, only 10-30 km from the center of Brussels. The northern municipalities are more urbanized, while the southern municipalities are rural towns. The proximity of Brussels, the capital of both Belgium and Europe, has unique consequences for Pajottenland as a rural area. The majority of people living in the region work in Brussels, which results in reduced economic activity in the region itself. Pajottenland is characterized by a sloping, closed rural landscape, peaceful living despite the proximity to Brussels, the presence of many "outsiders" and many French-speakers in a Dutch-speaking region, a strongly represented agricultural sector, many castles (including Gaasbeek castle), the Brabant cart horse, and others. Almost everyone in the region still feels somehow related to agriculture.

Since 2002, Pajottenland has been recognized as a Leader+ area and receives European support for rural development. Only the southern, rural municipalities comply with the conditions put forward by the European Union. The development strategy for 2007–2013 takes three tracks: boosting the rural economy, strengthening the infrastructure and rural accommodation, and preserving the rural character. The Local Action Group (LAG) is made up of 24 regional associations (social, economic, cultural and ecological), the town councils, and the social services departments. The acknowledgement of the region as a Leader+ area has led to more cooperation, as funds are only awarded to partnerships and investment costs are only partly refunded. Since the start of a number of coordinating projects, people have started to think more outside the box of their organization. One particular mayor is seen as a very important person in this whole process and is supporting and stimulating several different cooperative initiatives. The majority of the associations and municipalities see this closer collaboration as a very positive outcome of the Leader+ projects. There are many good individual initiatives in Pajottenland, and more cooperation is sure to follow, but co-ordination is still lacking.

Compared with other Leader areas in Flanders, there is rather little emphasis on support for the agricultural sector. Although agriculture is inextricably bound up with the region, Pajottenland's development process aims much more at creating of community. People try to work bottom-up as much as possible, which is not always easy. Compared with other Flemish Leader areas, Pajottenland's provincial administration has limited influence and is not imposing too much. Even so, some decisions made by the Province are not always accepted in Pajottenland, and people feel they get top-down instructions to which they don't feel related.

A new project to brand the region was begun in November 2008. This project is also financed by the European Fund for Regional Development and is done in cooperation with two other Flemish regions. Under coordination of Leader+, a steering committee was created to outline the future direction of the regional branding project.

An external marketing bureau was contacted to help determine some unique regional characteristics and to outline the branding strategy. This regional branding project also includes efforts to raise the awareness of the inhabitants and build community.

3.4. Comparative analysis of the cases

The comparative analysis of the interviews of these cases clearly shows that there is no such thing as a standard manual for regional branding. Every region has its own physical, social, cultural,historical and institutional features, which define the case-specific context. Regional branding is based on this specific context and every region has to find a way of organizing it, in order to meet the region-specific needs.

In West Cork, there is a strong sense of belonging to the region and a strong identity, while in Het Groene Woud, there is little or no attachment with the name of the recently defined National Landscape. The name 'Pajottenland' was first mentioned in 1789 and has been used ever since. Recently, the region receives more attention by the inhabitants as well as by visitors. Inhabitants of the region feel strongly connected to their region. If we use the terms of *Paasi* (2002), we can say that the regional identity or regional consciousness is most pronounced in West Cork, followed by Pajottenland and Het Groene Woud. As for the identity of the region, all three regions have important physical, cultural and historical features that distinguish it from other regions.

If we look at the intention of the regional branding processes in West Cork, we can state that the main focus there is on rural development. There is a strong focus on community-building and raising awareness on the uniqueness of the region. In Het Groene Woud, the basic motivation for the regional branding project was to earn money. On the other hand, in Het Groene Woud, the initiative was launched by a group of motivated farmers, while in West Cork it was the Leader co-operative that started the regional branding project.

For the management of the budget, there is a clear distinction between West Cork on the one hand and Groene Woud and Pajottenland on the other hand. In West Cork, money is granted to individuals, who need this support to be able to continue their business, which is not economically sustainable. In contrast to this, in Groene Woud and Pajottenland, Leader means are only spent on projects of associations or partnerships and the intention is that afterwards, these initiatives can continue without this support.

3.5 Critical success factors

The context-specificity of the cases does not mean however that we can't find some points of attention that are common to all case studies. Maybe the most important point is that passion is indispensable in the process. People who feel closely connected to the region are willing to take the lead in the rural development processes. These enthusiastic initiators are ambassadors of their region and work together to sell their region both internally and externally. All cases show that a strong and common regional identity can mobilize people to take action to preserve and develop their region.

In the regional branding process, cooperation and networks are very important. Successful results can only be obtained through cooperation among the different actors (entrepreneurs, government, associations and so on). A network in the region is necessary to facilitate cooperation and knowledge transfer. Coordination over all these actors is necessary and the role of each actor/association in the regional branding process should be well defined. The abilities of a good coordinator are very important in this aspect. The coordinator should be a person who is familiar with the regional context, with a social network in the region, and credibility by all important actors. The coordination should be independent from existing governmental or organizational structures and should not be too bureaucratic.

Next to the external marketing of the region to the outside, it is very important to market the region internally and take into account the desires and ideas of residents and local organizations. The inhabitants and local organizations should be the first target group of the regional branding process. There's little chance of success if they are not convinced of the benefits of the project or if they don't feel involved.

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AGRICULTURAL COOPERATIVES AND THEIR MEMBERSHIP IN COOPERATIVE UNIONS IN SERBIA

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Abstract: Goal of this paper is to analyse business of agricultural cooperatives in Serbia and their territorial distribution. Paper also comprehends analyses of premises of directors of agricultural cooperatives towards cooperative associations, based on result of survey conducted on chosen sample. Analysis is based on the hypothesis that reform processes present in the Serbian economy, and completely absent from cooperative sector, have weaken the work of cooperative unions and undermined regular relations between cooperatives and their associations.

Paper also analyse premises of directors of agricultural cooperatives on relevant questions on membership and work of 12 regional, provincial and Cooperative union of Serbia, based on result of survey conducted in 148 or 7.2% of 2.055 agricultural cooperatives in Serbia.

For cooperatives that are not members of any union, paper gives systematization of reasons why cooperative is not member and motives that could inspire cooperative to become a member. For cooperatives that are members of some union, we give analyses of answers if cooperative is satisfied with work and activities of union conducted for cooperative welfare; and suggestions for activities that cooperative unions should practice in the interests and needs of their members.

Key words: director, premises, membership, cooperatives, unions.

1. Introduction

Paper consists of two parts. In first part of paper is presented analysis of territorial distribution of agricultural cooperatives, and in second part are analysed standpoints of interviewed directors of agricultural cooperatives towards the work of cooperative unions in Serbia.

The Project **"Role and Potential of Cooperatives in Poverty Reduction"** in Serbia was implemented in cooperation between the *University of Stirling from Scotland*, the Faculty of Agriculture *of the University in Belgrade*[1], and the *Association of Agricultural Economists of Serbia*.[2] After the previous implementation of the projects of the similar contents in Tanzania and Sri Lanka, Serbia was selected as, for the time being, the only European country in which such a research has been undertaken.

As opposed to the countries in which this research had been previously conducted, in Serbia ten questions[3] were added about the relationships of the cooperatives with the regional and/or sectoral cooperative unions as well as with the Cooperative Union of Serbia (CUS), which is subject of further analysis in this paper.

In cooperative sector in European countries were conducted researches on theoretical models and findings on motives of cooperative members to participate in co-operative and mutual businesses (*Birchall, Simmons,* 2004). In this paper are, however, presented results of first more significant research in cooperative sector in Serbia in last three decades.

2. Materials and Methods

The Programme of research consisted of two parts:

– *Desk* research work – with the aim to identify exact data and to calculate the derived indicators of the number, activities that take place, and the territorial

[1] According to the research of Ševarlić M. M. (2009), upon examination of available curricula of all the higher-education institutions (state and private) in the Republic of Serbia, the subject of instruction in the area of *cooperative movement* exists only in the curricula of the *Department of Agro-economy* at the *Faculty of Agriculture of the University in Belgrade*, specifically:
a) Cooperative movement – with the total of 45 classes of lectures and 15 classes of exercises in VI semester, which was attended, in the academic year 2008/09, by the last generation of students of the *basic studies* according to the so-called old curriculum; and
b) Cooperative movement and association in agro-business – with the total of 45 classes of lectures and 15 classes of exercises in IX semester, which are yet to be attended, in the academic year 2011/12, by the first generation of students of *graduate academic studies* according to the so-called Bologna curriculum.

[2] Part of results of this research is presented in other papers (Simmons, 2009; Ševarlić, Nikolić, Simmons, 2009; Simmons, Sevarlic, Nikolic, 2009).

[3] This set of questions was formulated by Professor D.Sc. Miladin M. Ševarlić – the manager of the Project in Serbia and M.Sc. Marija Nikolić – the coordinator of the team of interviewers who conducted the field survey.

distribution of cooperatives and cooperative associations in Serbia, in order to identify the representative sample for survey of directors of cooperatives and further analysis of collected answers; and
– *Field* research work – within which the directors of 240 selected cooperatives were interviewed and whose positions are in the focus of this paper.

Based on the desk research work, the data were gathered from the Business Registers Agency of Republic of Serbia (state in 2008), whereby all the entities were covered, which were registered in the form of cooperatives and cooperative associations, and also the other legal entities, which in their name have the words, such as „c*ooperative farm*" or "*cooperative*", or acronyms: "c*o-op*", "c*op*" or "*coop*". Out of a total of 3,435 thus defined legal entities, 3,067 or 89.3% are cooperatives, 25 or 0.7% are cooperative associations, and the remaining 343 or 10.0% are other legal entities, which only use some of the above terms in the names of their respective companies.

Only those cooperatives that achieved positive financial result at least once in the period of 2005–2007 were selected in the subgroup of the sample for the survey, which was realized by 1,470 of them or 47.9% out of the total number of cooperatives. In line with the sectoral and regional structure of cooperatives that achieved positive financial result at least once within the specified three-year period, a total of 240 cooperatives were selected and their directors were surveyed using the questionnaire prepared in advance – which was compiled by the research workers from the University in Stirling. The questionnaire had appendix on directors' standpoints about membership and cooperation with cooperative unions that was prepared by researches from Serbia.

Data related to agricultural cooperatives were analysed separately, because they are the most numbered, but also because of their extraordinary significance that arise from demographic and economic structure in Serbia.

Territorial distribution of agricultural cooperatives is based on data of the Business Registers Agency of Republic of Serbia in 2008, where special emphasis is given to cooperatives that achieved positive financial result at least once in the period of 2005–2007, since these cooperatives represent group that might have positive effect on economic situation of their members and local community where these cooperatives exist.

Out of 240 cooperatives in which the survey was conducted, 148 are agricultural, which represents 7.2% of the total of 2,055 agricultural cooperatives registered in Serbia, or 16.3% of 907 agricultural cooperatives that achieved positive financial result at least in one year in the period of 2005–2007.

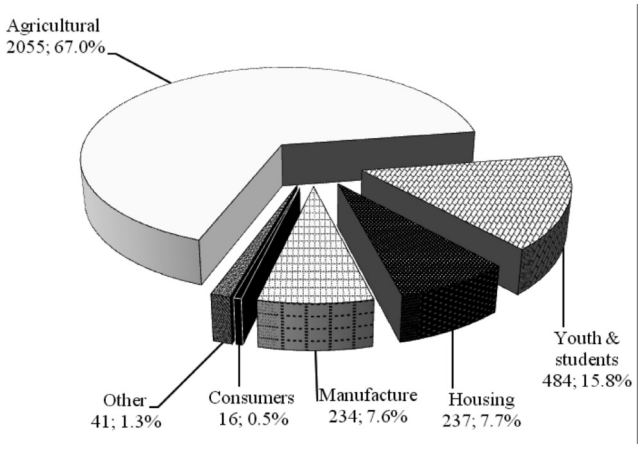
Second part of paper contains the analysis of the answers and standpoints of 148 surveyed directors of agricultural cooperatives concerning the relevant issues of membership and activities of the regional cooperative associations and of CUS. Subject to whether they are members of one of the cooperative unions or not, the surveyed agricultural cooperatives were classified in two subgroups:

– 138 agricultural cooperatives or 93.2% of the total number of the surveyed agricultural cooperatives, which are members of some of the cooperative union; and
– 10 agricultural cooperatives or 6.8% of the total surveyed agricultural cooperatives, the directors of which stated that their respective cooperatives are not members of any of the cooperative union in Serbia.

In the analysis of available data of the Business Registers Agency of Republic of Serbia and answers of surveyed directors of cooperatives were used following quantity and quality methods of research: indicators of structure (territorial and sectoral), method of sample, method of interview, comparison of calculated data, graphical presentation, analysis of contexts and synthesis.

3. Results and Discussion

Analysis of total number of cooperative in Serbia (Graph 1) indicates on domination of agricultural cooperatives (2,055 or 67.0%), followed by youth and students cooperatives (484 or 15.8%), then approximately equitable represented housing (237 or 7.7%) and production/manufacture cooperatives (234 or 7.6%), while there is the least number of registered consumers' (16 or 0.5%) and cooperatives in other sectors of economy (social, educational, health and other cooperatives), all represented as "other cooperatives" (41 or 1.3%).



Graph 1. Structure of total number of cooperatives by sectors of economy in Serbia (2008)

3.1. Territorial distribution of agricultural cooperatives in Serbia

Territorial distribution of agricultural cooperatives (Table 1) indicates that their dominant part is in Central Serbia (1,184 or 57.6%), and smaller part is in AP Vojvodina (871 or 42.4%), which correspond to relation of these two macro-regions in special, demographic, agrarian and total economic potentials. In AP Vojvodina the most number of agricultural cooperatives are registered in Južnobački district – where is

Table 1. Distribution of total number of agricultural cooperatives in regions in Serbia (2008)

Number	Territory / District	Total number of agricultural cooperatives	Participation of agricultural in total number of coops	Territorial distribution of agricultural cooperatives in	
				regions*	Serbia
1	Borski	38	70.4	3.2	1.8
2	Braničevski	69	**88.5**	5.8	3.4
3	City of Belgrade	72	22.3	6.1	3.5
4	Jablanički	45	63.4	3.8	2.2
5	Kolubarski	105	82.7	8.9	5.1
6	Mačvanski	**154**	82.4	**13.0**	7.5
7	Moravički	52	63.4	4.4	2.5
8	Nišavski	87	68.0	7.3	4.2
9	Pčinjski	30	45.5	2.5	1.5
10	Pirotski	34	85.0	2.9	1.7
11	Podunavski	57	76.0	4.8	2.8
12	Pomoravski	36	60.0	3.0	1.8
13	Rasinski	86	69.9	7.3	4.2
14	Raški	70	72.9	5.9	3.4
15	Šumadijski	72	72.7	6.1	3.5
16	Toplički	37	88.1	3.1	1.8
17	Zaječarski	57	81.4	4.8	2.8
18	Zlatiborski	83	62.4	7.0	4.0
19	**Central Serbia**	**1,184**	**63.9**	**100.0**	**57.6**
20	Severno-bački	47	74.6	5.4	2.3
21	Južno-bački	**202**	53.7	**23.2**	**9.8**
22	Zapadno-bački	118	77.6	13.5	5.7
23	Srednje-banatski	105	79.5	12.1	5.1
24	Južno-banatski	148	76.7	17.0	7.2
25	Severno-banatski	63	77.8	7.2	3.1
26	Sremski	188	87.0	21.6	9.1
27	**AP Vojvodina**	**871**	**71.8**	**100.0**	**42.4**
	Total Serbia	**2,055**	**67.0**	**-**	**100.0**

* By region in this table are implied Central Serbia and AP Vojvodina.
Source: Calculation of authors based on data provided by the Business Registers Agency of Republic of Serbia

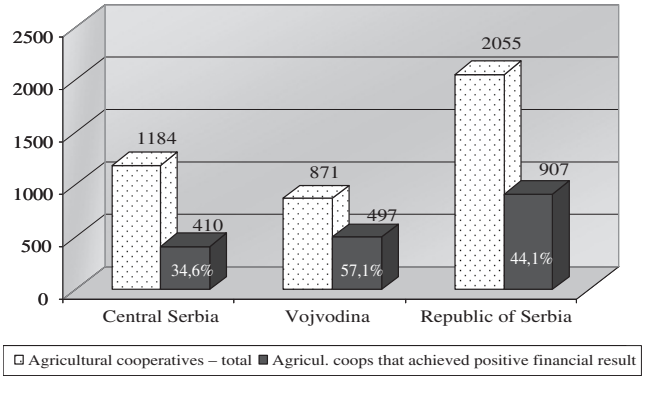
Agricultural cooperatives dominate in almost all districts in Serbia, and their highest participation in total number of cooperatives is in Braničevski district (88.5%). Actually, agricultural cooperatives represent less than half of total number of cooperatives only in Pčinjski district (45.5%).

Of total number of agricultural cooperatives 907 or 44.1% cooperatives achieved positive financial result at least in one year in the period of 2005–2007. Comparing to other types of cooperatives, by analysis it is possible to establish that agricultural cooperatives were less successful than youth and students (64.9%) and producing/manufacture cooperatives (55.6%), but at the same time are more successful than housing (42.6%), and particularly than consumers (31.3%) and other cooperatives (31.7%).

Among financially more successful figure specialised agricultural cooperatives that have encompassed system of reproduction – from providing inputs to selling final products to consumers (*Ševarlić, Skoko, Nikolić,* 2007).

Unfavourable economic position of agriculture and neglecting cooperative sector during reform process in the last two decades (*Šljukić*, 2006), as well as human resources devastation of cooperatives in Serbia (*Ševarlić* 2009-a, 2009-b), are some of the major reasons for adverse financial results of cooperative business.

situated and Novi Sad (administrative centre of this region), while in Central Serbia most of these cooperatives are in the Mačvanski district.



Graph 2. Agricultural cooperatives by regions in Serbia, according to financial results

3.2. Standpoints of directors of agricultural cooperatives on work of cooperative unions in Serbia

Analysis of standpoints of directors of agricultural cooperatives on work of cooperative unions in Serbia is conducted for the following two groups of cooperatives:

1. Agricultural cooperatives that are members of cooperative unions and
2. Agricultural cooperatives that aren't members of cooperative unions.

Division of agricultural cooperatives in these two subgroups is performed with aim to establish if there is or isn't a significant difference in standpoints of their directors regarding work of cooperative unions, or on their position regarding possible enrolment of their cooperatives into unions.

The directors of agricultural cooperatives as dominant subgroup of total number of cooperatives, in addition to

specifying the name of the cooperative union they are the members of, answered a number of questions:

– Which were the motives for becoming a member of the cooperative union;
– Whether they are satisfied with the work of the cooperative union and if not, what activities would stimulate them to become satisfied;
– Which was the last activity of the regional or sectoral cooperative union undertaken with the aim to protect the interests of the cooperative movement; and finally
– Which was the last activity CUS has undertaken with the aim to protect the interests of the concrete cooperative.

Out of 138 surveyed agricultural cooperatives, which are members of one of cooperative unions, 128 directors or 92.8% stated that their cooperatives are the members of some of the county cooperative unions or of the Cooperative Union of Vojvodina, and the remaining 10 directors stated that their cooperatives are the members directly of CUS – which indicates that 7.2% of the interviewed directors actually do not know that theirs cooperatives cannot be directly the members of CUS. In certain cooperatives they properly said that they are directly the members of the county or of the provincial cooperative unions, and through them, indirectly also the members of CUS.

Although 25 cooperative unions are registered in the Business Registers Agency, for the analysis of the relationships between agricultural cooperatives and cooperative unions, it is necessary to eliminate five occupational non-agricultural cooperative unions and the Cooperative Union of Kosovo and Metohija – in view of the fact that the cooperatives that belong to the above associations are not covered by the survey research, so that there remain 19 potential cooperative unions of which the surveyed agricultural cooperatives could become members. None of the surveyed cooperatives is a member of four occupational regional agricultural cooperative unions[4]. Consequently, there remain 15 cooperative unions organized on the territorial principle. It was established by research that 12 or 80% of county (dominantly agricultural) unions are comprehended with this research, which makes the sample particularly highly representative for the analysis of the relationships between the agricultural cooperatives and their cooperative unions.

We particularly point to the fact that just some directors from the territory of Srem in their responses stressed that their agricultural cooperatives are the members of the *County cooperative union of Srem*, while the directors of cooperatives from other regions in the Autonomous Province of Vojvodina (Banat and Bačka) specified only the membership in the Cooperative Union of Vojvodina (CAV) – which points to the processes of centralization of membership of cooperatives directly in the provincial cooperative union.

Apart from the county cooperative unions, which function within CUS, among those surveyed were also 11 directors or 8.0% of the agricultural cooperatives, which are the members of the Union of Cooperatives in Šabac. This cooperative union was founded in 2005 and gathers together recently founded cooperatives with the aim to establish business connections between them, and it functions independently from CUS.

On the basis of the answers of directors about the motives for becoming a member of cooperative unions, all the surveyed agricultural cooperatives, which are the members of some of the cooperative unions, are classified in six groups:

1. Exchange of timely information and raising of the level of dissemination of information, which was specified by 35 surveyed directors (25.4%) as the reason for becoming a member;
2. Becoming a member of cooperative unions was mandatory (34 or 24.6%);
3. Cooperation between cooperatives (18 or 13.0%);
4. Business interconnection and joint appearance in the market (17 or 12.3%);
5. Getting any form of aid (8 or 5.8%);
6. Other reasons (23 or 16.7%);[5]

While in three cooperatives (2.2%) directors did not want to specify the reason for becoming a member of a cooperative union.

The interviewed persons thereafter also responded to the question as to whether they are satisfied with the work of the cooperative union they are the members of, and the offered answers were:

– Yes – which was chosen by a half of the interviewed directors of agricultural cooperatives (69 or 50.0%);
– No – 47 directors of cooperatives (34.1%) are not satisfied, and
– I do not know – 20 (14.5%) of directors stated that they do not know as to whether they are satisfied or not with the work of cooperative alliances;

While, in 2 cooperatives (1.4%), they did not want to answer this question.

The directors of the surveyed agricultural cooperatives, who stated that they do not know or that they are not satisfied with the work of cooperative union (a total of 67 directors; 47 who were not satisfied and 20 who answered that they do not know as to whether they are satisfied), had the opportunity to chose, out of 10 offered activities, all those for which they find that they would improve the work of cooperative unions

[4] Cooperative association of livestock and farm cooperatives **Banmlek** – Kikinda; Cooperative association of vegetable-growing and farm cooperatives **Povrtarska unija** (Vegetable-growing Union) – Begeč; Cooperative association of farm and vegetable-growing cooperatives **Agrologik** – Horgoš, and Cooperative association of farm and beekeeping cooperatives **Vojvođanska pčela** – Veternik.

[5] All the answers that do not match with any of the above formulated answers were classified in the group „Other reasons“, and which mutually do not have common elements, such as: winning recognition for the cooperative movement, institutional support, joint problem solving, preservation of the principles of the cooperative movement, and others.

and increase the level of satisfaction of the cooperatives members. The question was of a semi-open-ended type, in view of the fact that the last activity was specified as „Other"where the surveyed persons could write what can be improved in their opinion in the work of cooperative unions. The structure of their answers is presented in *Table 2*.

Most of the directors of cooperatives find that the activities of cooperative unions should be focused on participation in the drafting of the new law on cooperatives – as much as 77.6%, which is consistent with the opinion of the majority of the surveyed persons, whom we interviewed, that the new law on cooperatives is necessary and that they look forward to it. The answer „Mediation in the contacts of cooperatives with the government authorities"also had a high frequency, which indicates dissatisfaction of the directors with the attitude of government bodies towards cooperatives, but, what is even more worrying, is the incompetence or inability of cooperative unions to articulate the requests of cooperatives to the government and to assist in settling of possible disputes between cooperatives and government authorities.

Table 2. Classification of answers given by director of agricultural cooperatives on question *„What activities should cooperative union be involved in, so that your cooperative is satisfied with its work?"*

Number	Given answers	Answers	
		number	%
1	Promoting interest of cooperatives and their members beyond cooperative movement	39	58,2
2	Intercession in contact of cooperatives and government bodies (when applying for sources, participate in projects and similar)	51	76,1
3	Creating stronger business relations between cooperatives that are members of union	34	50,7
4	More activity on transformation of social in coop property	39	58,2
5	Active participation in creating new law on cooperatives	52	77,6
6	Providing credits and / or other sources of finance under favourable conditions	49	73,1
7	Providing inputs under favourable conditions for production organised in cooperatives that are members of union	36	53,7
8	Help in sale of products	47	70,1
9	Organising seminars, lectures and presentation in order to promote advantages of cooperative work	42	62,7
10	Other[6]	2	3,0

Source: Calculation of authors based on survey conducted within Project "Role and Potential of Cooperatives in Poverty Reduction", in period October – December 2008

The need for subsidized sources of financing of cooperative sector (73.1%) was ranked third, implicating that almost three quarters of primary agricultural cooperatives suffer from lack of financial resources and expect financial support from the cooperative unions or at least support in providing help from other resources. It is important to point out that 70.1% of the interviewed directors of cooperatives, who are not satisfied with the work of cooperative unions, found that the union should offer assistance in the sale of products, which indicates dissatisfaction due to lack of the business function of cooperative unions.

Standpoints of directors on activities of cooperative unions

Comprehending of the relationship between cooperatives and cooperative unions is also analysed based on the results of the answers of the directors of cooperatives to two final questions in the survey:

(1) Specify the last activity undertaken by the regional or sectoral cooperative union with the aim to protect the interests of the cooperative movement; and
(2) Specify the last activity of the Cooperative Union of Serbia, which was undertaken with the aim to protect the interests of your cooperative.

The work of the regional cooperative unions was appraised on the basis of the answers of 128 directors of agricultural cooperatives, who stated that they are the members of some of the regional cooperative unions, while the work of CUS, in addition to them, was also appraised by 10 directors of cooperatives, who stated that they are members directly of CUS – although in practise *de jure* it is not possible. In view of the fact that the questions were open-ended (the surveyed persons could, in their own words, answer the question put), the obtained answers were very much heterogeneous. Therefore, analysis was conducted in two steps: in the first step, it was established whether the surveyed persons specified any concrete activity or not *(Table 3)*, and, in the second step, it was established which concrete activities they specified and those activities were systematized them in groups of related answers *(Table 4)*.

Out of 128 cooperatives, which are the members of one of the regional cooperative unions, in 95 or 74.3% of the cooperatives, they specified a concrete activity undertaken by the regional cooperative union with the aim to protect the interests of the cooperatives. In 14 cases (10.9%) directors claimed that the regional cooperative unions did nothing to protect the interests of the cooperative movement, while 19 surveyed persons (14.8%) answered that they do not know of or that they do not remember any activity of the regional cooperative union.

With respect to the work of the Cooperative Union of Serbia, the judgments were more severe. In only 46 surveys (33.3%), a concrete activity of CUS was specified, which was undertaken with the aim to protect the interests of the certain cooperative, while in as much as 71 cooperatives

[6] In two cooperatives, directors think that, in order to promote their work, cooperative unions should: (1) provide more useful things to cooperatives that are member of union, and (2) help cooperatives to apply for EU funds

Table 3. Analysis of answer given by director of cooperatives on question regarding work of regional and Cooperative Union of Serbia

	Regional cooperative unions				Cooperative Union of Serbia			
	Nothing	I do not know/can't remember	Given concrete activity	No answer	Nothing	I do not know/can't remember	Given concrete activity	No answer
Number of cooperatives	14	19	95	0	71	18	46	3
% (Σ=100)	10,9	14,8	74,3	–	51,5	13,0	33,3	2,2

Source: Ibid, as in Table 2.

(51.5%), they stated that nothing had been done, and in 18 cooperatives (13.0%) that they do not know of or that they do not remember any activity of CUS. In 3 cooperatives (2.2%), directors did not answer to this question.

On the basis of the above stated, we may conclude as follows:

- 128 directors of cooperatives that are the members of one of the regional cooperative unions, appraised their work, while the work of the Cooperative Union of Serbia was appraised by all 138 directors of the cooperatives that are the members of any cooperative union in Serbia;
- 74.3% of the members of the regional cooperative unions specified an activity undertaken with the aim to protect the interests of cooperatives, while only 33.3% did the same with respect to the work of CUS;
- 10.9% of the surveyed persons assert that the regional cooperative unions did nothing for the cooperatives, while over a half of them (51.5%) made the same statement for CUS; and
- 14.8% of those surveyed answered that they do not know of or do not remember any activity of the regional cooperative unions of importance for the cooperative, and the same answer concerning the activities of CUS was given by 13.0% of the respondents.

The second segment of the analysis of the answers to the above questions was the review of concrete activities of unions specified by the surveyed directors. The answers of directors about activities of cooperative unions were analyzed separately for the regional unions and for CUS, and then they were classified, despite heterogeneous answers, into groups of answers, which are common for all the unions (Table 4).

The most often specified activity of the regional cooperative unions is related to rising of the level of dissemination of information, organizing of lectures, and various kinds of trainings – which was specified by 29 or 30.5% of the directors of cooperatives. This is directly related to the fact that more available and timely information was the motive for 25.4% of the surveyed directors to join cooperative unions, which to a certain extent explains the statement of a half of the directors that they are satisfied with their work. In the work of CUS, dominant activities are related to the assistance to cooperatives in appearances at fairs and other events (26.1%), then (as expected) there follow the activities on connecting cooperatives with the competent Ministry and other governmental institutions (23.9%), while their activities on organizing lectures, training, and dissemination of information on national level are much less represented.

Table 4. Activities conducted by regional and Cooperative Union of Serbia in order to protect interests of cooperatives and cooperative movement

Group of activities conducted by regional and Cooperative Union of Serbia, according to answers of agricultural cooperatives directors	Regional cooperative unions		Cooperative Union of Serbia	
	number	%	number	%
Organising lectures, training and informing	29	30,5	5	10,9
Activities related to new law on cooperatives and other legal issues	18	18,9	7	15,2
Connecting cooperatives with Ministry of agriculture and other government bodies	11	11,6	11	23,9
Helping cooperatives when participating in fairs and other manifestations	5	5,3	12	26,1
Activities related to status of cooperative property	6	6,3	–	–
Help and support of regional cooperative unions	8	8,5	–	–
Advisory role	–	–	4	8,7
Other activities*	18	18,9	7	15,2
Total	95	100,0	46	100,0

* In group „other activities" of regional cooperative unions are included answers such as: creating price-list, occasional program on television, affirmation of cooperatives, etc; in the same group of answers regarding work of Cooperative Union of Serbia are included: late support in plough of land in 2007, control of financial work of cooperative, audit of cooperative and others.
Source: Ibid, as in Table 2.

Standpoints of the surveyed directors of agricultural cooperatives that are not members of any cooperative union

Out of the total of 148 surveyed agricultural cooperatives, 10 or 6.8% of the cooperatives are not members of any regional or sectoral cooperative union in Serbia.

The reasons due to which the surveyed cooperatives are not members of any union are rather versatile, but are fully specified (due to a small number of cooperatives):

- Lack of information and communication were stated in three cases, out of which one respondent also specified the lack of trust (30%);

- Lack of money for the membership fee was specified in two cases (20%);
- Lack of time was specified in two cooperatives (20%), although one of these cooperatives also added a small volume of work – which is contradictory to the answer concerning the lack of time;
- Services of the cooperative union are not adequate to the needs of the cooperative – this was specified in one case (10%);
- In one case the obtained answer was that there is no concrete reason (10%);

and one respondent did not want to answer to this question (10%).

To the question as to what could represent a motive for cooperatives to become members of cooperative unions, three equally distributed answers were obtained from 2 directors of cooperatives or 20% (better dissemination of information, higher dedication of a cooperative union to the members, and that they do not know what could motivate cooperatives to become members of a cooperative union), while four directors (40%) stressed that their cooperatives would have a motive for membership if cooperative unions would provide direct services to them (procurement of input and sale of products, legal advice, and representation in disputes).

Based on answers analysis of directors of agricultural cooperatives, of which almost 34.1% are not satisfied with the work of cooperative unions, and 14.5% of the surveyed directors of cooperatives were unsure with respect to the work of county cooperative unions („I do not know", „I do not remember", „I am not sure" or did not answer to certain questions), it can be concluded that hypothesis on significantly undermined relations between primarily cooperatives and their associations is confirmed.

The above specified results of the research of the standpoints of surveyed directors of agricultural cooperatives lead to the following conclusions:

- Dissemination of information is the dominantly identifiable activity of cooperative unions done in the favour of primary cooperatives; and
- General judgment is considerably more favourable regarding the work of the regional cooperative unions compared to the Cooperative Union of Serbia, which to some extent can be explained by the fact that the regional cooperative unions are in a more direct and regular contact with cooperatives, i.e. that they are more present in solving of their daily problems than CUS.

On the contrary to other countries, in Serbia is evident the lack of business functions of cooperative unions dedicated to improving competitiveness of cooperative business.

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THE CLIMATE CHANGE AND AGRICULTURE – DIMENSIONS AND CORRELATIONS

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Abstract: Global climate changes are taking place and its impacts on economy are already occurring in fields like tourism, agriculture, forestry, infrastructure, insurance industry or capital market. Specialists draw attention that climate change has negative effects and positive effects. For example, in some parts of Europe, especially in north, the agricultural may benefit from temperature rise increasing carbon dioxide levels in the atmosphere. The most important part of these changes is due to greenhouse gas (GHG) emissions from human activity. Between greenhouse gases, carbon dioxide (CO_2) is the largest contributor with a weight around of 80% of total GHG emissions. The agriculture is the most affected sector by the climate change, but agricultural activities have many negative implications on environment through emissions of methane and nitrous oxide that result from changes in land use. Besides the negative impact, the agriculture may play a positive role to environment protection through the production of bio fuels.

Because of the huge implications of climate change on human activities, the public authorities have made important steps in order to control this phenomenon, to reduce and prevent the negative impact.

Key words: climate change, agriculture, greenhouse gas emissions, environment

Introduction

The climate change is a complex and global phenomenon with many implications in economic, social and political life, because it has effects on agriculture; water resources, water supply and water quality; on energy use, ecosystems, human health and impacts of sea level rise or from drought; flooding; storm damage and extreme weather (including costs to infrastructure) etc. In addition, the climate change affects the depletion of the ozone layer and biodiversity and, in the future, it will be the main driver of biodiversity loss.

Materials and Methods

1. Climate change – an economic, social and political challenge

It is difficult to measure the economic impact of climate change but, there are available some statistics that demonstrate that the climate change has many consequences, for example:

- Since 1980 until 2004, 64% of catastrophic events are directly correlated to weather and climate extremes;
- In the hot dry summer of 2003, a loss of 10% of glacier mass in the Alps had been registered;
- In Spain, the droughts of 1999 caused losses over euro 3 billion;
- In northern Europe, in period of 1990–2000, the annual precipitation has increased by 10–40% with high implications on flooding an landslides;
- The economic annual losses from climate events increase in the last 20 years from USD 5 billion to USD 11 billion;
- Climate extreme events have causes 82% of death determined by catastrophic events;
- Climate extremes are responsible for 79% of economic losses caused by catastrophic events.

The main manifestations of climate change are the temperature's increase and the rise of sea level. The global warming is due, to some extend, to natural factors, but the most important determinant is the human activity through the emission of greenhouse gas. The climate change has many effects on economic and social life, because it affects human health, natural ecosystems, biodiversity etc.

The specialist are not concerned only in the past climate change impact but also in projected climate change impacts. Some climate changes like higher CO_2 concentrations, higher temperatures, sea level rise, storms, floods, droughts will have multiple consequences:

- The increase in tick borne diseases caused by the rise of temperature;
- The increase of vulnerability in insurance industry

due to the increase in intensity and frequency of climate change events;
- The agricultural area will expand northwards, in long terms;
- The increase of CO_2 concentrations and the rise of temperatures will have a positive impacts on European agriculture;
- The rise of sea level will determine flooding and costal erosion;
- The increased crop yield in northern areas and the cut of s crop yield in hotter and dryer regions from Europe.

For these reasons, at international level, there are scientific and political concerns regarding the climate change and the measures that have to adopt in order to limit these climate problems. The efforts made at international and regional level are important. The main results is the conclusion of Kyoto Protocol, under the United Nations Framework Convention on Climate Change, that sets binding emission targets for a basket of six GHGs. This protocol has three mechanisms: Joint Implementation (JI), Clean Development Mechanism (CDM) and international emissions trading (EEA, 2007, p. 169). In addition, at international level, many green investments schemes (GIS) have been promoted (for example, the EU emissions trading scheme introduced in 2005 and the Carbon Pollution Reduction Scheme from Australia starts in 2010).

The European Union is highly implicated in international negotiations and takes many measures in order to support the fulfillment of Kyoto Protocol commitments. In addition, on European continent, we remark the adoption of multiple programs and measures in order to reduce the GHGs emission. For example, in Turkey and Ukraine, the important efforts have been made for modernization of the steel and cement industry, in European Union, the use of fertilizers is reduced and the number of cattle is decreasing, but the cattle productivity is increasing in order to contribute to the decline of CH_4 emissions.

Table 1. Emissions of greenhouse gases in the European Union countries

	Emissions of carbon dioxide (million tones)		Emissions of carbon monoxide (million tones)		Emissions of methane (million tones)		Emissions of sulphur oxides (million tones of SO_2 equivalent)		Emissions of nitrogen oxides (million tones of NO_2 equivalent)	
Year	**1995**	**2005**	**1995**	**2005**	**1995**	**2005**	**1995**	**2005**	**1995**	**2005**
EU-27	4,165.2	4,269.0	51.08	31.89	25.73	19.94	17.16	8.28	14.60	11.29
Belgium	123.7	123.3	1.11	0.88	0.51	0.37	0.26	0.15	0.37	0.29
Bulgaria	65.9	54.8	0.85	0.74	0.71	0.49	1.48	0.90	0.27	0.23
Czech Republic	132.1	125.9	1.00	0.51	0.64	0.52	1.09	0.22	0.37	0.28
Denmark	60.5	50.4	0.71	0.61	0.28	0.27	0.14	0.02	0.26	0.19
Germany	921.2	872.9	6.53	4.03	3.88	2.27	1.73	0.56	2.17	1.44
Estonia	20.1	18.0	0.21	0.16	0.10	0.09	0.12	0.08	0.04	0.03
Ireland	35.5	47.3	0.32	0.23	0.65	0.62	0.16	0.07	0.12	0.12
Greece	87.4	111.7	1.32	*0.64*	0.44	*0.40*	0.54	*0.53*	0.32	*0.32*
Spain	255.6	368.3	3.22	*2.38*	1.46	*1.77*	1.81	*1.36*	1.33	*1.53*
France	390.1	412.5	9.57	5.68	3.30	2.68	0.97	0.47	1.65	1.21
Italy	445.7	493.4	7.17	*4.21*	2.10	*1.91*	1.32	*0.50*	1.81	*1.17*
Cyprus	5.6	7.8	0.10	0.04	0.04	0.05	0.04	0.04	0.02	0.02
Latvia	9.1	7.6	0.32	0.34	0.10	0.09	0.05	0.00	0.04	0.04
Lithuania	15.0	14.2	0.29	0.19	0.18	0.16	0.09	0.04	0.07	0.06
Luxembourg	9.2	11.9	0.11	*0.04*	0.02	*0.02*	0.01	*0.00*	0.02	*0.01*
Hungary	61.9	61.8	0.76	0.59	0.39	0.37	0.70	0.13	0.19	0.20
Malta	2.3	*3.0*	:	:	*0.02*	0.02	*0.03*	0.02	*0.01*	0.01
Netherlands	170.6	175.9	0.86	0.60	1.13	0.80	0.13	0.06	0.47	0.34
Austria	63.7	79.7	1.01	0.72	0.41	0.34	0.05	0.03	0.19	0.23
Poland	377.5	326.5	4.55	3.33	2.04	1.82	2.38	1.22	1.12	0.81
Portugal	53.1	67.9	0.85	0.65	0.59	0.53	0.33	0.21	0.27	0.28
Romania	134.8	110.5	*2.09*	1.41	*1.49*	1.23	*0.89*	0.73	*0.32*	0.31
Slovenia	14.9	16.7	0.09	0.08	0.10	0.10	0.13	0.04	0.07	0.06
Slovakia	43.8	39.9	0.42	0.30	0.23	0.20	0.25	0.09	0.18	0.10
Finland	58.2	57.0	0.44	0.52	0.29	0.21	0.10	0.07	0.26	0.18
Sweden	58.0	52.6	0.90	0.60	0.32	0.27	0.07	0.04	0.28	0.20
United Kingdom	549.8	557.6	6.30	2.42	4.30	2.36	2.32	0.71	2.38	1.63

Source: Eurostat, 2009

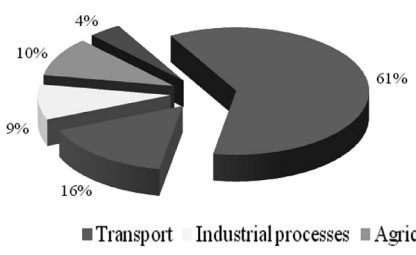


Figure 1. Greenhouse gas emissions by sector, EU-15, 1990 (based on data in million tones CO_2 equivalent)
Source: Adapted from Eurostat, 2009

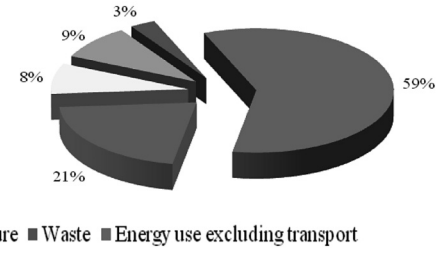
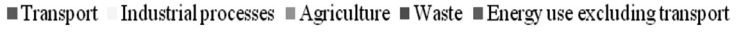


Figure 2. Greenhouse gas emissions by sector, EU-15, 2005 (based on data in million tones CO_2 equivalent)
Source: Adapted from Eurostat, 2009



The results of these efforts can be observed in the *table 1*; the figures available for countries from European Union demonstrate the commitment of European authorities in order to respect the protocols and agreements signed.

The impact of economic activities on the emission of GHGs is not the same in all the countries from the European Union. The „contribution" of each country depends on the structure of economy and the dynamics of this structure taking in account the importance of sectors to the production of GHG.

If the emissions of greenhouse gases presented in table 1 are converted in emissions of carbon dioxide *(table 2)*, we observed that the most important emissions belongs to developed countries from European Union like Germany, France, Italy and United Kingdom. So, we could say that the emission of GHGs is an indicator of development. In the top presented above, two new members of the European Union are presented due to their industrial development.

If we analyze the emission of carbon monoxide and carbon dioxide per capita, the situation is different, the first places being occupied by small countries, many of them being new members of the European Union. *This fact demonstrates that these countries use pollutant installations and equipments and they do not make important steps in order to meet environment's standards.*

Table 2. Weighted emissions of greenhouse gases (million tones of CO_2 equivalent)

	1995	2000	2005	Share in EU-27 (%)
EU-27	5,249.4	5,099.7	5,176.9	–
Germany	1,095.7	1,019.8	1,001.5	19.3
Spain	318.4	384.4	440.6	8.5
France	558.9	559.7	553.4	10.7
Italy	532.5	553.8	582.2	11.2
Netherlands	225.1	214.4	212.1	4.1
Poland	453.2	405.1	399.0	7.7
Romania	187.0	138.6	153.7	3.0
United Kingdom	710.1	674.0	657.4	12.7

Source: Eurostat, 2009

In European Union, a comprehensive energy and climate change package has been adopted in 2007. The European Council has committed to cut GHG emissions by at least 20% by 2020 compared with 1990 and adopted an „Energy Policy for Europe" in order to improve the use of energy, to increase the share of renewable energy to 20%, to reduce to carbon emissions. The main objective is the limitation of global temperature increase to 2 degrees Celsius above preindustrial levels by 2100.

At European Union level, the public authorities promote not only mitigation actions but also adaptation actions. The adaptations measures are promoted in order to cope with climate events like higher temperatures, increased rainfalls; frequent storms etc. These adaptation actions may consist in

Table 3. Emission of carbon monoxide and carbon dioxide in European Union countries (kg per capita)

Rank	Emissions of carbon monoxide	kg per capita	Rank	Emissions of carbon dioxide	kg per capita
	EU-27	**65.0**		**EU-27**	**8,696**
1	Latvia	147.4	1	Luxembourg	26,088
2	Estonia	118.7	2	Estonia	13,358
3	Denmark	112.7	3	Czech Republic	12,321
4	Finland	99.3	4	Belgium	11,807
5	Bulgaria	95.3	5	Ireland	11,508
6	France	90.9	6	Finland	10,887
7	Luxembourg	87.9	7	Netherlands	10,788
8	Austria	87.7	8	Germany	10,581
9	Poland	87.2	9	Cyprus	10,398
10	Belgium	84.2	10	Greece	10,076
11	Italy	72.0	11	Austria	9,706
12	Sweden	66.6	12	Denmark	9,319
13	Romania	65.1	13	United Kingdom	9,283
14	Portugal	61.7	14	Spain	8,557
15	Hungary	58.4	15	Poland	8,553
16	Greece	57.7	16	Italy	8,439
17	Ireland	56.0	17	Slovenia	8,345
18	Slovakia	55.7	18	Malta	7,500
19	Lithuania	55.5	19	Slovakia	7,417
20	Spain	55.3	20	Bulgaria	7,061
21	Cyprus	53.4	21	France	6,597
22	Czech Republic	49.9	22	Portugal	6,451
23	Germany	48.8	23	Hungary	6,121
24	United Kingdom	40.3	24	Sweden	5,834
25	Slovenia	40.0	25	Romania	5,103
26	Netherlands	36.8	26	Lithuania	4,134
27	Malta	NA	27	Latvia	3,282

Source: Eurostat, 2009

the efficient use of scarce water, the selection of species less vulnerable to climate changes, the development of drought tolerant crops, construction of flood walls, the increase of dykes` levels against sea level rise, relocation of ports. For these reason, in 2007, the European Union has been adopted the Green Paper „Adapting to climate change in Europe – options for EU action" that examines climate change impact on Europe and propose and adaptation strategies that must be promoted by local and regional authorities. This process of adaptation has many consequences because it creates new jobs and markets for innovative products and services (CEC, Green Paper, p 10);

- The development of climate-proof building techniques and products and the set up of new markets for these merchandises;
- The change of time period of beach tourism in Mediterranean countries because the summers will be to hot;
- The growing season will lengthen in Nordic areas, so it is necessarily to adapt the local agricultural management practices;
- The financial sector will develop new instruments in order to reduce the risks due to climate change.

The climate change has many implications on financial market. The development of financial market is dramatic and the pace of innovation is intense. On American continent, at Chicago Mercantile Exchange Group, the futures and options contracts on temperature, snow falls, frost and hurricanes are available for hedging and speculative strategies. New specialized exchanges like Chicago Climate Exchange, Chicago Climate Futures Exchange, and European Climate Exchange have been established. These exchanges have been developed a range of climate and environmental products, like derivatives or contracts for physical delivery. So, new merchandises traded on exchanges have been appeared: allowances like EU allowances (EUAs) issued under the EU Emissions Trading Scheme and Certified Emissions Reductions units (CER) generated from CDM projects.

The impact of climate change on countries is different because the geographical position plays an important role, but his most dramatic aspect is that the level of development has a great influence on their capacity to promote mitigation and adaptation actions to climate change. The most vulnerable countries to climate change are the least developed countries because of their low financial and technical capacity.

2. The connection between climate change and agriculture

The agriculture depends in a high extend by the climate, but other determinants like management practices, technological changes, market prices, policies related to subsidies or international trade patterns are important. For example, in the European Union, the Common Agricultural Policy (CAP), that is an important instrument of European authorities, drives the agriculture crops. Even if the European authorities try to protect the local agricultural production from foreign competition, they must respect the conditions imposed by the World Trade Organization in order to liberalize the international commercial exchanges.

It is very difficult to determine the exact influence of the climate change of agriculture. In addition, the impact of climate change can have positive and negative effects on agriculture, and the extension of these effects is correlated with other factors. The temperature's increase affects the temporal and spatial distribution of precipitation and evaporation, and these phenomena has direct impact on agriculture because water is crucial in food production.

At international level, over 80% agricultural land is rain-fed. In region like Australia or South America, the climate change has a huge impact on agricultural production taking in account the technical aspect like water evaporation and soil moisture distribution. In addition, available water resources for irrigation are important for agriculture.

The irrigated land represents at international level, around 18% of agricultural land, and its produces 1 billion tones of grain annually, that means half the world's total supply; (this situation is due to high yield of irrigated crops that is 2–3 times more than rain-fed lands. (WMO, UNEP, IPCC 2008, p. 59).

The European authorities consider that the agriculture is a victim of climate change and the European Economic and Social Committee is very concerned by the negative effects of this phenomenon on agriculture. (EESC 2008, p. 1). The most affected region is Southern Europe, because in this region, there are expected long periods of drought and water scarcity, and the worst predicted result is the total cessation of agricultural activity. This aspect has social implication because in Europe, the agriculture is an important source of employment.

The climate change affects agriculture, and agriculture affects climate change. Taking in consideration the IPCC definition, at international level, emissions of GHG from agriculture represent 10–12% of total emissions. The European Commission estimates the share of agriculture in GHGs emission, around 9%. The impact of agriculture on CO_2 emission is small because the plants absorb this gas and transform it.

Speaking about GHG emission, the agriculture has negative effects on climate through emission of methane and nitrous oxide that result from changes in land use and agricultural production. In Europe, 40% of methane and nitrous oxide emissions are due to agricultural activities.

The main problem is that methane and nitrous oxide are stronger warming potential, about 23 and 296 times than CO_2. Another important problem is that there are many ways of methane and nitrous oxide emissions: conversion of woodlands and grasslands in arable lands; the use of nitrogen fertilizers; the decomposition of organic matter in soils, the existence of ruminant animals that is correlated with meat consumption.

Besides these negative effects, the agriculture has a contribution to prevention of climate change. One way is the production of bio energy *(figure 3)*. The production of bio energy will solve, in some extend, the problem of GHGs emissions and will create new jobs. In the European Union, the authorities try to direct the use of agriculture lands for bio energy crops. In this way, the Common Agricultural Policy is adapted to new challenge of this time: environmental issues and climate change. In addition, all member states are encouraged to use bio fuels in order to reduce the dependence on oil that is around 98% in the transport sector from Europe. This directive is important because according with The European Commission White Paper "European transport policy for 2010: time to decide", the CO_2 emissions from transport is expected to rise in the next years. The road transport is guilty of a huge share of the CO_2 emission- around 90%), so, the promotion of Bio fuels Directive is an important step in order to increase the use of these fuels through different instruments like tax exemption, financial assistance for the processing industry, the establishment of a compulsory rate of bio fuels for oil companies.

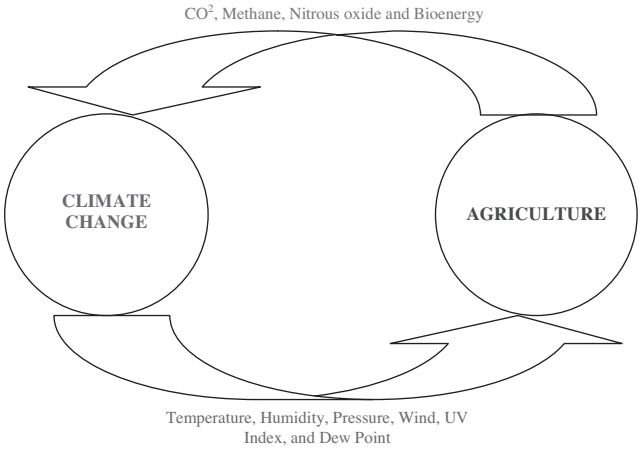


Figure 3. The connection between climate change and agriculture

All these problems determined in agricultural sector by climate change has many implications, even in scientific field because researchers must develop new varieties of plants that are more adaptable to the new climate conditions: warm in north regions and aridity in south regions and that need small quantities of nitrogenous fertilizers in order to facilitate the control of GHG emissions.

Results and Discussion

The agriculture is most dependent economic sector by natural conditions and climate change. The climate change has direct and indirect effects on agriculture, and agriculture, in some extends, has negative impact on environment. In European Union, this challenge called climate change is a new issue for Common Agricultural Policy. The battle against climate change is tough and climate change is considered, by European authorities (EESC 2006, p. 8), the biggest challenge for Europe and all continents. The implication of public authorities is crucial because they must promote two types of measures: adaptation measures and mitigation measures. The citizens must be implicated in the process understanding climate change because this phenomenon affects different communities in many ways. So, educational, informational and training measures must be adopted.

At international, regional a national level, many agreements and protocols were concluded and many programs are running in order to maintain climate changes under control. The Kyoto Protocol is the most important measure at international level, and in Europe, the EU carbon dioxide Emission Trading Scheme (EU ETS) was adopted in 2005 in order to reduce GHGs emissions. The immediate result of the EU ETS is the established of a new market: the carbon market or market for CO_2 allowances. The set up of this market has many implications. For example, the price of CO_2 emissions will affect the economic performance of producers covered by the European scheme, because the cost of production will be increased by the actions of reduction of CO_2 emissions (ECD-GE, 2005, p. 8).

In Europe, supply and use of energy is the most important source of GHGs emissions (80%). The agriculture has a share around 9%. So, the impact of agriculture on climate change is modest, but we remark the efforts made in EU in order to reduce the share of agriculture from 22% in 1990 to 9% in 2004. In this field, greenhouse gases like nitrous oxide (N_2O) from soils, due to the use of mineral nitrogen fertilizers and methane (CH_4) from enteric fermentation, mainly from cattle, are guilty of climate change. So, agriculture is not a victim of climate change because it generates climate change. For this reason, in the European Union, some reforms of CAP, like the decrease of livestock numbers and fertilizer use, had been adopted. The legislative efforts had been materialized in the adoption of the Nitrates Directive, the Landfill Directive and legislation on F-gases[1] and mobile air conditioning.

The agriculture can have an important role in combating the climate change through bio energy – energy from biomass. Biomass is the world's fourth largest energy source and it provides 10% of the energy used at international level. So, the use of bio energy can have major economic and political consequences. For example, the replacement of imported fuels from Russia with bio energy could contribute to ensuring the security of EU's energy supply.

In addition, biomass production is in a strong interdependence with environment. Cultivation, harvesting and collection of biomass and the use for heat, electricity and transport have consequences like soil erosion, emission of green house gas, and threats to biodiversity and water resources. So, bio energy can have negative impact on

[1] F-gases or fluorinated gases are a group of GHG have a very high influence on climate change.

environment and the main goal – reducing greenhouse gas emissions could not be achieved. Because of these interactions, we try to find the right way in order to use bio energy and to reduce the emission of GHGs.

Taking in consideration the interdependence between climate change and agriculture, in the European Union, the authorities try to promote a new type of agriculture: climate-friendly agriculture.

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ADJUSTMENT OF POLAND'S AGRICULTURE AND FOOD SECTOR TO CHALLENGES OF AGRICULTURAL POLICY OF THE EUROPEAN UNION

A. Kowalski[1], M. Wigier, P. Chmieliński

Abstract: Paper is aimed in assessment of first period of Poland's membership in EU and covering agriculture and rural areas with the support under the Common Agricultural Policy in the context of future challenges faced by the agricultural policy. Analysis shows that accession to EU became a strong impulse for growth of the Polish food economy, however the main challenge for the Common Agricultural Policy in future, from Poland's perspective, will be strengthening the multifunctional agriculture, i.e. territorial cohesion and positive effects of agricultural activity on natural environment.

Key words: multifunctional agriculture, common agricultural policy, rural development, Poland

Introduction

During the recent decades, agriculture and food economy of the EU have revealed a high capability of adapting to the new economic, social and environmental challenges, resulting, *inter alia*, from transformations, occurring in technique and production technology, competition pressure and consumers' requirements. The mentioned adaptations had also place in the field of agricultural policy and public support, obtained via this policy. Owing to the mentioned adaptation, agri-food sector of the EU remains still the important sector of its economy although it is characterized by a very big diversity in the particular member states. At the same time, the discussed sector has a key meaning for environment and landscape of rural areas, preservation of natural habitats or counteracting the occurring climate changes.

Rural areas constitute about 91% of the EU-27 territory and are inhabited by almost 56% of the whole population. In Poland such regions represent 93.2% of Poland's total area. Those areas are inhabited by 14.7 million persons, i.e. 38.6% of the population (CSO, 2008). Structural transformations in agriculture, as being forced by the changes in social – economic environment and technological progress in the agriculture alone are also supported by the CAP instruments. At the same time, CAP due to the contradictions contained in its instruments, inhibits the rate of the discussed transformations.

The aim of the paper is assessment of first 5 year period of covering Poland's agriculture and rural areas with the support under the Common Agricultural Policy in the context of future challenges faced by the agricultural policy. Analysis shows that accession to EU became a strong impulse for growth of the Polish food economy, however the main challenge for the Common Agricultural Policy in future, from Poland's perspective is support for the development of multifunctional agriculture.

Changing role of agriculture in the EU economy

Agriculture and food industry are the important part of the EU economy. Their participation in GDP of the EU in 2008 was equal to ca. 4% and the value added, produced by the discussed sectors exceeded 190 billion EUR in the discussed year, with the employment amounting to ca. 18.6 mln persons, i.e. almost 8.6% of all employees. Agri-food sector has a relatively greater meaning for the economy of the new member states, however according to the regularity, observed in highly developed countries, the decrease of the role of this sector in the national economy occurs together with the economic development. In parallel, the development of other sectors of the economy (mainly of services) is observed; in food-agricultural sector, the increase of productivity of capital is recorded. In consequence, it leads to decline of prices of agri-food products as compared to the prices of the remaining goods and services. Role of food economy in the national economy is, however, very much differentiated between the particular EU member states.

Production-economic structures of the EU agriculture reveal also a high diversity between the particular countries and even between their regions. The mentioned differences are the consequence of, *inter alia*: level of economic development, historical background, natural and climatic

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conditions and various institutional frames. The mentioned diversity is reflected in physical and economic size of the farm, production intensity or productivity. The employment coefficient in the EU-27 agriculture varies from ca. 1% in Great Britain to ca. 20% in Bulgaria and Rumania. As a result of the successive enlargements of the EU, the number of agricultural farms increased from 5.8 mln in 1980 to 14.5 mln in the EU-27 (*Kowalski* (ed.), 2009).

The CAP reforms, conducted in the years 2000–2007 were aimed at the improvement of its efficiency and effectiveness via the improvement of market oriented production, increase of its competitiveness, assurance of the positive effect of agriculture on environment, improvement of production quality, food safety and animal welfare and sustainable development of rural areas. The shift of the main accent of support, from prices to incomes, together with the enlargement of instruments of developing the rural policy allowed market mechanisms to play a greater role in allocation of resources. Introduction of the single payment scheme (decoupled payments) was intended to serve this aim. The effectiveness of the discussed instrument was also supported by OECD studies, which showed their smaller influence on production as compared to the earlier support of prices or direct aid.

The change of agricultural policy instruments, introduction of modulation mechanisms and financial discipline have considerably changed the level and structure of financial support of agricultural sector and rural areas. Owing to the discussed changes, most of the CAP budget was destined for payments, being not connected with production and direct payments, and only 20% of the CAP budget was destined for actions being directly connected with the market and support of export. The introduced reforms have also contributed to systematic increase of expenses on development of rural areas (at present, about 15% of the CAP budget). In consequence of the conducted reforms, and also of the earlier reform of MacSharry, the participation of expenses on agriculture in the EU budget and in GDP was systematically decreased *(Fig.2)*. In 2007, the expenses of the CAP, although were almost five times higher than at the beginning of the eighties and amounted to ca. 50 billion EUR, they constituted only ca. 40% of GDP of the "EU-25" whereas in the eighties, the discussed participation exceeded 60%.

From the preliminary budget plans, revealed by the European Commission, it results that the means for rural development have been increased by 0.3 billion EUR to the level of 13.9 billion EUR as compared to 2009 and for the implementation of the aims of the CAP Pillar Two – from more than 2.9 billion EUR to 43.7 billion EUR. The total budget of the EU is concentrated on the acceleration of reconstruction of the European economy, suffering from the consequences of the world crisis.

Table 1. Distribution of the expenses on the CAP according to the preliminary draft budget of the EU for 2010 (in mln EUR)

Specification	2009	2010	Change in per cent
Pillar One	41 127	43 745	6,4
Market actions	3 410	4 042	18,5
Direct payments	37 779	39 326	4,1
– in decoupled form	31 296	33 374	6,6
– % complete direct payments	83	85	–
Pillar Two	13 652	13 975	2,4
CAP in total	**54 779**	**57 720**	**5,4**

Source: (FAMU, 2009).

The participation of the funds, destined for the measures connected with agriculture (ca. 40% of the total sum of the budget expenses i.e. the amount of ca. 139.5 billion EUR) will be however, unchanged. The increase of the expenses on Pillar Two will be caused by 2% higher modulation. The obtained additional sum will be destined for payments connected with the "new challenges" and development of rural areas. The total expenses on the market and structural pillar of the CAP in 2010 will be found on the level of 57.3 billion EUR, i.e. by 2.9 billion EUR more than in 2009 *(Tab.1)*.

Higher expenses and costs of the CAP running are also connected with the mechanism of phasing-in which generates greater expenses on direct payments in the new member states. They reflect also certain prognosis increase of the market support, mainly in the dairy sector. As a result of the mentioned changes, Pillar One of the CAP will cover more than 31% of all expenses of the European Union in 2010; further ca. 11% will be destined for rural development, environmental protection and the Common Fisheries Policy. In spite of the expected current increase of expenses on implementation of the CAP within the frames of the Pillar One and Pillar Two in 2010, general decline of the mentioned expenses down to the level of 33% of the EU budget until 2013 is anticipated. Systematic decrease of the expenses on agriculture and development of rural areas in GDP is connected with the economic development of the EU, increase of the role of other EU policies and also, with the effects of the CAP reform implementation.

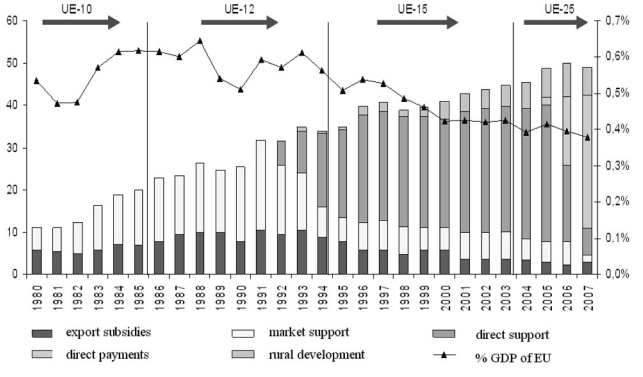

Figure 1. Expenses on CAP during the years 1980–2007, in billion EUR and as percent of GDP
Source: Own elaboration on the basis of Eurostat data

Changes in Poland's food sector 5 years after the accession to EU

The attempt to make an in-depth analysis of macroeconomic social and economic effects of Poland's membership in the EU after nearly 5 years is a risky task. Due to the relatively short time, it is difficult to assure methodologically correct separation of permanent effects and the phenomena resulting from the economic cycles or random events. The macroeconomic and microeconomic results of Poland's adjustments to the legal and institutional solutions of the "old" EU were not fully materialised yet.

The course of economic processes in Poland was influenced by geopolitical threats, significant changes in raw material prices, especially crude oil price, as well as instability of financial markets. These phenomena would have affected Polish economy irrespective of our membership in the EU.

Mutual full opening of markets was not a hindrance to the development of the Polish food economy; instead it became a strong impulse for its growth. The following phenomena serve as evidence for such an assumption (*Kowalski* (ed.), 2009):

- Within the 5 years of our membership in the EU the export of agri-food products increased from EUR 4.0 billion to EUR 11.3 billion (2.8 times), whereas the import increased from EUR 3.6 billion to EUR 9.8 billion (also 2.8 times), and the surplus increased 3.3 times from EUR 0.4 billion to EUR 1.5 billion.
- The trade with other EU states grew even faster. Food deliveries from Poland to the EU-25 States in 2003–2005 increased by 248%, whereas imports to Poland increased by 212%.
- The EU membership gave a new, very strong impulse to the export of Polish agri-food products to EU-10/12 countries. The increase in trade dynamics with these countries and the improvement of results were especially visible in recent years, whereas the trade with EU-15 noted a decrease in dynamics and the deterioration of results.
- The positive balance of foreign trade in agri-food products has improved: in total from EUR 0.4 billion in 2003 to EUR 1.5 billion in 2008, with EU-25 States from EUR 0.4 billion to EUR 2.3 billion in 2008, with EU-15 States from EUR 0.2 billion to EUR 0.8 billion in 2008 (but in 2006-2007 it was EUR 1.5 billion); with EU-12 States from EUR 0.2 billion to EUR 1.5 billion in 2008.

Foreign trade in this period became an important factor of the development of the situation in the food industry and in agriculture, because with a relatively stable domestic demand it absorbed vital part of the increase in domestic production. The share of the export in the production sold in 2008 reached 22%, as compared to 16.5% in 2004 and 10.5% in 2000 (*Kowalski, Wigier* (eds.) 2008).

After Poland's accession to the EU, the global agricultural production in fixed prices amounted to about PLN 58.5 billion and was on average 2.5% higher than in 2001–2003. In that period animal production increased by 6.9% and plant production decreased by 1.1%. The feature of plant production development is the faster growth rate of final production and commodity production than global production, which means that internal absorption decreases, both in respect to production and consumption, and the level of commodity production increases.

In 2003–2008 there have been important changes in the income situation of agricultural holdings in Poland. The income of Polish farmers grew significantly after Poland became an EU Member State in 2004. The income received from agricultural holdings in the pre-accession period increased over 2 times per 1 full-time employee (working at least 2,200 hours in an agricultural holding annually). The subsidies received by farmers from non-market sources had a fundamental impact on this favourable change of income situation. Although in 2003 the subsidies amounted to 9.4% share of income, the following year their share increased to 39%. The greatest share of subsidies in income in the discussed period was noted in 2006 when subsidies had greater importance than production activity in the creation of income. After the accession the relative profitability of farmers in relation to other occupational groups has also improved. The average agricultural income converted to 1 full-time employee amounted to 24.2% of the average net salary in the national economy in the pre-accession period, but in the first year of the accession this rate more than doubled and reached 56.2%. In the following years these relationships ranged from 43.3% in 2005 to 57.5% in 2007, a very good year for agriculture.

According to estimates conducted in line with the method of Economic Calculations for Agriculture, the production value of the Polish agricultural sector measured with the market prices in 2004–2008 increased by over 18.7% and for subsidies by 38.5%. At the same time the worth of indirect absorption increased by 28.1%. As a result the income per full-time employee in agriculture decreased in that period by 2.2%, whereas the average net salary in national economy

Table 2. Selected data on income and subsidies in the sector of agricultural holdings in Poland in 2003–2008

Specification	Unit	Year					
		2003	2004	2005	2006	2007	2008
Average net salary in national economy	PLN	17,622	18,325	19,060	19,840	21,570	23,330
Income per one full-time employee	PLN	4,259	10,290	8,252	9,984	12,411	10,062
Index of income for average salary	%	24.2	56.2	43.3	50.3	57.5	43.1
Subsidies per one full-time employee	PLN	402	4,009	3,882	5,198	5,352	5,019
Share of subsidies in income	%	9.4	39.0	47.0	52.1	43.1	49.9

Source: Calculations of Z. Floriańczyk and L. Goraj (IAFE-NRI) on the basis of macroeconomic calculations for agriculture – EAA and the CSO data.

increased by 27.3%. Now we must recall the assumptions and results of the forecast of farmers' income drawn up by the European Commission for 2005–2014. They indicate that the real income calculated per full-time employee will increase by 32.2% in 10 countries which entered the European Union in 2004 on condition that the employment (measured with the number of full-time employees) in agriculture is at the same time lowered by 21.8%. In order for this increase in income to take place, the employment in agriculture must decrease in the same period by 2.4% on average per year.

After the accession to the EU, the financial indicators of the entire food industry improved drastically. Between 2004 and 2007, as compared to 2003 (*Kowalski* (ed.), 2009):

- net profitability doubled to about 4% of the value, and ROE increased 2.5 times to about 12–13%, i.e. to the level over double as high as the basic percentage rate of the National Bank of Poland,
- profitability rates increased to a smaller degree: gross profit (from 2.5%–3.0% to 4.5–5%), cash revenues (from about 5% to 7%) and operational surplus (from 8.5% to 9.5%),
- cost-burdens of financial revenue decreased (from 2.3% to 1.2–1.3%) along with profit income tax-burdens (from 40% to about 20%); these are main sources of the improvement of net profitability rates,

As a result of a great profitability improvement, growth was observed in the previous years:

- the net profit amount increased from PLN 1.6 billion in 2003 to PLN 6.5 billion in 2007, i.e. 4-times,
- equity, increased respectively from PLN 30.1 billion to PLN 44.8 billion (by 49%), including own means in circulation from PLN 5.1 billion to PLN 10.8 billion.

It allowed for financing the increased (by 41%) investment costs when stabilising relative level of long-term debt, whose amount has increased just as the equity did.

After Poland's accession to the EU and in the subsequent years there were significant changes of enterprise structure in the food industry. There was also no mass bankruptcy of national companies. The processes of merger, takeovers or consolidations of whole sectors did not intensify either. In that period the number of industrial companies decreased slightly, mostly small and micro enterprises.

New challenges faced by the CAP and the development of agriculture and rural areas in Poland

Rural development represents an important priority of the common CAP which should be implemented through the second pillar of this policy. In actual fact, instruments and programmes of the second pillar of the CAP are aimed to support farmers rather than the rural population. Efforts to create a common rural development policy have been made for years. The failure to achieve this goal should be attributed to procedural complexity, high transaction costs of the instruments offered under the second pillar of the CAP, difficulties with the identification of institutions and persons responsible for rural development, the great diversity of rural areas in Europe, thus different priorities, which in turn complicates the definition of "common" elements in the rural development policy (*Woś,* 2004).

It should be noted, however, that the share of the rural population has been slightly increasing. Particularly strong population growth has been in rural areas in the proximity of major cities or in those characterised by attractive rural and natural landscape. At the same time, fluctuations in the number of rural residents is increasingly accompanied by a marked downward trend of the farming population, following the fall in the number of family farms. As their number decreases, the role of agricultural holdings in providing the source of income is gradually diminishing (*Woś,* 2001). Therefore, economic activity and sources of income of the farming population have been increasingly diversified. In 2005, farming provided the main activity and income source only for 36% of households with a farm of more than 1 ha of agricultural land, whereas the corresponding figure for 2000 was 42%. Such rural households accounted for 36% and 43% respectively of the farming population (*Karwat-Woźniak* et al., 2006). The analysis of the non-farming population has primarily demonstrated that this group represents a growing and ever more significant share of the rural population. Therefore, the rural community can no longer be identified exclusively with agricultural activities. As many as 57% of rural families own no agricultural land and 46% of private farms does not exceed 5 ha of cultivated land and for most of them main source of income is other than agricultural production (*Sikorska,* 2006). In some regions of Poland, particularly in the north and southwest, the group in question accounts for three-fourths of the total number of families. Even in the eastern Poland, where agricultural holdings have been characterised by very traditional family ties, non-farming families represent nearly half of the rural community, irrespective of the economic status of individuals.

The analysis of the socio-economic structure of rural population suggests that the upward trend of the number of non-farming population will continue and that this socio-occupational group will increasingly determine the socio-economic development of rural areas (*Sikorska* et. al., 2007). One should bear in mind that in the present picture of the Polish countryside agriculture plays a diminishing role, whereas non-agricultural elements have been gaining in importance, in terms of both employment and income of the rural population. The countryside has been losing its rural character and evolving towards multifunctional agriculture and rural areas development, which appears to be a universal development path (*Woś,* 2001). Also dynamic changes in the European and global agricultural and food market confirm the great meaning of traditional functions, played by the agriculture and rural areas. It refers, *inter alia*, to such aims as: securing food supplies at moderate prices for the

consumers, ensuring high competitiveness of production, maintaining stability of agricultural markets, or support of agricultural incomes. Increase of the prices of agricultural products and food in many regions of the world should be treated as a signal indicating the possibility of further perturbations on the international agricultural markets. At the same time, other risks of global character are recorded which force the change in attitude to agriculture and agricultural policy. The new threats and challenges indicate the need of considering the new areas connected with the agricultural activity in the aims and instruments of the CAP.

One of the most important challenges which the CAP will encounter in the future includes strengthening of positive effect of agricultural activity on natural environment. Depending on the type of production, its intensity, the employed technology and production concentration, agriculture may exert a positive or negative influence on natural environment. The EU and national legislation regulates the problems of limitation of the consequences of agricultural activity for natural environment in a greater and greater scale. It may be exemplified, *inter alia*, by high requirements in respect of environmental protection, animal welfare and food safety, being imposed on the farmers within the frames of the principle of mutual conformity (cross-compliance). Further intensification of environmental requirements will be connected with the expensive adaptative investments. It will be necessary, in the future, to find out a compromise between the production aims and the environmental goals. The increase of manufacturing costs, resulting from limitations and adaptations makes the European farmers to be in worse competitive position in relation to the producers from the countries which do not employ such requirements.

Other challenge for future CAP is ssupport of the incomes of the farms which implement the new aims and tasks of the policy. The characteristic feature of the European agriculture includes a dominating participation of agricultural family farms. The mentioned situation has not been principally changed in spite of the ongoing restructuring. In case of further world trade liberalization and increase of external competition, the participation of non-commercial farms in the total number of the farms may even be somewhat increased. In the future, a big part of agricultural family farms will also have difficulties in reaching the economic scale which ensures the extended reproduction. At the same time, the discussed farms will still play a significant role in the implementation of new public functions (such as e.g. preservation of traditional rural landscape, care of biodiversity etc.). It should be, therefore, assumed that support of agricultural incomes via the CAP will determine the economic vitality of a great part of the European agriculture; the future system of direct support of incomes should not, however, disturb functioning of Single European Market and inhibit natural restructuring and concentration processes.

Strengthening of rural development and ensuring territorial cohesion in the EU. In many EU regions, agriculture remains still the main host of rural areas. Owing to the instruments connected with the production and agricultural resources (Pillar One) and the instruments of Pillar Two, The Common Agricultural Policy strengthens social functions of rural areas. The mentioned areas constitute the important element of geographical and social-economic biodiversity but paradoxically, the differences in the level of economic development are just the greatest ones in the discussed areas. Differentiation of economic activity, ensuring an access to social services, and transport and telecommunication network has a significant meaning for striving at assurance of territorial cohesion and preservation of rural vitality.

In the light of the submitted arguments and Polish experiences resulting from the five-year membership in the EU and its effects on Polish agriculture and rural areas, it seems to be purposeful and justified to preserve, also in the future, its three elements, i.e. Common Market Organization, scheme of direct payments and policy of rural development. It does not mean that the CAP after 2013 should not meet the new European and global challenges.

The reached agreement "Health Check" contains significant, from Polish viewpoint, solutions concerning the future shape of the CAP after 2013. The priorities concerning further CAP reforms have been defined in document: "Polish vision of the Common Agricultural Policy after 2013 – assumptions and preliminary suggestions"(Polska…, 2009). When respecting the Community goals of the CAP and the principle of subsidiary, we think that the future CAP should consider conditions and problems which seem to be specific from Polish viewpoint, i.e.:

- Positive effect of the present CAP on development of agri-food sector and of rural areas and on leveling of the developmental distance between the agriculture of Poland and the EU-15 states and between the rural and urban areas;
- Striving at ensuring the equal conditions of competition for agricultural sector in Poland in relation to other member states;
- Evolutionary character of the path of the CAP changes, with the aim to adapt it to the new tasks and conditions in a global, not only in the European scale.

Preservation of the possibilities of the market support is significant not only from Polish viewpoint, especially in the sectors, affecting strongly the environment and having a great economic meaning for the economy of the regions. Instruments of market intervention are important for most of the middle-size farms, having smaller possibilities of managing with crisis situations. On the other hand, commercial farms require support in the field of utilization of modern instruments of risk management. Direct payments should become one of the main CAP instruments, being responsible for support and stabilization of agricultural incomes, compensating the costs connected with meeting the high standards of quality and methods of production and environmental requirements and also, maintaining agricultural production in less favored areas. Policy of rural

development should play a leading role in process of stimulating the structural transformations, in counteracting the climate changes, rationalization of water resources management, and protection of biodiversity and utilization of renewable energy sources. Apart from it, cohesion policy should receive greater meaning in stimulation of changes in rural areas. The priority of Poland should include the elimination of differences in the level of economic development of rural areas between the particular regions and also, reduction of such distance between rural and urban areas. Only comprehensive support of rural areas will enable their lasting and sustainable development, contributing simultaneously to the increase of the competitiveness of agricultural sector.

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SMALL AND MEDIUM ENTERPRISES AS DEVELOPMENT FACTOR OF AGRIBUSINESS IN REPUBLIC OF SERBIA

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Abstract: Development of strong and competitive sector of small and medium enterprises has very important role in process of total transition in Republic of Serbia. This sector should be one of the guidelines of economical development and future, like in developed countries.

Within the Strategy of development of SME and entrepreneurship in Republic of Serbia from 2003 to 2008 government of the Republic of Serbia, not accidentally, placed among many sectors which are expected to contribute and boost economical development, increase the employment rate, and realize increased influx of means deriving from export, the priority is on sector of processing of agricultural products. It can be concluded that significant contribution from agriculture to improvement of total economical situation is expected. Accession to EU should be considered primarily not only as the opportunity but serious task in regard to restructuring of the agriculture.

However, impeding circumstance, in regard to export of agricultural-food products, first of all to EU countries, is the fact that this market is under strict protective measures within the policy of agriculture and measures of agrarian protectionism. In such conditions it is very difficult for producers and processors of food to enter such closed markets. Small and medium enterprises are facing the choice of the business strategy:

- to place the existing product on current market;
- to place the existing product on new markets, including export;
- to sell the new product on existing market;
- to place the new product on new markets, including export.

Therefore, based on analysis of domestic market, volume and structure of import and export of agricultural and food products, as well as analysis of food industry and agricultural production in Serbia, it is necessary to define potential programs for small and medium enterprises with production which could be economically efficient and profitable from the aspect of investment.

Key words: SME, agribusiness development, transition, market.

1. Introduction

The use of term agribusiness should be explained at the very beginning. Literature offers many terms such as agro-complex, agro-industrial complex, food industry complex, agribusiness, etc. In this paper we will use the term agribusiness, considering definition presented by American economists Goldberg and Davis, (*Ceranic,* 2009) stating that agribusiness represents "the sum of all production operations and services for agricultural production, productive operations on farms, operations relating to storage, processing and sale of products produced from agricultural raw materials".

Agribusiness represents very complex business system with great variety and richness of organizational forms, and most important is division into following three segments:

- first, *pre-farm* – which includes production of organic inputs;
- second, *farm* – which includes agricultural production; and
- third, *post-farm* – which includes processing (industrial and craft) and sale of agricultural-food products.

Importance of agribusiness in the economical development of Republic of Serbia or in any other observation area is evaluated through numerous parameters on demographic changes and other macro economical indices. Primarily, it is evaluated trough contribution of this sector of economy in forming of social product and national income, in establishing and improvement of external trade balance, etc.

In order to represent the position of Republic of Serbia in a better way, often used parameters will be used which demonstrate that size of the agricultural household/holding in EU varies from 4 ha in Greece to 69 ha in Great Britain, and size of farms/holdings in Serbia is 3,28 ha. Average size of herd of dairy cows is between 3 and 5 in Portugal to 69 in Denmark, and average for EU is 24 heads of cattle, and in Serbia average is 1 to 2 cows per household. Number of persons employed in agriculture is also very different in EU countries, so the highest share of population employed in agriculture is recorded in Greece – 17% of labor force, and the lowest in Belgium – only 2 to 3%, average for EU is 47%. In Serbia, situation is also in this regard very unfavorable sine over 20% of population is

engaged in agriculture. Also, other parameters show no good picture of the condition of agriculture, for instance, plant production makes 60% of total agricultural production, approximately 750.000 private owned farms are engaged in agricultural production, size of farms of 3 ha is predominant (58,1%), whereas farms of over 20 ha are only 0,5%.

Of course, it is very important to give some main elements and information on implemented privatization, which is ongoing process in Serbia for over 18 years, according to different models and laws. The fact that should be pointed out is that despite the relatively long period of privatization, it is still not finished. Numerous controversies followed the previous process of privatization, and they are relating to the mode of privatization that was carried out, results of privatization and post privatization effect, but still, there are certain dilemmas on how to bring this process to the end. This is especially important since this is one of the leading sectors of domestic economy, which participates in gross added value of Serbia with approximately 15%, whereas in EU the respective value is 3,5%.

In efforts to improve the agriculture of Serbia, privatization has a special position. Issue is privatization of certain number of business systems in the field of food industry which dispose with approximately 15% of cultivable land (*Ceranic* et.al., 2009). These business systems in average dispose with 1.600 hectares of land and represented very important segment of market for agricultural-food products, in spite of their relatively low share in total agricultural land. They were the carriers of market supply with pork and eggs, have approximately the same share as family households in crop cultures, beef and mutton, as well as grapes. The single predominant role of private agricultural sector is in supply of the market with fruits, vegetables and milk.

In this paper, results realized so far in support to small and medium enterprises in development of agro business in Republic of Serbia are analyzed in more details. These are economical subjects who are of great importance because of their connection and effect on other sectors, and because they are potential for employment, can have considerable share in export, provide nutritional safety and security of the population and contribute to rural development.

Considering the flexibility of small and medium enterprises in regard to production programs, as well as their capability to adjust to economical trends, it can be expected that they become one of the most important subjects of support of agro business development in Republic of Serbia. This will be even more evident after ownership transition, since relatively few companies will be competitive with their production programs in development of economy of Republic of Serbia.

2. Major elements of the development strategy of small and medium enterprises

Agriculture as a branch of economy represents very important factor of total economical development of Serbia and important segment of the economical structure. Serbia has agricultural resources that are not used enough and therefore, they represent significant economical potential for further development. Maximal utilization of available resources is conditioned by both natural and socio-economic conditions that dictate the development of certain branches of production. Prerequisite for more stable and harmonized development of Serbia is in overcoming the problem of under developed regions. Small and medium enterprises represent main source of employment and driving force of most developed countries in the World, and therefore, they should have such importance and role in the development of our agriculture (*Ceranic and Maletic, 2005; Popovic, 2008*).

Ceranić et al. (2009) state that increasing globalization process divides scientists into two groups, the first one being of opinion that in newly created conditions small and medium enterprises will disappear, whereas the other group is of opinion that due to specific advantages small and medium enterprises will be able to recognize and conquer easily parts of unutilized market which would guarantee them perspective and survival in the future. Agro business is especially interesting field for small and medium enterprises, since this is very wide field which includes production and processing of agricultural and food stuff products, as well as numerous inputs for agricultural production.

All stated here indicates the necessity of establishing of small and medium enterprises in agribusiness of Serbia. Small and medium enterprises, by definition, represent family business. In these enterprises there is one or few owners, employees are mainly family members and also several permanently employed workers (*Ceranic* et al., 2006).

Concerning the origin of small and medium enterprises in agribusiness, it should be said that they derive partially from rural farms that underwent restructuring and gained new direction in processing of agricultural and food products (*Ceranic and Popovic*, 2009).

Advantage of small and medium enterprises is reflected in the following facts:

- In certain cases, there is a need for products whose volume should be smaller. Accordingly, in such cases, large enterprises don't have interest to be engaged in production, which leaves space for small and medium enterprises.
- Market, presently, with its dynamic changes sets certain demands, challenges for enterprises to react in very short time. Only small and medium enterprises can respond to these challenges since their organizational structure gives them the possibility to react sooner and faster than large enterprises.
- Level of utilization of production machines, transportation means and other resources is significantly higher than in large enterprises, since entrepreneur is constantly looking for new businesses to activate existing equipment.
- In small and medium enterprises, there is no strict division of labor; employees are trained for several operations, which enables them to adjust faster to changes in work process.

– Entrepreneur in small and medium enterprise has to know very well what are the sources of procurement and to maintain stoks at an optimal level in order to provide security of his business, and on the other hand not to financial means if it is not necessary.
– From previous text, it could be concluded that there is great rivalry between SME and large enterprises. This statement is not correct, since all the countriesof the world force such a form of cooperation between these two subjects, and therefore it is more realistic to talk about their complementary relations. That can be see from Figure 1 (*Ceranić and Popović, 2009*).

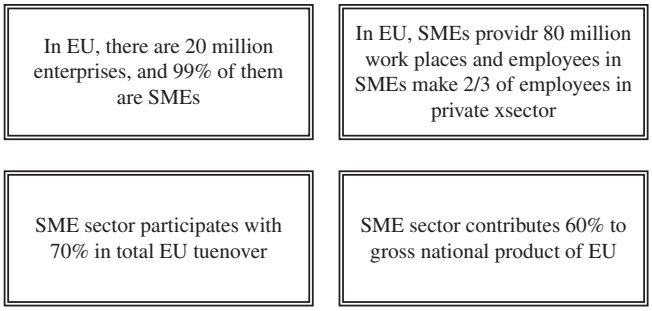

Figure 1. SME sector in European Union

– Further more, in order to illustrate a big importance of SMEs, comparative analysis of certain parameters is shown in table 1, and it refers to Serbia and nearby countries.

The focus of the development of small and medium enterprises can be defined in the following way:

– Development of a sector which is capable to significantly boost economical development, increase employment and flow of foreign currency- that can be realized by agricultural and food products processing;
– Strengthening of international support and respecting of the interest of small and medium enterprises' interests at all levels: Ministry of Agriculture, Ministry of Economy and Privatization, Republic agency for development of small and medium enterprises and entrepreneurship;
– Creation of new legal environment which would alleviate development of small and medium enterprises in agribusiness;
– Realization of reforms of public services in order to provide assistance in establishing of small and medium enterprises, and at the same time to reduce administrative and bureaucracy obstacles which are present for this sector;
– Carrying out of measures with aim to alleviate the access to sources of financing to small and medium enterprises considering that production of food is very sensitive;
– Connecting educational institutions and scientific research systems with small and medium enterprises in agribusiness, especially considering the fact that this is field with low qualification structure.

Table 1. Comparative analysis

Parameter	EU-27	Czech Rep.	Poland	Slo-venia	Hun-gary	Roma-nia	Bulga-ria	Serbia
Number of enterprises in 000	19602	878	1405	88	556	410	240	**277**
Number of employees in 000	85000	3461	5289	371	1783	2463	1318	**811**
GAV in billion EUR	3060	30	59	8	20	13	5	**6**
Number of employees per enterprise	4.3	2.8	3.8	4.2	3.2	6	5.5	**2.9**
GAV per employee in 000 EUR	**36.4**	**12.1**	**11.2**	**22.4**	**11.3**	**5.4**	**4.0**	**6.9**

Source: EUROSTAT – Statistics in focus, 31/2008.

3. Proposals for establishing of small and medium enterprises in agro business

Low level of utilization of food industry capacities of Serbia is a consequence of narrow foreign market, significant decrease of demand on the domestic market because of diminished paying capacity and inadequate production structure. Lower level of utilization of processing capacities had reflected negatively also on level and structure of primary agricultural production in Serbia. In development of *small and medium enterprises* in the field of agribusiness, starting point was assumption that small and medium enterprises with their *special production programs* will have *secure market, economically efficient and effective production* and, in that way, they will contribute and *induce increased use and technological improvement* of existing food industry, through cooperation programs, but also through establishing of objective competition (*Ceranic* et al., 2009; *Popovic, 2008*).

Development of small and medium enterprises in the field of agri business in Serbia should be directed to development of following types of production programs:

1. *Production of high quality products with protected trade mark, based on modern or traditional technologies, its own raw material base, and intended primarily for export to developed countries* (products of meat industry – ham, sausages, fermented dry sausage, smoked tenderloin and other high quality products manufactured from pork; dried and in another way processed sheep products, high quality products made of turkey, duck or goose meat, goose liver; *production and processing of high quality fish* – catfish, perch, sturgeon; *fruit products* – wall nuts, hazelnuts, almonds in small packages, stewed fruits, candied fruits, fruit teas, natural fruit juices, special fruit brandies (mulberry brandy, apricot brandy, apple brandy, sour cherry brandy, cherry brandy, etc.); *products from grapes* – special and autochthonous wines, grape juices with supplement of natural fruit aromas; *vegetable products* – warm and cold processing of different types of

vegetables, tomato and beet juices, ketchups, vacuum packaged sour vegetables (cabbage, cauliflower, carrot, peppers, pickles, onion, etc.), *mixed dry vegetables* (carrot, parsnip), *processing and small packages of horseradish, baby food based on vegetables.*

2. *Production and processing of «ecological» products, i.e. «healthy» food and other products made of natural raw materials* – integral flours and baked goods made on their basis, grainy «instant» food made of cereals with different supplements (dry fruits, honey, walnuts, hazelnuts, almonds, etc.), natural honey and honey products (honey with beebread, pollen, vitamins, medicinal herbs, minerals), teas and other preparations made of medicinal herbs (chamomile, Klamath weed, mint, elder, linden, nettles, black locust, black mulberry, rose hip, hawthorn berry, valerian, etc.), cosmetics preparations based on medicinal herbs and other natural raw materials, ecological packaging made of harvest remains, etc.

3. *Production intended to satisfy needs of domestic market and substitute import of products, which from natural, agro-ecological and economical aspect, can be produced in our country* – production of fresh water fish (carp, bighead carp), production of poultry eggs, production of broilers, production of wide-leaf tobacco «Virginia», production of yeast, production of dairy products, meat products, early fruits and vegetables grown in protected space, products of food industry which are currently imported (special types of cheeses, dry meat products, candy, etc.), production and processing of table mushrooms.

4. *Production intended to satisfy needs of domestic food industry and other branches of economy* – production of high quality fruit raw materials according to modern technology for the needs of conditory industry, dairy industry (dairy-fruit beverages), drying and grinding of onion and garlic for the meat industry, production of pheasant chicks and rearing of other wild game types (deer) for the needs of hunting tourism, production of protection clothes and hats.

5. *Other production* – production of fuels from harvest remains, production and processing of snails and frogs, collecting and processing of forest fruits, rearing and processing of fattening horses.

The other important presumption of development of small and medium enterprises in agribusiness is, also, that *considerable part of turnover/current assets will be invested in raw material basis*, i.e. into primary agricultural production and in this way development of these enterprises will stimulate further intensifying and restructuring of agriculture of Serbia.

Proposals for priority programs of development of small and medium enterprises in agribusiness are given according to groups of activities.

4. Support measures for development of small and medium enterprises in relation to European Charter

While European Charter for Small and Medium Enterprises adopted in 2000 by 15 EU members leaves no doubt about the direction in what way the economy of Europe is going, situation in Serbia is not totally clear. Namely, although Republic of Serbia has officially accepted the European Charter for Small Enterprises on the summit in Thessalonica, according to which it has obligation to prepare annual reports on sector of small enterprises, impression is that this has not become practice, yet.

Importance of principles contained in the European Charter should not be pointed out especially, but it will be useful to list them:

1. Education and training for entrepreneurship,
2. More favorable and faster start-up,
3. Better legislation and regulations,
4. Available abilities,
5. Improvement of on-line approach,
6. Improvement of business of small enterprises on domestic and foreign market,
7. Tax obligations and financial issues,
8. Strengthening of technological capacities in small enterprises,
9. Models of successful electronic business and first class support to small business,
10. Development of firmer and more efficient representation of the small enterprises' interests.

It is hard to say that any of these ten listed principles has been completely solved in Serbia. For future development of SME sector in Republic of Serbia, for strengthening its competitiveness and innovative capacities, it is necessary to create precise order in realization of principles contained in European Charter.

In any case, this is an imperative that has been accepted, and the question is how long EU will tolerate incomplete compliance to principles of European Charter.

If causes of such condition should be identified, then we need to look for them in the following:

- institutions and legislation,
- poor educational level of entrepreneur and persons employed in this sector,
- unfavorable conditions for functioning of SME,
- insufficient penetration and use of innovations and technological solutions of SME.

5. Conclusion

Changes of the political and economical concept have been initiated in the eighties of the last century, and are still ongoing, have changed significantly the strategy of agro business development. The concept of development of agro industrial complexes directed towards socializing of the agriculture and creating of corporations and big economical systems, changed into completely contrary concept, i.e. privatization and development of small and medium enterprises.

Small and medium enterprises in agro business were created partly due to the process of production restructuring of rural households by focusing on processing of agricultural

products, and partly due to the initiative of entrepreneurs or certain group with common goal.

Practice of most developed world economies confirms the fact that in the process of increasing globalization small and medium enterprises survive successfully, because they are in the position to recognize more rapidly and conquer parts of the market which have not been covered. However, it should be pointed out that size of the enterprise is not always guarantee for success, and according to some assertions the big don't eat the small, but the fastest eat the slowest.

There is no need to emphasize the importance of agriculture for Serbia, since it participates with 20% in GNP. And based on this, it is logical that small and medium enterprises should be important carrier of the development of agribusiness.

Republic of Serbia, as country in transition, is characterized by initiated reforms, unfinished privatization, high unemployment rate and many problems which reflect on development of small and medium enterprises.

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STRUCTURAL CHANGE IN REPUBLIKA SRPSKA – SMALL FARMS BETWEEN SUBSISTENCE ORIENTATION AND MODERNIZATION[1]

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Abstract: The paper aims to analyze the main barriers and opportunities for the modernization of the agricultural sector of Republika Srpska with a specific focus on the role of small farms. A particular attention has been given to specific elements related to the human, social, and institutional capital.

Methodologically the work has been based on an extensive desk research, on the use of a field survey and on a number of personal interviews with national experts and professionals. Overall the investigation has also greatly benefited from the theoretical framework elaborated by R. Yin within the "*case study methodology*".

Key words: small farms; structural change; subsistence farming; Republika Srpska.

1. Introduction

In describing the evolution of the Balkans Micheal Pailaret used the expression "*evolution without development*" and concluded that policy makers had spoiled rather than valued the natural and human resources of the region.

Within this framework agricultural and rural areas have been often neglected to the periphery not only physically, but also economically and politically. This is particularly evident in Bosnia and Herzegovina due to the extremely complex administrative organization created with the Dayton Peace Agreement in 1995. This complexity has lead to an extremely controversial policy environment that has been strongly characterized by the lack of a long-term perspective and by a non harmonized regulatory framework in which single municipalities have promoted individual development strategies.

The development of clear policy objectives and endorsement of a long-term, coherent and mutual agricultural and rural development policy have also been affected by structural problems: a lack of reliable information on population and other relevant issues, the absence of an adequate land registry system and cadastre. Moreover Bosnia and Herzegovina (BiH) agricultural sector is characterized by many factors that have typically affected transition countries such as land fragmentation, lack of agricultural mechanization and outdated production technologies, and rural aging, high unemployment and out-migration.

Small farms still dominate rural areas so their viability and their inclusion in long term agricultural and rural development strategies still represent a major issue in the academic and political debate.

The paper aims to explore and analyze the main barriers and opportunities for the modernization of the agricultural sector of Republika Srpska (RS) with a specific focus on the role of small farms. A particular attention has been given to specific elements related to the human, social, and institutional capital.

2. Theoretical framework

In South Eastern Europe the agricultural sector is still characterized by a dualistic structure composed of market-oriented commercial farms and small-scale subsistence farms. So an important part of the production is used predominantly for self-consumption and not for selling. This large share of subsistence makes agricultural performances often unpredictable (*P. Kostov, J. Lingard,* 2002).

Although no standard definition of subsistence farming exists, this phenomena is generally associated with small holding size, family agricultural work as a part-time or supporting activity, lack of machinery, difficulties in purchasing inputs and marketing products (assuming that they generate a marketable surplus), and lack of added value to primary commodities (*Z. Lerman,* 2004).

[1] Matteo Vittuari has been responsible for paragraphs 1, 2, 3 and 4. Conclusions have been jointly written by the authors.

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So, generally speaking, the term subsistence agriculture is used to identify those farms that are consuming a fundamental part of their own net production within the household, and, therefore, do not primarily produce to sell on the market. The larger is the share of self-consumption, the higher is the degree of subsistence. According *W. Doppler* (1994) a classification of subsistence farms could result as the following: farms producing at least 90% for their own consumption are subsistence oriented, farms producing between 10% and 90% for their own consumption are semi-subsistence farms, farms consuming less than 10% are market oriented.

Although a common definition is lacking, in agricultural economics literature, the term "subsistence agriculture" has a predominantly negative connotation (*R.E. Seavoy* 2003, *M. Brüntrup, F. Heidhues,* 2002). Subsistence-oriented agriculture is said to lack efficiency of resource use for various reasons:

- the priority given to satisfy family needs;
- the lack of market orientation;
- the lack of use of formal credit;
- external inputs are rarely used in subsistence production;
- technological backwardness;
- low responsiveness to policies.

Subsistence farming defined in these terms reflects, therefore, both historical factors and equally rational responses to high levels of rural unemployment, low incomes and social security systems. Such social security transfers play an important part in agricultural household income and could easily account for more than half of total agricultural household income in some countries. Subsistence farming can, therefore, play an important role in overall family welfare and, equally, in absorbing labor where alternative sources of employment are scarce.

3. Materials and Methods

Methodologically the work has been based on an extensive desk research, on the use of a field survey and on a number of personal interviews with national experts and professionals. Overall the investigation has also greatly benefited from the theoretical framework elaborated by R. Yin within his "case study methodology".

The desk research has been focused on the collection and examination of country surveys, reports and research papers, official reports of national agencies, national and international databases.

The field survey[3], based on a structured questionnaire[4], has involved 215 agricultural households in 5 "*regions*" of RS (Banja Luka, Bijeljina, Doboj, Sokolac, Trebinje). Since the administrative division of RS does not foresee the regional level – only the municipal level – the 5 regions were selected by following the territorial network and organization of the Agency for Extension Service of Republika Srpska.

Farmers have been selected randomly among those asking for advice or assistance to extension services (this criterion has been used to partially overcome the absence of a land registry). Moreover the number of respondent per region has been partially balanced according: the total population and the total sown area of each region.

The selection of the sample has been particularly complex due to the lack of data resulting from: an unclear definition of who can be identified as farmer in RS[5]; uncertain information regarding the total number of farmers in the Entity; the lack of a land register (a project to complete land registration has been initiated at the beginning of 2008 thanks to a World Bank loan); the number of farmers working part time or full time in other sectors and so not classified as agricultural workers by official statistics (*World Bank,* 2004).

Personal interviews have been carried out with a number of national and international experts in order to overcome the lack of data on specific issues and to collect expert opinions for certain dynamics.

4. Results

4.1 Assistance to Agriculture in RS: the 2000–2007 period

The major elements that must be underscored in analyzing Bosnia and Herzegovina agricultural policy, are the absence of a consistent uniform policy at the national level and the lack of institutional capacity to develop and coordinate agricultural policy and legislation (*European Commission,* 2005). According to the constitutional setting of BiH, all the existing public administration levels (state, entities, district, cantons and municipalities) are involved in agricultural legislation and administration (*European Commission,* 2005).

Duties and responsibilities at the State level are limited to the competencies emphasised by the Constitution as foreign policy and international agreements, foreign trade policy, and custom policy. Any function or power which is not expressly assigned in the Constitution belong to the Entities.

The agricultural support system of Republika Srpska has to be analyzed within this institutional framework. Taking

[3] The survey does not aim to be exhaustive and the limits of this approach are evident especially in the size and in the selection of the sample. However, even if the survey does not aim to have a statistical significance, the results are extremely significant in order to explore the main characteristics of the subsistence sector and to provide additional and updated field information.

[4] The questionnaire has been prepared by and the survey coordinated by Renata Rakic (Agency for Extension Service of Republika Srpska), Gordana Rokvic (Department of Agricultural Economics, University of Banjaluka), Matteo Vittuari (Department of Agricultural Economics and Engineering, University of Bologna).

[5] The Law 01-892/06 defines as farmer who is holding a registered farm or a member of a family farm who is engaged in agricultural production. A family farm is a farm owned and operated by a family. The definition remains unclear due to different classification that can be used to identify family farms.

into account the last decade, the agricultural budget never exceeded three percent of the national budget, and the policy measures adopted have often been characterized by short term perspective and regular annual revisions.

Table 1. Agricultural budget 2000–2007 (data in .000 KM[6])

2000	2001	2002	2003	2004	2005	2006	2007
7.562	16.149	17.781	22.149	27.607	31.748	38.780	50.000

Source: Ministry of Agriculture of RS

Before 2000, agricultural support in RS was characterized by individual, ad hoc decisions made by the Government or the Ministry of Agriculture. In addition, it was provided mostly to certain state-owned companies. In this sense public aid to agriculture was missing an overall strategy (both short or long term), and was basically unfair, as subsidies were not allocated according clear and transparent rules. Policy measures were adopted on an annual basis, and often characterized by a significant delay in their approval and implementation. This created uncertainty among agricultural producers, since in most of cases, they did not have any indication of the subsidies orientation or any access to credit, making it necessary for them to invest their own resources.

In the year 2000, some agricultural policy instruments were introduced, taking a step toward the creation of a clearer and better defined strategy. Measures such as regress for breading stocks in livestock production and premiums for milk and tobacco were introduced; moreover, significant resources (38% of total support) were used in the form of extended credits and loans.

In 2001, the agricultural budget more than doubled from the previous year. With the positive impact of these measures being confirmed during the preceding years, additional measures were also introduced in 2002. A case in point was the Law on Allocation and Disbursement of Resources for Agriculture and Rural Development Support, which provided long-term grounds of support for this sector. However, at the same time, this law was characterized by critical aspects related to significant fluctuations and instability in different premiums such as milk production and breeding stock. Subsidies for livestock were halved, and even tobacco and wheat subsidies were significantly reduced. Overall, total resources for agricultural development support remained at the level of the previous year (+10%), and government started co-financing operating costs of Agriculture Extension Services, as an indirect support measure.

The year 2003 was characterized by the availability of additional resources (+25% on an annual basis), and significant diversification of the overall program. Apart for a further growth of milk and tobacco premiums, for the first time, subsidies for fruit growing, feed and medicinal herb plantation production were introduced. An important measure, that became effective in 2004, was the provision of subsides for the interest rate for agricultural credits (around 10% of total resources). This significant diversification also included introduction of resources for rural infrastructure development that were planned but not used, due to the need for those financial resources to mitigate flood and drought consequences.

In 2004, overall resources grew an additional twenty-five percent. Apart from a further strengthening of the supports to milk and tobacco, new grants for the veterinarian sector were introduced. In addition, for the first time, subsidies for contracted production of vegetables and establishment of new orchards and vineyards were set up.

The increase of the agricultural budget continued during the 2005–2007 period, and was generally characterized by a lower degree of fragmentation than in the previous period: in these three years, agricultural policy was consolidated, despite constraints imposed by a lack of transparency and stability, low accessibility, and a general lack of a long term strategy. During this three-year period, direct support to production was slightly reduced in favor of investments in and support for rural development and the veterinary sector.

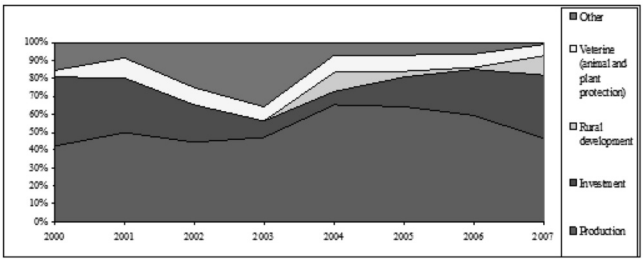

Figure 1. Subsidies by type of expenditure (2000–2007)
Source: elaboration of the author

Even though the four percent of the total RS budget provided for in the Law on Allocation and Distribution of Agriculture and Rural Development Support of 2002 was attained, the 2000–2007 period was characterized by a significant increase of resources.

During this period, the major share of agricultural support was allocated, through direct, support to certain types of production (milk, seed and tobacco) and only in the last years significant additional resources were assigned to rural development, long-term investment and to the veterinary sectors. Although this shift of resources towards rural development was a positive measure, a clear mechanism for distribution of these funds has yet to be developed with respect to transparent rules on how to distribute such resources to beneficiaries.

So among the tendencies that have characterized the agricultural support system in the 2000–2007 period, it is relevant to highlight the following:

– total amount was increased significantly since 2000, when it was KM 7.562 million, to KM approximately KM 50 million, or by 6.6 times;

[6] KM = Convertible Marks. 1 KM = 0.511292 Euro.

- more than 50% of the agricultural budget was allocated to direct support of production, and to income support in particular for certain products (milk, seed, and tobacco);
- many analysts agree that a significant amount of subsidies tend to end in the pockets of a negligible part of (large) producers, while a large number of (small) agricultural producers have had access to only relatively small subsidies (*Z. Vasko,* 2006). This suggests a lack of an equitable principle in subsidy allocation, and a failure in scope, as extremely few subventions have a social more than developmental character;
- funds for agricultural credit have often been characterized by an unclear mechanism of functioning, however, with the new strategy, these funds should be partially transferred to rural development;
- a not so negligible category was represented by those subsidies that were allocated by Ministry decision or under diverse "development programs" that were characterized by a lack of information regarding purpose and selection criteria;
- veterinarian grants have been allocated more for establishment and financing of veterinarian institutions than for animal health protection;
- funds have been allocated through 47 different items: such a broad spectrum suggests, on the one hand, that the overall strategy failed to have a long term perspective, and, on the other hand, that policy aims have been largely unclear.

Subsidies chosen by RS did not have developmental character during the period observed, and from the structure of beneficiaries, it could be concluded that they were used only by certain groups of beneficiaries, while they had little impact upon the stronger support for current and long-term development of larger groups of producers. Similarly, in the previous period, not a single more serious analysis of the impact of subsidies was performed, indicative of the impact of governmental financial support to growth, increased competitiveness and change of production structure. Actually, this analysis indicates irrational use and poor targeting of resources, which significantly puts under question readiness of society to provide support to the agriculture sector. When we add to this extreme inconsistency the measures and mechanisms implemented at RS level, individual local administration levels, as well as very poor monitoring of targeting resources and evaluating effects of the measures, we get a clearer picture of the appropriateness of RS agricultural policy and capacities of the responsible institutions.

Agricultural support policies has been partially revised during 2006 when the Ministry of Agriculture carried out important reforms and created and adopted three major documents: the "Strategy for agricultural development of the Republic of Srpska by 2015" (including a new model for agricultural subsidies); an action plan for the implementation of the strategy; and a new regulation on subsidies. All three documents came out with the following understanding:

a) RS Government shall channel its support to the agrarian sector through the "Agrarian budget" and the total amount of resources should reach 6% of the domestic revenues during the first phase of the strategy and 8% during the second phase (Ministry of Agriculture of Republik of Srpska, 2006).
b) Agricultural support should be addressed through the current system of subsidies and incentives (axis 1), through support to development programmes (axis 2), and through support to rural development and non-commercial holdings (axis 3) (Ministry of Agriculture of Republik of Srpska, 2006).
c) In the course of the initial three years of the realization of the Strategy, the ratio of resources directed should amount to 40 (axis 1):40 (axis 2):20 (axis 3), and following a period of three years, the ratio should shift to 30:50:20. Therefore, in both periods, the emphasis was placed on development (axis 2 and axis 3), with 60, i.e. 70% of the volume of support, from the aspect of multi-functional development of agriculture (Ministry of Agriculture of Republik of Srpska, 2006).

4.2 Small farms in RS: a field survey

4.2.1 Farm size

The sample in the survey respects the farm size estimations of the major reports and studies: a significant number of farms have a size lower than 5 ha. Farms above 10 hectares included in the sample are generally located in mountain areas or present a significant share of unutilized land.

Table 2. Farm size

Farm size	Number of farms (%)	Number of farms – Cumulate%
0–1 ha	8,4	8,4
1–5 ha	37,4	45,8
5–10 ha	36,5	82,3
10–30 ha	17,7	100,0

Source: elaboration of the author

Besides farm size a major constraint is land ownership which is still under a transition process. A large share of agricultural households do not have formal documents to certify their property or the rental status of the land (renting without contract is a quite common practice). Moreover, among the 50% of registered properties there is a variety of situations. An exception is represented by the few large producers who are in possession of the legal documents for the land they have rented.

Labor is largely the main input and in general the overall level of mechanization remains poor also due to the average farm size which is largely inappropriate for a modern mechanization and to the lack of financial resources that

would allow to purchase or to rent machinery. Moreover the existing technical equipment is generally outdated.

4.2.2 Market vs subsistence

Grain, fruit and vegetables are produced mainly for self consumption while the marketed share is considerably low. The case of fruit production, where only the 5% produce manly for the market and an additional 5% sell on the market at list the 70% of the total production, is particularly significant.

Farms based on fresh meat and fresh milk productions are generally more market oriented. Among the reasons behind the development of this sector there are: a well developed milk processing industry, a well structured shredded milk collection network, the opportunity for a valuable monthly income for small farmers, low market costs and fixed investments.

Milk and meat processed products are predominantly produced for self consumption with the exception of Doboj and Trebinje area. This can be partially explained considering some successful stories like the "*sir iz mijeha*" (cheese in a sack) which has been recently protected through a *slow food presidium*[7]. However on farm meat processing remains rare also because of the relevance of the livestock market within the Entity.

Table 3. Market orientation by product (%)

Product	Mainly for family consump.	Up to 70% for family consump. and 30% for market	50% for family consump. and 50% for market	Up to 70% for market and 30% for family consump.	Mainly for market	No product.
Grain	50,9	9,4	7,9	5,9	5,4	20,5
Fruits	71,9	6,4	3,5	4,4	4,9	8,9
Vegetable	76,8	5,9	2,0	8,7	5,6	1,0
Milk (fresh)	25,2	8,5	14,4	13,9	23,2	14,8
Milk products	43,0	5,5	5,9	15,9	7,4	22,3
Meat (fresh)	15,3	11,9	9,5	35,1	25,7	2,5
Meat products	73,2	1,0	0,5	0,5	0	24,8
Honey	17,3	0	2,0	2,5	2,0	76,2

Source: elaboration of the author

Overall more than the 40% of products are marketed through farmer markets while only a 20% of the farmers sell their products through a processing company or a distributor.

4.2.3 Credit

The credit system is not used by the majority of agricultural households (57.7%) however the most accessible institutions are Micro Credit Organization (MCOs) and NGOs while the presence of commercial banks is absolutely residual.

The major barriers to credit are the high interest rates required (MCOs and NGOs are more accessible since they offer better condition) and the request of significant collaterals that are considered as a major constraint in the 56% of the cases.

Overall credit has been used mainly for purchase of equipment, for the construction and modernization of buildings and other facilities, and for solving financial problems. Correlations between access to credit and access to subsidies have to be observed. Farmers who do not have access to subsidies usually do not have access either to credit or microcredit. Small size, age and low education level are among the main causes.

4.2.4 Subsidies

Overall more than 50% of the interviewed agricultural households have received subsidies, but relevant regional disparities have to be underlined. Subsidies have been received by the 65% of agricultural households in Doboj area and only by the 20% in Trebinje area. This diversity in subsidies distribution can be partially explained with the diversity of farm size within the regions: large farms in Banja Luka and Doboj receive the largest share of subsidies.

Table 4. Access to subsidies 2006–2007

	%	Cumulate%
Subsidies received	51,2	51,2
No subsidies received	48,8	100,0

Source: elaboration of the author

The subsidy system is considered extremely complicated by a large group of households who find the main element of complexity in the fact that in the last years the system has been deeply modified on a yearly basis.

Moreover subsidies are extremely fragmented and fail to promote specialization or competitiveness. Considering that almost the 80% of subsidy recipients obtain less than 900 KM

Table 5. Subsidies received in 2007 (KM)

Subsidies received	Number of farmers (%)	Number of farmers – Cumulate%
No subsidies received	47,8	49,2
50-100 KM	3,4	52,8
100-200 KM	3,4	56,3
200-300 KM	3,9	60,4
300-400 KM	5,4	66,0
400-500 KM	6,9	73,1
500-700 KM	4,4	77,7
700-900 KM	2,0	79,7
900-1500 KM	3,9	83,8
1500-2000 KM	6,4	90,4
>2000 KM	9,4	100,0

Source: elaboration of the author

[7] Slow Food: http://www.slowfood.com.

per year it is probably appropriate to recognize in agricultural subsidies more a social then a development purpose.

A large majority of subsidies (70,5%) have been allocated exclusively to production, this is coherent with the agricultural policy instruments used in the 2000–2007 period basically aimed to the direct support of certain commodities (overall milk and tobacco). Apart for production there is a quite significant share of farmers (7,9%) who have received subsidies both for production and for the purchase of new equipment. Other categories (modernization of new facilities, purchase of inputs as chemicals and fertilizers) have been residual and did not have a significant impact at the farm level. A subsidy scheme mainly oriented to support production instead the purchase of new equipment or the improvement of the facilities fails in promoting a modernization process

Table 6. Subsidies/aim

Aim	Subsidies received (%)	Subsidies received – Cumulate%
No subsidies received	48,2	48,2
Purchasing of new equipment	2,0	50,2
Modernization of facilities	2,0	52,2
Purchasing of inputs (chemicals, seeds)	1,5	53,7
Production	36,9	90,6
Purchasing new eq + production	7,9	98,5
Modernization of facilities + production	1,0	99,5
Equipment+inputs	0,5	100,0

Source: elaboration of the author

A major criticism that farmers direct to the subsidy system is also related to its extreme complexity due to the lack of stability (in the past decade an overall strategy have been not foreseen and instruments were changed on an annual basis) and the extremely bureaucratic (for farmer's average knowledge) procedures.

4.2.5 Sectoral organizations and farmers associations

The majority (68%) of the agricultural households are not member either of a cooperative or of an association. The situation is largely common in transition countries, where agriculture cooperatives played a big role in former systems. In RS more that 300 "old" cooperatives are still formally existing and most of the cases they are not functioning but they are still in control of valuable and large properties. This situation has a significant impact on the farmer's perception of the cooperative system. So mistrust is still a major constraint for the creation of associations and of a new model of cooperative.

4.2.6 Demographic trends and family structure

Effects of war and changes in the economic system continue to support the lasting trend of migration of people from rural areas to economically more developed urban centers contributing to further erosion of rural households and their deteriorating age structure. Agricultural activities in the area are thus often limited and have mainly a subsistence or semi-subsistence character. The age structure reflect this considerations since families are characterized mostly by elders and so by people with less chances to find a better job in a more urbanized center or with a not so strong desire to move in search of a better life. Generally life and work in villages are made more difficult by the lack of adequate infrastructures and services.

Interviewed households are not extremely large since the 45% of them have between 3 and 4 members and the 78% less than 6 members.

4.2.7 Family income

Insufficient income from agriculture is result of low level of investment. Limited production contributes to high sale price by product unit for which reason local products cannot compete in the market with those imported from neighboring countries.

Considering the farmers included in the survey a significant variety of situations has to be underlined: income range from less than 300 KM per month (16,4% of the total population) to more than 700KM (17,2% of the total population) and it is almost equally spread in all the categories in between.

Table 7. Income – Individual income (monthly)

Income	Individuals (%)	Individuals – Cumulate%
<300 KM	16,3	16,3
301-350 KM	5,8	22,1
351-400 KM	9,4	31,5
401-450KM	10,5	42,0
451-500 KM	14,0	56,0
501-600KM	10,5	66,5
601-700 KM	12,9	79,4
>700 KM	20,6	100,0

Source: elaboration of the author

Farmers and agricultural households' farm mostly part time and beside agriculture they are permanently employed or they have a temporary position in the service or in the industry sector. This situation is confirmed also by the fact that agriculture does not generally represent the majority of the income, but only an "additional source" to a salary from another sector or other revenues (i.e. a pension). More than 50% of farmers gain less than the 60% of their income from farming activities and only the 15%–20% can be considered as professional farmers since they gain the large majority of their income from agriculture.

Off farm work is shared among services (20%), agriculture through work in other farms or companies (19%) and industry (13%). A significant share (35%) is unemployed or has access only to short term casual jobs (5%). Other revenues such as pensions (34%) and remittances (2%)

represent an additional economic support for a significant share of farmers.

Overall a correlation between income and subsidies can be noticed: households with lower income do not receive subsidies or are anyway minor recipients.

5. Conclusions

A large majority of farmers seems to elude a commercial definition or orientation. Subsistence and semi-subsistence remain still largely the main orientation so that non commercial farms are still the most common production unit. This is emphasized also by several findings:

- farm size is predominantly small or really small (less than 5 ha) although if regional differences has to be highlighted;
- land ownership is still under a transition process so that the land market is affected by a significant stagnation due to the uncertainty of the property and to the lack of investments and long term strategy at the governmental level. This situation give not any incentive or adequate support to the farmer to move from a subsistence to a more market oriented production;
- there is an overall lack of investments both in physical (outdated machinery, lack of machinery and other facilities) and human capital (the level of education is generally low as well as the overall availability of vocational training);
- production is extremely diversified and based on labor as main input so that the overall productivity is significantly low;
- access to credit is at a very low level due to the high interest rate required and to the request of significant collateral by the credit institutions. Moreover the overall perception of the risk is very high so that farmers are reluctant to invest or ask for credit even in case they would have the chance to do it;
- subsidies are often too small to be attractive (so that the system results to be too complex also due to its scarce economic attractiveness) and do not have a significant impact on farming activities. Overall subsidies are too fragmented to promote specialization and competitiveness and so to support an evolution of the "farmer" that at the moment find in the subsidies, and overall in the agricultural sector, a social support;
- policy measures are mainly focused in supporting production and fails to stimulate innovation and change. Stronger emphasis could be dedicated to credit programmes for small-scale agriculture or to the improvement of rural areas through technological modernization and social infrastructures;
- associations and cooperatives are not developed. Also because of this farmers have no influence over legislation and regulation for agriculture in the sense of adopting new stimulative measures contributing to higher living standard of rural population and stopping rural migration;
- rural migration is significantly high especially among younger generations. The lack of services, infrastructure and of public investments in rural areas do not create any alternative economic opportunity so that the labor force is often forced to migrate often leaving farming activities to the elder members of the family or keeping on farming part time during week end and so failing in creating a class of specialized farmers;
- farmers are generally elder and younger farmers perform agricultural activities only part-time also due to the lack of economic attractiveness of the agricultural sector.

Most of these elements can be considered major constraints in promoting competitiveness and innovation. However if on the one hand subsistence farming embodies a barrier for the modernization of production schemes, it is also true that on the other hand it represents an important social safety net especially in rural areas and in the rural-urban fringe due to the lack of economic opportunities.

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MODELING MULTIFUNCTIONALITY OF AGRICULTURE AT A FARM-LEVEL: THE CASE OF KERKINI DISTRICT, NORTHERN GREECE

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Abstract: Multifuncionality has become a central concern at both conceptual and empirical levels. In this study, a comparative evaluation of the economic performance of conventional and multifunctional farms (mainly organic farms) was conducted for the Lake Kerkini region (North Greece) with the use of mixed integer non-linear programming method. The economic performance of farms was evaluated in terms of farm income, resource allocation, production level and production mix. The results indicate that multifunctional farms have overall better economic performance and young farm managers are keener to adopt multifunctional farming than the older ones. Differences between the model results and the observed facts are attributed to the structural characteristics of the farms, along with the CAP measures and the existence of multiple objectives, beyond maximization of net farm returns.

Key words: Greek farming, multifunctionality of farming, farm decision making, Mixed Integer Nonlinear Programming

Introduction

An interesting strand of the literature on multifunctionality refers to the attempts that have been made from scholars to operationalise the notion of multifunctional agriculture at the farm level.

Using mathematical programming methods at the farm level, *Havlík* et al. (2005) analysed the impact of various policy instruments on the production of environmental goods, related to agricultural commodities, in view of the uncertainty in output prices and farmers' risk aversion. Additionally, *Wilson* (2008) conceptualizes the idea of multifunctional transitional processes over time and, introduces the notions of multifunctional path dependency and decision-making corridors.

Multifunctionality is integrated in the policy impact analysis from *Buysse* et al. (2007), with the use of three different, farm-level, mathematical programming models. *Moreover, Wilson* (2009), suggests that the farm level is the most important spatial scale for the implementation of multifunctional action 'on the ground'; this argument stems from the analysis of different interlinked 'layers' of multifunctional decision-making ranging from the farm level to the national and global levels. Additionally, several studies have used various types of mathematical programming methods in order to examine the differences between organic and conventional farming (i.e. *Acs* et al. (2007), *Cisilino and Madau* (2007), *Schmid and Sinabel* (2005, 2007)).

Finally, Aguglia et al. (2009), explore the adoption of diversification and multifunctionality as possible alternative strategies to the agricultural "productivist" model.

The Greek literature is quite poor with regard to studies about the economic performance of multifunctional farms and the jointness between commodity and non-commodity outputs. Recent references on various multifunctional aspects of Greek agriculture include: *Barrio and Vounouki* (2003), *Louloudis* et al. (2004), and *Karanikolas* et al. (2007). These studies illustrate that multifunctional activities are more efficient and can help family farming as well as rural communities to improve their overall performance.

Greek agriculture is a highly diversified sector. This diversification results from the high fragmentation of farm holdings, the topography and natural features of Greek landscape (83% of the agricultural area is situated in less favored areas or mountain areas), the multitude of farm holdings (860,000 holdings) and, last but not least, from the scarce resource endowments. Moreover, 36% of all farm holdings have an economic size of less than 2 European Size Units, 67% of holdings occupy less than one Annual Working Unit and 76% use less than 5 ha of agricultural area. The chief goods produced are wheat, corn, olive oil, fruits and vegetables. The age and sex distribution of farm holders

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is another important aspect of Greek agriculture; 25% of the holders are women, 55% are aged 55 or more (37% are aged 65 or more), and only 7% are younger than 35 years. Finally, only 15% of farm holders are full-time farmers.

The purpose of this study is to evaluate the economic performance of multifunctional and conventional farming, by using a mathematical programming method at the farm level.

The paper is organized as follows. In the next section**,** the mathematical model and the data used in the study are described. In section 3, the results of the model are discussed and then are compared with the actual behavior in order to draw some conclusions about farmer behavior in the Lake Kerkini region, Greece.

Materials and Methods

In order to achieve the objective of this study, a field survey was conducted in 2007 in the Lake Kerkini area (Northern Greece). A sample of 70 farms was drawn, consisting of 45 representative conventional farms, along with 25 multifunctional (MF) farms (see below). Two specific kinds of activities have been used as an indication of the concept of multifunctionality. The first is, organic farming and the second is the provision of eco-touristic activities, a major form of on-farm diversification in the Greek countryside.

After the compilation of a detailed dataset through face to face interviews with the heads of those farms, a mixed integer non-linear programming (MINLP) method was implemented. MINLP is selected as an approach in this paper because it was necessary to be able to simultaneously optimize the system structure (discrete) and the parameters (continuous). The mathematical model is as follows:

$$\text{(1) Max:} \quad \sum_j R_j X_j - \sum_j C_j X_j + (HSAMT \times HS) + (LSAMT \times LS)$$

Subject to:

$$\text{(2)} \quad \sum_j A_j X_j \le CP$$

$$\text{(3)} \quad \sum_j D_j X_j \le DRLND$$

$$\text{(4)} \quad \sum_j F_j X_j \le IRLND$$

$$\text{(5)} \quad \sum_j T_j X_j \le PST$$

$$\text{(6)} \quad \sum_j H_j X_j \le L$$

$$\text{(7)} \quad \sum_j N_{jm} X_j \le MCN, \forall m$$

$$\text{(8)} \quad HS + LS \le 1$$

$$\text{(9)} \quad DI = \frac{X_{"cows"} \times [10 + (6 \times \gamma)] + X_{"sheep"} \times 1.5}{PST}$$

$$\text{(10)} \quad HSAMT = (200 \times X_{"cow"}) + (25 \times X_{"sheep"})$$

$$\text{(11)} \quad LSAMT = (25 \times X_{"cow"}) + (6.25 \times X_{"sheep"})$$

$$\text{(12)} \quad DI - 1.8HS - M \times LS \le 0$$

Where j represents the possible enterprises of: apple, pear, sheep, cow, trefoil, olive, cherry, corn, tare, pig, tomato, and barley for organic producers and cow, sheep, pig, soft wheat, hard wheat, trefoil, olives, tare, cotton and tobacco for conventional producers. Regarding the objective function coefficients, R_j represents the gross revenue (in €) calculated at the prevailing market price of the j^{th} enterprise. C_j represents the production cost (including variable costs) of one unit (stremma or head) of the j^{th} enterprise. The decision variable includes X_j which represents the stremmas or head produced of the j^{th} enterprise. Finally, HSAMT represents the high subsidy amount (€) and LSAMT represents the low subsidy amount (€) of livestock subsidies. Binary variables (HS, LS) were created in order to choose between high subsidy and low subsidy payments.

There are six resource constraints in the model for capital availability (€), three types of land availability (stremmas), labor (available working hours) and machinery availability (available operating hours). Land includes irrigated land, dry land and pasture (stremmas). Operating hours of machines are potentially limiting and are represented in individual constraints by machine type (m). Resource endowments include available area of irrigated land (IRLND), pasture land (PST) and dry land (DRLND) in stremmas, capital availability (CP) in Euros, labor (L) and machinery (MCN) availability in working hours.

Regarding technical coefficients, A_j represents the amount of capital (in €) used when producing one unit of the j^{th} enterprise, similarly, D_j and F_j represent the amount of dry and irrigated land used to produce one unit of the j^{th} enterprise (in stremmas). T_j represents the amount of pasture land required for the production of one unit of the j^{th} enterprise. Finally, H_j and N_{jm} represent the hours of labor and machine operation required for the production of one unit of the j^{th} enterprise. Regarding accounting constraints, DI represents the density index of livestock productivity, γ is the weighted average of the number of cows between six and twenty-four months age and is calculated based on life expectancy and livestock replacement assumptions[5] (for this study γ = 0.8).The need to incorporate an either/or condition on subsidy amount is enabled with binary variables. Equation (12) establishes the density index dependent requirements of receiving either a high subsidy (HS) or a low subsidy (LS) but not both, as mentioned previously. Thus, if HS=1 and LS=0 then DI must be less than 1.8. Otherwise, the DI is not restricted as M theoretically represents pasture infinity but practically is a very large number (e.g. 1,000,000,000). This formulation therefore depicts an empirical application of introducing Boolean logic not often used in mathematical programming demonstrating a potentially powerful technique.

While modeling the constraints, a difficulty has arisen, concerning the specification of the right hand side for pasture land availability. Specifically, pasture land has the characteristics of free good (zero opportunity cost) in the

[6] KM = Convertible Marks. 1 KM = 0.511292 Euro.

Table 1. Characteristics of the "Average Farms" By Farm Size

Size	Type	Irrigated land	Dry Land Stremmas	Pasture	Capital -€-	Labor Hours	Tractor Hours
Small	MF	40	0	10	900	1200	150
	Conventional	18	20	15	850	800	120
Medium	MF	70	0	15	1200	2000	300
	Conventional	33	27.5	20	1600	1400	180
Large	MF	95	0	15	2000	2600	400
	Conventional	45	45	30	3000	3000	400

Source: Questionnaire results

examined area; as a result farmers may be able to have an "infinitely high" amount of pasture land and, because of the high price of dairy products, they could use all their available labor, capital and machine for cattle production instead of crops. What stops farmers from having infinitely high amount of pasture are the quotas form the Common Agricultural Policy regarding milk productivity for each country. Based on these limits each farmer has some productivity rights regarding the number of animals and his/her milk production. So the right hand side regarding pasture availability constraint was defined as the historic average of the pasture land farmers had based on their productivity rights.

Finally, regarding the units of the different sets of constraints the following should be taken into account: a) land was measured in stremmas (5 stremmas = 1.25 acres) b) labor was measured in hours per stremma or in hours per head for livestock productivity c) gross revenue, variable costs, capital and wage rates are in Euros (1 € = 1.2 U.S. dollars for the examined period). The model was solved with the use of General Algebraic Modeling System (GAMS), which provides a flexible framework for formulating and solving MINLP problems.

The samples used for this study consist of 25 MF (organic) farms, 10 of which engage in eco-tourist activities, and 45 conventional farms respectively. All the organic farms of the area of interest are included in the sample. The choice of the conventional operations was made with the method of stratified random sampling. Specifically, the population of the conventional farmers in the examined area was divided in groups with main criterion land availability and type of enterprises in order to create comparable groups of MF and conventional farms. Afterwards, with a random number generator farmers from each category were selected. Finally, MF and conventional farms were divided into three groups with main criterion the land availability for agricultural activities: Firstly, *small farms*, consisting of 10 MF and 18 conventional farms respectively with less than 50 stremmas available. Secondly, *medium farms*, comprising 9 MF and 16 conventional farms respectively, which have between 50 and 100 stremmas available. The third group, *large farms* consists of 6 MF and 11 conventional farms which have more than 100 stremmas available for agricultural activities.

For each one of these groups an "average" conventional and MF farm operation was estimated based on the data coming from the questionnaire. The characteristics of the "mean farms" are presented in Table 1. Descriptive statistics regarding important characteristics of decision makers are presented in Tables 2 through 5.

Table 2 shows that the leaders of MF farms are quite often between 30-39 years old. The age of the manager turns out to be an important factor for decision making. This is so because, younger decision makers are less risk averse and have a longer planning horizon.

Table 2. Age of Primary Decision Makers

	Small farms		Medium Farms		Large Farms	
	MF	Conventional	MF	Conventional	MF	Conventional
30-39	70.0%	33.3%	47.5%	30.7%	30.0%	53.8%
40-49	20.0%	26.4%	22.5%	38.4%	50.0%	23.0%
50-59	10.0%	32.4%	30.0%	23.0%	20.0%	15.6%
60+	0.0%	7.8%	0.0%	7.6%	0.0%	7.6%
Mean	40	47.7	43.6	40	42	41.4

Source: Questionnaire results

From *Table 3* it can be seen that, as the size of the farm expands the percentage of the farm managers with off farm activities is declining. Additionally, it can be seen that the percentage of farm managers with off farm activities is higher in conventional enterprises. This is not unexpected because MF enterprises are more labor intensive.

Table 3. Percentage of Primary Decision Makers With Off Farm Activities

Small farms		Medium Farms		Large Farms	
MF	Conventional	MF	Conventional	MF	Conventional
60.0%	70.0%	23.0%	30.0%	15.0%	23.0%

Source: Questionnaire results

Another important point is related to the education level of farm managers *(Table 4)*. Specifically, as the farm size gets bigger, the education level of managers in both MF and conventional operations increases. This improvement can be attributed to the complexity of problems that have to be answered by the managers of bigger farms.

Table 4. Educational Level of the Decision Makers

Education	Small farms		Medium Farms		Large Farms	
	MF	Conventional	MF	Conventional	MF	Conventional
Illiterate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Primary School	50.0%	57.8%	37.8%	53.8%	50.0%	23.0%
Secondary School	40.0%	26.5%	12.5%	30.7%	30.0%	38.4%
High School	10.0%	15.7%	37.5%	7.7%	0.0%	38.4%
University	0.0%	0.0%	12.5%	7.7%	20.0%	0.0%

Source: Questionnaire results

From *Table 5*, it can be seen that MF producers prefer direct selling of their products while the conventional producers in their majority prefer selling their products to vendors. This difference can be attributed to some of the factors mentioned above (younger decision makers, higher education level) and to the fact that marketing channels regarding MF products in Greece have not been fully developed yet. In addition to that, producers said that by direct selling they can avoid the middle-men thus increasing their profits.

Table 5. How Products Are Sold

Size	Type	Sold to vendor	Direct sales	Consumed by the family	Used in the ecotourism activities of the farm
Small	MF	20.0%	60.0%	10.0%	10.0%
	Conventional	57.8%	21.1%	21.1%	0.0%
Medium	MF	30.0%	70.0%	0.0%	0.0%
	Conventional	76.9%	23.0%	0.0%	0.0%
Large	MF	69.0%	20.0%	0.0%	11.0%
	Conventional	90.0%	10.0%	0.0%	11.0%

Source: Questionnaire results

Results and Discussion

The results regarding income, shadow prices, slacks and decision variables, for all the types of farms examined in this study are shown in *Tables 6 and 7*.

From *Table 6* it can be seen that, the level of maximum income for all farm sizes (small, medium, large) is greater for MF farms. Thus, the results of the present paper are in agreement with similar conclusions found in literature, confirming that MF farming can be more profitable and attractive to farmers compared to conventional methods (among other references: *Acs* et al. (2007), *Cisilino and Madau* (2007), *Schmid and Sinabel* (2005, 2007), *Pacini* et al. (2003), *Parra-Lopez and Calatrava-Requena* (2006)).

The incomes estimated from the model are higher than the average income estimated from the questionnaires. This difference can be attributed to several possibilities: 1) the model does not depict the fragmentation of the farm holdings, 2) farm managers may have multiple objectives besides maximizing farm income (for example reducing risk and volatility of income), and 3) the model is static and does not take into account the loss of income from the transition periods. Despite these differences, the model results are not unreasonable and they can act as a good indicator for the difference in economic performance between MF and traditional enterprises.

Another important point is the high shadow prices of pasture land (which has the characteristics of a free good in the examined area) for conventional farms. Since shadow prices indicate the marginal value product of pasture, why do producers not use more pasture to increase their income? The answer to this question comes from the milk quotas imposed by the Common Agricultural Policy of Europe (CAP). If the operation has more animals or more production than the limit placed by CAP then the monetary amount of subsidies will decrease drastically. Greek farmers prefer to have a stable monetary amount of subsidies than to take the risk of increasing production and lowering subsidies without knowing if the extra production can cover the loss of subsidies. Consequently, shadow prices of pasture land likely reflect the subsidies given to cattle producers. In contrast to conventional farms, MF farms do not use all their available pasture land. This is so because MF products have higher returns than the conventional ones so the model allocates the limited amount of labor to crops or to trees instead of cattle.

Furthermore, from *Table 6*, it can be seen that irrigated land for small conventional farms has a high shadow price. But, the high cost of asset fixity (i.e. irrigation systems) and the extra labor needed substantially reduce this value. Additionally, medium and large conventional farms have higher slack of irrigated land compared to dry land *(Table 6)*. This is due to the more labor intensive nature of farming in irrigated land, which, in conjunction with the limiter amount of available labor leads the model to allocate more labor to dry land.

Moreover, it can be seen *(Table 6)* that there is a slack of capital and operating machine hours for all the types of enterprises examined. The former, is a result of self-insure methods adopted by the farmers, while, the latter, can be contributed to "lumpy-assets". Specifically, if farmers can not find the machine that exactly fits with their needs they prefer to buy a bigger one, which, may be useful if they decide to expand their operation in the future.

Fourthly, regarding labor, the average wage of an unskilled worker in the examined area (7 € per hour) in conjunction with the shadow prices of labor for conventional and MF farms (7 and 11 € per hour respectively) justifies why there is a substantial big number of MF farms with hired workers, while, conventional enterprises, despite the slack of agricultural area, do not hire off farm workers.

The model results suggest that small and medium producers should have three enterprises and large producers optimally should have two types of enterprises if they are

Table 6. Economic Results and Slack Levels By Farm Type and Size

		Small		Medium		Large	
		MF	Conv	MF	Conv	MF	Conv
Net Returns-Model (Survey Results) – €		30,786 (26,530)	24,435 (20,802)	53,403 (44,200)	32,660 (27,700)	60,945 (50,638)	50,803 (45,655)
Irrigated Land	Slack – str*	4.7	(-)	3.4	9	5	13
	Shadow Price	(-)	482	(-)	(-)	(-)	(-)
Dryland	Slack – str	(-)	2	(-)	3.5	(-)	13
	Shadow Price	(-)	(-)	(-)	(-)	(-)	(-)
Pasture	Slack	0.815	(-)	4.08	(-)	2.5	(-)
	Shadow Price	(-)	237.74	(-)	196	(-)	270
Labor	Shadow Price	11.5	7	11.47	7.48	11.36	6.69
Tractor	Slack – hrs	18	16	79.26	68	115	228
Capital	Slack -€	505	358	696	821	332	1683

Source: Model results
*str stands for stremmas

Table 7. Production Level Results By Farm Type and Size

		Tare-Dry	Tare-Irr	Trefoil	Olives	Cows	Sheep
Size	Type	Stremmas				Head	
Small	MF	(-)	26.67	(-)	6.67	3	(-)
	Conventional	14.2	(-)	3.7		(-)	8
Medium	MF	(-)	28.33	(-)	8.6	1	(-)
	Conventional	24	21	(-)		4	6
Large	MF		33.3	(-)	33.3	4	(-)
	Conventional	20	21	(-)	11	8	(-)

Source: Model results

conventional and three types if they are MF *(Table 7)*. But, the questionnaire results show that small producers (MF and conventional) have on average five enterprises while large and medium producers have three. Two reasons justify this difference. Firstly, small producers have multiple goals beyond the maximization of net farm returns (i.e. equal distribution of the available family labor through the year, cultivation of some products to cover family needs, diversification of enterprises in order to have income even if some type of crops fail etc.). Secondly, farm holdings are highly fragmented (in average every farm has 4 different land parcels). Each parcel of land has different characteristics (e.g., different slope, different yield) that affect the decisions of farm managers, but, the model does not consider these spatial characteristics and differences.

Regarding production levels, *Table 7* shows that MF farms should keep the same enterprises as their size gets larger and increase the number of stremmas or the number of head. Meanwhile, the model selects different type of enterprises for the different size of conventional farms.

Another difference between the model results and the questionnaire is the production mix, especially for medium and large conventional operations. Specifically, cotton and tobacco, which are two of the main types of enterprises according to the questionnaire, are not chosen from the model. Three reasons justify this difference: a) The reduction in cotton and tobacco subsidies made these crops less profitable, b) the vast majority of farmers who continue to cultivate those crops are more than 60 years old. A main goal of this group of farmers is to decrease the volatility of their farm income. This objective in conjunction with the high level of risk aversion of elderly farmers and their short planning horizon prevent them from changing their set of enterprises, c) a change of enterprises would require new investments in capital and machinery which is a costly procedure that farm managers especially on smaller farms want to avoid.

Finally, the reduced cost ranking estimated from the model for each of the possible enterprises is consistent with actual enterprise choices made by the managers.

In conclusion, the results of this study indicate that, for every farm type, multifunctional farms have better economic performance than the conventional ones. Moreover, the results illustrate that young farm managers are keener to adopt multifunctional farming compared to older ones. This difference can be attributed to the longer planning horizon of the former and to the fact that older managers have learned to operate under a different environment.

Finally, the structural characteristics of the farms, along with the CAP measures and the existence of multiple objectives, beyond maximization of net farm returns, justify the differences between the model results and the observed facts.

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ANALYSIS OF PRODUCTION AND COMPETITIVENESS ON SMALL BEEKEEPING FARMS IN SELECTED DISTRICTS OF SERBIA

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Abstract: The study researched the costs and returns on typical small beekeeping farms from five districts in Serbia. On the basis of the field research, data on the number of beehives, type of product, volume of production per beehive and values per measurement unit were collected. In order to demonstrate the competitiveness of various apicultural products, analysis of the available data was performed using analytical calculations. According to the analysis, the labour costs comprise about 49.65% to 64.15% of the variable costs on beekeeping farms in the Raška and Šumadija districts, respectively. Production is most economical on the bee farm in the district of Srem, where every dinar spent in production creates a value of 2.22 dinars, while the farm from the district of Raška is the least economical (1.32 din). Bee farms must reduce labour costs and re-direct their business orientation to other bee products, besides honey, such as pollen, which could be significantly more profitable.

Key words: small beekeeping farms, honey, economy

Introduction

Since 1980, global honey production has constantly been increasing, exceeding a million tons annually for the first time in 1983. In 2004, global honey production amounted to approximately 1.37 million tons, which is approximately 29.9% more than production in the 1980's. The largest part of this production was realized in Asia (36.8%), Europe (22.6%), North America (16.0%), and Africa (11.3%), South America (11,0%) and Oceania (2.3%) (*Guoda* and *Chun*, 2003).

The main apicultural product in Serbia is honey, while production of other bee products (pollen, propolis and beebread) is minimal. However, taking into account the agro-ecological conditions, there are some exceptions, such as in the district of Srem, where due to widespread distribution of pollen plants, beekeepers are oriented towards collection of pollen powder. Their total annual production is 10 t of pollen, most of which is used in the production of bee food (pollen sugar patty) or in honey mixtures, and similarly to this practice, royal jelly and propolis are also used for honey mixtures.

The average production of honey in Serbia in 2001 was 2.667 tons, and in 2007 it was increased to 3.538 tons (*Statistical Annual*, 2002; 2008). Central Serbia participates in the total production of honey with 89%, and Vojvodina with 11%.

Consumption of honey in Serbia per capita is still low and in 2004 (as per FAO data) it amounted to 0.37 kg annually. Globally, the largest average annual honey consumption per capita is in the Central African Republic – 3.3 kg, followed by New Zealand with 2.5 kg, then Angola, Austria and Greece with 1.6 kg. Switzerland, Cyprus, Slovenia and Ukraine also has an average honey consumption per capita of over 1 kg (*Munćan* and *Božić*, 2007). The possibilities for development of apiculture production are, from the aspect of natural conditions, very favorable, therefore in Serbia it would be possible to breed up to 800.000 bee colonies, meaning that the current utilization of possibilities is only 33.4%.

Companies, and particularly beekeeping farms, must have competitive advantages, i.e. they must have advantages over competing companies by offering better value to consumers, either through lower prices or by providing more benefits which would justify higher prices (*Kotler* and *Armstrong*, 2008). Beekeepers must be aware of their competitors. Since they produce similar products, they are exposed to direct competition. In addition, there are a number of importers of honey from countries where the price of honey is much lower than it is on the domestic market. For countries with a small market, such as ours, the international market is an important element. There are opportunities for export of honey from our country to the West European and Arabian market. In order to increase export, reduce domestic honey reserves, and thereby increase domestic production, in 2007, the Ministry of Agriculture included for the first time honey amongst products subject to export stimulation, subsidizing its production by 20% of the exported goods value. Stimulation of honey export has already shown results, taking into account that by the end of 2007 about 100 t of

honey were exported to country members of the EU (*Terzić*, 2008). Bearing in mind that the price of domestic honey is somewhat higher than in the surrounding countries, competitiveness could be achieved only by increasing production and reducing costs. In beekeeping the possibility of better product advertising should be considered, as other products in the group of indirect competition are much better advertised.

Measures for stimulating programs for development and improvement of apiculture in the Republic of Serbia undertaken by the Government, through its resource Ministry of Agriculture, Forestry and Water Management have been more intensive since 2004, when for the first time apiculture was equalized with other branches of livestock breeding as regards supportive measures, through programs of selection measures in apiculture. In the same year, agricultural producers, including beekeepers, were enabled to use loans in the amount of 100.000 €in accordance with the Decree on Loan Granting to Agricultural Producers. In 2006, during implementation of the Agreement on Stabilization and Association and liberalization of customs rates, for honey (customs code 0409), the Ministry of Agriculture applied a delayed method of liberalization, the purpose of which was protection of domestic honey producers during the following time period by maintaining, for the import of honey, a high customs rate of 30% plus 15 dinars duty on each kilo of imported honey (*Terzić*, 2008).

Materials and Methods

In this study, where were used data from typical small beekeeping farms (BF) from five districts in Serbia: district of Raška, (BF1), Kolubara district (BF2), district of Banat (BF3), district of Srem (BF4) and Šumadija district (BF5). The records in this study could not be obtained from official statistics records, but were obtained on the basis of field research. A prerequisite for the analysis of competitiveness is the availability of corresponding records. In view of the current situation and scarce availability of official data in Serbia as regards competitiveness in apiculture, this analysis was based on previously conducted field studies. The following data were collected from the researched subjects: number of beehives, type of product, volume of production per beehive and value per measurement unit. The selected producers are representative professional beekeepers from each district and beekeepers owning Langstrot Rut (LR) beehives, which are well-known for this kind of production in the world. Field research was conducted during the period of 2005–2008 when the conditions for production of honey and honey products were different. The calculation includes data reflecting average yields in an average production year. The prices of products and costs are calculated on the basis of records from 2008 when the average value of 1€was 82 dinars.

In accordance with the goal of the research, analysis of the available data was performed by applying analitical calculations of the production of bee products where the direct costs of material, direct costs of production services, depreciation of beehives and direct costs of labor were included. Economy of production was calculated on the basis of the calculated value of small beekeeping farms and their costs.

Results and Discussion

Since Serbia has heterogeneous relief and climate conditions in which bees are bred, but also due to different economic development of some regions and districts, the level of production per bee colony varies, as well as participation of both individual and overall production costs (*Mladenović et. al.*, 2001; *Nedić*, 2009). In 2007, the total number of bee colonies in the Republic of Serbia was 267,000, and the average production of honey per bee colony was 13 kg (*Statistical Annual* 2007). 1.74% of the total number of bee colonies (48,311) is owned by professional beekeepers who have over 100 beehives (*Stojanović*, 2008). Although their participation in the total number of bee colonies is low, the average production per bee colony of professional beekeepers is higher than that of hobby beekeepers, and in the period from 2005–2008, it was approximately 22 kg. The analysis shows that the total production realized by professional producers (bee farms) reaches a level of about 1000 t honey annually, and comprises 28% of the total annual production of honey in Serbia.

Table 1 shows that the volume of honey production per beehive ranges from 11 kg on a bee farm in the Srem district to 23 kg on a bee farm in the Banat district. Large variations in the volume of honey production may be associated with specific apicultural conditions, where the production of one product is dominant while other products are obtained as by-products and in a much smaller volume. Further, the level of production is also influenced by climate and pasture conditions as well as by the applied apicultural technique.

The largest portion of the total production value of the bee farms was the value of honey production, amounting to 61.4% and 68.9% on bee farms in the Raška and Kolubara district respectively, while farms in the Banat and Šumadija districts based their production on honey alone. The exception is the bee farm from the Srem district which realized only 27.2% of its value from honey production, while 70.7% of its earnings were realized from pollen production, which is a result of the excellent pollen pastures for bees in this district and the applied apicultural technique.

A small bee farm in the Raška district based its production and marketing activities not only on honey, but also on honey mixtures, which participate in its production value structure with 34.5%. Every product that contains other ingredients beside honey is of higher quality compared to honey alone, sells better and reaches a considerably higher market price (680 din.). The market is deficient in these products so this farm can be considered one of the main competitors in the production of honey mixtures. As regards competitiveness, it is important to point out that the

Table 1. Value of production on small beekeeping farms

BF	Products	Number of beehives	Measurement unit	Volume of production		Value (din.)		Share%
				Per beehive	Total	Per measurement unit	Total	
BF1	Honey	250	kg	22	5500	220	1,210,000	61.4
	Wax	250	kg	1	250	320	80,000	4.1
	Honey mixtures	250	kg	4	1000	680	680,000	34.5
	I Value of production						1,970,000	100.0
BF2	Honey	130	kg	11.5	1495	220	328,900	68.9
	Pollen	130	kg	0.77	100.1	700	70,070	14.7
	Propolis	130	kg	0.03	3.9	4,000	15,600	3.3
	Beebread	130	kg	0.008	1,04	60,000	62,400	13.1
	I Value of production						476,970	100.0
BF3	Honey	500	kg	23	11,500	220	2,530,000	100.0
	I Value of production						2,530,000	100.0
BF4	Honey	450	kg	11	4950	220	1,089,000	27.2
	Pollen	450	kg	9	4050	700	2,835,000	70.7
	Propolis	450	kg	0.01	4.5	4,000	18,000	0.4
	Honey mixtures	450	kg	0.22	99	680	67,320	1.7
	I Value of production						4,009,320	100.0
BF5	Honey	400	kg	21	8400	220	1,848,000	100.0
	I Value of production						1,848,000	100.0

production of pollen could also be a way to achieve higher profits, since the demand for this product significantly exceeds the offer.

This kind of bee product requires specific application of apicultural technological measures and adequate natural conditions which have proved to be an advantage for the beekeeping farm in the Srem district compared to the other studied farms. Besides this farm, the farm from the Kolubara district also realized 14.7% of its profit from pollen production (*Table* 1).

Table 2 sets out the costs of production on small beekeeping farms. On the basis of the calculated direct material costs at the selected beekeeping farms, we found that their participation in total production costs amounts to 20.3% on average. The exception is the beekeeping farm from the Kolubara district where this participation was 52.46%. This deviation is a result of considerably more frequent replacement of wax foundation per bee colony and use of medicaments that are approximately 50% more expensive than those used on other beekeeping farms. It is important to note that the choice of medicaments, especially those used against bee mites, is made by the beekeepers themselves and causes variation in costs and treatment results.

Professional beekeepers characteristically move bee colonies from pasture to pasture, whereby the profit per colony is increased. However, this also increases the participation of transport costs since transport means are usually hired out, and not owned by the beekeepers. In these studies the beekeeping farms from Raška, Banat and Šumadija district hire transport means for moving the bees and the average participation of these costs in the overall production costs was 13.38%. In the bee farm from the Kolubara district the costs of operating machines were low and amounted to 6.36%. This could be explained by the fact that this is a case of stationary beekeeping where the beehives are not moved. The same type of costs on the beekeeping farm in Srem was the lowest, amounting to 5.92%. The reason for such low costs lies in the fact that the bee pastures, both pollen and nectar, are situated in the vicinity of the apiary so that minimal movement of the bee colonies was performed, all within the same district.

Depending on the type of test, size of the required test samples, and costs of veterinary station services, the costs of veterinary services for the studied bee farms varies. In the studied subjects, apiary amortization costs were calculated at the rate of 10% since the average estimated time of use for beehives is 10 years.

Variable costs, including costs of labour in apiaries with Langstrot Rut beehives, range from 64 to 70% (*Oluwatusin*, 2008). Similar results were obtained in these studies. The participation of labour costs was very large in the beekeeping farms in Raška (64.15%), Srem (55.08%) and Šumadija district (49.65%). Such high costs on the first studied bee farm may be explained by unnecessarily large engagement of permanent and temporary workers for technical and technological jobs on the farm. The specific technology of pollen production, which requires regular collection, drying, and storage during the season, is the cause of high labour costs on the beekeeping farm in the Srem district. On the beekeeping farm in the Šumadija district, because of the large number of bee colonies, in addition to permanent labour, an increased number of temporary workers is engaged during the honey collecting season, so that labour costs comprise half of the total production costs.

Table 2. Production costs on small beekeeping farms

Type of costs		District/BF									
		Raška (BF1)		Kolubara (BF2)		Banat (BF3)		Srem (BF4)		Šumadija (BF5)	
		Amount, din.	Share %	Amount, din.	Share %	Amount, din.	Share %	Amount, din.	Share %	Amount, din.	Share %
a) basic material	sugar	81,000	5.41	56,160	17.86	189,000	16.45	162,000	8.97	151,200	12.51
	sugar patty	80,000	5.35	-	-	-	-	121,500	6.73	64,000	5.30
b) auxiliary material	honeycomb bases	*7,500	0.50	60,000	19.08	*24,000	2.09	96,000	5.31	*12,000	0.99
	medicaments	20,000	1.34	48,810	15.52	52,000	4.52	60,000	3.32	27,200	2.25
1. Direct material costs (a + b)		188,500	12.60	164,970	52.46	265,000	2.06	439,500	24.33	254,400	21.05
c) Machine services		180,000	12.03	20,000	6.36	224,000	19.50	107,000	5.92	104,000	8.61
d) veterinary services		18,000	1.20	7,500	2.38	24,000	2.09	45,000	2.49	40,000	3.31
e) beehive maintenance services		50,000	3.34	10,000	3.18	20,000	1.74	40,000	2.21	50,000	4.14
2. Direct production services (c + d + e)		248,000	16.57	37,500	11.92	268,000	23.33	192,000	10.62	194,000	16.06
3. Apiary depreciation		100,000	6.68	52,000	16.53	200,000	17.41	180,000	9.96	160,000	13.24
4. Direct labour costs	permanent labour	840,000	56.13	-	-	320,000	27.85	960,000	53.14	420,000	34.76
	temporary labour	120,000	8.02	60,000	19.08	96,000	8.35	35,000	1.94	180,000	14.89
II Direct production costs (1 – 4)		1,496,500	100.0	314,470	100.0	1,149,000	100.0	1,806,500	100.0	1,208,400	100.0

* Costs of processing wax into honeycomb foundation

On the beekeeping farm in the Kolubara district, direct labour costs, in accordance with stationary beekeeping and the relatively small number of beehives, are very low, comprising 19.08% of the total production costs.

The concept of economic operation means the degree of benefitial effect of production factors in the production process. The lower the costs of production factors for obtaining a certain volume of production, the higher the economic degree and vice versa (*Andriæ*, 1998). In beehives with a small number of bee colonies and stationary type of beekeeping, there are no large production costs because there are no costs of moving the apiaries, while labour costs for maintenance of the beehives and costs of veterinary services are minimal. However, on professional farms, all of the aforementioned costs burden production, so if professional success is expected, economical production is essential. Since this type of beekeeping is mobile, an economic use of bee pastures would be achieved if the realized profit is considerably higher than the incurred costs, i.e., if pasture moving contributes to the increase of the total profit of beekeeping farm.

Table 3: Economy of production of small beekeeping farms

Districts/BF	Economic coefficient		Profit per 1 din of commercial value of the product
	Commercial production value /Production costs	Production costs /Commercial production value	
Raška (BF1)	1.32	0.76	0.24
Kolubara (BF2)	1.52	0.66	0.34
Banat (BF3)	2.20	0.45	0.55
Srem (BF4)	2.22	0.45	0.55
Šumadija (BF5)	1.53	0.65	0.35

Table 3 shows the economy of production of small beekeeping farms. On the basis of the obtained results for the value of production and production costs of the studied small beekeeping farms, their economic level was also calculated. The economic level was highest on the bee farm from the Srem district, where every dinar spent in production created products in the value of 2.22 dinars, i.e., for each dinar of the commercial value of the products, an expenditure of 0.45 din was made. This shows that the orientation of bee farm towards pollen production is profitable, no matter how high the production costs. The least economical was the farm from the Raška district where every dinar of expenditure brought 1.32 din in product value i.e., for each dinar of the commercial value of the product, 0.76 dinars of costs were incurred. This shows that with realized high direct labour costs (64.15%), for a smaller number of bee colonies than those on beekeeping farms in the Banat and Šumadija district, a low commercial value is realized. If the bee farm in the Raška district were engaged only in honey production, it would operate with losses, with the same costs.

Conclusion

The majority of beekeepers in Serbia are engaged exclusively in honey production and only a small number of them produce other bee products. Average honey production per honeybee colony ranges from 13 to 15 kg, although production capabilities of one honey colony exceed the aforementioned degree of utilization.

On the basis of research it can be concluded that the average direct labour costs of small beekeeping farms are very high (51.27%), excluding the farm from the Kolubara district where these costs were 19.08%, as they have a stationary type of beekeeping. Labour costs were also high also on the farm in Srem as a consequence of the pollen production technology. However, high costs were in this case justified by a high pollen production per bee colony so it can be concluded that a business orientation based on other bee products, besides honey, may be significantly more profitable. This is also

supported by the data from the farm in the Raška district, where 34.50% of the production value is based on the production of honey mixtures. A weak side of the studied bee farms is that they don't have their own transport vehicles for moving bee colonies and therefore they must hire them, which increases transport costs. Different costs of veterinary services and different choice of medicaments caused variations in expenditure costs per studied farm, which were highest on the farm in the Kolubara district, amounting to 15.52%.

Despite the mentioned costs, the studied farms achieved a positive business economy, with a coefficient of economy ranging from 1.32 to 2.22. In order to realize higher operating efficiency in the next period, bee farms should reduce labour costs in their total costs by rearrangement of labour and reduction of the number of permanent workers, and by engaging temporary seasonal labour in accordance with the duration of the beekeeping season. In the next period, by selecting appropriate apiculture technology and spatial planning of beekeeping production in accordance with pasture conditions, it would be possible to increase the bee products yield per beehive and thereby to increase the product value. In order to increase competitiveness of the bee products, and in accordance with the goals of the agricultural food industry it is essential to adopt policies of product quality and product safety.

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WHO BENEFITS FROM EMOTIONAL LABOUR?

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Abstract: Emotional labour is an essential requisite in most professions. It is present wherever performance of work involves interactions with colleagues and/or customers. Emotional labour produces multiple positive consequences for organizations, such as constant performance by employees, uniform image, and regular, satisfied customers. Of all effects of emotional labour on individuals, literature discusses the negative ones mostly. This study is to demonstrate that emotional labour may as well have positive effects on individuals.

Key words: emotional labour, side-effects, positive side-effects.

Literature Review

The Emotional Labor Theory deals with emotions which employees feel, or pretend to feel, to meet their job requirements. According to Hochschild's definition (1983, pp. 7), „emotional labour is the management of feelings to create bodily and facial displays compliant with social requirements. Emotional labour has an exchange value, since it is paid wages for."

This definition suggests that emotional labour is primarily beneficial to the employer and organization. A uniform behaviour by all employees will result in efficient fulfilment of duties, provision of high-quality services, and regular customers. According to *Ashforth and Lee* (1990), emotional labour enhances the efficiency of working, reduces the necessity of direct control, and lessens interpersonal problems.

On the other hand, literature data show that the effects which emotional labour has on individuals are predominantly negative. According to *Wharton and Erickson* (1993), a major cause of the development of negative effects on employees is that, through implementing emotional directives, employers limit their employees' right to spontaneous action.

Furthermore, a higher relative incidence rate of psychosomatic diseases among professionals performing emotional labour is a fact supported by data from clinical studies. According to *Schaubroeck and Jones* (2000), the root cause of higher rates of tumours and cardio-vascular diseases resulting from a hypo-functioning immune system is to be searched in the suppression of emotions invariably.

However, the most common subjects of literature on emotional labour are psychic consequences. *Hochshild* (1983) was the first to report that, as a result of their emotional labour, some employees identified themselves with their job-defined roles so much so that they became unable to disregard their role requirements in other areas of life either. Hiding or sublimating their true emotions frequently, another group of employees became uncertain about their own emotions. Alienation is one of the typical responses to burdens deriving from emotional labour. Where expectations excessive or impossible to satisfy are raised, emotional labour will become ingenuine, which will, in its turn, increase the prevalence of depression (*Ashforth and Humphrey,* 1993).

Excessive identification with emotional requirements often goes hand in hand with burnout. The studies of *Ashforth and Mael* (1989) show that the more an individual identifies himself/herself with his/her job or role, the more intense negative effects of emotional labour he/she will sustain. Moreover, if the individual even fails to meet the requirements at work, the psychic verification process of his/her social identity will be damaged, which will lead to a sense of uselessness as well as increased propensity to commit suicide (*Burke,* 1991).

Payne, Jick and Burke (1982) concluded that emotional labour affects acute and permanent states of mind equally. As a result of negative effects, an individual may lose not only his/her inclination or propensity, but ability to perform emotional labour.

It should be clearly understood, however, that it is not emotional labour but emotional dissonance (defined as discrepancy between expected/displayed and real emotional states) and consequences thereof that may be harmful. If an individual's genuine emotions are identical with the emotional expectations at work (defined as *genuine acting*), neither emotional dissonance nor negative side-effects will occur. According to the findings of *Rafaeli and Sutton* (1987), emotional dissonance is most often dissolved through *deep acting* too, while being a constant concomitant of *surface acting* only.

When an individual uses only external manifestations of his/her emotions (such as physiognomy, tone and intonation of voice, and gestures) to meet the organization's emotional norms without actually altering his/her emotions, he/she is said to be performing surface acting. In this case his/her

emotional displays do not coincide with his/her actual emotions.

On the other hand, deep acting is defined as *alteration of the individual's true emotions in order to comply with the organization's emotional norms*. Such alteration may result from either cognitive processes and deliberate efforts (i.e. re-tuning to a situation through recalling and reliving situations with appropriate emotional charges) or spontaneous empathy.

Brotheridge and Grandey (2002) found that surface acting and deep acting differ in terms of most of their effects on individuals. The frequency of surface acting shows correlation with both emotional exhaustion (*Maslach, Schaufeli and Leiter,* 2001) and depersonalization (*Totterdel and Holman,* 2003), and is associated with increased rates of individuals who underrate their personal contribution to work (*Brotheridge and Lee,* 2002). *Zerbe and Falkenberg* (1989) found their studies to prove correlation between burnout and surface acting. Based on Hochschild's findings (1983), deep acting will, unlike surface acting, not lead to emotional exhaustion or depersonalization, but positively affect employees' feeling of contribution to work.

Emotional labour, or rather a certain form thereof, may have positive effects on the individual as well. *Wharton* (1993) finds that emotional labour increases the level of job satisfaction. Furthermore, emotional compliance with organizational and social requirements leads to predictable emotional displays, while reducing the possibility that embarassing interpersonal situations may arise (*Gross and Stone,* 1964), and enhancing one's feeling of personal efficiacy (*Rose,* 2001). It is through effects of emotional labour on satisfaction with life that this paper aims at demonstrating its negative and positive consequences for individuals.

Survey and methods

Altogether 250 questionnaires were distributed in the Medical School & Health Science Center of the Debrecen University (DEOEC), Kenézy Gyula Hospital Debrecen, University & Healthcare Center of Kaposvár, and Borsod-Abaúj-Zemplén County Hospital, Miskolc. Demographics and job experience data of individuals under study are given in the *table 1.*

Table 1: Characteristics of individuals under study

Characte-ristics	Units	DEOEC	Debrecen	Miskolc	Kaposvár	Total
Total	Persons	148	19	6	14	187
Age	20-30	30	2	2	1	35
	30-40	58	7	1	7	73
	40-50	44	7	0	6	57
	50-60	10	3	3	0	16
	60-	6	0	0	0	6
Gender	Males	27	4	4	6	41
	Females	121	15	2	8	146
Marital status	Single	28	0	3	1	32
	Married	64	9	3	10	86
	Co-habitant	29	5	0	1	35
	Divorced	23	2	0	2	27
	Widow	4	3	0	0	7
Child(ren)	Without	100	14	3	11	128
	With	48	5	3	3	59
Healthcare	0-10	24	4	3	4	35
experience	10-20	23	1	0	4	28
	20-30	50	5	0	3	58
	30-40	51	9	3	3	66
Job-assign ment	Physicians	23	0	5	8	36
	HCPs	125	19	1	6	151

Results

Satisfaction with life: The Satisfaction with Life Scale (SWLS) was used to assess subjective well-being (Diener, 1994). An SWLS questionnaire sizes up satisfaction with life in terms of three dimensions, including life of meaning, life of pleasure, and life of engagement. This kind of test was chosen because, though being fundamentally a diagnostic tool of positive psychology, it offers acceptable psychometric indicators (Ryan and Deci, 2001). Respondents were supposed to use a seven-degree Likert scale to tell the extent to which they agreed with each of 18 statements. The dimensions of satisfaction with life were found to be correlated with demographic and job-related characteristics as follows.

Table 2: Correlation between demographic data and life satisfaction

Characteristics	Life of pleasure		Life of engagement		Life of meaning	
Correlation	Pearson	Sig.	Pearson	Sig.	Pearson	Sig.
Age	-0.21	0.00				
Gender			-0.15	0.04		
Child(ren)	0.21	0.00				
Healthcare experience	-0.21	0.00				
Job-assignment			-0.16	0.03		
Family background					-0.16	0.03

As clear from the *table 2*, younger individuals with less healthcare experience and without children scored higher, i.e. performed better, in terms of the life-of-pleasure dimension of satisfaction with life. Females and healthcare professionals underperformed males and physicians in the life-of-engagement dimension. The respondents' family background was found to be correlated with the life-of-meaning dimension of satisfaction with life, with single, divorced, or widowed respondents having scored higher than their married or co-habitant colleagues.

Emotional labour: Emotional labour was assessed by means of a 17-question form designed on the basis of Grandey's emotional labour questionnaire (2003). This was added 10 more questions derived from an emotional labour assessment questionnaire designed by *Brotheridge and Lee* (1998). (My test sample measured a Cronbach's Alfa at 0.77.) My respondents were supposed to evaluate the statements by frequency against a five-degree Likert scale. Of all factors assessed by means of the questionnaire, only the pretence-of-emotions factor showed correlation with demographic characteristics across the whole sample.

Table 3: Correlation between demographic data and pretence of emotions

Characteristics	Pearson correlation	Sig.
Age	-0.20	0.03
Healthcare experience	0.01	0.23
Child(ren)	-0.16	0.00

Table 4: Correlation between emotional labour and life satisfaction

Characteristics	Life of meaning		Life of engagement	
Correlation	Pearson	Sig.	Pearson	Sig.
Deep acting	0.25	0.00	0.16	0.03

Table 5: Correlation between emotional labour and life satisfaction of male and female respondents

Characteristics	Males		Females			
	Life of engagement		Life of meaning		Life of engagement	
Correlation	Pearson	Sig.	Pearson	Sig.	Pearson	Sig.
Surface acting	0.33	0.04				
Deep acting			0.32	0.00	0.18	0.03

According to the findings summarized in the *table 3*, older respondents with longer healthcare experience pretend emotions less frequently than their younger colleagues with less job experience. Furthermore, individuals with children under study were found to display emotions different from their true ones more frequently than healthcare professionals without children did.

In an attempt to explore effects of emotional labour on individuals, the relationship between emotional labour and satisfaction with life was examined. A significant correlation was only found with deep acting *Table 4*.

The correlation found in this study substantiated Hochschild's conclusion to the effect that deep acting does not bring about negative consequences for individuals. And what is more, satisfaction with life scored higher in terms of both life of meaning and life of engagement with increasing frequencies of deep acting across the whole sample under study.

As illustrated in the *table 5*, such correlation resulted from the scores of the female population under study, while with my male respondents, it was surface acting that was found to show positive correlation with the life-of-engagement dimension of satisfaction with life, a finding which seems to reach farther than data from literature discussed above.

Furthermore, a positive effect of emotional labour on satisfaction with life was detectable among physicians and individuals living alone *Table 6*.

Table 6: Correlation between emotional labour and life satisfaction of physicians and healthcare professionals

Characteristics	Physicians		Healthcare professionals	
	Life of pleasure		Life of meaning	
Correlation	Pearson	Sig.	Pearson	Sig.
Deep acting			0.28	0.00
Pretence of emotions	0.41	0.01		

It was pretence of emotions that led to increased satisfaction with life among physicians and individuals living alone Table 7. Physicians who displayed/pretended emotions different from their true ones more frequently, over performed their counterparts in the life-of-pleasure dimension, while among individuals living alone, those using pretence to alter their true emotions over performed their counterparts in the life-of-engagement dimension.

Summary and conclusions

The results from this study showed that deep acting increased satisfaction with life in terms of both life of engagement and life of meaning with the majority of individuals under study, a finding in line with correlations reported in international literature.

Table 7: Correlation between emotional labour and life satisfaction in groups different in marital status

Characteristics	Individuals living alone				Individuals living with a partner			
	Life of meaning		Life of engagement		Life of meaning		Life of engagement	
Correlation	Pearson	Sig.	Pearson	Sig.	Pearson	Sig.	Pearson	Sig.
Deep acting	0.27	0.03			0.23	0.01	0.30	0.00
Pretence of emotions			0.29	0.02				

However, three sub-groups of individuals under study were identified in which even surface acting brought about an increase in satisfaction with life. Among male respondents, surface acting, i.e. both pretence of emotions and hiding of true emotions, resulted in increased satisfaction with life in the life-of-engagement dimension, while among physicians and individuals living alone, it was pretence of emotions that led to increased satisfaction with life in the life-of-pleasure and life-of-engagement dimensions.

Thus the results from this study seem to confirm the assumption that emotional labour may be beneficial to the individual as well. Positive consequences do, however, not reduce the occurrence rate of harmful side-effects or hazards arising from emotional labour as described in literature, but

modulate a picture of the phenomenon painted in very dark colours so far.

Due to the relatively small size of the sample under study, the findings presented herein serve as guidance only, though calling attention to the fact that not only deep acting, but surface acting may bring about positive side-effects on the individual. Further studies will be needed to identify the range of individuals who experience predominantly positive rather than negative consequences of any emotional labour, whether in the form of deep or surface acting, as they may perform.

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RENEWABLE ENERGY RESOURCES IN HUNGARY – SOLID BIOMASS UTILIZATION IN TERMS OF NECESSITY AND OPPORTUNITY

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Annotation. In the 21st century a country's success significantly depends on how it can solve the problems (supply safety, growing prices, climate change, etc.) induced by the application structure of the fossil energy sources with the means of energy saving, energy efficiency and the utilization of renewable energy resources.

The utilization of renewable energy sources has positive effects on five key areas: environment protection, energy policies, fulfilment of EU expectations, agriculture and rural development and on the whole of the national economy.

The bioenergy – beside fulfilling the national economic aims – it is putting up the value of the role of agriculture and rural development. The role of agriculture is multi-functional in the process. The agricultural sector has an important task in the area of bioenergy to ensure the proper quality and quantity of raw materials for the increase of bioenergy utilization. This also means new sales perspectives and opportunities for the producers.

Above all this, the agricultural policy aims for the agriculture and the rural development segment to be the unambiguous winner of the new bioenergy sector and for most of the available profit to stay with the agricultural sector, with the rural players. For this reason encouraging the raw material production it wishes to encourage the producer their primary process and their local utilization.

One of the fundamental objectives of the measures is that agriculture should go beyond the raw material production and take steps towards processing and utilization. The multifunctional role in the product chain might mean extra income and more added value for the producers and the active players in the process.

The other objective is to promote the local utilization, the scatter of the environmentally friendly energy sources in rural areas, to change the energy is "lying on the ground unutilized" principle while local processing and promoting the utilization, to achieve a lower energy dependency and to optimize and disseminate cost efficient solutions. To realize all this means a great task and a huge challenge for the agricultural government as well as the rural societies and micro regions but might lead to a successful rural development.

The range of the tools and measures to fulfil the aims might be very broad, from the regulating instruments to the various subsidies, coordination and dissemination tools. Part of the subsidy schemes are direct production-type of subsidies (the so called direct payments, for example the area based subsidies) and the other main forms are the investment-type subsidies which are for technology development, promotion of competitive production and local processing and for establishing a green energy industry.

In the period of 2007-2013 the key elements of the development schemes were drafted in the frame of the New Hungary Rural Development Programme (ÚMVP) and the Environmental Energy Operational Program (KEOP).

The available raw materials and the conditions are taken into consideration while designing the development schemes because a successful realization of a product chain means the assurance of the inputs and outputs. The starting point of determining the development direction is the principle of an operation which is sustainable and economical on the long run. In addition such developments are considered reasonable which are viable on medium and long term and bring numerous rural development, environmental and societal returns.

Key words: Renewable energy resources, Solid biomass utilization

European Union – Hungary. Regulation, objectives, expectations, performance

The European Union does not have a single energy policy and a closely related implementing policy. The development of a common energy policy is indeed a difficult task since the member states have different regional and environmental properties, and the energy policies of the member states indicating heterogeneous, manifold and complex regulations.

At an EU level there are several objectives and guidelines. They refer to already operative legislations (Directive 2009/28/EC) and to long term strategic objectives (White Paper, Biomass Action Plan, Climate Strategy, Renewable Energy Roadmap). In these documents the European Union formulated expectations and suggestions to reduce the greenhouse gas (GH) emissions of developed countries by 20% (comparing 1990 level) until 2020, the carbon dioxide emissions by 30% until 2020, and 50% until 2050.

The Renewable Energy Roadmap and the guidelines clearly indicate the target numbers which aim to have a 20% share of renewable energy resources by 2020, including 10%

for bio-fuels. For these EU goals and expectations to be realized immediate action is needed, taking into consideration the members states' different geographic and regional characteristics as well as their development potentials.

Based on the above we can state that it is not only Europe but the whole world which is forced to choose an alternative. The challenges of climate changes arising from the „anthropogenic" GHG emissions originating from the fossil energy utilization have to be solved effectively and urgently. The growing dependence on fossil fuels and rising energy prices make it even more compelling to have a comprehensive and ambitious energy policy which combines the effective and successful action both at a European and at a member state level.

Our common goal is to increase the utilization of renewable energy sources based on agriculture and forestry, to enhance the security of domestic energy supply and to diversify its supply, to sustain development for the profitability of agricultural production, to increase rural employment, to make villages and small towns more sustainable by replacing fossil energy sources and to harmonize the governmental and professional strategies of renewable energy sources while taking into consideration the environment and nature protection aspects.

The national comprehensive targets for the share of energy based on renewable resources of the final energy consumption by the end of 2020 Hungary engaged 13% (while according to some expert reports 20% could have been accomplished) which can be achieved by fulfilling the below mentioned aims:

Biofuels, biorefineries

- Setting up of small, medium and large-scale capacity bioethanol plants with related renewable energy blocks.
- Local use of feedstocks and motivation for public transport use.
- Setting up of medium and large-scale biorefinery plants.

Solid biomass, power plants, local governments, citizens

- Optimal process and use of biomass deriving from the forestry and the agricultural sector for energetic purposes.
- Direct subsidies for introducing, processing and using of short rotation forestry plantations.
- Setting up of biomass-based district-heating centers to supply individual gas-heated flats and communal buildings.
- Improve the energy efficiency of institutions maintained by local governments and replace the raw materials to renewable biomass.
- Developing of biomass-based small-scale heating power stations to produce electricity and use the waste heat.
- Biomass-based (by-products from the agricultural and forestry sectors, biomass production) small-scale power stations with related agricultural investments (e.g. horticulture).
- Developing of energy farms in order to exploit the advantages of bioethanol, biogas, animal-husbandry and cultivation of arable plants integrated into one system.
- Changing of already existing gas-based district-heating centers and heat centers of industrial or agricultural technologies.
- Replace of co-generated heat centers to biomass-based small-scale power stations associated with the suitable legal and financial environment.
- Developing of biomass-based systems at settlements without gas-systems.

Biogas, bio-methane, pirogas

- Developing of heat user capacities based on the waste heat of biogas plants.
- Developing of biogas systems, connections of biomethane systems into the national network, development of biogas-based public transport.
- Realization of pirogas micro power stations for electricity and heat production based on locally produced communal waste.

Solid biomass – woody energy plantation, exploitation, and extension

The natural gas system of Hungary is well developed, 90.8% of the municipalities have piped gas supply, the combustion machineries are basically modern and well controlled. Despite the increasing price of gas and the periodic difficulties of supply it is difficult to exchange for an alternative kind of energy. The fact should be stressed that more than 70% of Hungary's gas supply is depending on import.

In Hungary, the 80% of the total renewable energy use is constituted by biomass. Fifty percent of biomass is composed of firewood. Biomass, as the dominant factor of renewable energy sources, can serve as a basis of their increase. A significant quantity of biomass is still produced in silviculture and wood-based industries, and also in agriculture, that is not or only partially used for energy purposes. The exploitation of these feedstocks and the production of biomass for the utilities can provide a considerable quantity of renewable resources. The areas withdrawn from agriculture allow the production of biomass (energy plantations and other energy plants) in a large quantity. In Hungary, the greatest chance for progress is biomass, including solid biomass and dendromass production; the latter deriving from traditional silviculture and utilizable for energy production.

According to recent forecasts, by 2020, 3992 GWh / year + 50 PJ / year (24 PJ / year for public, 26 PJ / year heating

systems) of energy should be supplied with raw material, which is estimated to be around 7.8 to 8 million tons of biomass per year *(Table 1)*. In order to produce this quantity we have to rely upon the present stands and new plantings (2010–2015), and the firewood, harvesting losses, agricultural by-products, herbaceous plants from croplands, woody energy plantations, by-products and waste coming from them. A considerable part of this quantity is available in the state and private forests of Hungary.

Table 1: Forecasts for biomass in Hungary for 2020

Biomass Type	Volume (thousand t/ha)	Share (%)
Forest products	1 289	16.50%
Felling waste	490	6.27%
Industrial wood waste	207	2.65%
Energy plants	2 305	29.50%
Waste – by-product	3 522	45.08%
Total	7 813	100%

In order to assure the long-term 3-4% average annual growth rate of gross domestic product (GDP) that represents the economic development, the total energy need of the economy (the energy required to produce a unit of GDP) should be decreased by 3.5%/a. Such reduction of the energy needs is required to ensure that the annual average growth rate of energy consumption should not exceed 1.5%. As a contribution to meeting this requirement, by 2010 about 75 PJ / year of heat value (1.8 Mt of oil equivalent) should be saved by means of partly state-supported energy-saving activities and exchanged for domestic renewable energy sources. Due to the savings, sulfur dioxide emission can be reduced by 50–55 kt / year, carbon dioxide emission can be reduced by 5–6 Mt / year. The traditional energy sources should be saved, besides, in order to reduce the environmental risks the present use of renewable energy sources should be increased from 28 PJ / year to 65–70 PJ / year by 2015.

Concerning the above, the agriculture has a special place and role. A significant proportion of raw materials for renewable energy come from agriculture and its close environment. The agricultural potential of Hungary suggests that the calculations targeted by European Commission in different segments of bioenergy can be realized by means of a continuous market-focused development strategy. The favourable agro-ecological conditions of Hungary ensure comparative advantage in implementing the EU program.

Taking into account the conditions of our country, biomass plays a determining role within renewable energy sources. This also means that, regarding the progress in the field of renewable energy sources, rural areas will have a higher value, agriculture can be transformed into an energy producing sector, distribution potentials can be widened, and producers can increase their profit.

By means of wood-based energy crops the biomass supply for energy can be improved, that, on the one hand, will relieve forests as a source for biomass, and new crops enable us to create a more rational – more suitable for site conditions – way of crop use, on the other. In addition to various herbaceous and woody energy crops, particular attention should be paid to the collection and use of by-products and waste (straw, stem, cane, etc).

Besides the national renewable energy use (medium and large electric power stations) local applications are also of special importance (municipalities and their institutions). It is important to note that a great part of renewable energy source is available cheaply, so rural areas can meet a substantial part of their energy needs from their own resources in an environment friendly, cost effective way. With the increasing price of fossil fuels, in the case of the larger energy-consuming agricultural activities (drying, heating of foil tents, poultry farm, etc.) a key to future competitiveness can be an energy supply based on cheap local sources and the substitution of fossil energy in rural, small town and public areas.

With the use of solid biomass for energy and industrial purposes a considerable advantage can be achieved:

- Meeting EU requirements concerning renewable energy sources;
- Diversification of energy supply, decrease of the dependence on oil and gas;
- Using domestic energy sources in stead of import to improve the balance of payment;
- Environmental benefits, reducing CO2 emissions;
- Agricultural benefits, improving farmers income;
- Direct job creation and reservation.

4,300–4,500 thousand hectare arable land is used by the cultivation of arable plants, grass land is about 1,600 thousand hectare. 3,300–3,400 thousand hectare agricultural land is available on which the traditional production structure can be maintained, according to professional workshops and significant part of the representations of interests (grain balance, export data, market analysis, etc.). On the basis of all these, an alternative utilization (non-food purpose) has to be fined for a minimum of 1000 thousand hectare land. The most practical form of it is the cultivation of energy crops. It is an important agricultural and a national economic surplus to employ 120–150 thousand people on 1000 thousand hectare land (considering the multiplicative effects). The abandonment of the "usual" cultivation would raise the unemployment in the rural areas. Such huge unemployment layer could not be employed with other rural activities (e.g. tourism, handicrafts, etc.) so the volume and the usage of the cultivation have to be maintained.

The change of the utilization method is reasonable because parts of the affected arable land have unfavourable production circumstances (e.g. danger of inland waters, etc.). These lands are not suitable for profitable production of plants for purposes of the food industry but are suitable for economical energy production.

In the short run (3–5 years), 200 thousand hectare, currently also intensively cultivated land from the minimum needed 1,000 thousand hectare territory for biofuels' raw material production, can be involved into solid biomass production. The suitable land-size can be increased by the alternative use of grass lands and by those lands of energetic purpose that are currently not under the "classical"

agricultural cultivation. Such territories are the ones indicated for recultivation, short forestry energy plantations beside the roads (quickly growing tree species and also because of road safety reasons it is reasonable to have more flexible species than the ones with massive, thicker trunks) and flooded territories.

By 2020 the raising need of biomass (and wood chips) will, even beside a more intensive collection of waste, be just partly satisfied by the currently available selection.

Considering the given circumstances, possibilities and needs (can vary according to fields and type of users), the biomass-mix tries to find out the balance that is able to assure the needed amount of biomass.

By 2015 the share of short rotation forestry plantation within the biomass mix is 1.6 million tones of wood waste a year. The 1.6 million tones of wood waste a year can be assured by the plantation of short rotation forestry energy plantations.

Employment

Job creation and keeping of it affects, first of all the agriculture and the rural areas. Collecting of biomass, farming on energetic plantations can solve the problems of a huge amount of uneducated workforce. There is a numerous variety (heating technology, biogas, biofuels) for the use of biomass. Among these, it is considerable to raise our attention to the ones with significant national economic and social effects. The energetic use of biomass can open up new opportunities for integrated systems and for realization of more project units (attitude of solid biomass product range).

To sum up we can say, that thinking according to the attitude of the solid biomass product range, based on the plantation-like forestry, can contribute to the 20% renewable energy share. The availability, production and use of solid biomass play an important role in the spread of renewables. First of all, the aim is to assure the suitable cultures at territories with worse quality (flood area, sand).

The different short rotation forestry energy plants compared to the "traditional" food plants possess usually with wider tolerance spectrum, so a profitable farming even on unfavourable territories can assure positive economic, social and energetic effects. The key of the success is to choose the suitable and optimal Hungarian growing to the concrete site and market conditions. Growing of energy plants has two aims, on one hand to widen the palette of growing, while on the other hand to assure the needed quantity of raw material.

Considering the above mentioned, fundamental rule is the safe food supply and the order of the energetic utilization because the good-quality arable land demands the healthy production of food raw material, while the territories with less productivity open up opportunities for alternative energy production.

The climate change, the global warming, the worldwide increasing need of energy consumption, the rapid raise of fossil energy resources make the world and Hungary parallel with the members of the European Union act as soon as possible. The diversification of energy resources and the raise of bioenergy-share within the renewable energy share have been a key role. Hungary can benefit from the renewable energy industry by taking the suitable strategic steps and the needed acts while in any other case, we can only be viewers.

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THE ROLE OF CHAMBER SYSTEM IN DEVELOPMENT OF AGRICOMMERCE IN SERBIA

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Abstract: This research is carried out in order to be determined the role of Chamber system in development of agricommerce along with successful preparation of Serbia for EU accession.

On February 28, 1857 Prince Aleksandar Karaðorðeviæ signed the Decree, called THE CONSTITUTION OF THE TRADE. By this Decree, the first Business Association in Serbia was constituted.

Under the Law on retail stores passed in June 1910, the first chambers were established. Those were the following:

- The Chamber of TRADE
- The Chamber of CRAFTS
- The Chamber of INDUSTRY
- The Chamber of WORKERS

Today, in conditions of economic and social reforms and transfer toward market oriented economy, chambers in Serbia chose to reconsider their role, by using experiences of chambers in countries with developed market economy. The chamber strives to be organized as independent, business oriented and expert association of economic operators.

The structure of economy, from the aspect of important economic indicators (total revenue, profit), shows dominant share of manufacturing and agro-industry, trade, financial and other services sectors, transport, telecommunication, and construction industries. By generating over 30% of GDP and employment, Belgrade plays vital role in the economy of the whole Serbia. That is an advantage, but also the responsibility to constantly stimulate faster development and higher living standards by inciting the positive changes in economic and overall environment.

Key words: chamber structure, coordination, institutions, advocate

Introduction

Chamber of Commerce is organized as vocational association and its main goals are quality services and assistance to its member companies as well as proper representing of their interests.

Members of the Chamber of Commerce are all legal and private entities that perform their registered business activity on the territory of Serbia, no matter what the type of ownership it is.

Chamber, through its branch Associations and Boards, Assembly and Managing Board, represents interests of its member companies and monitors and analyzes economic development. It influences adoption of economic policy measures, monitors their effects and suggests corrections if necessary. The Chamber provides expert assistance to its member companies in solving concrete problems, affirmates and promotes their production programme at trade fairs and exhibitions, in the country and abroad. By networking economic operators with foreign partners through contacts with foreign chambers of commerce, embassies, etc. it has important role in transition process of social and economic system of the country. That way, our companies return to foreign markets and revive production and economic growth, by mobilizing all creative powers in view of faster and more efficient economic recovery and easier adjustment to new business environment. A chamber provides assistance to its members in adapting to modern trends of market economy and in overcoming of the existing difficulties. Long lasting aim in the future will be creation of healthy, priphitable, modern and market oriented economy.

The chamber is actively involved in the activities regarding EU accession, by providing information to its members about this topic. By developing partnerships (with domestic and foreign institutions and organisations), chamber, as important instrument, participates in numerous projects financed by the EU, which makes significant contribution to social and economic development of the region. Within these activities it is important to mention cooperation of the chambers of commerce with NGOs as well.

Chambers of commerce cooperate with republic and regional institutions, representatives of foreign chambers of commerce in the country, scientific and research institutions and faculties as well as local self-government.

Belgrade Chamber of Commerce

Belgrade, capital of the Republic of Serbia and center of the South-East Europe, has significant potential in all areas that earn the attribute of a modern city, attractive for living

and working in it. With approximately 1.8 million population (21% of Serbia's total) and over 600,000 employed, Belgrade is not only the seat of government and public institutions, but also a tourist, trade, industrial, transportation, financial, cultural, scientific, and educational centre.

The territory of the City of Belgrade is divided into 17 municipalities: 10 central (Čukarica, Voždovac, Vračar, Novi Beograd, Palilula, Rakovica, Savski venac, Stari grad, Zemun, Zvezdara) and 7 suburban (Barajevo, Grocka, Lazarevac, Obrenovac, Mladenovac, Sopot, and Surčin).

Economic potential of Belgrade constitute most of all 36,537 registered companies (38.3% of all Serbian companies) and 40,688 entrepreneurs (19.7% of Serbia's total).

Due to the macroeconomic stability, market size, human resources, information technology, telecommunication and, especially, its geographic position and well-developed investment infrastructure, Belgrade became one of the most attractive locations for doing business in the region. In the competition for the European cities and regions of the future organized by the "Financial Times", in March 2006 Belgrade was awarded the title "City of the future in Southern Europe".

Belgrade Chamber of Commerce was founded and began working in January 1962.

Belgrade Chamber of Commerce is a true representative of economic operators which, in compliance with the economic development strategy, actively contributes to economic and social development and higher living standards, that should promote Belgrade to a leading position in the south-Eastern Europe.

The main activities of the Belgrade Chamber of Commerce, that is, services it offers to its members are as follows:

- ❑ REPRESENTING INTERESTS OF BELGRADE COMMERCE IN FRONT OF STATE AUTHORITIES AND INSTITUTIONS
  - Initiating measures of fiscal, credit and monetary politics and total economic and legal regulations, in order to build-up market economy institutions;
  - Defining of economic and system regulations and measures of economic policies;
  - Creation of strategy of economic development of Belgrade region and Republic of Serbia and
  - Sector and branch strategies
- ❑ THE PLACE OF GATHERING, COMMUNICATION AND COOPERATION WITH LOCAL AND INTERNATIONAL BUSINESSPEOPLE – Networking and creation of solid business relations
- ❑ PROVIDING EDUCATION OF EMPLOYEES AND OTHER INDIVIDUALS IN ALL SECTORS AND ISSUE APPROPRIATE CERTIFICATES
- ❑ PROVIDING INFORMATION AND CONSULTANT AND OTHER EXPERT SERVICES
  - All kinds of statistical data and analyses
  - Information on loan offer, development programs, innovations and patents offer, support programs for development of SME and entrepreneurship, particularly those financed by the funds
  - Information on all current issues related to the business operations (business cooperation, application of laws, custom procedures, contracts)
  - Address data on business entities, data from all the registers of general associations
  - Assistance in registration of business entities and business plans elaborating
  - Implementation of directives and standards necessary for business transactions with EU, CEFTA and other markets
  - Consultant services related to the use EU funds (information, application, implementation, Project Management seminars and trainings
- ❑ BUSINESS IMPROVEMENT THROUGH PROMOTIONS AND PRESENTATIONS
- ❑ PRESERVING GOOD BUSINESS CUSTOMS, PROTECTION OF BUSINESS ETHICS AND DEVELOPMENT OF SOCIAL RESPONSIBILITY.

Association of Agriculture and Food Industry (AAFI)

The Association is the basic form of organization and work within the Chamber. The Association is a form of organization and work for the Chamber members linked by their functions and branches.

The following associations are operate within the Chamber:

1. Association of Industry
2. Association of transportation and telecommunications
3. Association of Commerce
4. Association of civil engineering and public utility services
5. Association of agriculture and food industry
6. Association of catering and tourism
7. Association of banks, insurance organizations and other financial organizations
8. Association of informational activities

Agriculture plays an exceptional role in overall economic development of Serbia today, especially in reform and transition processes.

Table 1. The share of Agriculture and Food Industry in total GDP of The Republic of Serbia

Year	Agricultural production	Food industry	Other
2002	14.8%	5.9%	79.3%
2003	13.6%	5.7%	80.7%
2004	15.0%	5.4%	79.6%
2005	13.5%	5.4%	81.1%
2006	12.6%	5.3%	82.1%
2007	10.8%	5.2%	84.0%
2008	11.8%	5.5%	82.7%
2009	10,8%	7,2%	82,0%

Source: Statistical Bureau of Republic of Serbia

Agriculture and food industry with around 20% share in GDP represent the major economic sector in the Republic of Serbia.

This sector will continue to have important effect on the economic developments in Serbia.

The activities of the AAFI are focused on realisation of the goals and tasks defined in the yearly Plan of Activities of the Chamber and of the AAFI, as well as of those set out during the year at the meetings of the Association Board, Chamber, and relevant Belgrade and Serbian institutions.

These activities are primarily carried out through the meetings of the Association Board, and meetings with representatives of companies and other stakeholders. In large number of topics and issues dealt with, there was a close cooperation with the Belgrade Union of Cooperatives.

Developments in the industry and performance of companies were monitored and analyzed on regular basis, as were the effects of economic policy measures, operating conditions, privatization and restructuring, and common problems in agriculture and food industry.

The special attention was focused on monitoring of new system solutions that should be in compliance with the Strategy for Development of Agriculture in Belgrade until 2015 and that concern measures for stimulation of agricultural production, subsidies in agriculture, system of reserves, agricultural land reform, production of safe food, environmental protection, and assistance in placement of goods and equal market access opportunities.

The AAFI was regularly analysing the terms of loans for agricultural and food producers and disseminating such information to companies and registered farms.

Process of privatisation was closely monitored and analyzed at the Board meetings. Differentiation of land ownership and privatisation of big agricultural companies were the most sensitive issues, especially the latter due to large amount of land in their possession and fact that it constitutes the reproductive base for agriculture.

In addition to the above, the AAFI was also engaged in finding solutions for contemporary problems identified by its members, other institutions and subjects.

The AAFI actively participated in activities of the Serbian Chamber of Commerce, Serbian Union of Cooperatives, Ministry of Agriculture, Belgrade City Administration – Secretariat of Economy, Belgrade Institute of Statistics and Informatics, Faculty of Agriculture of the Belgrade University, and others.

Conclusion

Chambers of commerce face enormous challenge today – to maintain but also to improve the present positions in their respective national economies. Main reasons for slow modernization of chambers of commerce are:

- absence of in-depth, long-term strategy for economic development on national and local levels;
- no balance between daily activities and engagement on strategic projects;
- resistance to essential, system-related changes;
- total absence or partial implementation of the principle of direct profitability from work;
- inherited image of chambers of commerce as "para–governmental" institutions (especially in the transition countries).

As for the system of chambers of commerce in Serbia, it is evident that the legislation in force does not prevent reforms in the chamber system, but the process has not started yet – neither from the outside, by the government, nor from within the chamber system itself. The reasons for that are twofold: "preoccupation" of the government by other issues on one hand, and on the other – "autism" of chambers, with stiff inner structures opposing any changes and thus missing out the chance to impose themselves as a real representative and service to companies which is, in fact, the essence of the European partnership recommendation – „to simplify the complex chamber system".

From the contemporary chamber of commerce, especially those in the transition countries, it is expected:

- to advocate efficiently the needs and interests of its members in a dialogue with the government,
- to be an equal partner to the government in creation of business environment and economic policy measures that will stimulate economic development,
- to provide the requested services to its members.

Every country that wants to have a fair share in the business world today must have chambers of commerce that will communicate with the chambers of commerce in the countries that have well-developed market economy. Chambers have to be trustworthy institutions, with credentials based on their own capacities and professionalism that can respond adequately to all requirements of their members.

Chambers of commerce do not have invested in them any executive powers, nor should they. Instead, they must have strong arguments. Those arguments are knowledge, experience, information, and readiness and willingness to use all of them for the benefit of economy. Chambers of commerce must become equal, strong and capable partner of the government, always having in mind the primary interests of the economy and economic operators they represent. Complete political neutrality of chambers of commerce is essential because that is a precondition of professional authority and partnership with all those in power. The role of chambers of commerce can be especially important in the transition countries, but only when all the above has been in place.

Important role of the Serbian network of chambers of commerce in future is to promote the Serbian economy through cooperation with the investors already present in Serbia, participation in trade fairs and cooperation with chambers of commerce in foreign countries. By promotion and implementation of CEFTA Agreement and Free Trade Agreement with the Russian Federation, Serbia has become an attractive destination for foreign partners. That opens new possibilities for foreign market access. In conditions of transition and transformation into market-based operation,

chambers of commerce have the advantage of being a system with long tradition and representative membership that advocates and protects interests of its members.

Only unbiased, efficient and modern chambers of commerce system is capable of sustaining the challenges of present economic developments and contributes to development of stimulating business environment.

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GENERALIZED COEFFICIENTS OF GOODS QUALITY AND SATISFYING OF CONSUMERS DEMAND

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Annotation. In process of work the problems are set and solved. There are problems of social welfare research in conditions of nonhomogeneity of objects and subjects of management, of revealing and substantiating insuperable difficulties in rising of social welfare by approaches, worked out before. Also there developed a new direction in implementation of the most important aim of any socially-oriented economy.

Key words: consumer demand, quality, qualitative growth of welfare, competitiveness

1. Introduction

Increase of goods quality is one of the conditions of actual satisfaction of customers demands (interests). However estimation of goods quality and level of satisfaction is difficult task [1, 2].

At present time producers of goods for determining coefficients of quality of objects (goods and services) widely use instrumental and expert methods. Instrumental methods are based on physical effects and use of special apparatuses. Expert methods are used there, where physical phenomenon is not open or very difficult to use. Variety of expert method is so-called organoleptic method, based on use of human organs of sense. There exist some different approaches to estimation of goods quality, which use multi-factor models. The most widespread among them is the method of neighboring point. However known methods lead to different estimations of consequence of consumers relation coefficients.

In spite of existence of different approaches in the sphere of determining of quality coefficients there are some unsolved problems. Difficulties are connected with transformation of the notion of quality from technical category to economical. They began to consider quality in interconnection with demand, satisfaction of consumers demand, and amount of expenses and so on. Quality is an aggregate of features and characteristics of object (goods or service) which enables it to satisfy provided or supposed needs. Consumers demands are characterized both by qualitative and qualitative parameters of goods. In such conditions use of known methods is inconvenient since the abilities of the known methods do not respond to difficulty and many-sided character. In this connection the most difficult and less formalized and actual in theoretical relation and practical use of the notion of quality of objects, oriented on consumers demand, is development of generalized coefficients of quality.

2. Target setting

Satisfaction of consumers' demand – is a peculiar measure of concordance of parameters of object to parameters of consumers' demand. Concordance of those parameters can be measured by generalized coefficients of quality, which we suggest to introduce on the basis of choice of corresponding measure. To this measure the following demands are made. Objects and demands of consumers are characterized by arbitrary number of parameters, among which is the definite number of parameters, specified by quantitative data and several parameters only by qualitative data.

Besides even at high enough quality level goods or service can not satisfy consumer (customer), if its fixed price is too high. In other words quality can not be defined without price taken into consideration. It is significant at planning and projecting of quality. Providing of proper quality is impossible without regulation of prices incomes and costs. The same can be said about the volume of supply (production). If enterprise doesn't have data about volume of supply, amount of production waste, rejection rate, or necessary alterations, it is impossible to define the share of faulty units, and failure rate on enterprise. Without those

coefficients providing of necessary quality level is impossible.

Insufficient volume of supply of goods or service, which is in requisition, causes inconvenience of consumers. Excessive volume of supply means over-expenditure of labor force, raw material, and energy. Regulation of expenses and providing of required level of quality are two sides of one medal. That's why it's always necessary to aim at delivery of goods or services at exactly specified volume, specified level of quality and at defined price. Therefore price and non-price parameters of goods should correspond to consumers' demand. That's why they must be considered by coefficient of quality. Coefficients of quality must allow the successful economic interpretation of obtained results. To our point of view measure of similarity fully corresponds to all these requirements [3]. Hereinafter as a generalized coefficient of quality of object oriented on satisfaction of consumers demand we will use measure of similarity $q_{nki} = q(\Pi_{ni}, T_{ki})$ between i-ми parameters k–го goods $T_k = [T_{k0}, Tk_1,..., T_{ki},..., T_{kI}]$ and corresponding i-ми parameters of demand n-го consumer, taken as a base of comparison. $\Pi_n = \Pi_{n0}, \Pi_{n1},..., \Pi_{ni},..., \Pi_{nI}$.

Measure of similarity, being generalized coefficient of quality of goods, connected with measure of closeness of vector parameters T_k и Π_n, by the simple ratio $q_{nk}=1-d_{nk}$, $n=\overline{1,N}, k = \overline{1,K}$.

By generalized coefficient of quality we mean measure of similarity q_{nk} between parameters of k-го object T_k ($k = \overline{1,K}$.) and need of n-го consumer Π_n ($n=\overline{1,N}$,). Coefficient of quality is – qualitative measure of consumers' satisfaction on goods and service market. (q_{nk} – is positive real number describing quality of goods). Quality is one of determining factors of function of utility and competitiveness.

3. Bases of comparison

Precision of estimation of quality and decisions significantly depends on choosing bases of comparison. Starting from the set target, bases of comparison can be:

- consumers' needs;
- value of necessary efficiency;
- hypothetic sample;
- group of analogues .

In case when bases of comparison is needs of consumers, there must be carried out the choice of nomenclature and preset of parameters of customers needs values, parameters of evaluated or competing production, which consumer use estimating production on market, and also ponderability of those parameters in their general set.

When as a base of comparison we take value of production coefficient, needed for consumer, and also amount of funds, which consumer is ready to spend on purchase and consumption, we choose as a standard coefficient itself or the amount of funds.

If estimated product has competitor then product – sample models need and acts as materialized demands to which estimated product must correspond.

Sometimes hypothetical sample acts as bases of comparison. It is average value of parameters of a group of items. Such procedure is used in such a case when information on specific sample-analogue is insufficient. In fact we talk about analyses of need which may not exist and this estimation must be considered as preliminary and a subject for further specification.

More often as bases of comparison there is taken group of analogues, singled out according to correspondence of classification parameters of sample and estimated production from which are chosen the most stately and then progressive items, having the best prospective for the further widening of sales volume.

The estimation of satisfaction of production consumers' demands is made by comparison of parameters of analyzed production with parameters of bases of comparison of consumers needs. Comparison is made by groups of technical and economical parameters.

4. Generalized coefficients of goods quality and consumers satisfaction

Generalized coefficient of quality and satisfaction of consumers, introduced on the basis of measure of similarity between parameters of object and bases of comparison must correspond to the three following conditions [5]:

$$\begin{aligned}
&1.\ q_{nk} = \max q_{nk}, \text{ if } \Pi_n = T_k;\\
&2.\ q_{nk} = q_{kn}, \text{ if } q[\Pi_n, T_k] = q[T_k, \Pi_n];\\
&3.\ 0 \le q_{nk} < \max q_{nk}, \text{ if } \Pi_n \ne T_k,\ \Pi_n, T_k \in \Pi,\ n = \overline{1,N},\ k = \overline{1,K},
\end{aligned} \tag{1}$$

where Π – range of variation of parameters of bases of comparison, for example, consumers needs.

The first condition of quality coefficient is the condition of maximum object correspondence to bases of comparison; for example, satisfaction of consumers means perfect or potentially reachable level of quality.

The second condition is a the condition of symmetry, and the third condition satisfies the request of monotone decrease of quality coefficient (measure of similarity) q_{nk} on distance d_{nk} i.e. из $d_{nk} \ge d_{nj}$ with the necessity there follows satisfaction of inequality $q_{nk} \le q_{nj}$.

The case of equality of maximum value of quality coefficient to unity i.e. $q_{nk} = \dfrac{q_{nk}}{q(\Pi_n, \Pi_n)} = 1$ corresponds to normalized value of generalized coefficient of quality and is introduced as follows:

$$\begin{aligned}
&1.\ q_{nk} = 1, \text{ if } \Pi_n = T_k;\ q_{nk} = \frac{q_{nk}}{q(\Pi_n, \Pi_n)};\\
&2.\ q_{nk} = q_{kn}, \text{ if } q[\Pi_n, T_k] = q[T_k, \Pi_n];\\
&3.\ 0 \le q_{nk} \le 1, \text{ if } \Pi_n \ne T_k \text{ for all } \Pi_n, T_k \in \Pi,\ n = \overline{1,N},\ k = \overline{1,K}.
\end{aligned} \tag{2}$$

Function of measure of similarity (2) has homogeneity property towards arguments Π_{ni} и T_{ki}, because following condition is fulfilled for it $q(\lambda_i \Pi_{ni}, \lambda_i T_{ki}) = \lambda_i^r\, q(\Pi_{ni}, T_{ki})$ where λ_i и r some numbers. Supposing $r=1$, $\lambda_i = \dfrac{1}{\Pi_{ni}}$ or

$\lambda_i = \frac{1}{T_{ki}}$. Then the following relations are correct $q(П_{ni}, T_{ki}) = q\left(1, \frac{T_{ki}}{П_{ni}}\right) = q\left(\frac{П_{ni}}{T_{ki}}, 1\right)$, which are the result of function's homogeneity.

Economic meaning of symmetry of measure of similarity is connected with its single-valued possibility of application of the given coefficient, both by consumers and producers.

In the area of research of consumers' relation the measure of similarity can be used as coefficient of consumers and goods relations. Coefficient of consumers to object relations – is value of measure of similarity between parameters of consumers needs and goods. During research of goods quality on market the measure of similarity is used as coefficient of goods quality.

It should be noted that analogues of quality coefficient are ordinary weigh-scales or measuring bar "meter". They are used both by sellers and customers for determining of weigh or measuring of lengths of goods.

Therefore, coefficient of quality – is the value of the measure of similarity between parameters of comparison bases and object (goods or service).

5. Analyses and evaluation of goods quality and satisfaction of consumers wants

Comparing among themselves quality coefficients of objects in relation to each consumer, it's able to determine level of quality of each goods in relation to other goods.

Obviously quality of *j-го* goods in relation to *n-st* consumer will be determined by formula:

$$q_{nj} = \max\{q_{n1}, q_{n2}, ..., q_{nj}, ..., q_{nK}\},\ n = \overline{1, N}. \quad (3)$$

It's also able to introduce relation of *l-st* consumer to the level of quality of *k-st* goods:

$$q_{lk} = \max\{q_{1k}, q_{2k}, ..., q_{lk}, ..., q_{Nk}\},\ k = \overline{1, K}. \quad (4)$$

Naturally it's necessary to compare value with some threshold value of quality h_j, which is determined in each case in its own way. Exceeding the threshold level by the coefficient of quality is written as

$$1 - q_{nj} > h_j,\ n = \overline{1, N},\ j = \overline{1, J}, \quad (5)$$

and $1 > n_j$ is the condition of sufficing on market *j-го* goods to *n-му* consumer.

Besides let's introduce difference threshold of goods by quality:

$$|q_{nj} - q_{nk}| \le \varepsilon_{j,k},\ k \ne j, \quad (6)$$

where – minimum difference between coefficients of goods quality. By the threshold of difference we mean the smallest change of quality coefficient between goods, which consumer is able to notice. Otherwise *n-й* consumer with the same possibility can be satisfied by *j-м* goods or *k-м* goods.

6. Certain forms of generalized coefficient of quality

Let's consider certain forms of generalized coefficient of quality as applied to parameters of consumers' wants and goods, quantitatively and qualitatively defined.

To quantitative parameters belong price coefficients and characteristics of goods, defined quantitatively. Coefficients of quality for such parameters can be formed on the basis of use of particular kinds of measure of similarity, metrics of nearness (distance) d_{nk}, connected to the measure of similarity $q_{nk} = 1 - d_{nk}$ and parametrical correlation methods.

Suppose that on finite aggregate of positive parameters of consumers wants $П_n$ and goods T_k it is required to determine the measure of similarity. Suppose that $П_{n1}$, $П_{n2}$,..., $П_{ni}$,..., $П_{nI}$ и T_{k1}, T_{k2},..., T_{ki},..., T_{kI} any positive numbers. Then the expression of unit coefficient of quality is determined as:

$$q_{nki} = \frac{2\sqrt{П_{ni} \cdot T_{ki}}}{П_{ni} + T_{ki}} = \frac{2\sqrt{T_{ki} / П_{ni}}}{1 + T_{ki} / П_{ni}} = \frac{2\sqrt{П_{ni} / T_{ki}}}{1 + П_{ni} / T_{ki}},\ i = \overline{1, I}, \quad (7)$$

complies with all three conditions of the measure of similarity

1. $q_{nki} = \frac{2\sqrt{П_{ni} \cdot T_{ki}}}{П_{ni} + T_{ki}} = \max q_{nki}$, если $П_{ni} = T_{ki}$, (8)

2. $q_{nki} = \frac{2\sqrt{П_{ni} \cdot T_{ki}}}{П_{ni} + T_{ki}} = \frac{2\sqrt{T_{ki} \cdot П_{ni}}}{T_{ki} + П_{ni}} = q_{kni}$ symmetry condition of measure of similarity

3. $0 \le \frac{2\sqrt{П_{ni} \cdot T_{ki}}}{П_{ni} + T_{ki}} \le \max q_{nki}$, if $П_{ni} \ne T_{ki}$ for all $П_{ni}, T_{ki} \in П_i$, $n = \overline{1, N}$, $k = \overline{1, K}$, $i = \overline{1, I}$.

For the proof let's consider difference. $П_{ni} + T_{ki} - 2\sqrt{П_{ni} \cdot T_{ki}} \ge 0$, which comes from the third expression (8) Then the correlation $\left(\sqrt{П_{ni}} - \sqrt{T_{ki}}\right)^2 \ge 0$ is just. Equal sign $\sqrt{П_{ni}} - \sqrt{T_{ki}} = 0$ takes place then and only then, when $П_{ni} = T_{ki}$.

Genuinely inserting (8) into the first expression we shall obtain $q_{nki} = max\ q_{nki}$, if $П_{ni} = T_{ki}$.

This case corresponds to ideal or potential quality of goods by *i-му* qualitative parameter.

Let's consider another condition $0 \le q_{nki} = \frac{2\sqrt{П_{ni} \cdot T_{ki}}}{П_{ni} + T_{ki}}$.

From this condition succeeds that $П_{ni} \ne 0$ $0 \le \frac{2\sqrt{П_{ni} \cdot T_{ki}}}{П_{ni} + T_{ki}} < 2\sqrt{П_{ni} \cdot T_{ki}} = 0$ then and only then, when T_{ki}=0.

This condition means that i-й parameter of goods T_k completely do not satisfy consumers demand. As it seen from the expression (9), condition of symmetry is also fulfilled. Thus the expression (8) is the measure of similarity.

If parameters of consumer's demand and goods consist of positive and negative numbers, then the measure of similarity (8) can be given in a little changed way:

$$q_{nki} = \frac{2|\Pi_{ni} \cdot T_{ki}|}{\Pi_{ni}^{\ 2} + T_{ki}^{\ 2}}. \qquad (9)$$

For life-cycle phase, parameters of consumers wants $\Pi_{ni}(t)$ and object $T_{ki}(t)$ are continuous functions of time t. Then the measure of similarity (7) and (9) respectively, will be written in integral form..

It should be also noted that as a measure of similarity can be used parametrical and non-parametrical methods of estimation of correlation connections between vectors T_k and Π_n, widely used in different statistic and economic researches.

Correlation, translated from English literally means correspondence or accordance. In this context non-parametrical methods of correlation connections must be considered in context of correspondence of satisfaction of qualitatively given parameters of goods and consumers wants. Then as a measure of similarity there are used coefficients of correlations between parameters of consumers' wants and goods. Among these are coefficients of correlation of Spearman, Candall, coefficients of concordance, association, contingency, and others [4]. These coefficients for direct relationship of parameters of demand and goods are measured in limits $q_{nk} \in [0,1]$and for inverse relationship respectively – $q_{nk} \in [0,1]$.

Generalized (integral) coefficient of quality of price and non-price parameters of goods is evaluated by expression

$$q_{nk} = \frac{1}{2}\left[1 - \left|\frac{\Pi_{n0} - T_{k0}}{\Pi_{n0} + T_{k0}}\right| + \frac{1}{I}\sum_{i=1}^{I} q_{nki} + \frac{1}{J}\sum_{j=1}^{J} q_{nkj}\right], \qquad (10)$$

Where I и J – Respectively number of quantitative and qualitative parameters of consumer's demand and object.

Let's consider generalized coefficient of quality q_{nk} on the basis of use of distance d_{nki} between parameters Π_{ni}, $i = \overline{1,I}$ of wants N of consumer and parameters T_{ki}, $i = \overline{1,I}$ of goods of one type K

$$q_{nk} = \frac{1}{2}\left[1 - \left|\frac{\Pi_{n0} - T_{k0}}{\Pi_{n0} + T_{k0}}\right| + \frac{1}{I}\sum_{i=1}^{I}\left(1 - d_{nki}\right)\right],\ n = \overline{1,N},\ k = \overline{1,K}. \quad 1)$$

where parameters T_{k0} и Π_{n0} – relatively are price of *к-го* goods and consumer value of this goods for *n-го* consumer.

Price of *к-го* goods T_{k0} forms from prime cost of goods and profit of producer. Consumer value of goods Π_{n0} – is maximum price, which consumer considers advantageous to pay for it. It consists of consumer cost, equal to price of goods, and unpaid part of consumer value, which is equal to additional profit gained by consumer from use of goods.

The first multiplier in (11) is equal to relation of goods to consumer value and contains in its compound costs and income, both of producer and consumer.

That's why this multiplier determines economic share in coefficient of quality. The second multiplier (radicand) in formula (11) determines technical aspect of quality.

Thus the value q_{nk} simultaneously accounts for correlation with bases of comparison and economical and technical properties of goods.

Metrics of nearness – Euclidian and hemming distances and their modifications are used comparatively wide.[2]

7.Conclusions

This work offers methodology and methods of evaluation of quality of objects and level of consumer demands satisfaction. On the basis of use of measure of similarity there were developed generalized coefficients of quality. There were introduced specific types of generalized coefficients of quality. There was substantiated the choice of bases of comparison resulted from task setting. The results can be applied in the sphere of quality management and organizing of production in different branches.

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FARM-RETAIL PRICE TRANSMISSION IN MALAYSIAN PORK SECTOR

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Annotation. This study intends to determine the farm-retail price transmission behaviors of pork in Malaysia to serve as a good implication for pork pricing system in Malaysia. Using monthly data from January 1997 to December 2008, markup pricing model, Houck, and ECM approaches were estimated. While many previous studies found that farm-retail price transmission is asymmetric, this study encountered different result where the findings in both the Houck and ECM approaches suggested that the Malaysian pork farm-retail price transmission is symmetric. A change in farm price of pork is likely to have similar direction in change of retail price of pork in Malaysia. The pricing system of pork can therefore be further described by the estimated price transmission elasticities (that derived from the symmetric mark-up pricing model) where retail price is very sensitive to the changes in farm price. A change in farm price is expected to result in a bigger change in retail price of pork while other things remain unchanged.

Key words: symmetry, pork, elasticity of price transmission

1. Introduction

There has been a spate of changes in pork sector in Malaysia that precipitated by the doubling of feed, production, and marketing costs over the years. The unprecedented crises in 2008 – namely oil crisis, food crisis, and financial crisis did not only mark the end of cheap food era but also the end of cheap feed era in a more uncertain economic environment. Started off with crude oil crisis, the cost of expensive crude oil passed through and caused an increase in the price carbon-based fertilizers and agro-chemicals used as inputs, through an increase in the cost of operation as well as in transportation and freight. With no option, Malaysia – as a net importer of feed had to continue importing expensive feed. Such unintended burden was even slugged by the food crisis before the tsunami of the financial crisis at latter stage.

All these costs are embedded in the price changes of pork in Malaysia. Farm and retail prices of pork have increased about 42 and 28 percent from January 2001 to RM6.30 and RM12.17 in the end of 2008 respectively. Perhaps, this inequitable change between farm and retail prices of pork is self-explanatory of the recent debate over the determination of pork retail price. For the past few years, National Pork Seller Association determined the retail price in response to the farm price given by the farmers in the top producing states – Johor, Selangor, Penang, and Perak. Some quarters argued that such pricing system is not efficient and viable where farmers' profit is minimal and arguing to seek for ideal farm price but retailers, on the other hand, tend to make higher profit and place the burden on consumers instead of the need to ensure price stabilization at retail level.

Arising from the above, there is an urgent need to review the price transmission system of pork in Malaysia. Without the availability of wholesale price data, this study hence intends to determine the farm-retail price transmission behaviors of pork in Malaysia. The relationship between farm and retail prices provides insights into marketing efficiency as well as consumer and producer welfare (*Capps and Sherwell,* 2007). This will serve as a fundamental implication for pork pricing system in Malaysia.

2. Pork sector in Malaysia

After poultry, swine is the next largest component of the Malaysian animal sector though it is consumed by non-Muslims who make up a significant minority (30 percent) of the population. This sector has been one of the fastest growing industries and self-sufficient since 1981. The country was once recorded 137% self-sufficient in pork with the excess exported to Singapore. Unfortunately, the Nipah virus outbreak in 1998/99 resulted in the closure of some 950, mostly small farms and more prudent attention and stringent animal health, farm operation and environmental regulations. Following the changes, the country was only 79% self-sufficient in pork in 2000. This is mainly due to massive culling of pigs during the Nipah virus outbreak.

In 2003, there were about 824 pig farms in Malaysia. 20 percent of the farms had over 1,000 head and accounted for 70 percent of total pork production. The rest – small farms are rapidly being replaced by large intensive operations or eliminated during annual renewal of license (due to inability

of compliance with the stringent pig farming regulations). The bulk of the new policy as well as stepping up of on-going efforts are directed at increasing food safety and environmental friendly pig production system or modern pig farming system in short.

Should there is no policy intervention, *Tey* (2009) suggested that per capita consumption of pork would be decreased to a lower level from 7.35kg in 2006 that already is a significant difference to its 10.73kg in 1980. The new policy at large, though not directly, is expected to boost consumers' confidence in domestic pork products and improve the statistics of decreasing per capita consumption of pork. The new policy, however, may not perform at its best to compensate the small holders' loss of production in short-term looking at the widening gap between domestic production (200,110 and 195,070 tonnes) and domestic consumption (204,690 and 201,920 tonnes) of pork (in 2007 and 2008 respectively).

3. Method

Markup pricing model has been notably applied in previous studies (*Heien,* 1980; *Kinnucan and Forker,* 1987; *Ferris,* 1998). *However, Gardner* (1975) *and Wohlgenant and Mullen* (1987) found the inferior performance of the markup pricing model compared to the relative price spread specification. This is because the farm-retail price spread changes when retail food demand, farm product supply, or the supply of marketing services shifts.

Encountering such issues in policy applications, Wohlgenant and *Mullen* (1987) suggested a relative price model. The relative price model was compared with the markup pricing model in *Dickerson* (2003) and *Tey* et al. (2009). It was found that the markup pricing model performed better than the relative price model and hence yielded more plausible elasticity of price transmission. The markup pricing model can be expressed as:

$$MM_t = c + \beta_1 P_{rt} + \beta_i P_{rt-i} \tag{1}$$

where MM_t is retail price minus farm price in month t (Ringgit/kilogram), and
P_{rt} is retail and farm prices of pork (Ringgit/kilogram).

Equation 1 can be estimated via generalized least squares/ordinary least squares[1]. Subsequently, the ultimate benefit of the markup pricing model is of its ability to yield elasticity of price transmission for pork over a series of time at general level. The formula for the elasticity of price transmission is:

$$EPT_t = \frac{1}{(1-\beta_1)} * \frac{P_{ft}}{P_{rt}} \tag{2}$$

The previous studies mentioned above obtained elasticities of price transmission by assuming symmetry in price transmission which means that retail prices would behave in the same manner of both increases and decreases in farm prices. However, some other previous studies suggested that price transmission is largely asymmetric. *Von Cramon-Taubadel and Meyer* (2000) explained that the presence of asymmetric price transmission often is considered to be evidence of market failure or the abuse of market power. At a micro perspective, *Kinnucan and Forker* (1987), *Hahn* (1990), *Bernard and Willett* (1996), *and Capps and Sherwell* (2007) found that price transmission elasticities in conjunction with rising farm prices generally are larger than corresponding elasticities associated with falling farm prices. On the other hand, *Ward* (1982) and *Punyawadee* et al. (1991) argued that it should be another way round.

Further to *Von Cramon-Taubadel and Meyer's* (2000) point, it is a doubt whether there has been market failure or the abuse of market power in the Malaysian pork market. This needs to be tested, particularly to determine whether price transmission in pork is symmetric or asymmetric before conducting analysis on farm-retail price spread for pork in Malaysia. As suggested by *Capps and Sherwell* (2007), this study adopted *Houck* (1977) model which has been empirically applied by *Boyd and Brorsen* (1988), *Kinnucan and Forker* (1987), *Bailey and Brorsen* (1989), *Zhang* et al. (1995), *Mohanty* et al. (1995), *Bernard and Willett* (1966), *Willett* et al. (1997), *Peltzman* (2000), *and Aguiar* (2002). The model implicitly builds on the notion that retails prices is a function of farm prices and not vice versa. It can then be expressed as:

$$\Delta P_{rt} = \alpha_o + \alpha_1 \Delta P_{ft}^{+} + \alpha_2 \Delta P_{ft}^{-} + \in_t \tag{3}$$

where P_{ft} is farm prices of pork (Ringgit/kilogram),
$t = 1, 2, \ldots,$
Δ is the first difference operator,
ΔP_{ft}^{+} is $P_{ft} - P_{ft-1}$, if $P_{ft} > P_{ft-1}$ and 0 otherwise, and
ΔP_{ft}^{-} is $P_{ft} - P_{ft-1}$, if $P_{ft} < P_{ft-1}$ and 0 otherwise.

However, it is rare to have perfect efficiency in price transmission like illustrated in Equation (3). In Malaysia, National Pork Seller Association is currently the sole collector of the farm price of pork and decision maker for the retail price of pork. The association announces the price changes only via daily mainstream newspapers. Pig farmers, mostly are not highly educated, perhaps do not read these newspapers and the common channel to get the information of price changes is via word-of-mouth. Hence, Equation (3) with incorporation of lag length that to be estimated via generalized least squares/ordinary least squares (see Footnote 1) can be rewritten as:

$$\Delta P_{rt} = \alpha_o + \sum_{i=0}^{M1} \alpha_1 \Delta P_{ft}^{+} + \sum_{i=0}^{M2} \alpha_2 \Delta P_{ft}^{-} + \in_t \tag{4}$$

[1] Use generalized least squares if serial correlation is evident OR ordinary least squares if serial correlation is not evident.

where *M1* and *M2* are the length of the lags, and other variables are as described in Equation (3).

At the outset, it is prudent to examine whether the Malaysian price transmission of pork is asymmetric. Following Gardner (1975), a formal test on the following asymmetry hypothesis,

$$H_0 : \sum_{i=0}^{M1} \alpha_{1i} = \sum_{i=0}^{M2} \alpha_{2i} \tag{5}$$

can be conducted using a t-test or an F-test. Failure to reject the null hypothesis would mean that the price transmission is symmetric. On the other hand, a rejection of the null hypothesis would provide evidence of asymmetry and hence the analysis asymmetric price transmission can then be estimated by employing error correction model (ECM) if retail price and farm price are cointegrated. The ECM' residuals can be incorporated in the Engle-Granger Representation Theorem and the price transmission model can be expressed as:

$$\Delta P_{rt} = \alpha_o + \alpha_1 \Delta P_{ft} + \alpha_2 ECT_{t-1} + \sum_{i=1}^{M1} \alpha_{3i} \Delta P^{+}_{rt-i} + \sum_{i=1}^{M2} \alpha_{4i} \Delta P_{ft-i} + \in_t \tag{6}$$

where ECT is the residuals from the cointegrating relation between P_{rt}, and P_{ft} and other variables are those defined earlier.

Granger and Lee (1989) improved the model by modifying Equation 6 to segment the ECT into positive and negative components. Further improvement made by *Cramon-Taubadel and Loy* (1999) to allow incorporation of ΔP_{ft} sees the asymmetric error correction model to be expressed as:

$$\Delta P_{rt} = \alpha_o + \sum_{i=1}^{M1} \alpha_{1i} \Delta P_{rt-i} + \sum_{i=0}^{M2} \alpha^{+}_{2i} \Delta P^{+}_{ft-i} + \sum_{i=0}^{M3} \alpha^{-}_{2i} \Delta P^{-}_{ft-i} - \\ + \alpha^{+}_3 ECT^{+}_{t-1} + \alpha^{-}_3 ECT^{-}_{t-1} + \in_t \tag{7}$$

Equation 7 provides long-run (cumulative) effect of rising and falling of farm-retail price transmission. For the sake of completeness, this study is also interested to look at the short-run effect of rising and falling of farm-retail price transmission and the final ECM model can be expressed as:

$$\Delta P_{rt} = \alpha_o + \sum_{i=1}^{M1} \alpha_{1i} \Delta P_{rt-i} + \alpha^{+}_{2i} \Delta P^{+}_{ft-i} + \sum_{i=0}^{M2} \alpha^{+}_{3i} \Delta P^{+}_{ft-i} + \alpha^{-}_{4i} \Delta P^{-}_{ft-i} - \\ + \sum_{i=0}^{M3} \alpha^{-}_{5i} \Delta P^{-}_{ft-i} + \alpha^{+}_6 ECT^{+}_{t-1} + \alpha^{-}_7 ECT^{-}_{t-1} + \in_t \tag{8}$$

With the estimation of Equation 8 via generalized least squares/ordinary least squares (see Footnote 1), any of the coefficients, α_{1i}, α^{+}_6, α^{-}_7, that are statistically different from zero will provide evidence that the ECM approach is better than the Houck approach. A further verification whether the Malaysian pork price transmission is asymmetric can be done by performing an F-test or t-test on the hypothesis of:

$$H_0 : \alpha^{+}_{2i} = \alpha^{-}_{4i} \text{ or } \sum_{i=0}^{M2} \alpha^{+}_{3i} = \sum_{i=0}^{M3} \alpha^{-}_{5i} . \tag{9}$$

Also, short-run and long run elasticities for farm-retail price transmission can be yielded from the estimation of Equation 8. The formulas are:

Short-run elasticity of price transmission for rising farm prices:

$$\varepsilon^{+}_{sr} = \alpha^{+}_{2i} * P_{ft} / P_{rt} \tag{10}$$

Short-run elasticity of price transmission for falling farm prices:

$$\varepsilon^{-}_{sr} = \alpha^{-}_{4i} * P_{ft} / P_{rt} \tag{11}$$

Long-run elasticity of price transmission for rising farm prices:

$$\varepsilon^{+}_{LR} = \sum_{i=0}^{M2} \alpha^{+}_{3i} * P_{ft} / P_{rt} \tag{12}$$

Long-run elasticity of price transmission for falling farm prices:

$$\varepsilon^{-}_{LR} = \sum_{i=0}^{M3} \alpha^{-}_{5i} * P_{ft} / P_{rt} \tag{13}$$

4. Data

Monthly data from January 2001 to December 2008 for farm and retail prices of pork was collected from the Ministry of Agriculture and Agro-based Industries, Malaysia. Table 1 presents the descriptive statistics associated with the price series discussed in earlier section. It is apparent that the retail price was more than double of farm price of pork at average within 2001"2008. This could be the result from the growth in the sector itself as a recovery after Nipah virus outbreak in 1997. Hence, there was more rising in farm price of pork than falling in the same period.

Table 1: Descriptive statistics

Mean price		Cumulative	
Farm	Retail	Rising	Falling
4.6094	9.51	18.78	-16.33

A further observation in the spread of farm and retail prices of pork is shown illustratively in *Figure 1*. The spread represents an aggregate of marketing costs and profits. Ferris (1998) suggested that the price spread is equal to the equilibrium of demand and supply of marketing services and materials per unit of product, where marginal value of the marketing services and materials per unit of product (addressed as marketing margin in this study) is equal to marginal cost. In general, it is seen that a change in farm price of pork led to similar change in retail price of pork. Perhaps, this indicates that the price transmission is symmetric. The price spread was quite stable even at the outbreak of Nipah virus in 1997 but it plunged to its worst in 1999 due to lagged consumers' confidence crisis in pork

products. It started to pick up since 2000 and the spread widened in the latter years of observation. Perhaps, there were more marketing costs involved in transferring pork products from farm to retail. Part of them, perhaps the most significant one is diesel price, which was just RM0.651/liter in 1997 but it went up to its peak at RM2.582/liter in June 2008 and recorded slightly lower at RM1.75/liter at the end of 2008. There were more marketing costs associated with the diesel price changes hereafter.

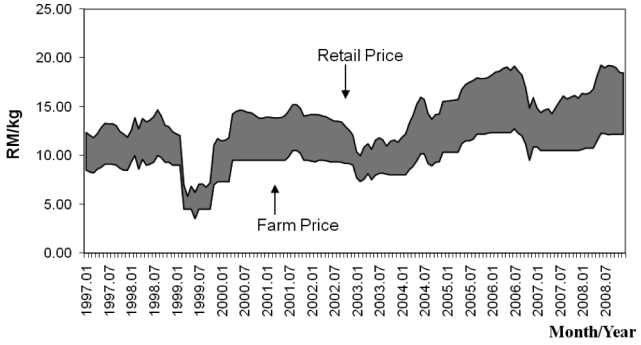

Figure 1: Farm-retail price spread in pork, Malaysia, 2001–2008

5. Results

A correlation test was performed to measure the degree to which the marketing margin and retail prices of pork are linearly related. The estimated correlation coefficient of 0.8259 shows that there is positive and strong correlation between these two variables. Subsequently, Equation 1 was estimated using generalized least squares and the results are presented in Table 2. It is evident that an increase in retail price of pork is likely to lead to an increase in marketing margin of pork in Malaysia.

Table 2: Parameter estimates of markup pricing model

	Coefficient	Std. Error
Intercept	-1.1050	(0.6889)
	0.7824	(0.0442)***
	-0.1593	(0.0435)***
AR(1)	0.8996	(0.0435)***
R-square	0.9198	
Akaike info criterion	0.4656	
Schwarz criterion	0.5488	
Durbin-Watson stat	2.1769	

Note: *** Statistically significant at 1% level of significance.

The discussion above presents an overview of retail prices behavior in relations to changes in farm prices. To provide a better picture on the behavior of retail price of pork in response to rising and falling farm price of pork, Houck approach was further applied. Before a formal estimation on Equation 4, the lag length(s) was determined based on the Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC). It was found that the number of lags associated with both rising and falling farm price is one in the Houck approach. With such specification, the estimated parameters are presented in *Table 3*. A t-test on the coefficient of ΔP^{+}_{ft-1} (1.2594) and ΔP^{-}_{ft-1} (1.2229) revealed that the Malaysian farm-retail price transmission of pork is symmetric as we failed to reject the null hypothesis (Equation 5) at 5 percent significance level.

Table 3: Parameter estimates of the Houck approach

	Coefficient	Std. Error
Intercept	-0.2473	(0.4916)
ΔP^{+}_{ft}	-0.4606	(0.2298)**
ΔP^{+}_{ft-1}	-0.3851	(0.2233)*
$\sum \Delta P^{+}_{ft}$	1.2594	(0.1723)***
ΔP^{-}_{ft}	-0.6542	(0.3131)**
ΔP^{+}_{ft-1}	-0.3586	(0.2896)
$\sum \Delta P^{-}_{ft}$	1.2229	(0.2036)***
AR(1)	0.7960	(0.0524)***
R-square	0.9153	
Akaike info criterion	1.7151	
Schwarz criterion	1.8816	
Durbin-Watson stat	2.1245	

Note: *** Statistically significant at 1% and ** 5% level of significance.

A further cointegration test on the relationship between farm and retail prices show that they are indeed cointegrated. Hence, the ECM approach of Equation 8 was estimated and the results are presented in *Table 4*. The coefficient of ECT^{+}_{t-1}, ECT^{-}_{t-1}, $\sum \Delta P_{rt-1}$ that is statically different from zero and the R-square value show that the ECM approach performed better than the Houck approach. To reaffirm such indication, ECM was also found superior to the Houck approach based on the lowest Schwarz and Akaike criteria. A further verification using an t-test found that the Malaysian farm-retail price transmission is symmetric [coefficient of $\sum \Delta P^{+}_{ft}$ (0.3647) and $\sum \Delta P^{-}_{ft}$ (0.3645)] at 5 percent significance level.

Arising from the findings of both the Houck and ECM approaches that suggests symmetry in the Malaysian pork farm-retail price transmission, elasticities of price transmission from the markup pricing model were estimated. *Figure 2* illustrates the changes of the elasticity of price transmission for pork within 2007–2008. It is obvious that the elasticities vary from month to month. This is because the ratio of the farm price to retail price varies from month to month. Hence, the elasticity of price transmission is defined as the percentage change in retail price due to a one percent change in farm price. For instance, the average elasticity of price transmission (2.2655) computed at the sample mean can be interpreted as one percent increase in farm price is likely to see 2.2655 percent increase in retail price of pork.

On the whole, the price transmission has been very elastic even at its lowest level of 1.34 in April 1999. The lowest level

Table 4: Parameter estimates of the ECM approach

	Coefficient	Std. Error
Intercept	-0.0037	(0.1048)
ΔP_{ft}^{+}	0.1990	(0.2551)
ΔP_{ft-1}^{+}	-0.4947	(0.2484)**
$\sum \Delta P_{ft}^{+}$	0.3647	(0.0959)***
ΔP_{ft}^{-}	0.6337	(0.3046)**
ΔP_{ft-1}^{+}	0.3716	(0.3169)
$\sum \Delta P_{ft}^{-}$	0.3645	(0.1006)***
ECT_{t-1}^{+}	0.2008	(0.1920)
ECT_{t-1}^{-}	-0.3718	(0.1457)**
$\sum \Delta P_{rt-1}$	0.7850	(0.0613)***
R-square	0.9234	
Akaike info criterion	1.6372	
Schwarz criterion	1.8444	
Durbin-Watson stat	2.1432	

Note: *** Statistically significant at 1% and ** 5% level of significance.

of price transmission elasticity can be attributed to consumers' confidence level carried over from the Nipah virus outbreak in late 1997. Subsequently, it saw astonishing shift away from pork consumption where retailers were forced to sell at as low as RM0.80/kg marketing margins in June 1999. Since the recovery in 2000, the market has corrected itself to reward the retailers with commensurate markup margins between RM2.87/kg and RM6.88/kg.

Figure 2: Changes of the price transmission elasticity for pork in Malaysia, 1997–2008

From the discussion on the more plausible model – ECM approaches also provides zoom-in ability to see the short-run and long-run price transmission behaviors. These figures, however, are purely indicative of their behaviors. *Table 5* presents the short-run and long-run elasticities of price transmission that estimated at the sample means of the data. All estimated elasticities of price transmission are far less than unity and hence inelastic. The short-run elasticity of price transmission for falling farm prices (0.3072) is about triple as large as the short-run elasticity of price transmission for rising farm prices (0.0965). It implies that retail price of pork is more responsive to the falling farm prices compared to rising farm prices in short-run. This result, however, does not hold in long-run. The elasticity of price transmission for rising and falling farm prices is similar, only with marginal difference in long-run.

Table 5: Estimates of short-run and long-run elasticities of price transmission

	Short-run elasticity of price transmission		Long-run elasticity of price transmission	
	Rising farm prices	Falling farm prices	Rising farm prices	Falling farm prices
ECM Approach	0.0965	0.3072	0.1768	0.1767

6. Conclusion

Using monthly data from January 1997 to December 2008, several quantitative analyses (markup pricing model, Houck, and ECM approaches) on farm-retail price transmission in the Malaysian pork market was undertaken. While many previous studies found that farm-retail price transmission is asymmetric, this study found different result where the findings in both the Houck and ECM approaches suggested that the Malaysian pork farm-retail price transmission is symmetric. A change in farm price of pork is likely to have similar direction in change of retail retail price of pork in Malaysia. The pricing system of pork can therefore be further described by the estimated price transmission elasticities (that derived from the symmetric mark-up pricing model) where retail price is very sensitive to the changes in farm price. A change in farm price is expected to result in a bigger change in retail price of pork while other things remain unchanged. This is crucial looking at the future international commodity market is increasingly uncertain where the feed is sought from, consumers would have to continue consuming expensive pork or stop consuming pork and seek for substitutes, should there be no corrective action taken in the current price transmission system of pork. If it is so, an effort to assure retail price stabilization will be at the expense of farm price and subsequently pig farmers' revenue and profit.

Beyond the dependent on the gloomy price transmission system, future challenge in the market does not only lay on inter-organizational competition but also on inter-supply chain system competition. Some retailers have elected to take the current price transmission system as a benchmark against their efficiency in operation and ability to offer lower price to consumers by taking initiative to team-up with pig farmers in a context of contract farming and lean supply chain system. The direct supply from farm to retail has seen quite a success in the development of pork specialized retail outlets in several major cities in Malaysia. This initiative should also be extended to pig farmers by setting up co-operatives jointly and applying leaner supply chain system to run pork specialized retail outlets in future. The operational and cost

efficiencies are expected to benefit most parties, particularly consumers where farmers and retailers both make commensurate profit as well.

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BRIEF OVERVIEW OF THE INTERNATIONAL FLOWER MARKET, ITS STATE AND DEVELOPMENT UNDER PRESENT-DAY ECONOMIC CONDITIONS

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Abstract: The research of international flower market was conducted in this article. A big attention was paid to the main countries which are suppliers and importers of flowers and plants including their shares in the world flower production. The impact of financial crisis on this economic sector and inequality in consumption level of different countries were observed.

Key words: flower market, demand, supply, import, export.

Introduction

Flower market appeared many years ago and has its specific among other kinds of market. There are developed and developing countries that conduct this activity and for some of them it is a huge part of GDP, like countries of Latin America. Rich countries with great demand on flower products provide themselves with flowers by importing and simultaneously provide working places in developing countries. The amount of production differs strongly between countries and depends on the many factors from climatic conditions to economic possibilities.

Recently, most of the flower productions are conducted in greenhouses with high technology and protected from the weather unpredictability, but there is some external influence, like today's economic situation, that all markets are touched by and it does not make any exclusion for the flower market. That is why this question is also mentioned in this article and in need of further research.

The task of the research is to determine the main participants of the international flower market, the largest growers and importers that can influence on the world market of flowers and plants and to explore present situation on this sector of economy.

Research methods

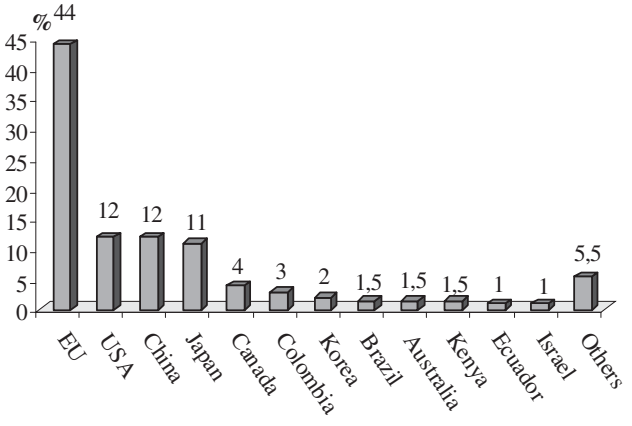
The research is based on the methods of analysis, synthesis and summing up of information from international sources concerning flower market. Tabular and diagrammatic methods were used for representation of analytical and statistical information.

Results

The EU represents a share of ca. 10% of the world area of flowers. The Asia-Pacific region has a share of more than two-thirds in the world acreage, due to China and India. China with 54% and India with 12% have a majority in the world acreage of flowers and plants. Japan, Taiwan and Thailand are other major flower producing countries in this region. The area of flowers in Africa is very small with a share 1.1%. Kenya is the largest African grower. The United States and Mexico are among the most important world producers.

The share of EU production in the world production of flowers and plants is ca. 44%. The United States, Japan, China and Canada are among the countries with the largest production of flowers and plants in the world *(Graph 1)*.

The EU with a share of 10% in the total world area and a 44% share in the world production of flowers and plants is one of the countries with the highest flower production



Graph 1. Flower Production Share of Countries in Value Terms
Source: AIPH/Union Fleurs: International Statistics Flowers and Plants 2009 [1]

Table 1: Protected and open area for production of flowers and plants in comparison to yields in selected countries

Country	Protected Area hectares	Open Area hectares	Total hectares	Value of Production millions Euro	Yields thousand Euros/ hectare	Ratio of protected area %
Austria	418	1753	2171	240	110,548	19
Belgium	625	1027	1652	263	159,200	38
Czech Republic	129	91	220	43	195,454	59
Denmark	350	194	544	349	641,544	64
France	1909	3323	5232	956	182,721	36
Germany	2524	5116	7640	1289	168,717	33
Hungary	220	220	440	95	215,909	50
The Netherlands	5047	2581	7628	4005	525,039	66
Spain	2456	3684	6140	412	67,100	40
Sweden	159	0	159	128	805,031	100
United Kingdom	1043	5726	6769	431	63,672	15
China	72701	224601	297302	2903	9,764	24
Japan	10190	9869	20059	2606	129,916	51
United States	6856	12549	19405	2992	154,187	35

Source: Calculated by data of AIPH/Union Fleurs: International Statistics Flowers and Plants 2009 [1]

intensity per hectare. Countries with a high ratio of protected production areas such as Denmark, Sweden or Netherlands achieve the highest yields per hectare. We can conclude that the production of flowers and plants under protection is mach more intensive and effective than production in open areas *(Table 1)*.

The combined production value of EU countries according to the available data is more then € 19,5 billion (97% in old Member States and new Member States – 3% only). The Netherlands is by far the major producer in the EU (32%), accounting for almost one third of total production value [12]. Production development differs strongly between countries. In some Norwest European countries like the UK, Germany and Belgium, production is declining. In the Netherlands, Italy, Spain, Belgium, Sweden and Denmark, the number of active growers is also declining. The average production per company however increases. Furthermore, East-European countries like Poland and Hungary are showing a recovery and even growth, in cut flower production [2].

In the 1970s and 1980s, Poland was sometimes called "the Holland of Eastern Europe", referring to its considerable floricultural production sector. In those times, Dianthus and Gerbera were the main products cultivated. The increasing costs of energy after the fall of communism forced many growers to stop their production in the early 1990s.

Up-to-date statististics on the Polish floricultural sector are scarce. In 2005, the Research Institute of Pomology and Floriculture Poland estimated the value of cut flower and pot plant production in Poland at € 501–536 million in 2003. Approximately € 456 million of the production value was ascribed to greenhouse production (cut flowers, pot plants and bulbs). Another € 45–70 million was ascribed to production in open area.

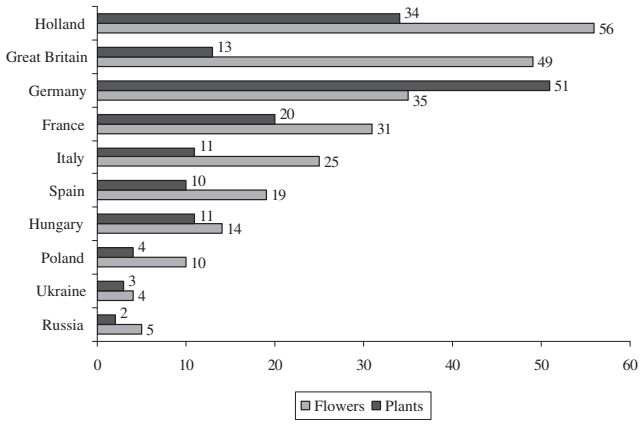
According to the Polish agricultural census of 2002, the greenhouse area for floriculture was 1.417 hectares in 2002. It is estimated that cut flowers account for about 65% of this area. The open area for the production of floricultural products amounted to 3.176 hectares. Around 15% of this area is used for the production of cut flowers. In accordance with an article in Floriculture International, this area is declining. Industry sources, however, indicate that the industry is very much in transition to more effective production and more cooperation. Polish production is particularly strong in spring and in summer.

Concerning shares in total acreage, Poland produces mostly Rosa (27%), Gerbera (19%), Dendranthema (14%), Dianthus (12%), Freesia (6%) and Anthurium (5%) (Agricultural *University of Warschaw,* 2000). The total assortment of cut flowers produced in Poland is still limited, but a few crops are growing in importance like Eustoma (Lisianthus), Zantedeschia, Tulipa and Anthurium. One of the largest Anthurium farms in Europe is the 3.5 hectares big farm of JMP near Lublin. Although traditionally an important product featuring many Polish varieties, the cultivation of Gerbera is shrinking [8].

Main flower products consumption in EU is in the "old" Member States (Germany, France, and Italy). Low consumption occurs in the new Member States but it is increasing (Poland, Czech Republic). There is a stable average per capita consumption: 38 EUR per capita per year but there is significant differences between "old" Member States (45 EUR) and "new" Member States (11 EUR), Netherlands: 85 EUR per capita. As for consumption data the figures provided were calculated theoretically (Production + Imports – Exports = theoretical consumption) [12].

According to the research conducted by Flower Council of Holland in 2007 Russia and Ukraine belong to countries with lowest flower consumption *(Graph 2)*. The explanation of such situation is not only that their citizens are used to buy flowers mostly for some celebrations but also restricted financial possibilities of people.

Eurostat trade statistics illustrate that the EU is the world's leading importer of flowers, with imports amounting to € 3.5 billion in 2008. In the period 2004-2008, imports increased significantly at an annual average rate of 1.9% in terms of value. In terms of volume, imports actually decreased by 2.1% on average per year. These opposite developments show that average prices of the imported flowers became higher. Germany and the UK are the leading import markets in the EU, accounting for 44% of total EU



Graph 2. Per capita consumption (2207) in EUR
Source: www.flowercouncil.org/us/marketinformation/ [3]

imports (in value). In the period 2004–2008, Germany remained the largest European importer. However, imports by Germany decreased considerably since 2005. Imports by the UK showed healthy growth from 2004 to 2008. Last year, the UK was hit hard by the global economic crisis, resulting amongst other things in a sharp drop in cut flower imports.

Only 18% of total imports was imported from outside the EU. However, this share is increasing. The Netherlands is the leading importer of products from outside the EU, accounting for more than half of these imports. A great part of Netherlands imports is re-exported to other countries, in particular Germany [11].

It was a constant trade growth in the last 10 years except for the last 2 years. Imports from third countries represent 17,6% of total deliveries (volume) and 461 000 tons were imported in 2008 (1.5 billion EUR in terms of value – 78% cut flowers). Origin countries: Kenya – main origin for flowers and ornamental plants increased supply in the last 8 years, Costa Rica and China. EU provided 561.700 tons of export in 2008 (31% potted plants, 16% cut flowers and cut foliage). This volume was accounted in 1.7 billion EUR (33% cut flowers, 29% potted plants) and delivered to Russia as a first destination (22%), Switzerland, USA, Ukraine (6% until now but significant growth in 2008) and other countries. USA and Japan are main destination for bulbs.

EU 27 is a net importer of cut flowers and cut foliage and net exporter of other flower products. It has a positive balance since 2002 [12].

France is the third largest market for cut flowers in the European Union, and the fourth-largest EU importer of cut flowers and foliage. Imports added up to €417 million in 2006. Major imports include roses (the most popular cut flower in France), tulips, orchids, chrysanthemums, and carnations. The main suppliers are the Netherlands (which holds a significant portion of the market about 80% of the market) followed by Italy and Spain. French consumers enjoy flowers that are brightly coloured [5].

The Netherlands is the main supplier of cut flowers to other EU member states. The dominating position of The Netherlands as a supplier to the EU is the result of both its large production and the aforementioned re-export of flowers. Besides The Netherlands, other leading cut flower suppliers to the EU contributing major shares were Kenya, Colombia, Ecuador and Israel [11].

Present situation shows that Netherlands` cut flowers market fall in turn over by 13%, pot plants market increase of 3,5% in volume. There are problems with export because some destination countries encounter fluctuations in exchange rate (UK, $-linked economies like Russia, Ukraine), even independently from economic crisis. Gas contracts will be a lot cheaper in 2010 than they were in 2009 (0.15 Eurocent per cubic meter vs. 0.44 Eurocent in 2009) but several Dutch producing companies did not survive in 2009 due to the high energy prices [12].

Recently published trade data (Eurostat) covering the year 2008 shows that The Netherlands remains the leading gateway for flowers from a number of different developing countries [10].

The major market for Kenyan flowers is also Holland with 69% of all the Kenyan flower exports through the Dutch auctions. Kenya has become the European Union's biggest source of flower imports and overtaken Israel as market leader. It has a 25% market share, beating Colombia and Israel which each have about16% [4].

Imports from Kenya increased by 13% annually between 2004 and 2008, while imports from Ecuador increased by 20% annually during this period. Imports from Colombia and Tanzania showed significant increases as well. However, the most notable performance was that of Ethiopia. Imports from Ethiopia increased by 193% annually, with imports amounting to €63 million in 2008. Only four years before, the imports from this country were still negligible. In contrast, imports from Zimbabwe decreased by 18% annually during the review period, due to the unstable economic and political situation [10].

Analysis of recently published Eurostat data (covering trade until 2008) shows that developing countries accounted for a share of 55% in Spanish cut flower imports in 2008. This is relatively high compared to the EU average of 24%.

Between 2004 and 2008, Spanish imports from developing countries increased by 10% annually. The most important developing country suppliers are Colombia and Ecuador, together accounting for 53% of total imports. Developing countries have particularly large shares in imports of roses and carnations [7].

There is ongoing profound crisis in Spain. During last period carnations land area have been reduced by 40%, roses – by 14%, but prices are constant, similar to 3–4 years ago, despite increase in production costs. Incomes are decreasing, unemployment has increased, consumption has fallen and profitability has therefore fallen.

On the meeting of the advisory group on flowers and ornamental plants held in Brussels on 09/11/2009 Italian representatives of both the trade and production reported that economic crisis has strongly hit consumption in Italy in 2008–2009. Drop of 20% in income in the sector in 2009. General signals that crisis has bottomed out but not in the

flowers sectors (sales are not going up). Wholesalers sold a lot but not retailers. 1st of November 2009 has been a disaster. Production is suffering a lot, partly due to structural problems (small farms, difficulties to industrialize the sector; tiny businesses in Liguria: it is going to be difficult to remain competitive in long term: very bad profitability). Additional problems are due to energy prices and financial speculation in the sector. In that respect, the use of EU funds should be carefully monitored by the Commission to ensure that they are actually used for the sector and not for speculation! Prices to producers are the number one problem worldwide (they do not cover production costs) [12].

Since 1993, the EU imports of fresh cut flowers have been dominated by Rosa. Between 2004 and 2008, imports of Rosa increased by 7.6% annually [11].

In the international market for cut flowers and foliage, the major tropical flowers (or exotics) are Orchids and Anthuriums. Other important products falling within this product group are Protea's (originally from South Africa) and of course Heliconias, Alpinia, Gingers, Strelitzias (birds of paradise) and to a lesser extent Calatheas.

Tropical flowers account for a very small portion of the international flower trade (far below 5%). As a result, the international flower trade has structured itself almost completely according to the requirements in handling traditional flowers: low temperatures during post-harvest and transportation, the so-called cold chain.

The main international markets for tropical flowers are the European and North American markets (USA and Canada). In general, it can be said that the European market is characterized by stricter quality requirements than the North American market. The role of the Dutch (and German) flower auctions in the tropical flower trade is considerable. Most tropical flowers and foliage are directly exported to European and North American importers / importing wholesalers. Nevertheless, exporters that are able to supply consistent and large volumes of high quality should determine if selling through the auctions is a viable option as this may offer them full sales certainty. Sales via the auctions is often organized with the assistance of a local import agent who arranges eventual re-packing and distribution of the products [9].

The financial and economic crisis has already had a significant negative impact on export levels, profit margins and employment in the flower sector in developing countries.

Regional differences in trade patterns are reinforced by the crisis. Flower exporters from Latin American countries – already heavily dependent on the US market before the crisis – are suffering more severely as the US market faces more serious problems than the EU market. African producers – known for their low prices – face pressure to cut prices even more because of the crisis. All exporters report increased rigour among European buyers in their price and margin negotiations. Moreover, more than 60% of the exporters surveyed are having difficulty obtaining export credits. More than 80% claim to be having difficulties accessing investment capital.

Within the EU, the demand for flowers has declined considerably since December 2008. Demand from the USA was already on the decline before that time. The consequence of this decline is oversupply, which in turn is leading to lower prices. Importers in the Netherlands indicate that prices have gone down by 15 to 30% since last December. Some flower species are being sold below production cost. Declining order numbers and volumes, together with decreasing prices, have caused a turnover drop among Dutch importers of 0 to 30%, depending on the product range: consumer purchasing behavior is also shifting, shifting from more expensive and luxurious flowers to cheaper products.

The general expectation among respondents is that these trends will persist in the next 2 to 3 years. According to some respondents, the crisis may also have a positive effect on the sector, causing players to reorient with regard to competitive advantages, innovation and value addition [6].

Conclusions

Despite differences in flower market share of different countries, all of them are important for its development. The economics of flower oriented countries are interrelated and their cooperation in solving problems concerning flower market is important especially today. Nevertheless flower production exists and will not disappear in the future and economic crisis gives the producers to see their weak sides in order to use new opportunities.

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PRICE RISK MANAGEMENT USING BY A SPECIFIED FUTURES MODEL

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Annotation. The principal achievement of this paper is to introduce the operation of a specified 'Futures' model and it's practice for decision-makers of financial institutes through an example based on the price data's of grain futures market from EU assessment 2004 to these days in Hungary.

Based on a theoretical foundation, the calculation model was developed in order to assist short and long-term marketing decisions. The economical basis of the model is the combinative use of two market institutions: public warehousing and futures market.

This electronically developed and working model 'using excel background 'allows all of the participants of the market: producers, consumers, banks and traders, to use this model in immediate calculations. In addition it helps in order to establish the own business strategy. The model can be used to analyze price influencing factors therefore; it can also be used for policy-making decisions for market participants as well as banks dealing with trade financing activity.

Key words: Renewable energy resources, Solid biomass utilization

Introduction

The present practice of Lombard financing has been developed for more than twenty years, and by now it has became a day-by-day used financing system. Most of the Hungarian commercial banks are dealing with this type of business.

The Futures Grain Market is in a special situation in Hungary. This market – organized according to the large American Exchanges – corresponds to the strictest expectations by its service, technique, organization and guaranties.

The entire market uses the prices of the given Futures Market as target prices for production agreements, trading contracts as well as Lombard credit financing, and there are participants in the market, from the hedging to the speculating side, as well. This market has a bigger turnover in grain futures contracts than the other European markets such as Marché A Terme d'Instruments Financiers (MATIF), and the other members of the EURONET.

The institutes of public warehousing and futures market are available for the participants on the grain market in Hungary and in several other European countries. The combination of possibilities offered by the two institutes gives the biggest chance to eliminate price risks. In the case of Lombard credits, it gives the best opportunity for both the borrower and the bank, namely: the borrower can have the highest credit amount as the lowest risk for the bank. This construction is called as a Lombard credit with a futures hedge background.

The most important basic information required to do business is the price of the commodity. This determines the profit of the business and the possible financing risk from the banks point of view.

There is no such a thing as „average" price information, because of the parity, storage, finance and logistics. Knowing the special conditions of a given market, it is possible, however, to prepare precise price calculations for selling or purchasing as well as financing decisions for that market.

To find the relevant answer to these questions, a calculation model was created and all of the prices influencing factors are built in.

The goal of using this model from the sellers and buyers point of view is to calculate daily price information to decide on immediate selling/buying or a postponed selling/buying of the commodity, based on public warehousing and futures hedge information.

The financial institute – depending on the momentary position – can easily become the same selling/buying participant of the market as the others. Because of this the service of the two market institutes as Futures Exchange and Public Warehousing and the introduced Futures model, based on the functions of these institutes' can offer the price risk management possibility for the bank as well.

2. Methodology of the futures model

The function of the model is to give up-to-date price information based on the principles described above and daily information about price influencing factors for any participant of the market.

2.1. Inputs of the model

The inputs of the model can be shared into two parts: the medium-term principal inputs (e.g. railway tariffs), and the daily-modified information (e.g. currency exchange rate).

The main inputs are, as below:

Primary cost: Pc: (€t) the cost of the production of one metric ton of the commodity (in local currency). This is the basis for the price calculation (in the case of a producer).

In case of consumer: **Purchasing price: Pp** (in local currency).

In case of trader: **Pp, or Selling price: Sp** (in chosen foreign currency).

The price calculation is prepared in one direction in the case of a producer and consumer, but it can be prepared in two directions, as well, in the case of a trader.

Foreign currency: Fc: (€c) the currency of the offer or the contract. It is usually USD, but any other currency can be used.

Inputs, connected to the storage:

Sf: storage fee (€month), in the case of self – owned storage capacity its primary cost per ton.

St: storage time (month).

Ff: fumigation fee (€case).

Fp: fumigation period (case).

Inputs, connected to public warehousing:

Wf: warehouse fee (€month).

Wp: warehousing period (month).

Wo: other additional costs, for example: additional insurance cost (€t).

Inputs, connected to financing:

Ir: interest rate of the financing (%/year, the real rate according to the credit contract, or the average bank interest rate).

Fp: financing period (month).

Fo: other financing costs: additional bank fees (€t).

Inputs, connected to Commodity Exchange:

Bf: Brokerage fee, containing the direct fee of Brokerage Company, the fee of Exchange and the fee of Clearing House (€t).

Id: interest of daily exchange rate differences: (%/year)= **Ir**.

Pr+, Pr0, Pr-, direction of financing of the daily exchange rate differences.

Fp: Futures period (month), the real open period of the futures contract.

Inputs, connected to transportation:

Rd: Railway distance: (km), distance from the actual loading point to the border.

Cl: Carriage loading: cost of the loading of railway carriage (€t).

Rf: Railway freight: the official freight tariffs of the actual Railway Company (€t).

Tf: Truck Freight: (€t/km), freightage of the Truck Company.

Td: Trucking distance: (km), the exact carriage distance by truck.

Tl: Truck loading: cost of the loading of truck (€t).

Inputs, at the port (€t):

L: Loading, from truck or rail carriage into the ship/barge.

S: Scaling, the fee of official scaling.

W: Wharfage, the fees of using wharf during loading.

D: Documentation, costs of documents issuing at the port (duty, etc.).

Quality and health certificates (€t):

Q: The fee of Quality Certificate.

Pl: The fee of local Phytosanitary Certificate.

Pe: The fee of export Phytosanitary Certificate.

Ve: The fee of export Veterinary Certificate.

Profit: P: the amount of desired profit (€t).

2.2. Outputs of the model

The model uses the information of principal database first. The pre-calculatory outputs of this calculation gives immediate information for the user, and the final cost and price calculation will be based on these results, as well as the other primary inputs (see above).

The pre-calculation outputs are, as follows:

Storage cost, S: (€t)

Public Warehousing cost, W: (€t)

Financing cost, F: (€t)

Cost of the Commodity Exchange, E: (€t).

The model calculates the cost of the daily financing based on the daily exchange rate differences. In case of:

E1 (Pr+): the futures position needs financing during the whole period, which is not more than 50 per cent, according to long-term practice.

E2 (Pr-): the opposite situation, the exchange price difference generates income.

The possibilities of E1 and E2 are the similar in the daily business.

E3 (Pr0): the costs and incomes eliminate each other.

Railway cost, R: (€t)

Railway costs cannot be calculated on a €km basis, because the freight cost is not linear with the length of transportation. Because of this, the model uses the official freight tariffs of the actual Railway Company as a principal data base, and chooses the actual cost according to the railway distance.

The loading of railway carriage is not the part of the railway cost, since it is an independent output.

Trucking cost, T: (€t)

Cost of the port, P: (€t)

Agent's cost, A: (€t)

Foreign currency, Fc: (€c) the currency of the offer or the contract. It is usually $, but any other currencies can also be used.

Final calculation can be prepared after the pre-calculation phase, using the chosen pre-calculation outputs and the other chosen inputs, as a database.

Final outputs are, as below:

Primary cost, Pc: (€/t) the cost of the production of one metric ton of the commodity (in local currency). This is the basis for the price calculation (in case of a producer).

In case of a consumer: **Purchasing price: Pp** (in local currency).

In case of a trader: **Pp, or Selling price: Sp** (in chosen foreign currency).

In case of a seller the final output is the selling price: Sp in €, and in the given foreign currency, as well. The model shows the actual parity of the INCOTERMS, too.

In case of a buyer the final output is the Purchasing cost: Pc in € which contains the purchasing price and the additional costs of purchasing.

In case of a trader the final output is the selling price: Sp in the given foreign currency if there is Purchasing price: Pp in the input side, or Purchasing price: Pp in €, if there is a selling price: Sp at the input side.

If there is no price information on the input side, the output is the logistic cost: Lc in the given foreign currency. The model shows the parity of INCOTERMS, too, according to the actual price information.

3. Practic of the model

Risk sensibility is the most important question in trade/commodity – financing situations from banks point of view. To avoid risk banks usually chose so-called secure financing constructions with low income possibility instead of commodity – financing with high risk and high profitability.

Opposite of this marketing strategy we can declare that using suitable price risk management practice, combination of the two institution, trade – financing constructions contains much higher profitability without higher level of risk.

Through investigation of futures and spot prices fluctuation of Hungarian grain market between 2004 and 2009 and using calculation model with real price data I try to justify the statement above.

3.1. Grain price fluctuation from EU assessment 2004 to these days

Dealing with grain market investigation it is plausible to analyze the price information of these period focusing the price explosion and collapse in 2007–2008.

The *figure 1 and 2* are the charts of corn and wheat prices from 2004 to 2009.

According to the charts we can quote that immediately after the assessment the grain prices decreased to the intervention level. From the autumn of 2006 the price trend changed to increasing. After the price explosion of 2007 and the price collapse of 2008 prices returned to the average price

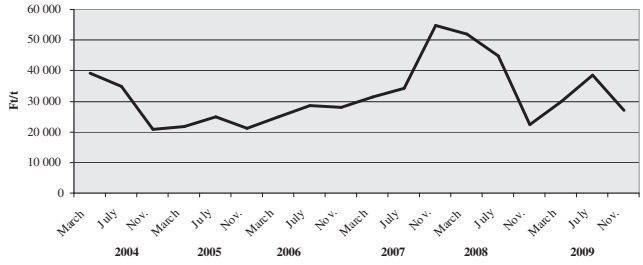

Figure 1: Corn prices in Hungary 2004–2009.

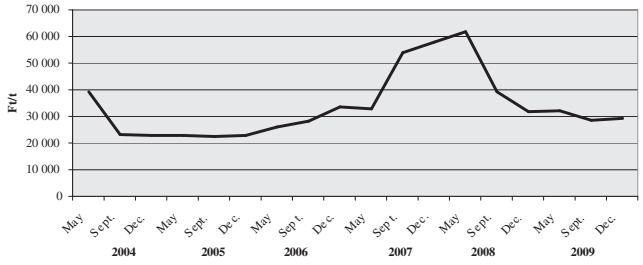

Figure 2: Wheat prices in Hungary 2004–2009.

3.2. Investigation of the price explosion and collapse in 2007–2008

After the overview of price information of the examined period let's focus the two critical years 2007 and 2008 from the financing banks point of view. Financing banks in the field of Lombard credits in grain market sustained extremely high loss in this period.

I hereby try to explain the reason of this and try to justify reasonable price risk management with combined use of public warehousing and futures market involved my futures model as technical tool calculations.

According to the charts of two main merchandises of grain market on *Figure 3* price trend changing is noticeable.

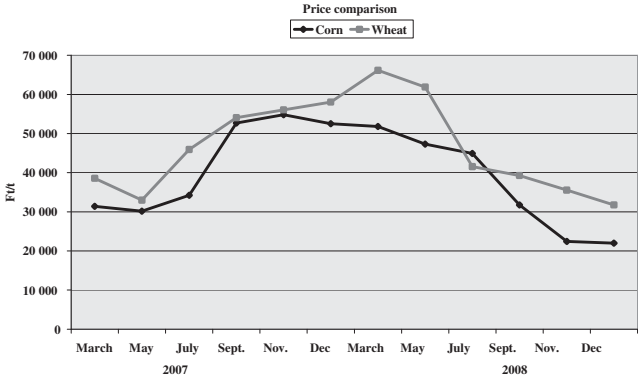

Figure 3: Prices trend changing in Hungary 2007–2008

In consequence of price decreasing and of course the shortage of suitable risk management strategy financing banks lost high amounts and pulled out from Lombard financing.

3.3. Financial risk management based on model calculations

Based on the on the fact that futures market prices are public and the market institutions are available for all of market participants, included financial banks, it is possible and obligatory to manage price and through this financial risks!

Hereinafter I introduce the suitable price risk strategy from the bank point of view applying futures and spot market prices of the two investigated year and using the model as a calculation tool.

Example: The bank intents to credit a 180 days long period from March to September. The collateral of the credit is the Warehouse Receipt redemption is due in September which has to cover the financial costs.

Creditor has to calculate 180 days price with all of the costs during financing period facing that calculated price must be lower maximum equal of futures price. In this case the creditor has to open a futures selling position on the futures market. The price risk is managed and the credit is in safe position.

To achieve this rule creditor has to use 70–90% financing price level compared futures prices.

In this example I supposed to become goods owner in the middle of financing period, because of collapsed credit, so costs are calculated for 3 month. Parity is FOB Csepel to simplify the example but the model is able to calculate any other parity and logistical possibility too.

3.1.1. Model calculations for 2007 and 2008.

Hereinafter I introduce model calculations and management strategy based on them. Table 1 shows spot and futures corn prices in 2007.

Table 1: Corn prices, 2007 (Ft/t)

March	May	July	September	November	December
31 395	30 179	34 214	52 697	54 828	52 545
Futures	31 500	31 800	31 500	29 100	29 200

Investigated the data of 2007 price increasing of spot prices is remarkable comparing futures prices. *Figure 4* shows it graphically.

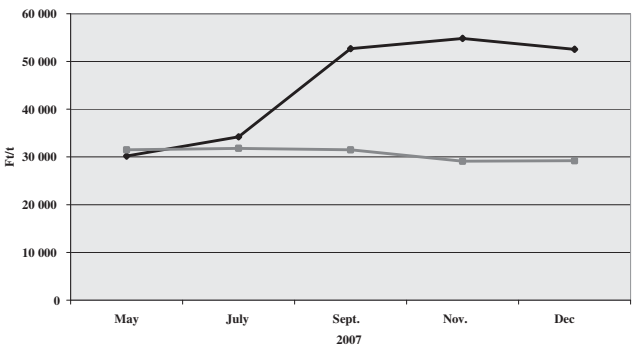

Figure 4: Corn Prices in 2007.

In March the only known price information are futures prices which must be the basis of market strategy. According to the September futures price creditor has to use 28.000 Ft/t financing price level and hedge it.

Using this financial price as the basis the result of the model calculation is the following:

Calculated 180 days price: 31.395 Ft/t
Futures price: 31.500 Ft/t

Result: Futures price is higher, the risk is managed credit is saved.

Because of extreme price increasing borrowers could repay credits easily, and this is the relevant business decision from their side to realize extra profit. The increasing value of the collateral secures the credit in the moment of liquidation of futures position. *Table 1* shows spot and futures corn prices in 2008.

Table 2: Corn prices, 2008 (Ft/t)

March	May	July	September	November	December
51 808	47 308	44 920	31 773	22 434	22 024
Futures	50 800	51 700	52 700	47 300	47 700

Investigated the data of 2008 price increasing of spot prices is remarkable comparing futures prices. *Figure 5* shows it graphically.

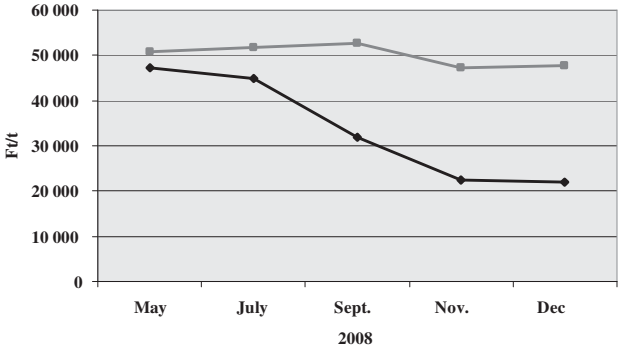

Figure 5: Corn Prices in 2008.

According to the theory of financial business introduced above using price data of *Table 2* the financing price can be 48.000 Ft/t the result of model calculation is the following:

Calculated 180 days price: 52.645 Ft/t
Futures price: 52.700 Ft/t

Result: Futures price is higher, the risk is managed credit is saved.

Because of extreme price decreasing value of the collateral collapsed. The profit of hedge position secures the credit in the moment of credit repayment and liquidation of futures position.

Conclusions

The Specified Futures Model using electronic database is a real practical tool for calculations. The model can present up-to-date information for business decisions based on daily figures. The excel basis helps to be easily available and

useful for any market participants. The model is suitable for help in case of short term business calculations and building long term market strategies as well.

The institutes as futures exchange and public warehouse give a lot of possibilities in price risk management. The Warehouse Receipt is one of the best collateral in case of Lombard financing and the futures hedge is available price fixing possibility. The real appropriate solution is the combined using.

After presented the most important price trends from the EU assessment in 2004 until these days the reason of financial loss in 2008 was justified.

The proposition from Creditors side was the result of irrelevant marketing strategy without suitable price risk management!

Focused the two extreme years 2007 and 2008 using real spot and futures prices data of this period as the basis of financial strategy building the relevant 180 days long commodity financing construction became effectuated independently of market price risks.

Combined using of market institutes as well as pre-calculations is necessary for building secure market position.

The model is competent to be practical tool for establish price and credit risk strategy introduced in this paper

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COMPETIVENESS OF THE HUNGARIAN PIG SECTOR

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Abstract: The number of Hungarian pig population was 3.2 million in February 2010, 150 thousand less than in the previous year. This included 226 thousand brood sows, 54 thousand less than in the previous year, and this number is expected to fall further next year. In the past two years the number of brood sows decreased to a larger extent in economic organizations than in private farms (KSH, 2010). Despite the rising costs of feedingstuffs, producer prices for slaughter pigs have decreased, therefore private farms with small herds of brood sows have sold their breeding animals for slaughterhouses. However, economic organizations mostly tried to restructure their production and place emphasis on plant production, thus improving their situation.

These market changes indicate that the sector continues to scale down, production shrinks, market losses are continuous within the sector and vulnerability threaten the players of the product cycle increasingly.

Key words: Pig production, Consumption, Competitiveness, Sector analysis

1. Introduction

Developing Hungarian pig production has ceased to exist for a long time; in addition, the most crucial problem is posed by the deterioration of its international competitiveness. However, it is to be highlighted that these competitive disadvantages are not merely due to national insufficiencies. The effects of international markets on demand – supply also play a significant role, both in terms of product quality and price (*AKI,* 2009).

The above mentioned facts lead to conclude that the analysis of the sector on the level of product cycle is justified in order to highlight the reasons of its decline. From producers to trade each and every economic player needs to analyze their competitiveness, efficiency and income and then identify the key problems. To maintain the sector ready for appropriate operation all the players need to produce competitively, as no competitive processing industry exists without the production of quality source material; similarly, no easy-to-sell products exist without a meat sector which functions appropriately; these statements are valid backwards as well (*Udovecz,* 2008).

2. Methods

To unveil the conditions – objective and subjective competitive disadvantages that hinder development – and gain a lifelike analysis, mostly prominent national and international agricultural, food-industrial and trade enterprises, organizations were visited. Sincere discussions took place with several lead experts. "Representativity" was not a conscious objective, as competitive options can be evaluated realistically from the viewpoint of significant economic players. The opinions given by the addressed practical experts were collected and a comprehensive table was prepared which includes all the problems on product cycle level to determine the results and also to cease the reason of the problem. Examination was carried out to find out what measures for the improvement or the removal of the problem had been carried out so far. Finally, in certain cases, recommendations were made for the explored problems.

From the very outset, our research was characterized by the unity of theory and practice (usefulness), the merge of international and national viewpoints and ideas related to product cycles. There is no competitive agriculture without competitive processing and trade; there is no practice-oriented education without research! Naturally, realistic guidelines are also vital! (*AKI,* 2009).

I take the view that information on the improvement potentials of competitive options, correlations and expert opinions provide a sound proof for the identification of state tasks, and also for agro-economic players to assess their own strengths and to develop their long-term business policies. Hopefully, the present study will serve as a key pillar for the establishment of a realistic and modern agricultural strategy. The present research seeks to map out the SWOT analysis of the sector on the grounds of this table, followed by the creation of a problem-tree and a target-tree to provide solutions how to improve areas suffering from competitive disadvantages.

3. Results

Hungary has particularly blatant problems of competitiveness in several areas. Above all, the judgement of our taxation system is dramatically poor. Not only tax rates, but the effects of taxes and supports in the distortion of

Table 1: Competitive disadvantages on macro-economic level

Competitive disadvantages on macro-economic level	**REASON**	**RESULT**	**Measures taken so far**	**Suggestions for the solution**
Tax, contribution and administrative burdens	Personal Income tax, VAT, social security contributions, employers' contribution, employees' contributions, costs of business start-ups	Black economy 30% (trade, employment)	Standard tax system, tax law???	Reduction, rationalization of VAT and administrative burdens, elimination of bureaucracy
Support policy	Haphazard, occasional and not renewing	Pig keeping is not supported, so farmers are "helped" in several ways	EU regulation, no free activities, frittered support AGENDA 2000	Standard, clear support policy on national level
Land policy	Separated property	No feedingstuff for individual owners, guarantee for loan requests; difficulties of land rent and costs increase	Support for access to land, diversification, merging farms, Act on Arable Land	Integration
Logistics	Geographical disadvantage Disorganized transport Irrational system of supply	Lack of seaports Railway transportation is slow and obsolete Quality of road network is questionable Slaughter -processing are separated	Motorway construction Concentration in certain premises on larger farms Pick Zrt.	
Commercial chains	Standards, compliance, ethics	Domestic products can hardly compete with depressed prices, old suppliers are privileged	80–20% Ethical code?	Integration Bargaining position Homogenous, large quantity and good quality of goods ensured in the long run
Social problems confidence and morals	Inheritance of the past, morals, safety of property corruption	Joining forces, joint property are out of the question	Network of consultancy, TCS (Producer Groups) – BÉSZs (Cooperatives for Purchase and Sales)	Initiatives carried out in favour of integration
Demographic and social problems	Composition of society, urbanization, incomes in the sector	Young people are not interested in agriculture, the trade is ageing	Keeping the population in the country, supports, diversification Agenda 2000	Education is built on practice
Commitment	Lack of management, cooperation	Owners' interests are different		

Source: author' own collection

competition are heavily criticized. On the other hand, high taxes are coupled with the poor quality of public services: general opinion about law enforcement, health care but primarily about welfare policies for the reduction of unequal opportunities is especially negative. Moreover, Hungarian competitiveness is in a disadvantageous position regarding the investigated indicators of both education and training (*Bartha,* 2008).

This brings us to the next issue, the introduction of competitive disadvantages investigated on macro-economic level in terms of agricultural production. In addition, besides extremely high, obscure and chaotic taxes which impede efficient production, contributions and administrative costs are also considerable high, thereby further exacerbating the situation. Our support policy has been realized without thorough consideration on various levels and the pig sector was primarily hit by this period. The insufficiency of external resources and deductions is only one item on the list of factors which inflicted the players of Hungarian pig sector.

The formation of the Hungarian holding system is to be mentioned: it clearly hinders economical production as the majority of pig farmers do not possess private lands which would serve as a basis for feedingstuff production and potential capital acquisition. Besides all these hardships, Hungary also has to cope with its disadvantageous geographical location: there is no seaport, shipping on the Danube is restricted, the railway network is slow and has also become obsolete; therefore our export opportunities are limited into third countries. In the past couple of years motorway construction improved the potentials of inland transportation but it has opened the windows of export opportunities only into nearby countries.

In contrast with such kind of infrastructure development the retail traders who set up businesses in Hungary prefer rather their own suppliers at the expense of Hungarian producers and products. They stipulate high requirements and costly standards rendering it impossible for Hungarian products to be available in hyper-and supermarkets. The only solution might be joint action, cooperation and support, which could improve our bargaining positions, uphold and promote the Hungarian will. To achieve this, Hungarian mentality has to go through considerable changes.

With a paradigm-shift, let us start the further investigation of competitive disadvantages on product cycle

Table 2: Competitive disadvantages on consumption level

Competitive disadvantages on consumption level	**REASON**	**RESULT**	**Measures taken so far**	**Suggestions for the solution**
Growing consumption	Lack of technological background	Demand is not met		Capital into the sector, takeover of technology and genetics
Healthy diet has gained ground	Impact of media	The ratio of poultry meat and pork is instable	Trademarks	Community communication to clarify misbelief
Growing demand for premium products	Accelerated life, conscious food intake	Processed products		Keeping abreast of the market, fast reactions
Diverse consumer attitudes	Different animal body regions are preferred in different regions	Not every product is quick-selling on markets		A good system of distribution is needed by eliminating inequalities in processing
Consumers depend on sales and prices	Price sensitivity	Customers always look for products on sale, by adjusting their eating habits; permanently low meat prices		
Seasonal impact	Demand for meat and meat products changes	Concentration, storing, warehousing are difficult, deep-frozen pork is not marketable		Diversification in several regions, exploitation on demand-dependent markets
Lack of loyalty	Hungarian products are not "strong" trademarks	Import intake		Restoration of the fame of Hungarian products

Source: author' own collection

level with production. The whole analysis is based on changing this approach. I have come to the realization that consumers and consumption are the drivers everywhere. In the present market-economy only those can survive who can react as fast as possible to changes in consumer attitudes and markets. Hungarian pork consumption is basically determined by its price. Domestic consumers are rather price-sensitive and dependent on sales; therefore they are not loyal to Hungarian products. Therefore, cheap import meat and meat products could become ready-selling on Hungarian markets (*Szakály,* et al., 2008).

Mention must be made on seasonality and diverse regional consumer attitudes on regional level. This can only be eliminated by diversification. None of the processing

Table 3: Competitive disadvantages on commercial level

Competitive disadvantages on commercial level	**REASON**	**RESULT**	**Measures taken so far**	**Suggestions for the solution**
Counter for fresh carcass meat ceases	Consumer attitudes change	Prepared, packaged meat products are ready selling		
Prepared products are marketed at higher prices	Higher added value	Price rise is not accepted by retailers		Joining of forces, improvement of bargaining positions
Excess supply for meat preparations	Processors cannot promote their products	Retailers choose what is cheaper		
Excess number of stores in one place	Undercut effect	Prices are even more difficult to realize prices		Maximization of retail shops for the population or for a given area
Branded products gain ground in trade	Lower prices, higher price competition	Lower quality		No competitiveness on the mass-product market, unique domestic products
Difficulties of contracts between retailers and Hungarian suppliers	Long-term contractual relations with "foreign" partners	The distribution of Hungarian products is limited	Ethical code	Favourable bargaining position can be gained by standard, good quality goods in the required quantity
Date of payment	Production difficulty in both directions of the product cycle	Liquidity is difficult to maintain, go-round debts	Regulation on payment dates, Law of XVI. 2003 on the Organization of an Agricultural Market	Long term contracts, fixed payment dates

Source: author' own collection

Table 4: Competitive disadvantages on the level of processing

Competitive disadvantages on the level of processing	**REASON**	**RESULT**	**Measures taken so far**	**Suggestions for the solution**
Concentration	Lack of capital, specialization is not solved	Slaughter–cutting-product manufacturing are merged		Separation on the level of farms
Lack of contractual relations	No long-term agreements, rather oral deals are typical	Standard source material (quality, quantity) is not provided		Contract
BÉSZs (Cooperatives for Purchase and Sales)	Unity of action, but individual sales are also maintained	Standard products are difficult to be provided for processors, source material supply is unpredictable		Sales through BÉSZs only under strict regulation
Bargaining position	Pressure by commercial chains	Looking for cheap base material resources, mainly from import		Two-way long-term contractual relation
Black economy	No follow-up for the product cycle	30%	Supervision	Reduction of financial burdens imposed on work, reduction of VAT
Payment morals	Production difficulties in both directions of the product cycle	Liquidity is difficult to maintain, go-round debt	Regulations on payment deadlines, Law of XVI. 2003 on the Organization of an Agricultural Market	Long-term contracts, fixed payment dates
Utilization of capacities, distribution of source materials	Disorganization of the production cycle, utilization is under 50%	Transport problems, kilometres between slaughterhouses and processors, upward price adjustment		Regional concentration
Representative body	Several organizations	Disorganization		United representation, centralization lead by one organization

Source: author' own collection

companies can afford to slaughter only for loin in the summer grilling season just because there is demand for it. Markets for other regions of animals' bodies are to be searched for which is getting increasingly difficult with the media full of advertisements on healthy diet giving false information on pork and recommending only poultry meat (*Juhász,* 2008).

Hungarian consumer attitudes are easy to be influenced as a result of their price sensitivity. Retailers know it very well and take the opportunity. All this makes its effect felt on the suppliers' side, as meat prices are kept artificially low by these series of sales, causing increasing problems for both Hungarian processors and producers. Moreover, standards have been carefully stipulated thus creating considerable extra expenses, such as "shelf money", inclusion in sales etc. The situation is further aggravated by the lack of payment morals, i.e. in many cases liquidity for the actors of the product cycle is hampered by circumventing the deadline of payment laid down by regulations. This leads to constant go-round debt, which hinders smooth production and the transport of goods; these are the deficiencies and problems why retailers prefer their own foreign suppliers, leaving scope for their own branded products which are often placed on the market under lower quality requirements and at cheaper prices than Hungarian products.

The analysis of the Hungarian meat industry indicated the concurrence of several factors, out of which only problems directly affecting processors will be highlighted. The most crucial of them is that capacity is under-utilized. It triggers high fixed costs in production and production costs are also high.

Bargaining positions in sales are weak as forces are not joined and there is no appropriate representative body on this level. Long-term contracts are not concluded by either producers or retailers, so their future is unpredictable and hazardous, giving an impetus for the boost of the black economy. Taken generally, it is impossible to follow up the product cycle.

The key problem in source material production is posed by the lack of own resources (*Chikán,* 2006). Producers do not possess their own lands, therefore they are unable to produce the necessary feedingstuff for their livestock and they are vulnerable to high cereal prices as fodder costs amount to the largest part of production costs.

They cannot afford to pay animal breeders and it is common practice that breeding animals are selected from their own fattening herds. Geneticists' efforts are in vain, as there is no solvent demand for their work on product cycle levels. If fattening farms worked with the appropriate genome, it would not lead to much more effective production due to the lack of good breeding technologies.

In terms of efficiency, the greatest problems are posed by low progeny number, slow weight gain and poor feed conversion, long fattening period, long sow rotation and high labour costs. Stables are out-of-date, they produce high

Table 5: Competitive disadvantages on the level of source material production

Competitive disadvantages es on the level source material production	**REASON**	**RESULT**	**Measures taken so far**	**Suggestions for the solution**
Lack of own resources	Small farms, support has not been successful	Not credit-worthy, no development, not competitive		
Slaughter-house	Slaughter-cutting; further processing	Slaughter in itself is unremunera-tive, there is no specialization		
Breeding animal	Breeding animal, privately owned herd	Farmers fail to use products by Hungarian breeding organizations, they use their privately owned herds		Long-term contractual relations between breeders and producers
Land	Pig breeders do not own lands	There are no own resources and fodder	Act on Arable Land, merge of micro and properties lands	Integration
Weak efficiency indicators	Progeny, death, feed conversion: sow/piglet	Non-competitive production, perhaps only production costs are covered on certain farms	Genetic experiments, takeover of modern keeping technologies	Genetic experiments, takeover of modern keeping technologies

Source: author' own collection

running costs as a result of insufficient insulation, the removal and placement of manure is also problematic for lack of privately owned lands. Moreover, producers fail to join their forces, so they are unable to provide the continuous production of standard, quality source materials in bulk. As a result, their bargaining positions are weak and they cannot represent their own interests.

4. Conclusion

In contrast with developed Western-European countries, Hungarian farms are not specialized, although breeding animals and fattening pigs require diverse technologies. Our farm structure is both concentrated and disintegrated. The majority of pig breeders are vulnerable for lack of land as they are unable to produce the necessary amount of feedingstuffs and place manure safely.

The effective Act on Arable Land stipulates that self-sufficient animal farms shall not get access to land or shall no rent lands in the long run (up to 50 years) so property and land use are largely separated from livestock farming. In terms of efficiency, the greatest problems are posed by low progeny number, slow weight gain and poor feed conversion, long fattening period, long sow rotation and high labour costs. In the absence of modern farms high quality genome is not worth using. Solutions for the problem might be green or brown field investments, temporary disuse or disinfection of earlier fattening farms.

Due to geographical, economical-political and social reasons Hungarian meat producers cannot compete with developed pig producing countries. As a result of Hungary's location, the acquisition of protein sources and the export of pork to third countries are considerably more costly than for our competitors. Costs of heating and cooling are much higher than e.g. in Denmark, the Netherlands or Brazil, where temperature fluctuations are lower. Animal farms see the increasing number of crimes against property, so the establishment of safeguard services also increases production costs. Further problems are posed by the high interest rate of foreign capital (14-16%), (MNB, 2008), the disorganization of the product cycle and the lack of technical advice.

In conclusion, the product cycles of the sector face a large number of problems on each level and solutions can only be provided by strategic decisions. It is not enough to improve certain levels of the product cycle, the sector needs to be analysed as a unit and problems are to be handled simultaneously.

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GREEN HOUSE GAS MITIGATION AND HEADLINE TARGETS OF EUROPE 2020 STRATEGY

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Abstract: Climate change is considered as one of the biggest challenges of XXI century and global action is needed to mitigate greenhouse gases (GHG) and adapt to changing water levels and temperatures, which affect food supply and ecosystem integrity. Climate change will have significant economic and social impacts in many regions of EU and sectors like agriculture is considered to bear greater adverse affects. Less developed regions and certain sections of society (the elderly and/or low-income households) are expected to suffer more from climate change. Climate change policy of EU, adopted in December 2008, includes ambitious targets for 2020. The policy is focused on a sustainable future with an energy-efficient economy by (i) cutting greenhouse gases by 20% (30% if international agreement is reached), (ii) reducing energy consumption by 20% through increased energy efficiency and (iii) meeting 20% of energy needs from renewable sources. In the frame of the headline targets of Europe 2020 Strategy, this paper discusses most important greenhouse gas-emitting activities in agriculture, emphasizes the importance structural changes through the modernisation of infrastructure particularly in developing regions of EU and calls for enhancing the competitiveness of economy to promote energy efficiency.

Key words: Green house gas (GHG), Mitigation, Headline targets, Europe 2020 strategy

Introduction

Climate change is supposed to increase continental and sea temperatures, alters precipitation quantity and patterns, resulting in the increase of global average sea level and an expected increase in the severity of weather-related natural disasters. Addressing climate change requires two types of response. Countries must reduce GHG by taking mitigation action and take adaptation action to deal with the unavoidable impacts. Similar to mitigation activities, the integration of environmental concerns into the Common Agricultural Policy (CAP) is based on a distinction between ensuring a sustainable way of farming by avoiding harmful activities and providing incentives for public goods and services. The common rules and standards are mandatory for farmers to ensure that agricultural activity is undertaken in a sustainable way and preserve environment and the landscape. These rules and standards form the reference level to which the costs for complying with these obligations have to be born by the farmer, according to the "Polluter-Pays-Principle". The Common Agricultural Policy ensures that farming and preservation of the environment go hand-in-hand and plays a vital role in confronting new challenges such as biodiversity, water management and climate change.

On the other side, the Common Agricultural Policy has identified three priority areas for action to protect and enhance rural heritage: (i) the preservation and development of natural farming and traditional agricultural landscapes; (ii) water management and sustainable use and (iii) dealing with climate change. Measures of Rural Development Plan in EU countries promote the development of agricultural practices for preserving the environment and safeguarding the countryside. This is achieved by targeting rural development and promoting environmental friendly, sustainable practices, like agri-environment schemes. Farmers are encouraged to continue playing a positive role in the maintenance of the countryside and the environment.

As farming activities depend on climatic conditions, agriculture is directly exposed to climate change, but agriculture can also help to provide solutions to the mitigation of greenhouse gases. The EU recently conducted a study of the impact of climate change on different European agri-climatic zones and options for adaptation. Even if some climate changes may be positive for some North European regions, most will be negative, affecting regions already suffering from changing economic situation and environmental regulations. Farming will be most affected in the Southern and South-Eastern Regions of Europe, but according to the Intergovernmental Panel on Climate Change, the worst consequences may not be felt until 2050, even if significant adverse impacts are expected from more frequent extreme conditions in the short term.

In April 2009, the European Commission presented a White Paper laying out a European framework for action to improve Europe's resilience to climate change, emphasising the need to integrate adaptation into all key European policies and enhance co-operation at all levels of governance. Complementing to the White Paper, the report "Adapting to Climate Change: The Challenge for European Agriculture and Rural Areas" summarises the main impacts of climate change on EU agriculture, examines adaptation needs, describes the implications for the CAP and explores possible orientations for future action. It aims at engaging Member States and the farming community into actions on adaptation.

The Adaptation Framework respects the principle of sustainable development and is focused on four pillars; (1) building a solid knowledge base on the impact and consequences of climate change, (2) integrating adaptation into key policy areas; (3) employing a combination of policy instruments (market-based instruments, guidelines, public-private partnerships) and (4) stepping up international cooperation on adaptation. The Adaptation Framework complements action of Member States and supports wider international efforts to adapt to climate change. In the United Nations Framework Convention on Climate Change, EU is working with partner countries towards a climate agreement and the Communication entitled "Towards a comprehensive climate change agreement in Copenhagen" addresses both adaptation and mitigation activities.

Agriculture

Agricultural activities contribute directly to emissions of greenhouse gases through a variety of different processes. Enteric fermentation, manure management and greenhouse gas emissions from agricultural soils are discussed in details. **Emissions per capita reported in the agriculture were 0.948 tonnes of CO_2-equivalent of greenhouse gases in 2007** at EU-27 level. This represents 9.2% of total emissions, decreased from 11% in 1990. GHG emission of fuel combustion is 7,680 t CO_2 eq. per capita **out of which 1.933 t CO_2 eq. per capita belonds to the transport sector. The GHG emission of international aviation 0.279 t CO_2 eq. per capita and international maritime transport 0.343 t CO_2 eq. per capita is calculated separately.** Agricultural emissions account for almost 14% at global level. Agriculture is the most important source of two powerful gases, nitrous oxide (N_2O) and methane (CH_4), which account for around 8.15% and 7.34% of total European emissions respectively. Between 1990 and 2007 carbon dioxid (CO_2) emission was reduced by 4.84%, nitrous oxide emission by 27.14 and methane emission by 31.15%, while emission of fluorinated gases increased by 31.06%. Farming influences climate change mainly by producing two powerful greenhouse gases (i) methane from livestock digestion processes and stored animal manure, nitrous oxide from organic and mineral nitrogen fertilisers. Human-induced emissions in agriculture have a high degree of uncertainty as farming activities are very diverse and involve a wide range of biological processes, which naturally emit GHG. Behind the overall picture, there are considerable variations in the national situations *(Figure 1)*. Large reductions occurred in Latvia, Bulgaria, Slovakia, Lithuania, Czech Republic, Estonia, Romania and Hungary, while Spaine increased GHG emission of agriculture between 1990 and 2007. Per capita GHG emission of agriculture was highest in Ireland and produced four times more than the mean value of EU-27 countries in 2007. Reduction in GHG emission was very fast between 1990 and 1994, mostly as results of transition in East Europen countries. The contribution of EU-15 member states countries to the GHG emission of EU increased until 2000 *(Figure 2)*.

Agricultural activities also release carbon dioxide from fossil fuel use in buildings, equipment and machinery for field

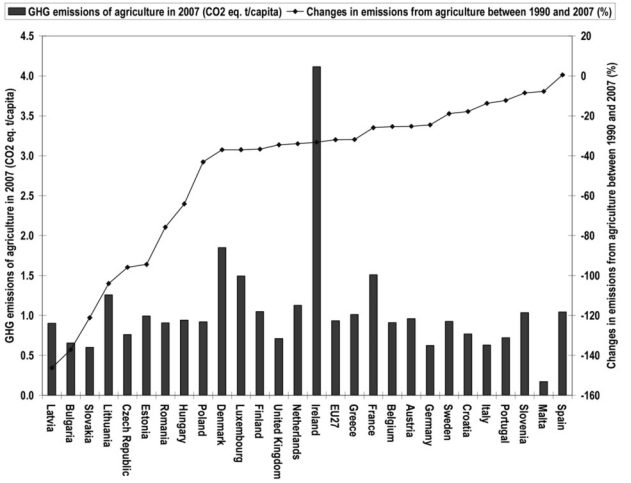

Figure 1: GHG emissions of agriculture in 2007 (CO_2 eq. t/capita) and changes in emissions between 1990 and 2007 (%) (Data are from dataservice.eea.europa.eu)

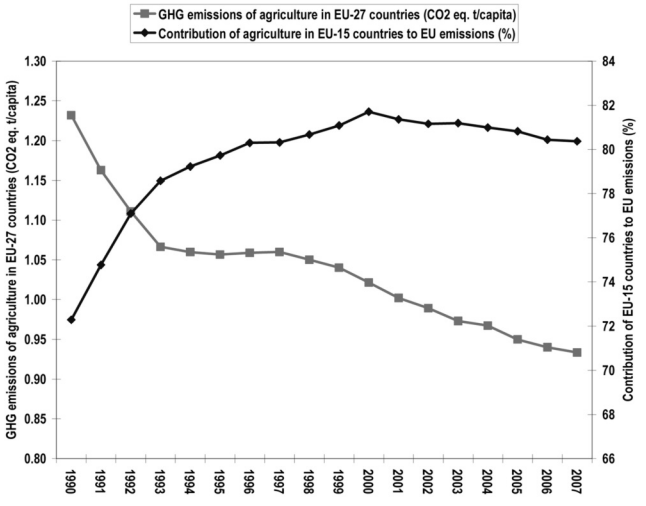

Figure 2: GHG emissions of agriculture in EU-27 countries (CO_2 eq. t/capita) and contribution of EU-15 countries to EU emissions (%) (dataservice.eea.europa.eu)

operations, which account for around 1% of CO_2 emissions of all sectors. Following the IPCC Guidelines for National Greenhouse Gas Inventories reporting scheme these emissions are not accounted in the 'agriculture' category but are included in the 'energy' inventory (IPCC, 1995). Further agriculture-related emissions, such as those from the manufacturing of fertilisers and animal feed, are included in the inventory on industrial processes.

Methan emissions from enteric fermentation in domestic livestock

Methane is produced in herbivores as a by-product of enteric fermentation, a digestive process by which carbohydrates are broken down by micro-organisms into simple molecules for absorption into the bloodstream. The amount of released methan depends on the type, age, and

weight of the animal, the quality and quantity of the feed, and the energy expenditure of the animal. The type of digestive system also has a significant influence on the rate of methane emission. Ruminant animals have the highest emission of methan as results of methane-producing fermentation within the rumen. The main ruminant animals in EU are cattle, sheep and goats. Pseudo-ruminant animals, like horses and monogastric animals, like swine have relatively lower methane emissions because much less methane-producing fermentation takes place in their digestive systems (IPCC, 1995; 1996abc).

Methane (CH_4) is produced by the fermentation of feed and generally, the higher the feed intake, the higher is the methane emission. Feed intake is positively related to animal size, growth rate, and production (e.g., milk production, wool growth, or pregnancy). The amount of methane emitted by a population of animals is calculated by multiplying the emission rate per animal by the number of animals. To reflect the variation in emission rates among animal types, the population of animals is divided into subgroups, and an emission rate per animal is estimated for each subgroup. Types of population subgroup are recommended by the IPCC Guidelines for National Greenhouse Gas Inventories.

In some countries of EU, the dairy cattle population is comprised of two well-defined segments: high-producing improved varieties in commercial operations; and low-producing cows managed with traditional methods. These two segments are evaluated separately by defining two dairy cattle categories. However, the dairy cattle category does not include cows kept principally to produce calves. Low productivity multi-purpose cows should be considered as non-dairy cattle. Emmision data of average milk production of dairy cattle are expressed in terms of kilograms of whole fresh milk produced per year per dairy cow, and can be obtained from country-specific reports. Two or more dairy cattle categories are defined, the average milk production per cow is required for each category. Reduction of methane from enteric fermentation, still require substantial research efforts and practical experience before they could become general practice. Some of the most relevant measures, such as those linked to the nitrogen cycle are closely related to measures aiming at controlling nitrates and ammonia emissions and thus produce a range of substantive environmental benefits.

In the period of 1990–2007, methane emissions from enteric fermentation decreased by 31.1% in EU-27 countries, which represent 0.293 tons CO_2 eq. per capita. Considering the GHG emissions of enteric fermentation in 2007, Ireland produced 2.050 tons of CO_2 eq. per capita *(Figure 3)*. This is nearly six times more than the averge of EU-27 coumtries. Large reductions occurred in Latvia, Bulgaria, Lithuania, Slovakia, Estonia, Czech Republic and Hungary, while Spaine and Portugal increased GHG emission from enteric fermentation *(Figure 3)*. As results of transition in East Europen countries, reduction in GHG emission was very fast between 1990 and 1993. The contribution of EU-15 member states countries to the GHG emission of EU increased until 2001 *(Figure 4)*.

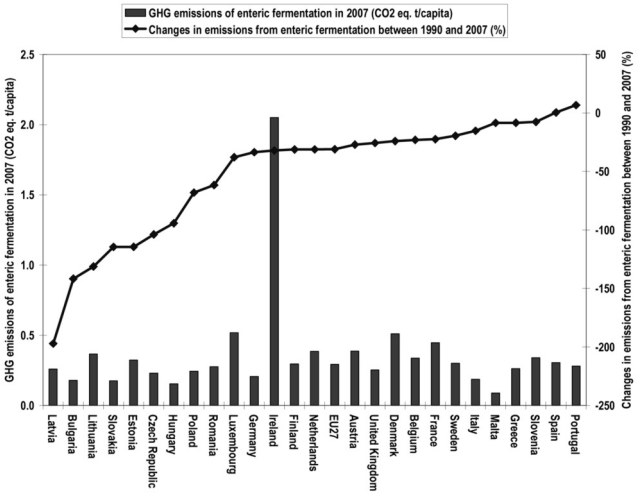

Figure 3: GHG emissions of enteric fermentation in 2007 (CO_2 eq. t/capita) and changes in emissions between 1990 and 2007 (%) (Data are from dataservice.eea.europa.eu)

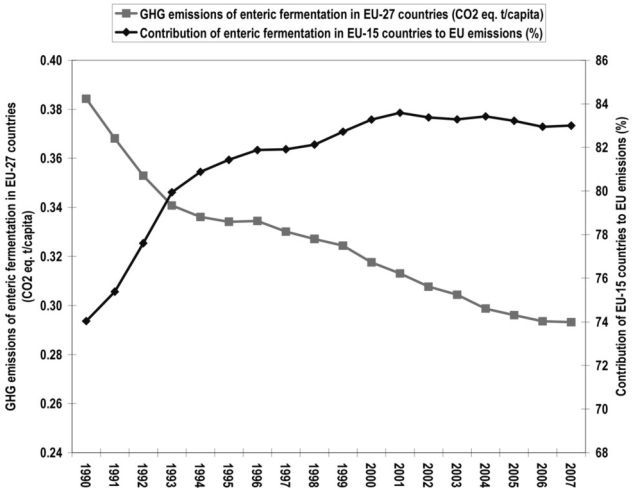

Figure 4: GHG emissions of enteric fermentation in EU-27 countries (CO_2 eq. t/capita) and contribution of EU-15 countries to EU emissions (%) (dataservice.eea.europa.eu)

Methane and nitrous oxide emissions from manure management

This section presents a brief overview of the key factors affecting methane and nitrous oxide (N_2O) emissions from these sources. Methane emissions from manure management are usually smaller than enteric fermentation emissions, and are principally associated with confined animal management facilities, where liquid manure is handled (IPCC, 1995). Methane is produced from the decomposition of manure under anaerobic conditions. These conditions often occur when large numbers of animals are managed in a confined area (dairy farms, beef feedlots, swine and poultry farms), where manure is typically stored in large piles or disposed of in lagoons. During storage, some manure nitrogen is converted to nitrous oxide. Emissions of N_2O before the manure is added to soils are included in this category, while

manure-related N_2O emissions from soils are considered as agricultural soil emissions. Improved manure and slurry storage, processing and application techniques are technically feasible measures for reducing methane and nitrous oxide emissions. In regions with high animal densities, volumes of slurry and manure are high and the installation of anaerobic digestion plants is particularly effective in reducing emissions. Anaerobic digestion is the natural process of biological degradation of organic material in the absence of air. Anaerobic digester is a man-made system that uses this process to treat different types of organic waste and produce biogas. The biogas can be converted into heat and/or electricity. The process reduces gaseous emissions from the input material, while at the same time delivering valuable renewable energy.

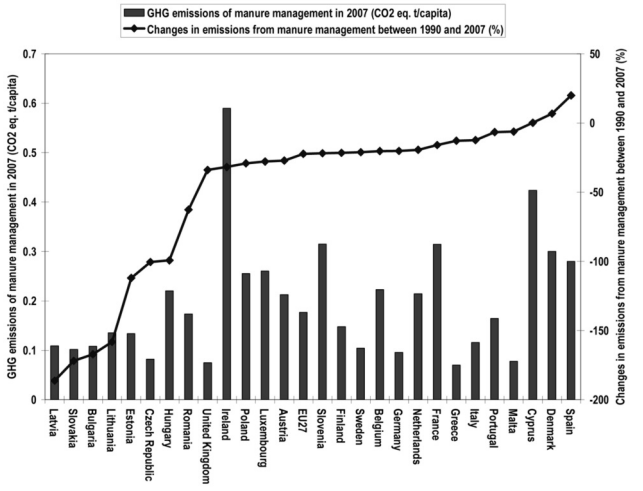

Figure 5: GHG emissions of manure management in 2007 (CO_2 eq. t/capita) and changes in emissions between 1990 and 2007 (%) (Data are from dataservice.eea.europa.eu)

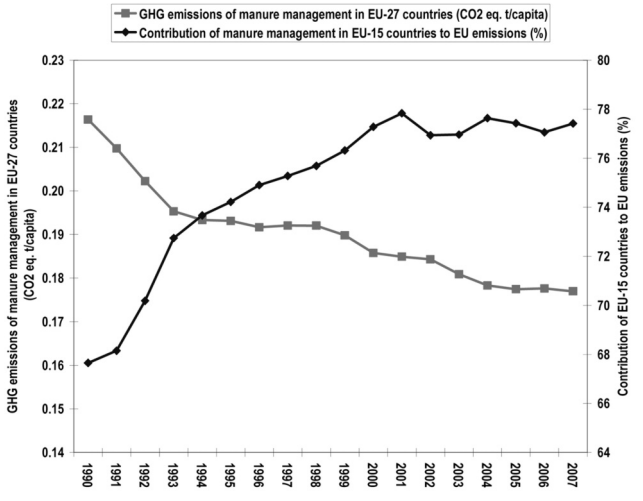

Figure 6: GHG emissions of manure management in EU-27 countries (CO_2 eq. t/capita) and contribution of EU-15 countries to EU emissions (%) (dataservice.eea.europa.eu)

In the period of 1990–2007, methane and nitrous oxide emissions from manure management decreased by 22.3% in EU-27 countries, which represent 0.177 tons CO_2 eq. per capita. Considering the GHG emissions of manure management, Ireland and produced 0.589 tons CO_2 eq. per capita in 2007 *(Figure 5)*. This is 233% more than the averge of EU-27 coumtries. Large reductions occurred in Latvia, Slovakia, Bulgaria, Lithuania, Estonia, Czech Republic and Hungary, while Cyprus, Denmark and Spaine increased GHG emission of manure management between 1990 and 2007 *(Figure 5)*. Reduction in GHG emission was very fast between 1990 and 1993 mostly as results of transition in East Europen countries. The contribution of EU-15 member states countries to the GHG emission of EU increased until 2003 *(Figure 6)*.

Greenhouse gas emissions from agricultural soils

Agricultural soils may also emit or remove nitrous oxide (N_2O), carbon dioxide (CO_2), and/or methane (CH_4). The method for calculating national emissions of agriculture soils are decribed in IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 1996abc). In the methodology two sources of nitrous oxide are distinguished; (i) direct emissions from agricultural soils, and (ii) nitrous oxide emissions induced indirectly by agricultural activities. Anthropogenic input include synthetic fertiliser, nitrogen from animal wastes, nitrogen from increased biological N-fixation, and nitrogen derived from cultivation of mineral and organic soils, through enhanced organic matter mineralisation. Nitrous oxide may be produced and emitted directly in agricultural fields, animal confinements or pastoral systems or be transported from agricultural systems into ground and surface waters through surface runoff, nitrogen leaching. In some cases, human sewage systems also transport the nitrogen into surface water. Ammonia and NO_x emitted from soil may be transported and fertilise other systems, which leads to enhanced production of N_2O. Carbon dioxide emissions from soils are described in the section of Land-Use Land-Use Change and Forestry (LULUCF).

The methodology to calculate greenhouse gas emissions from agricultural soils are based on data available from FAO database and the methodology does not take into account different crops, soils and climates, which are known to regulate N_2O production. Because of limited data availability to provide appropriate emission, these factors are generally not considered. Countries, which have data to show that default data are inappropriate for their country, should include a full explanation for the values used. The IPCC method also uses a linear extrapolation between N_2O emissions and fertiliser nitrogen application. In most agricultural soils, mineral nitrogen enhances microbiological formation of N_2O, which in turn increases nitrification and denitrification rates. The amount of synthetic fertiliser nitrogen applied to soil is well documented in the FAO Annual Fertiliser Yearbook, but factors are needed to account for the loss of fertiliser in from of NH_3 volatilisation and emission of nitric oxide. The IPCC methodology for

assessing direct N_2O emissions includes consideration of synthetic fertiliser, nitrogen from animal waste, enhanced N_2O production due to biological N-fixation, nitrogen from crop residue mineralisation and soil nitrogen mineralisation due to cultivation of Histosols (IPCC 2001ab). Significant amounts of CO_2 can be removed from the atmosphere and stored in soils through a range of farming practices, such as organic farming; zero or reduced tillage systems that avoid or reduce soil disturbance; growing protein crops; planting hedgerows; maintenance of permanent pastures and conversion of arable land to grassland. Significant amounts of carbon can be removed with afforestation, as woody species hold much more carbon than most agricultural crops.

In the period of 1990–2007, methane and nitrous oxide emissions from agricultural soils decreased by 36.4% in EU-27 countries, which represent 0.457 tons CO_2 eq. per capita. There are considerable variations in emissions from agricultural soils between countries of EU (Figure 7). Large

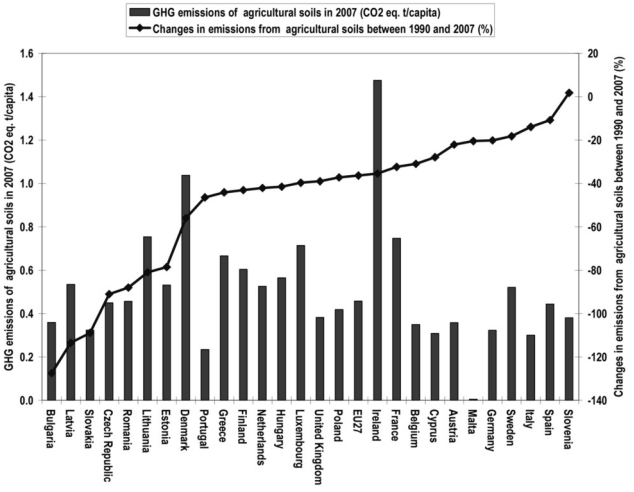

Figure 7: GHG emissions of agricultural soils in 2007 (CO_2 eq. t/capita) and changes in emissions between 1990 and 2007 (%) (Data are from dataservice.eea.europa.eu)

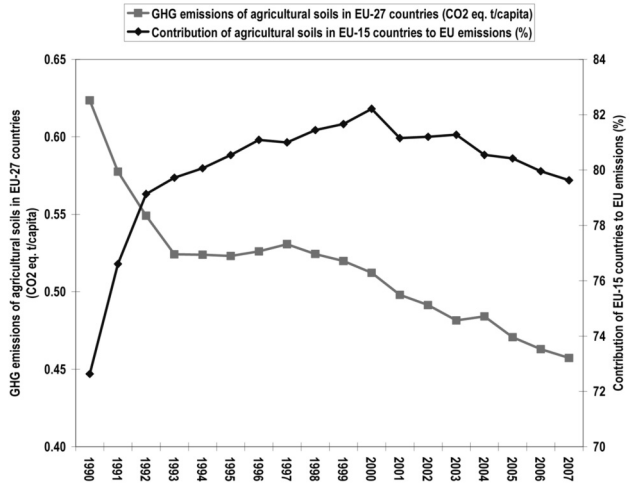

Figure 8: GHG emissions of agricultural soils in EU-27 countries (CO_2 eq. t/capita) and contribution of EU-15 countries to EU emissions (%) (dataservice.eea.europa.eu)

reductions occurred in Bulgaria, Latvia, Slovakia, Czech Republic, Romania, Lithuania and Estonia, while Slovenia increased GHG emission from agriculture soils between 1990 and 2007. In 2007, per capita GHG emission of agricultural soils ware highest in Ireland and Denmark. Reduction in GHG emission was very fast between 1990 and 1993, mostly as results of transition in East Europen countries. The contribution of EU-15 member states countries to the GHG emission of EU increased until 2001 *(Figure 8).*

Land-use, land-use change and forestry

Human activities, which change the way land is used, such as clearing of forests for agricultural use affect the amount of CO_2 stored in biomass and soil (*Rosenzweig and Parry,* 1994; *Schellnhuber* et al. 2004). This mitigation potential is a focal point of calculating greenhouse gas emissions. The biosphere is a strong determinant of the chemical composition of the atmosphere and it has been true since the existence of the biosphere, when a large ammount of carbon, nitrogen, and sulphur gases was absorbed. There is strong evidence that the expanding human use of the biosphere for food, fuel and fibre is contributing to increasing atmospheric concentrations of greehouse gases (*Lal* et al. 1997, *Robert* et al. 2000). Estimates of CO_2 emissions due to land-use change vary considerably because of diversified human activity. According to IPCC Guidelines for National Greenhouse Gas Inventories, the fundamental basis for the methodology rest upon two linked themes (IPCC, 2001ab). The flux of CO_2 to or from the atmosphere is equal to changes in carbon stocks in the biomass and soils. The changes in carbon stocks can be estimated by establishing rates of change. Although there are data on which land-use change estimates, the rates of change in land use are difficult to establish (*Gilliam and Hoyt,* 1987; *Reilly,* 2002). A more practical approach is to make simple assumptions about the effects of land-use change on carbon stocks and the subsequent biological response to the land-use change, and to use these assumptions to calculate carbon stock changes and hence the CO_2 flux (Friedlingstein et al. 2001). IPCC method also addresses the immediate release of CH_4, CO, N_2O and NO_x from the open burning of biomass after forest clearing. According to IPCC Guidelines for National Greenhouse Gas Inventories, the most important land-use changes that result in CO_2 emissions and removals are:

- *changes in forest and other woody biomass stocks:* the most important effects of human interactions with existing forests includes commercial management, harvest of industrial roundwood and fuelwood, production and use of wood commodities;
- *forest and grassland conversion:* the conversion of forests and grasslands to pasture, cropland, or other managed uses can significantly change carbon stored in vegetation and soil;
- *abandonment of croplands, pastures, plantation*

forests, or other managed lands, which regrow into their prior natural grassland or forest conditions.

- *changes in soil carbon:* In most cases, land that has been cultivated for many years is depleted in organic matter relative to its original state. In the temperate zone, considerable areas of formerly cultivated lands have been abandoned or converted to grassland and forest. If converted to perennial vegetation, either through land abandonment and natural succession or as an active management decision, such as conversion to pasture and conservation practices, soil carbon levels generally increase.

Intensive soil tillage is recognised as a significant factor causing soil organic matter declines in cultivated soils (*Paustian* et al. 1997, *West and Post,* 2002). Intensive tillage enhances decomposition of organic matter and supply crops with plant nutrients (*Vetsch and Randall,* 2000; *Smith* et al. 2001). Reduced tillage and particularly no-till practices have been shown to promote higher levels of organic matter in many regions, where productivity and organic matter inputs are not adversely related (*Bouwman,* 1990, *Franzluebbers and Steiner,* 2002). Reduced soil erosion and lower soil temperatures under surface mulches are particularly important attributes of no-till systems. Maintenance of soil carbon also depends on an adequate return of organic substrates, which serve as the raw material for organic matter formation (*West and Post,* 2002). In most agricultural systems, the primary sources of new carbon are crop residues. The amount of carbon returned in the form of residues depends on the total biomass yield and the proportion of that biomass, which is exported from the field. Of the carbon applied to soil in the form of crop residues, about one third typically remains after one year and about one-fifth remains after five years under temperate conditions. The remainder is returned to the atmosphere as CO_2 via biological decomposition. The rate of decomposition, and the proportion of carbon retained by soil, is influenced by climate, soil conditions, placement (surface versus buried), and the composition of the residue. Some agricultural soils also receive significant inputs in the form of vegetation grown, at least in part, to provide additional carbon and other nutrients to the soil. For example, legumes are sometimes included in cropping systems as a 'green manure'. Similar benefits are derived from vegetative additions in 'alley-cropping' systems. A third source of carbon is various by-products, which are applied as soil amendments. The most noteworthy of these are animal manure, but some soils also derive appreciable carbon inputs from sewage sludge. Although such additions can significantly increase soil carbon, gains in the soil must be compared with alternative uses of the resources. For example, if sewage sludge decomposes more rapidly in soil than in fermeted form to produce biogas, the net effect will be an additional flux of carbon to the atmosphere. The estimate of CO_2 fluxes is based on inventorying the areas and C stocks for land-use systems predominating within a particular climatic region. The most significant practices that differentiate land-use and management systems are clearing of native vegetation with conversion to cultivated crops or pasture; land abandonment; shifting cultivation; differing residue addition levels; ?differing tillage systems; and? agricultural use of organic soils.

In the period of 1990–2007, GHG removals of LULUCF increased by 13.6% in EU-27 countries, which represent 0.822 tons CO_2 eq. per capita, although there are considerable variations between countries *(Figure 9)*. Large removals from LULUCF occurred in Austria, Sweden, Lithuania, Slovenia, Finland, Estonia and Latvia, while between 1990 and 2007, Netherlands increased GHG emission from LULUCF. In 2007, Per capita GHG removal of LULUCF was highest in Latvia and removed more CO_2 than the total GHG emission of the country. Mostly as result of transition in East Europen countries, reduction in GHG emission was very fast between 1990 and 1994. The contribution of EU-15 member states countries to the GHG emission of EU increased until 2000 *(Figure 10)*.

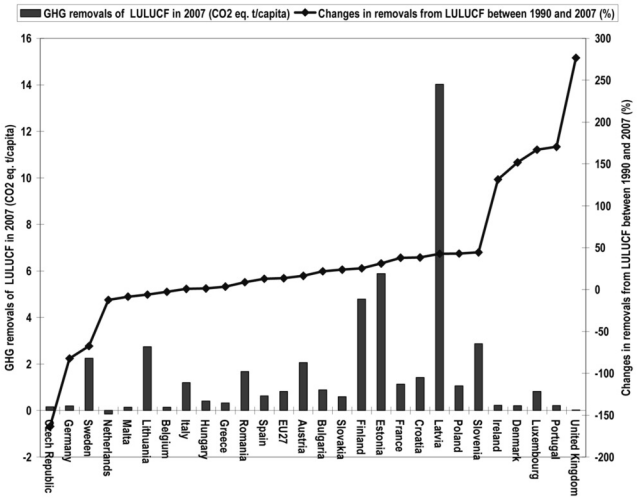

Figure 9: GHG removals of LULUCF in 2007 (CO_2 eq. t/capita) and changes in removals between 1990 and 2007 (%)(Data are from dataservice.eea.europa.eu)

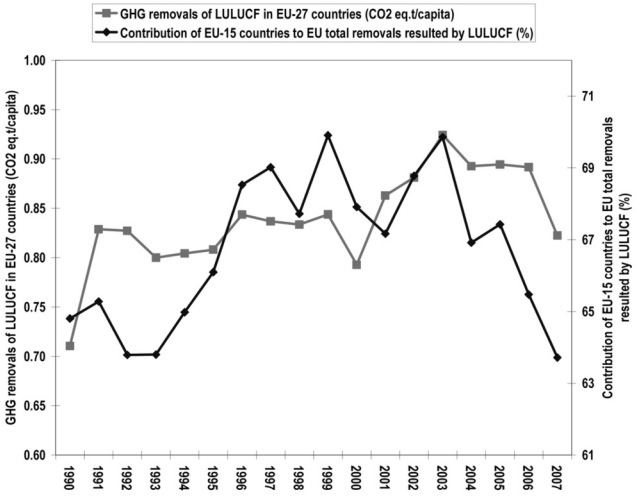

Figure 10: GHG removals of LULUCF in EU-27 countries (CO_2 eq. t/capita) and contribution of EU-15 countries to EU removals (%) (dataservice.eea.europa.eu)

Mitigation potential of EU agriculture

Agriculture has further possibilities to reduce the emissions of methane, nitrous oxide and carbon dioxide released by farming activities and by maintaining and sequestering carbon in farmland soils (*Bruinsma,* 2003). There are management options that have the potential to reduce methane and nitrous oxide emissions below current levels. These include the reduction in use of fertiliser and agricultural input, livestock and manure management (*Parry* et al. 2004). Precision farming, optimisation of mineral and organic nitrogen application and overall reduction of external inputs (e.g. in organic farming) also contributes to the reduction of GHG emissions. Production of mineral fertilisers and other chemical products is energy intensive. GHG emission of ammonia production in EU-27 countries was 0.056 tons CO_2 eq. per capita in 2007. Extensive forms of pasture management in livestock rearing, technical additives to control methane from digestion processes and improvements in the nutrition patterns (diet and the level of food intake) of livestock influence the amount of methane releases from enteric fermentation and manure management. Less intensive forms of rearing is beneficial for landscape conservation and bio-diversity. Improved manure storage, such as appropriate installations for different types of animal manure and slurry, application of immediate incorporation into soils and better accounting of nitrogen content can contribute to the reduction of GHG emissions. Processing of animal waste in anaerobic digestion plants for the production of biogas has been identified as one of the most promising measures and is highly cost-effective in farms with high animal densities and large volumes of slurry and manure. These technical and management options vary in cost-effectiveness. One of the best practices is improved storage of manure and the accounting of its nitrogen content when applied to the fields. The costs and benefits of agricultural mitigation options are diverse. Regional differences are influenced by a number of factors such as farm characteristics (size, location, yields, level of inputs), climatic and environmental conditions (land and soil characteristics, water availability), the degree to which mitigation measures compete with traditional agricultural practices and profitability (e.g., extensive grazing systems or fertilization), and the incentives in place such as financial support.

Mitigation and Europe 2020 strategy

There are large regional differences in mitigation potential and in the costs and benefits of mitigation options. It is necessary to tailor policy measures to specific conditions of farming. The Europe 2020 strategy puts innovation and green growth at the heart of its blueprint for competitiveness, and proposes tighter monitoring of national reform programmes to get out of the crisis and to prepare the foundation for the EU economy for the next decade. The Commission identifies three key drivers for growth to be implemented at national levels and regional: (i) smart growth (fostering knowledge, innovation and education), (ii) sustainable growth (making our production more resource efficient while boosting European competitiveness) and (iii) inclusive growth (raising participation in the labour market, the acquisition of skills and the fight against poverty). The battle for growth and jobs requires land stewardship at the uppermost political level and RTD activities across Europe. Progress should be measured against five representative headline targets: 75% of the population aged 20-64 should be employed; 3% of the EU's GDP should be invested in R&D; the "20/20/20" climate/energy targets should be met. The share of early school leavers should be under 10% also in rural erea and at least 40% of the younger generation should have a degree to reduce the number of people living in poverty.

Total GHG emissions of 1–7 sectors (excluding LULUCF) were reduced from 11.645 tons of CO_2 eq. per

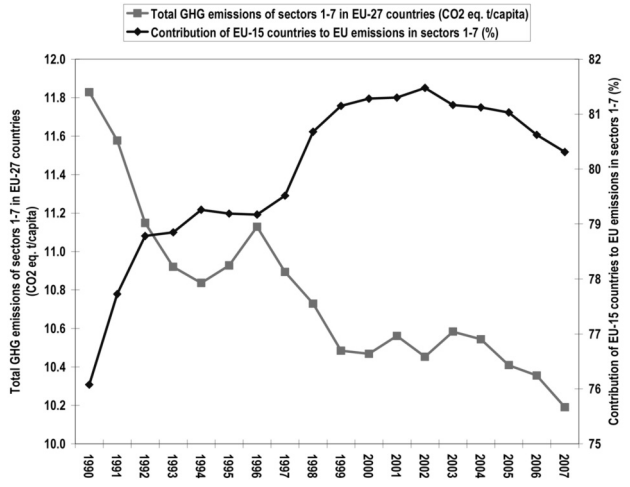

Figure 11: Total GHG emissions of sectors 1-7 (excluding LULUCF) in EU-27 countries (CO_2 eq. t/capita) and contribution of EU-15 countries to EU emissions (%) (Data are from dataservice.eea.europa.eu)

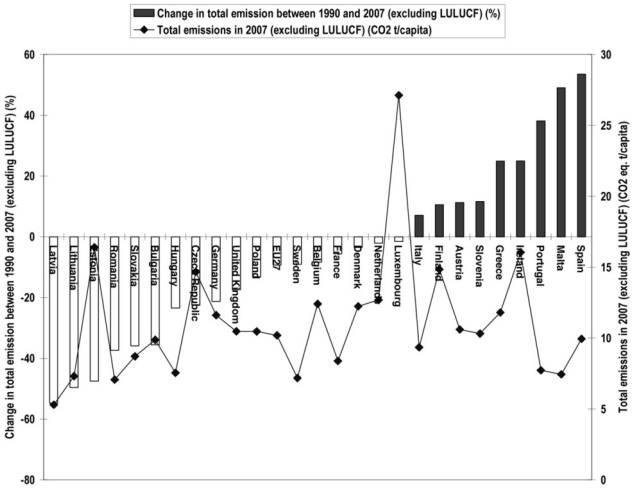

Figure 12: Total emissions in 2007 (CO_2 eq. kg/euro) (excluding LULUCF) and change in total emission between 1990 and 2007 (%) (Data are from dataservice.eea.europa.eu)

capita to 10.343 tons of CO_2 eq. capita in EU-27 countries between 1990 and 2007. The reduction took place in East Europen countries and EU-15 countries have increased their contribution to the GHG emission from 76.1% to 80.3% *(Figure 11)*. Changes in total emission between 1990 and 2007 do not show any correlation with the total GHG emission in year 2007 *(Figure 12)*. GHG emission was reduced in Hungary, Slovakia, Lithuania, Czech Republic, Romania, Poland, Estonia and Bulgaria, where GHG efficiency is low *(Figure 13 and 14)*.

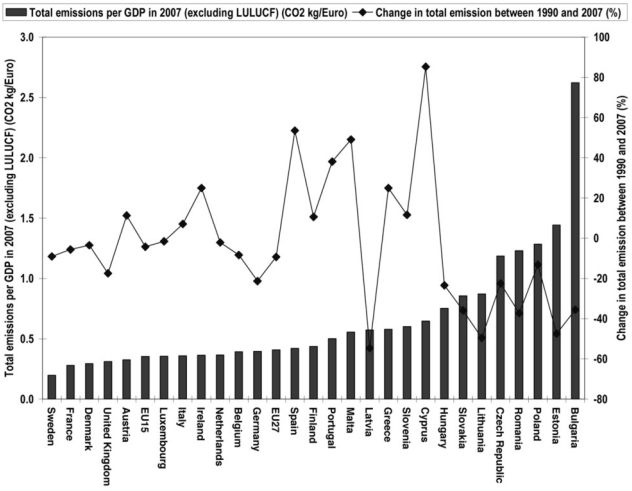

Figure 13: Total emissions per GDP in 2007 (CO_2 kg/Euro) (excluding LULUCF) and change in total emission between 1990 and 2007 (%) (Data are from dataservice.eea.europa.eu)

Hungary, Slovakia, Lithuania, Czech Republic, Romania, Poland, Estonia and Bulgaria have paid a high price for the challenging data in GHG emission reduction as their agricultural production went back in a similar scale. Except for cereals, the EU is contributing less and less to world total food and agricultural production. According to FAO statistics, EU-27 countries produced 27% of total world meat production in 1961 and this has reduced to 15%. Contribution of EU countries to total world fruit production was more than 30% at the beginning of the 1960s and now it is close to 10%. EU produced more than 20% of vegetables and this number has reduced to less than 7%. To ensure adequate food supplies, produce row material for industry and energy sector, preserve the countryside and provide a reasonable living for agricultural and related populations we need Europe 2020 strategy. Measures of Rural Development Progammes (RDP) may not achieve their optimal effect without the realization of comprehensive Europe 2020 strategy. The key drivers for growth are valid for rural area. Number one is smart growth for fostering knowledge, innovation and education in agriculture. The second is sustainable growth for making our production more resource efficient while boosting European competitiveness in food and agriculture sector. The third one is inclusive growth, which is especially valid for rural area, where the employment rate is low and the acquisition of skills to fight against poverty is difficult. Progress in rural development and in CAP should be measured against five representative headline targets: 75% of the population aged 20–64 should be employed; 3% of the GDP should be invested in R&D even in rural area; the "20/20/20" climate/energy targets should be met by agriculture. The share of early school leavers should be under 10% also in rural erea, reduce the number of people living in poverty and improve skills and knowledge of the younger generation – not only in volume, but also in quality – to reduce assimetrical interdependence in and of rural region.

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Space and Economics: An Introduction to Regional Economics

By W.J.M. Heijman and R.A. Schipper,

Mansolt Publication Series. Wageningen University, the Netherlands. 272 pages, 2010,
ISBN: 978-90-8686-097-5 Paperback, price (€): 40.00

The book opens with the view that subject area regional economics is becoming increasingly topical. The authors conduct a thorough analysis of the evidence and arguments supporting their thesis, while at the same time incorporating a discussion of General Economics. Models and their applications play a major role in how the authors interrogate the subject matter. The book contains both basic and more advanced subjects. To study the advanced subjects effectively, the student should be familiar with the basic principles of economics.

The first chapter is focused on the classical traditions in location theory and offers an introduction to this theory based on the spatial theories of Johann Heinrich von Thünen and Alfred Weber. These two classic authors laid the foundations for the field of regional economics.

Chapter 2 deals with the fundamentals of the economics of land use, analysing the economics of land use planning and the relationship between economics and planning. Questions addressed here include a discussion of which crops are grown on a given area and an explanation of the productivity of land and the intensity of land use. Thünen's theory is combined with the classic land rent theory of Ricardo. Finally, the model is put into practice for a number of European countries.

In Chapter 3, the classical theory of location devised by Alfred Weber is discussed, as well as the early spatial equilibrium theories of Palander, Christaller, Lösch and the model developed by Harold Hotelling.

The next chapter is devoted to the modern theory of location, largely covering the period following the Second World War. The main topics covered here are the cluster theories of Perroux (growth pole theory), cumulative causation (Myrdal) and the currently used cluster theory, which is based mainly on the concept of 'external economies of scale'.

In Chapter 5, the general equilibrium model of consumer location is analysed, the rank-size rule is explained and then applied to a number of European countries. This chapter also marks the conclusion of the theory of location.

Chapter 6 concentrates on regional disparities and regional development. The Gini-index of regional inequality is applied to a number of countries and the shift share analysis is used to distinguish between structural and other components of regional disparities.

In Chapter 7, interregional trade is discussed, starting with the simple export base theory. The model is gradually expanded to encompass a large number of regions. The chapter concludes with an application of the model to international trade among the EU countries.

Chapter 8 focuses on input-output analysis and discusses the estimation of input-output coefficients.

Chapter 9 is devoted to important regional economic operational techniques and describes Gravity Models, Linear Programming, Network Analysis (theory of graphs) and Markov Chains. Chapter 10 deals with spatial equilibrium theory and the partial spatial equilibrium model (SEM).

Regional economics are crucial, as any national or global economy consists of nationally independent regions. This book could usefully serve as an auxiliary in a graduate course on regional economics. The reader gets a holistic view of the continuity in regional science research. Important features of the book are its applications, questions and exercises, which allow students to actively work with the study material. The author demonstrates superior abilities in various branches of mathematics. To assist the student, the spreadsheet programme is frequently used as a convenient tool for the computation of model results.

The most distinguishing feature of this book is the explicit attention given to spatial factors in the process of economic growth and development. I would like to point out that the book is extremely well written. Therefore, I can recommend this book to the readers of Applied Studies in Agribusiness and Commerce and to the relatively wide audience of the AGRIMBA network. This book can be of much interest for students, as well as for those researchers who are interested in spatial econometric techniques and rural development.

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Information for authors

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ABSTRACT

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