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Editors' welcome

This 'Apstract' contains a special issue with papers presented during the conference on the occasion of the 100th anniversary of the Department of Farm Management of Warsaw University of Life Sciences (WULS) in December 2009. Apart from the special issue you will find many other interesting contributions. The deputy editors, Prof. Dr András Nábrádi and Prof. Dr János Lazányi, and the Agroinform Publishing House Hungary in Budapest deserve a great compliment for all the excellent work they have done to publish this issue.

The history of the department of Farm Management in Warsaw goes back to the year 1909 when the "Society of Scientific Courses" [Towarzystwo Kursow Naukowych] was established as the first legal, independent higher education institution acting in the part of Poland still occupied by Russia before the first World War. The small unit of Farm Management became a department of Warsaw Agricultural University in 1918, which was renamed WULS recently. During the conference, which was very well organized, an interesting overview was given of agriculture in several parts of Europe.

In a previous issue of Apstract (Numbers 5–6, Vol. 3) it was mentioned that the AVA international congress, held in Debrecen March 26–27, 2009, was to become a bi-annual event. This has become true. The second AGRIMBA-AVA congress will be organized in Wageningen on June 23–24, 2011. I am looking forward to this great event and expect many visitors from all over Europe and beyond. More information about the conference can be found on www.aep.wur.nl/uk/agrimbacongress.

The international study week has become an important part of our MBA-programmes. Especially in May 2010 the organizers lead by Dr Elena Kovtun did a good job in Kiev. It is interesting to see how MBA students and staff get along so well and how much can be achieved when participants cooperate intensively. Further, the MBA-programmes in Kiev, Warsaw and Zagreb were (re)accredited by the Board during the General Board Meeting in Zagreb on June 16, 2010. Congratulations to all that are involved!

I would like to take the opportunity to welcome the new members of our international network. Colleagues from Belgorod (Russia), Kazan (Russia), Nitra (Slovakia), and Ulan Bataar (Mongolia) have joint us. Many of them will attend the AGRIMBA-AVA Conference in June and there will be ample possibilities to meet and discuss possible cooperation with them.

Wageningen, January 2011.

Wim Heijman
Editor in chief

SUSTAINABLE INITIATIVES IN MARGINAL RURAL AREAS OF SERBIA: A CASE STUDY OF DIMITROVGRAD MUNICIPALITY

Juan-Pablo Rodriguez[1]

[1]IMRD, Humboldt University of Berlin, Faculty of Agriculture and Horticulture, rocallej@cms.hu-berlin.de

Abstract: This paper is based on a 2009 case study research on the role and impacts of rural initiatives in Dimitrovgrad, South-eastern Serbia region. This area is of interest, because of local efforts to conserve autochthonous livestock breeds, and the work of smallholders and independent professionals involved farming and rural tourism activities. The research used participant visits to initiative places, drawing on farm visits, meetings with stakeholders and analysis of secondary information. The study highlights that local organizations are running without link to initiatives. Although, Serbia country has well structured rural developments programs, those still are harmonising. Thus, through Actor-Network approach is suggested which turn around a farm manager. This may represent to all stakeholders with initiatives (on-farm and non-farm). Besides, local food products issues from initiatives may reconnect providers and consumers, revaluing local food products. However, is necessary the institutional and organizational involvement to encourage the initiatives. Furthermore, to promote touristic places, by an integrated rural tourism approach it may involve all stakeholders to promote local products and issues from initiatives. Indirectly it may create local employs.

Key words: rural initiatives, local agrobiodiversity, sustainability, South-Eastern Serbia

1. Introduction

European countries have improved rural infrastructures and supported the abilities of villagers in remote and marginal rural areas, through adequate development policies. In countries with few smallholding areas, other alternatives to improve these situations have been developed over time. Initiatives become sustainable activities and possible door for developing remote area, using animal and plant local genetic resources and innovation activities (*Mühlinghaus and Wälty,* 2001; *Milone*, 2009). Countries in transition are starting from the bottom, as it is the case of Serbia, which remained with the harmonization of their development policies addressed to improve slightly the vulnerable and remote rural areas (*Bogdanov,* 2006, 2007).

However, endogenous development takes into account a sustainable way of development by improving and creating rural innovations based on local resources (*Kucerova,* 2002; *Remmers,* 1996, 2006). Main actors involve local population and use of natural resources, promotion of rural areas and traditional activities through rural tourism (agro-tourism and eco-tourism). Employing local livestock in agriculture often valorises the territory and maintain the landscapes, meanwhile provides sustainability and liveability of smallholders in remote areas, including the system of an ecological, economic and social viewpoint, as well as rural villages have bred rare farm animals (*Anderson,* 2003; *Köhler-Rollefson,* 2007). Hence, in Serbia; several projects started for enhancing sustainability of smallholders and improve rural improve rural household welfare in mountainous areas, carrying out projects focused on recovering and revalorizing autochthonous livestock breeds and rebuilding places to develop rural tourism (*Marczin* et al., 2007; *Stojanovic,* 2008; *Saxena & Ilbery,* 2008).

Although, rural development policies in Serbia have some constraints to support initiatives; local stakeholders and projects have started developing initiatives in South-eastern Serbia Region. Those set up around local resources. It arouses the attention in make out how local actors and external agents achieve agrobiodiversity and rural tourism projects. However, forms of local stakeholders' participation and other means have not been considered. This paper will focus on the nature on initiatives and rural tourism as means to develop and become successful maintenance of rural life style. The objectives of this paper are twofold; to note how do rural initiatives contribute to preserving local agrobiodiversity in marginal villages; second, to consider how local entrepreneurs may be sustainable organized. Next section of the paper outlines some theoretical frameworks which help to understand the background of rural initiatives in South-eastern Serbia. The results and discussions are covered by fourth section where are presented by a framework upon initiatives and development relations, and also an Actor-Network approach surrounding initiatives is proposed. Finally, the paper ends with conclusions in the fifth section.

2. Rurality and initiatives in South-eastern Serbia

Serbia's rural areas are featured of traditional farming, and 55% population live in rural area. Often, there is a low and uncertain governmental support and a low productivity

comprised by smallholder (3.5 ha). Hence, rural areas were considered as a problem and not as a resource. Moreover, former policies focused to support larger farmers and improving agricultural infrastructures; while that, smallholders had lacking technical and financial support. Additional, other problems have been the reversible migration from villages to cities. Therefore, economic structure in Serbia still depends on the primary sector and exploitation of natural resources. Chiefly, local projects are supported by local and external agencies through development projects (*Bogdanov,* 2008; S.O.R.S, 2008).

Rural initiatives are no registered as initiatives and/or activities in Serbian statistics accounts. Nevertheless, innovative activities exist according to a pilot survey (INOV), a study that compiled and drew most intensive innovation trend in organization of enterprises (57.34% enterprises), and marketing sector showed slowest (28.81% enterprises). Innovation of products/services and processes are almost the same 47.09% and 46.81 respectively. Over 100 totals of enterprises, solely comprises 7.2% of enterprises in agriculture, mining and quarrying sector exist (OSRS, 2008b).

Furthermore, former policies improved SMEs through establishing of producers associations and improvement of infrastructures. During the 1970s period the rural life had several changes, centralizing the development in cities and towns. It has modified completely the traditional style of rural areas. Despite de fact that rural development policies were established and led to support marginal and poorly rural areas, they were not adequate. Serbia has designed strategic policies to reduce main problems related to rural areas such as poverty, infrastructural means and business initiatives (*Bogdanov; Djordjevic-Milosevic,* 2008). Nevertheless, it is still harmonising between local stakeholders from different sectors.

2.1 Initiatives in Dimitrovgrad marginal rural areas

Rural households in Serbia South-eastern region are considered vulnerable and make up 25% of the rural poverty, mainly due to geographic location, social isolation, lack of access to communication and services (Ersado, 2006; Bogdanov; Djordjevic-Milosevic, 2008). In Dimitrovgrad, few years ago local projects are carrying out to develop and improve rural infrastructures and offer places for rural tourism activities. Moreover, rural initiatives entail on-farm activities (conserving indigenous farm animals) and non-farm activities (rebuilding, renovating old housing, and rural tourism). Official documents and the socio-economic statistics still describe the territory of Dimitrovgrad as rural marginal area. A "rural marginal area" is defined to areas with less population than 100 inhabitants, regional intense depopulation process, higher ageing level, lack of infrastructures, and higher unemployment rate. (OECD, 1994; SORS, 2008a). During sixties, the villages were characterized by sheep breeding and traditional home-made sheep cheese. In spite of these negative trends, the countryside still preserves high and wealthy agro-biodiversity, local heritage and local traditions.

2.2 Rural Development, integrated territorial agri-food approach and sustainable rural tourism

Rural development terms are seen as implementation of political, economic and social project lead for a collective vision and future of rural regions. It involves the creation of new products, services and development of new markets. Seeing a new resurgence of interest in 'more natural' or 'more local' issue, particularly from territory, it is based on local food product. This implies a management of local resources beneath sustainable advantage patterns, and also takes economic aspects into account. It appears redefined as a model of identities, strategies, practices, interrelations and networks. (*Marsden* et al., 2000; *van der Ploeg* et al., 2000; *Yves,* 2005).

Sustainable rural development, suggest the need to regard the prevailing (and potentially new) condition which can be taken into emerging, social-scientific and political-economic relationships (*Marsden,* 2006; *Sonino* et al., 2008; *Tovey* et al., 2009). It conveys a conceptualization of social nature and rural development abroad some obstacles as the social construction of feature and the assumption of natural trend. Regarding upon last standpoint it suggest the ANT (Actor-Network-Theory approach) which includes interrelations between human-nature interactions (*Callon,* 1999; *Murdoch,* 2000).

Concerning exogenous and endogenous processes Murdoch's (2000) draws upon networks and based on rural development issue; he claims two network models. i) Vertical networks that emerge linked to rural areas into agro-food sector and ANT. ii) Horizontal network which denote forms linked to rural spaces and non agricultural processes of economic change; it aim to integrate rural areas into the national and international economy.

Using local resources as means to enhance environmental sustainability of marginal areas, there is an approach on re-valuing foods. Particularly, by taking local food products from rural territories linked to networks. Wiskerke (2009) suggests the place as a resource to promote integrated territorial agro-food. This focus addresses on the multitude of social, economic and ecologic problems. Besides, he also argues ways of organization through Short Food Supply Chains. This means a reconnection consumers and local food producers.

Keeping alternatives of progress for marginal areas, tourism development appears which integrates sustainable local actors, formal and informal networks. Integrated rural tourism encourages environmental, economic, and socio-cultural sustainability in tourism, as well as encourages local people (*Cawley & Gillmor,* 2008; *Saxena & Ilbery,* 2010).

3. Material and methods

This study is based upon three initiatives, which achieve in Dimitrovgrad municipality. Case studies were hereby chosen as a research method, because these can to address

the research question in a contemporary situation where there is no or very little control on the behavioural events (*Ying,* 2003). The fieldwork has been led upon summer 2009 in northern and southern villages of Dimitrovgrad Municipality (Gornji Krivodol, Smilovci, Prtopopinci and Zvonce). The case study compiles two methodology follows by a) visits done to the farm activities involved in rural on-farm and non-farm initiatives, b) participant observations and informal meetings with stakeholders (interviews). In addition, walk around initiative places were realised, as well as a deep analysis of secondary information was done. Further, a framework is developed upon different relations set up on rural initiatives. Throughout, actor-network approach as a strategy of stakeholder association and likely dynamics is proposed as well. The main aim of the case study research was to catch on the dynamics of specific initiatives. Next, the cases also aimed to strengthen and deepen the understanding of themes regarding local resources and products developed by entrepreneurs. Hence, following section outlines the situation of three cases, which are part of rural initiatives.

3.1 Farm Company in Gornji Krivodol and Smilovci Villages

Smallholders and independent stakeholders of Dimitrovgrad countryside become the main actors of the rural initiatives in 2002. At the beginning a local NGO promoted the preserving of local animal breeds merely as a disinterest act for keeping Serbian traditional heritage in agriculture without a marketable purpose. This local NGO and Serbian Ministry of Agriculture (MAWFM) started first. Animals belonging to Balkan livestock breeds (donkeys, cattle, goat and sheep) have been identified by an agrobiodiversity conservation group.

To become sustainable, the agrobiodiversity conservation project, it is invested by two Belgrade private investors since 2008, who were interested in small farm breeding of threatened local animal breeds in a traditional way. After meetings with farmers from the local NGO in Dimitrovgrad, the investors decided to buy two middle sized farms in Smilovci and Gornji Krivodol villages (Stara Planina Mountain area – northern of Dimitrovgrad).

The local NGO activists and their partners from other municipalities of Dimitrovgrad, Pirot, Babusnica, Trgoviste, Bosilegrad and Bujanovac discovered many animals planned to be sold for slaughtering. However, the foreign investors acquired these animals and they were transported in farms in Gornji Krivodol and Smilovci villages. Nowadays, this project supported by investors on conserving local breeds is considered the most important initiative in Dimitrovgrad countryside as well as in Central Serbia in the field of agrobiodiversity conservation.

3.2 Farm in Prtopopinci Village

The initiative started in 2003, and had since beginning external cooperation combined with local projects, now remains by own funds. Currently it follows with the same perspectives as the conserving of autochthonous livestock breeds; particularly the local sheep, Alpino and Balkan goat breeds.

Moreover, one of the assets and products that are offered by this farm comprise the home-made cheeses. Nowadays, they are produced using artisanal techniques (e.g. cheeses of goat and sheep milk). Every year the owner takes participation in local and international events related on Balkan animal breeds. And also, the owner is a specialist in "traditional home-made cheese" and musician, attending in these events he was awarded and recognized due to his participation and the quality of his products.

Activities and services offered by this farm comprise the possibility to stay and to know the traditional South-East farming and rural life style. Furthermore, traditional music is performed by the owner of this farm as well as local heritage is represented through rare breeds. Local infrastructure is not adequate and still uses old housing like farmyard. However, while local products are made by traditional techniques and no certified organic production based on local breeds is elaborated in small scale.

3.3 SPA Hostel in Zvonce Village

SPA Hostel activity started with own funds and initiative, in order to produce additional income. It display to the people in Dimitrovgrad that is able make a livelihood out of rural tourism and produce local products promoting local potentialities and resources (landscape, river and preserved nature areas). Before, to start, the owner worked in Bosnia and Herzegovina. Thus, the initiative became after his experience with tourism activities in that country. Therefore, he decided begin with own means to renovate and rebuild his house combining with local features.

Since Dimitrovgrad is a border town between Serbia and Bulgaria, it presents manifold opportunities and possibilities for visitors and voyagers. Moreover, the owner is a teacher of a High School in Dimitrovgrad town. He is engaged recovering traditional and local heritage knowledge visiting other villages. Researches on ancient history and cultural heritage of Dimitrovgrad are done for him and are spelled in books. Throughout, working in the classroom he knows on the affection of students.

This initiative embarked on focusing upon local resources around Greben Mountain through hiking and staying in the SPA Hostel. Despite, the existence of alternatives to promote rural areas through tourism initiatives in Serbia, nonetheless, it needs procedures in order to get support and still are in process of harmonising with local actors.

4. Results and Discussions

4.1 Organizations involved on rural initiatives in Dimitrovgrad

There are a number of government, non-governmental organization and academic institutions supporting to

initiatives involved through local development project. Their services included advisory and financial. Besides, some of these organizations are assisting in rural development projects in Dimitrovgrad. These are shown in *table 1* and *figure 1*.

Table 1. Organizations involved through support to initiatives since beginning and nowadays in Dimitrovgrad marginal villages'

Name of Organization	Status	Location	Main roles
MAWMF	Public	Belgrade, Dimitrovgrad	Engaged since 2002 through REC project. Preservation local farm animal breeds.
SIDA	Private	Sweden	Financial and technical support.
Academics and Universities	Public Research	Nish Belgrade Dimitrovgrad	Drafting local strategies.
Municipality of Dimitrovgrad	Public	Dimitrovgrad	Supporting and coordinating the improvement of local infrastructures.
Local NGO	Private	Dimitrovgrad	Monitoring and establishing of local agrobiodiversity. Rural Development projects, agriculture and organic farming.
SAVE Foundation	Private	Belgium	Technical cooperation. Advices on conserving indigenous plant and animal breeds.

Source: Own table.

The Ministry of Agriculture, Water Management and Forestry (MAWMF), is engaged since 2002 with REC Project on preserving local animal diversity around the Stara Planina Mountain Area. Through the Department of Genetic Resources, this sector focus on a strategy of conservation taking more cares upon sustainability of on-farm autochthonous livestock breeds. In addition, is engaged in provide technical advices to rural areas on farming, and animal breeding.

SIDA (Swedish International Development Authority) has been supporting through the project Reka Mleka, encouraging to dairy sector and improvement farmer skills

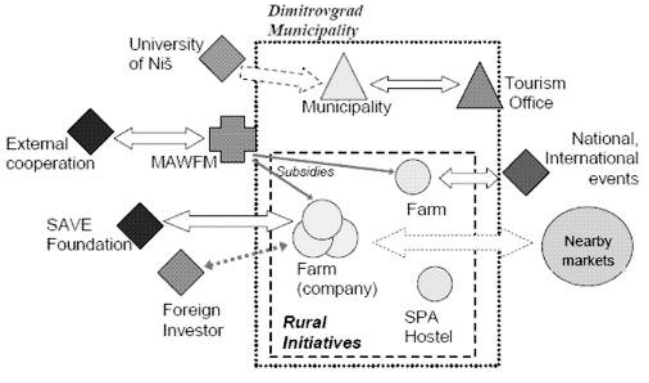

Figure 1. Organizations involved through rural initiatives in marginal villages of Dimitrovgrad Municipality (Source: Own Figure)

by technical assistance. Principal aims of SIDA were financial support addressed to local development projects.

Academics and universities are also player in the local development and design of strategies to develop Dimitrovgrad. Often professors from Nish University are invited to City Hall in Dimitrovgrad town for drawing the development strategy. Regularly, every year the City Hall organizes meetings, further local stakeholders are invited.

The municipality of Dimitrovgrad is involved through local support and coordinating the improvement of local infrastructures in the town, and rural development projects. Some members of municipality council are starting with rural initiatives. The municipality coordinates between local actors and organizations.

The local NGO is engaged since 2002, beginning with the establishment of Agrobiodiversity project and monitoring of autochthonous animal breeds. This NGO has participated actively in projects of Rural Development, Agriculture and Organic Farming through advices to smallholders in villages carried out in Dimitrovgrad.

SAVE Foundation (Safeguard for Agricultural Varieties in Europe), this organization coordinates with BIOVERSITY in activities focused in conserving indigenous livestock breeds and plants distributed in Europe. Their aim is provide assistance and technical advices on native plant and animal preservation and avoid the disappearing local agro-biodiversity.

4.2 Local projects encouraging development in marginal rural areas and partly supporting initiatives

Rural development projects involved strengthening of smallholder skills on cattle management, rural tourism development, recovering autochthonous livestock breeds, local and traditional heritage. At the moment, local projects achieve supporting initiatives involved to local agrobiodiversity conservation partly coordinating with MAWMF *(Table 2)*.

Table 2. Projects achieved and/or going in rural areas of Dimitrovgrad municipality around initiatives

Name of Project	Location	Date of Execution
West Stara Planina Project	Pirot District, Dimitrovgrad municipality Serbian and Bulgarian border municipalities surrounding SPMA	Was designed through two periods 2000 – 2006 (first) and 2006 – at present (the project is called Euro Region Project)
Reka Mleka	20 municipalities (Central and Southern of Serbia)	2003 – 2006 2006 – 2008
IACP Project	Stara Planina Mountain Area	In execution Project financed by REC.

Source: Own table.

West Stara Planina project was created in a stable partnership and institutions to support transboundary cooperation in the development of the region and empower

local stakeholders and improve their welfare through supporting local tourism and agriculture initiatives. 11 pilot municipalities in the region were taken into account. This project was designed for two phases. Firstly, was carried out in 2000 and 2006. A second phase started and is more focused like Euroregion project involving Serbian and Bulgarian municipalities around Stara Planina Mountain area.

Reka Mleka project has been a project supported by SIDA. The main aim was encouraging to dairy sector and improvement of farmer skills by technical assistance. The project was led in two phases 2003–2006 and 2006–2008. Hence, 20 municipalities in Serbia were taken into account, further; improve abilities and strength technical knowledge to national and regional level was done.

IACP, current project is carried out through development of rural tourism in the Stara Planina Mountain area (through rural and conventional tourism) especially winter tourism. This project is financed by REC (Regional Environmental Centre). Besides, its role is support to initiatives around the area, as well as rebuilding rural tourism infrastructures (old housing restoration, etc.).

4.3 Actors'-Network development surrounding initiatives

Rural initiatives presented in this paper as cases make up role on endogenous development, actually focuses on-farm activities and non-farm activities. Over last years, projects for improving steadily rural household welfare in Pirot District have been carried out, particularly in municipalities around the Stara Planina Mountain area. What is more, agricultural initiatives are strengthening social networks by smallholder farms through innovative activities (i.e. networks created in local fairs, sharing of local knowledge).

The particular Farm (company project, *Figure 1*) sustained by private investor, local projects and technological assistance from an international network; still is better organising to reach local and organic animal products to the nearest markets. Particularly, this economical support is led for agrobiodiversity activities and rural tourism. Besides, the initiatives in Smilovci and Gornji Krivodol (company project) want to reach the local products to nearest local markets through strong alliances with specific retailers of typical products. Due to this short background, they tried to find strategically alliances and get more contacts, particularly promoting products in restaurants, and special markets based on products indigenous livestock breeds. At the moment, the farm company started to promote their products through short food exhibition in restaurants of Belgrade.

The initiative in Prtopopinci has demonstrated that participating in local fairs can to promote their local products and build networks. Indeed, the entrepreneur of SPA hostel believes, that may develop more tourism infrastructures, and so, attract more visitors. This would provide alternatives source of incomes and foster to young entrepreneurs take more interest in local means and products.

This scenario illustrate that, local organizations i.e. Tourism office, Local government (i.e. municipality) and external agents (University of Niš) are achieving activities without links over initiatives (Figure 1). Instead, its support is more addressed to planning and organizing municipal strategies. Although, Serbia has created interesting and well designed rural development strategies; most of these strategies were formulated by top-down overview. And for the stakeholders getting economical support from government should be by local projects. Nevertheless, other stakeholder working with initiatives reach a financial support still is inadequate due to procedures.

4.4 Sustainable initiatives through fostering re-connect territorial agro-food and rural tourism

To this aim, according to suggestions from local stakeholders, farmers and representatives of municipality; they have suggested the establishment of a manager and/or consortium (i.e. an agent that might act for other stakeholders that were not considered in this case study). This manager should organise to the previous stakeholder and initiatives of being part to the existing network. In this case the established network would comprise by Farm Company (i.e. for setting up a strong network).

These factors have been the basis to suggest possible relations involving more stakeholders *(Figure 2)*. Because, would not only are implied with local agrobiodiversity as well rural tourism and organic farming in less proportion. Hence, through this hypothetical case fostering to *'Farm Company – FC', it* might to the local producers *(Figure 2)*.

This manager (FC) may involve more stakeholders and necessarily, it should organize and involve with the municipality to create a local retailer in Dimitrovgrad town. A vertical network fits through a possible short supply food chain, may be structured connecting between local producer and consumers (*Murdoch; Marsden,* 2000). The institutional support is necessary for strengthening this network, thought, and at the moment still is matching regional and local strategies; as well social network may be more encouraged and should change steadily the attitude of farmers. These synergies may more promote local products issues from autochthonous agrobiodiversity, crafts and rural tourism products.

Local products are embedded to the place. Seeing the potential of smallholder making local products and how they are promoted steadily through local events (Regional Fair of Balkan Agrobiodiversity and Rural Heritage). The features meet the conditions to encourage re-connect consumers and food producers/providers, since local products take into account the environmental conditions, artisanal techniques, which are still elaborated (*Wiskerke,* 2009). Tourism office has started supporting and involving to the young in local activities. It as well should foster to municipality in provide an advice centre for them and local entrepreneurs should remain involving in local jobs (tourism, local livestock breeds, crafts).

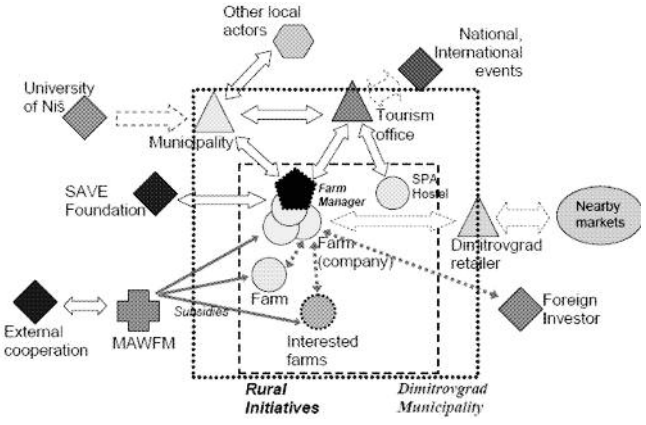

Figure 3. Suggested framework, whether Farm Company become manager for the farmers from marginal villages in Dimitrovgrad
(Source: Own Figure)

However, is necessary the active involvement of local agencies, mainly for being sustainable projects and imply more local and external organizations. Particularly promote them through rural tourism activities (e.g. local tourism, agro-tourism, ecotourism), as well as institutional support (*Murdoch,* 2000; *Marsden,* 2006). This framework outlines more commitment of local actors and organizations focusing initiatives and rural tourism. Through an integrated tourism, on-farm and non-farm initiatives may be more linked, maintaining the economic and socio-cultural features of the localities take place (*Cawley & Gillmor,* 2008; *Saxena & Ilbery,* 2010). Nevertheless, here it may run, whether municipality, tourism office and farm manager become a coordination. It shall provide more promotion on rural tourism, rural life, traditional crafts and traditions for the visitors and/or tourists. Furthermore, social network may be strengthened, mainly to the stakeholders encouraging their social networks (*Vergunst* et al., 2009).

5. Conclusions

This paper set out to investigate the efforts made for smallholders and organizations to become sustainable and promote products through initiatives in Dimitrovgrad municipality.

While there is sound strategically to preserve local agrobiodiversity and promote steadily local food products, these appear important issues concerning to development of marginal rural areas in Dimitrovgrad. The cases taken into account are involved through local projects, foreign investors, local organizations and own funds, and also being part of international networks, which provides technical assistance. However, exogenous support may still be necessary to sustain the main manager and should engage to coordinate between local actors, local agencies, intermediate institutions and external agents (horizontal network).

Nevertheless, it should not be focus on this group, and also it should organize the other stakeholders that are pursuing with initiatives or want to start. There are further means of support to keep local livestock through subsidies provided from Agricultural Ministry. Thereby, seen in other villages, there are smallholder interested to access this subvention, hence they necessarily should meet the procedures to reach it.

Horizontal and vertical networking and embeddedness upon initiatives were proposed as being conductive to maximize resource use and achieving the basic purpose to reconnect local food products to nearly markets. Examples of successful horizontal embedded networking were identified, as was vertical networking to attract tourists. Deficiencies in local networking served, however, to inhibit development in more remote areas. Re-valuing local food taking local resources turn around on a likely integrated territorial agro-food. Regarding environmental sustainability, the farms may be strengthened their networks inside of initiatives.

Farmers that live in these areas still manage by organic farming on a small scale and through rural initiatives. The importance of agrobiodiversity should stimulate the government to coordinate and improve rural strategies by promoting better integration between institutional and local stakeholders. In addition, the government should run awareness-making campaigns to convince entrepreneurs that protecting and enhancing agrobiodiversity is feasible and relevant for future viable agricultural production in those areas.

Rural tourism should be advocate both by official bodies as well as by individual farmers. Elderly people retiring and leaving the productive economy altogether, it is evident that for rural areas to retain their economic vitality it is important for alternative income source to be created therein. Promoting an Integrated sustainable rural tourism it will increase possible source of enhanced employment, expansion of high quality handicraft production.

Although, there are adequate rural tourism infrastructure (at the present occupancy rates are relatively low, which majority of transits). Seeing the expansion of established initiatives, and present potential in villages could be the expansion of handicrafts and specialist in high-quality food issue from indigenous livestock. All of which could provide direct employments possibilities for people living in rural areas. Nevertheless, there are main factors can limit the direct benefit, like small size of country, enabling to visitors to stay there. Besides, few of the facilities available in rural areas are below the quality expected by most international tourist, thus restricting their desire to visit them. One of the strategies to improve initiatives may be through development of website. Despite of locating in marginal villages, these tools can help to attract visitors. In addition may provide information to external visitors, seeing now a globalized world. Through this mean should display the products offered by farms as well the local products. Several experiences using these means have been successful promoting local products.

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THE FUTURE ROLE OF AGRICULTURE IN MULTIFUNCTIONAL RURAL DEVELOPMENT: THE CASE OF ITALY

Davide Viaggi

University of Bologna davide.viaggi@unibo.it

Abstract: This paper addresses the issue of the role of agriculture in multifunctional rural development in Italy. Italy is characterised by high heterogeneity in terms of territorial composition, rural areas and the role of agriculture. The paper reviews the main multifunctionality concerns in Italy, by discussing rural development issues and policies and addressing the role of agriculture in such a context. The further development of agriculture and related future issues are then discussed, both in terms of dominant themes and most relevant policy design issues.

Key words: multifunctionality, Italy, agriculture, rural development

1. Introduction and objectives

Italy is characterised by high heterogeneity in territorial characteristics, including a wide range of climatic and ecologic conditions (lowlands, mountains, coastal and internal areas, as well as rather fertile and almost arid areas, etc.). The rural areas and Italian agriculture reflect this heterogeneity. The prevailing character, however, at least in the policy discourse and public perception, is that of high cost, high quality production, embedded in a rich cultural and natural rural environment, strongly determined and conditioned by its long term historical development path.

In this context, the issue of multifunctionality has been central to the discussion regarding the development of rural areas over the past decade. A major role in this discussion has been played by agriculture and related policies.

The aim of this paper is to review the role of agriculture in multifunctional development of rural areas in Italy.

The paper is organised as follows: after a review of past trends and the present situation (section 2), the paper analyses future expected changes in the farming sector (sector 3), followed by a discussion of future multifunctionality issues in section 4. The paper ends with some conclusions.

2. Current situation and past trends[1]

2.1 Role and structure of the agricultural sector

The Italian agricultural area is about 30 million hectares, with a relatively low share of lowlands (23%) compared with hilly and mountainous areas. Agricultural areas account for between 37% of total area in the North and 44% in the South. About half of the total agricultural area is cultivated with crops. The ratio between population and agricultural area is of about 400 inhabitants/100 hectares.

The economic role of agriculture is confined to about 2% of the total value added, and 5.3% of total employment (2007). However, both figures are above the EU25 average , denoting the relatively important role of agriculture.

In 2007, there were about 1.7 million agricultural holdings in Italy. *(Table 1)*.

Of this, about 73% are below 5 hectares in size, denoting a small average structure and the presence of a large share of micro-holdings. In recent decades, the agricultural sector has been characterised by a decrease in the total number of farms. The decrease has been particularly evident in the smallest size classes, while the average sized farms are rather stable in number and there is an increase of the number of farms in the highest size classes. The large majority (almost 100%) of agricultural holders are natural persons. However, the share of legal entities with agricultural holdings has grown steadily in recent years. The age of the farmer population is rather high, with about 44% of the farmers being above 65 years of age. The number of farmers below 35 is small and continues to decline. The labour force is composed of approximately 1.3 million agricultural working units, which is less than 1 working unit per holding. The number of physical persons involved in agriculture is, however, much higher with a total of more than 3 million in 2007. Of these, a large majority are family farm members.

In spite of the emphasis on diversification and multifunctionality, only a minority of farms have gainful

1 The main source of information for this section is INEA, 2008. Check this source for the original source of information, mostly ISTAT (Istituto Nazionale di Statistica).

Table 1. Key indicators in farm structures and labour in Italian agriculture

	1990	1995	2000	2005	2007
Number of agricultural holdings (000)	2664.55	2482.1	2153.72	1728.53	1679.44
Agricultural holdings with agricultural area < 5 ha (000)	2099.05	1938.26	1687.04	1271.66	1230.7
Agricultural holdings with agricultural area > = 50 ha (000)	38.37	40.25	36.54	38.62	40.01
Agricultural holders being a natural person (000)	2646.53	2470.57	2137.72	1699.46	1663.51
Agricultural holders < 35 years old (000)	137.59	110.21	110.6	56.49	49.07
Agricultural holders > = 65 years old (000)	850.95	912.29	825.95	734.95	740.54
Total farm labour force (000)	1923.99	1818.02	1364.92	1374.26	1302.18
Family farm labour force (000)	5197.21	4695.58	3888.22	3127.46	3056.54
Agricultural holdings with another gainful activity than agricultural production (%)			8.8	6.1	6.4

Source: Eurostat website, 2010.

activity other than farming, and the share is declining, pointing to a process of specialisation.

The agro-industrial system is very strong in Italy with a total value added of about 240 billion euros, 10 times that of the agricultural sector, and about 8.3% of the value added of the industrial sector. The total number of employees is about 0,5 million. The main categories of products of the food industry (based on value added) are: Diet foods and other categories, milk and dairy, confectionery, and wine.

Agriculture and the agri-food industry are generally very connected to each other. A large share of the agricultural production is processed or traded by the co-operative agri-food industry, particularly in the North. Many high-quality food products (e.g. Parmiggiano-Reggiano cheese) owe their specificities to a combination of agricultural and processing prescriptions. In the perception of the general public, agriculture and small agri-food industries are the main distinguishing features of Italian rural areas. Most marketing strategies in the agricultural and food sectors are more or less explicitly related to origin (e.g. for wine and most certified quality products). While the population which depends directly on agricultural is limited to about 5%, a larger share of (rural) households are still connected to agriculture through assets (land, house) property or indirect work-related activities (agri-food and related industries).

2.2. Specificities of different rural areas

This very general picture is actually characterised by a high degree of territorial differentiation, which also reflects the role of agriculture in rural development. The "Piano Strategico Nazionale per lo sviluppo rurale" (National strategic plan for rural development, MiPAAF, 2009) identifies three main typologies of rural areas in addition to urban areas *(Figure 1)*

Urban areas include 43% of the Italian population and are characterised by a strong role of industry and services. Agriculture is mostly relevant in the surroundings of large urban settlements, which are potentially important short-distance markets for high quality products. While the role of agricultural employment in these areas is low, or negligible, the presence of food manufacturing is rather high, with about 30% of employment located in these areas. These are the areas experiencing the highest pressure from urbanisation and, as a consequence, higher land prices and a greater share of land subtracted from agriculture (-15% of Usable Agricultural Area, UAA, in a decade). The presence of Natura 2000 sites in these areas is rather low, while there is an important share of land vulnerable to nitrates according to the nitrate directive. Due to the vicinity of town centres, the infrastructure endowment is rather good, as well as tourism and hospitality facilities.

Rural areas with intensive specialised agriculture are the most important agricultural areas of the country. They occupy mainly plain areas in the North. They include only about 22% of the total national population and 24% of the UAA, but 29% of agricultural employees, 30% of the agro-food industry and account for 38% of the national agricultural value added. They tend to be densely populated areas, with a younger and growing population (+10% in the past decade). Most of the area is composed of agricultural

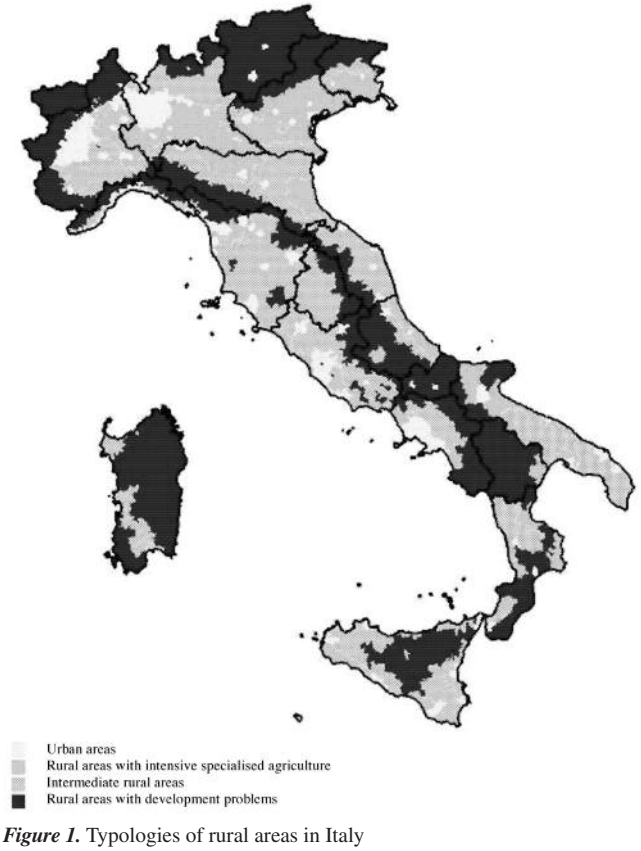

Figure 1. Typologies of rural areas in Italy

land (UAA=62%) and the economic system is strongly specialised in agriculture, with high productivity (gross revenue per hectare above 5000 euro/year). The Agro-food industry is also strong in the rural areas, with important chain and district connections with agriculture. However, small industries and other entrepreneurial activities are also very relevant in these areas. Rural areas with intensive specialised agriculture are also important for environmental concerns, in particular because they include 35% of the national areas classified as vulnerable to nitrates. While tourism and hospitality infrastructures are generally good, other infrastructures are below the national average.

Intermediate rural areas are mostly located in hilly and mountainous areas. They include 24% of the national population and 32% of the national surface area. The population is growing in these areas (+6% in a decade), but is affected by problems related to ageing. Agriculture is important in these areas, with a gross production of approximately 2200 euro/ha. However, the sector is experiencing important difficulties, with a strong reduction of cultivated surface (-12% of UAA) and employment (-27%) in a decade. This is due to the combination of ageing, increased production costs and lower land productivity. In spite of this, the agricultural and food sectors are considered to be a strategic component of the economy of these areas, in part because they combine with important environmental endowments (21% of the national protected areas, and 23 Natura 2000 areas). About 30% of nitrate vulnerable areas are also found in this typology of rural areas. The infrastructure endowment is very low in these areas, with regard to transportation, hospitals and internet connections. Moreover, tourism and hospitality infrastructures are considered to be insufficient. The area was strongly involved in the Leader+ initiative, with the municipalities interested in this policy representing about 37% of the population.

The rural areas with development problems are mostly located in the mountains and hills of the South. They are less densely populated, with a decreasing population (-1% in a decade, with a peak in the South of -6% due also to migration). While they include only 12% of the population, they cover 43% of the national surface, and 35% of the UAA. They also account for 20% of agricultural employees and 18% of the national agricultural value added. Agricultural productivity is low (1000 euro/ha) and does not guarantee economic viability. Consequently, land abandonment is very high. Development potential is generally seen to be related to local resources and tourism. These areas are marked by high unemployment rates and a higher than the average share of the population dependent on agriculture (8% compared with the national average of 5%). They are, however, very important from an environmental point of view, with 62% of the Natura 2000 areas (21% of the area of this typology), and 68% of the protected areas. The infrastructure endowment of these areas tends to be very poor, however, and the Leader+ initiative is most concentrated here (covering about 63% of the population).

2.3 Strength, weaknesses, opportunities and threats

In spite of the high heterogeneity of the system, it is possible to identify some mainlines that form the strategic development of the agricultural sector in Italy. This exercise was performed on the occasion of the "Piano Strategico Nazionale per lo sviluppo rurale" (National strategic plan for rural development, MiPAAF, 2009).

The main strengths are identified in the high propensity to produce certified quality products and in the diffusion of organic and integrated agriculture. The growing connections with the food industry and tourism are also seen as important.

The main weaknesses are found in the insufficiently high economic performances which ultimately prevent the sector from being competitive (high costs, low value added per employee). Additional weaknesses are found in structural problems at the level of agriculture (small farm size) and poor performance of the agricultural and food chain in terms of price transmission, performance of processing plants, difficulties in organization and concentration of supply, uneven market power between agriculture and the downstream sectors. Ageing and low infrastructural endowment, particularly in some areas, add to this picture.

The main opportunities concern the changes in consumption patterns with more attention to healthy and ethical products. Opportunities are also seen in the wide range of policy measures encouraging restructuring, investment and chain organization, as well as in the wide scope for enterprise organization though emerging legal forms such as agricultural limited liability companies.

The main threats identified stem from the crisis of consumption of agri-food products and the strong competition on international markets by both EU and non-EU countries (e.g. southern Mediterranean countries).

2.4. Agricultural policies

The Common Agricultural Policy (CAP) is the main policy concerning agriculture in Italy. The total first pillar expenditure for Italy is about 4660 million euro, representing 11.1% of the total EU expenditure under this chapter (with a decrease of 3% in 2008 compared to 2007). According to the variety of farming systems, specialisations and structural characteristics, a very wide range of measures are implemented in Italy, with varying importance depending on prevailing local production systems.

However, the chapter that is by far the most important in the first pillar is the single farm payment (SFP), which accounted for 3206 million euro (69% of first pillar payments) in 2008. In the same year, other direct payments accounted for 600 million euro (13%), while the remainder of the first pillar is provided by direct intervention on agricultural markets (880 million euro, 19%). The sugar restitution fund also played an important role with a 535 million euro payment. Following the Fischler reform, Italy opted for the total decoupling of cereal, oil and protein crops payment starting in 2005. In the same year environmental

cross-compliance was also introduced, tying SFP payments to compliance with a number of basic environmental regulations, and with keeping farmland in good agricultural and environmental conditions.

Pillar two measures, basically represented by Rural Development Plans (RDP) started in 2000 and aggregated a number of previous interventions classified either as structural or complementary measures. Italian RDP are co-financed by the national government and have a total availability of 16,604 million euro for the programming period 2007–2013, which is about 2372 million euro per year. However, the implementation got off to a slow start and on March 31, 2009 only about 1359 million euro had been paid (less than 9%). This is actually quite common in the implementation of all rural development plans; it also occurred at the beginning of the 2000-2006 programming period and in the mid nineties when the accompanying measures introduced by reg. EC 2078/92, 2079/92 and 2080/92 were implemented. Of the amount already paid, altogether, 81,3% of the total RDP funding is devoted to axis 2 measures, 16,3% to axis 1 and the remainder to axis 3. This concentration of payments on axis 2 is largely due to the coverage of undertakings already established in the period 2000-2006, and which remain in force for the following period during to the length of the contracts (5 to 20 years), particularly in the field of agri-environmental measures.

2.5 Public goods and agriculture

Pierangeli et al. (2008) found that different areas of Europe undergo different "multifunctional specialisations" and that this is more evident when moving to the lower scale. They also classified EU countries according to their characteristics with respect to multifunctionality. In this exercise, Italy is included in a cluster with other Mediterranean countries (Greece, Spain and Portugal). This cluster is characterised by the relevant weight of the primary sector on GDP, rural diversification (underscored by the large diffusion of Leader+ activities) and by the emphasis on product valorisation and territorial identification, mainly by way of certifications of origin.

Public goods related to agriculture are mostly identified with environmental and landscape features in rural areas. In such contexts, MiPAAF (2009) identifies seven main areas of concern:

- biodiversity;
- water resources;
- climate change;
- soil;
- air quality;
- landscape;
- disadvantaged areas.

Let us consider the main components in turn.

Agriculture plays a major role in biodiversity conservation due to the high share of high natural value farmland (about 21% of the total UAA), mostly concentrated in Natura 2000 areas. However, the level of biodiversity is still decreasing, as shown mainly by bird populations. This is mostly caused by a simplification of most agricultural habitats, due to the intensification of farming activities or farmland abandonment.

Water is a critical resource in Mediterranean systems, and for agriculture in particular. About one third of Italian UAA is irrigable, while almost a half of the national value added from agriculture comes from irrigated crops. This high dependency on water causes agriculture to be by far the most important water using sector in Italy (roughly 50-60% of total national water use), which encourages conflicts with other sectors for water resources. Water protection issues are mostly connected with qualitative issues in the North, and quantitative issues in the South. While surface water is for the most part in an acceptable status, the situation of groundwater is critical in many areas, particularly in the South where it is the source for 53% of water abstraction. Agriculture affects water quality mainly through nitrogen emissions (about 40 kg/ha) and quantity through abstraction for irrigation purposes. The use of chemicals in agriculture is characterised by an increase in total market value, but a decrease in quantity used. Irrigation water management is affected by major inefficiencies both in the distribution system and concerning on-farm irrigation systems.

Climate change is a relevant issue from the point of view of emissions/fixation of gasses contributing to climate change, and from the related point of view of energy production from biomasses. From the point of view of greenhouse gas (GHG) emissions, agriculture contributes only 6,5% of total Italian emissions. However, agriculture is the main source of emissions for Methane and Nitrous Oxide. From 1990 to 2006, emissions of these gasses have fallen by respectively 12 and 8%. What is most important is that many agricultural systems can play a role in carbon fixation. This role is particularly important as the total GHG emissions in Italy in the period 1990-2006 have increased by 10% compared to an expected reduction by 6,5%. In recent years a major emphasis has been devoted to the production of energy from biomass, mostly driven by poor agricultural profitability and the consequent search for alternative sources of income, and encouraged by both the value of green certificates and specific payments for energy-related investments under the RDP 2007-2013, axis 1.

Soil management issues are mostly characterised by the reduction of the cultivated area (-16% in the last decade), mostly in the area cultivated with permanent pastures (-26%). Soil quality is also a problem. In plain areas the main soil quality issue is related to the increase in phosphorous pollution due to fertilizers. In hill and mountain areas, soil degradation is mostly caused by the reduction of organic matter and soil erosion due to water flows. Practices such as organic agriculture have a major role in the preservation of soil. Organic agriculture represented about 9% of the national UAA in 2007, with a constant overall growth trend (it was 8% in 2000), but with contrasting trends among different crops (steady growth in fodder crops and a decline in grapes and fruit).

With regard to air pollution, the main source from agriculture is ammonia emissions (NH3). The main source of such emissions is livestock production with about 54%, followed by cultivation with 40%. The ammonia emissions in agriculture between 1994 and 2006 have been reduced by 12%, mainly due to a reduction in herd size. Agriculture is now seen as playing a major role in the fight against climate change.

Rural landscapes are a major feature of Italian agriculture, built over thousands of years, contributing to biodiversity conservation, cultural perceptions of rurality, quality perceptions the certification of products, and rural recreation activities. Rural landscapes have deteriorated in recent decades, particularly due to urban development and the simplification of crop-mixes. This trend was partly accompanied by unfavourable policy designs, which for decades were mostly oriented toward productive agriculture. Abandonment of marginal land and forests has also contributed to landscape degradation. In spite of the change in policy focus since the beginning of the 1990s, negative trends seem, altogether, to prevail.

Disadvantaged areas have been identified in order to implement the RDP measures on compensation for disadvantaged areas. They account for 61% of the national area, with percentages ranging from less than 40% to more than 90% in the Aosta Valley, Basilicata and the autonomous province of Bolzano. In terms of agricultural production units, they concern 59% of Italian farms. These areas have been characterised by constant depopulation and abandonment of agricultural activities in the last two decades. In contrast with this, the average farm area is also decreasing, although the trend can also be associated with a rationalisation of existing farming structures. Economic activities and infrastructure are also weaker in these areas.

This is particularly relevant in connection with the socio-economic aspects of agriculture, already discussed in relation to the differentiation of rural areas above. Though less commonly connected to agricultural activities and policy, socio-economic aspects also contribute to the public role of agriculture. For example, they are tied to the various dimensions of employment, social networks and cultural characteristics that are strongly related with the differing importance of agriculture in different kinds of rural areas, as discussed in section 2.2.

2.6 Policies related to multifunctionality

Agri-environmental measures have dominated the scene of non-first pillar measures since 1992, and also since 2000 (with the Agenda 2000 reform), when they were integrated into the RDP. RDP now include a very wide range of policies related to various aspects of multifunctionality, ranging from payments for investment in diversification activities, to measures aimed at improving the quality of life in rural areas.

The main measures directly related to multifunctionality in terms of budget, are those included in axis 2 of the second pillar of the CAP.

During the period 2000–2006, expenditures for contracts established under reg. EC 2078/92 (agri-environmental measures) accounted for 31,6% of the total RDP expenditure and this summed up to the Measure F of the RDP (agri-environment), which accounted for 19%. As a result, about half of the RDP resources were devoted directly to providing incentives for the production of environmental services from agriculture. The next most relevant measures in terms of expenditure were those of Measure A (farm investment), with about 10% of the total expenditure over the period 2000-2006 (MIPAAF, 2007).

3. Expected changes in the organisation of farming sectors from a generational perspective (20-25 years)

The main features of the last decades which are expected to continue in the future are the process of exiting from agriculture, accompanied by major restructuring of farms, either through the sale or renting of land or the increased role of machinery renting companies.

This will be to some extent driven by CAP developments. In particular, if the main policy trend remains characterised by decoupling, competition on the global market will accelerate restructuring and exiting from the farming sector, resulting in a more and more dualistic agriculture sector in which well-connected and endowed competitive areas are opposed with less favoured areas.

Such effects will also increase the attention given to innovative farm and chain organisation (e.g. farmers' markets), and the quality of production.

This will occur against two background features: urban development and climate change.

Urban development has characterised the second part of the 20th century and strongly affected land prices and ownership strategies in agriculture. Settlement development is expected to continue, particularly in small villages in rural areas surrounding the main towns. This will affect both access to land and quality of life in rural areas.

Climate change will be a crucial issue in the medium-long term. The crucial issues for Mediterranean agriculture will be related to water availability and the effects of temperature on evapo-transpiration. In addition, energy and carbon sequestration issues could yield opportunities for agriculture.

4. Possible Future Multifunctionality Issues

4.1 Main thematic issues

All the main thematic issues discussed above will maintain their relevance in the future. Among them, however, recent trends show a shift in attention toward water resources, climate change and energy production from biomass, and biodiversity. While this is consistent with the

recent trends in EU policy (new challenges introduced by the Health Check of the CAP), a number of specificities exist with regard to the Italian context.

Water management concepts are changing under the pressure of the increasing frequency of drought events, and the implementation of the Water Framework Directive (60/2000). While water scarcity issues are expected to become more severe in the future, the commitment from agriculture to save or efficiently use water is becoming more important in the context of the mediation of allocation to other sectors.

Climate change and energy are seen as relevant opportunities for Italian agriculture. After the rush to open new facilities and provide incentives for energy production from biomasses, witnessed over the last five years, the next challenges will be devoted to ensuring economic viability of existing energy producing infrastructures, and understanding the most likely strategies for a consistent development of energy production.

Agriculture continues to be mostly competitive with biodiversity conservation, in spite of the emphasis on biodiversity as a resource. Biodiversity conservation usually implies putting constraints on agricultural production for which compensation is provided.

A key concern in reconciling the profitability of agriculture and biodiversity (as well as a number of other public good related concerns) is the role of organic agriculture. In fact, based on the experience of recent years, two different "types" of organic agriculture should be considered. On the one hand, there is economically viable organic agriculture, mostly related to high value products, with rather direct connections with consumers, and sometimes connected to diversification activities (i.e. rural tourism). On the other hand, there is policy-driven organic agriculture, which is often characterised by extensive low-input crops, and mainly justified by payments provided by the RDPs, but unlikely to provide significant environmental benefits or market profits.

A connected issue is the role of quality products. The development of certifications has contributed to public (consumer) awareness and the recovery of typical high value added products. However, willingness to pay for quality and the effectiveness of certification is still modestly understood. In addition, the actual degree of connection between quality products and public goods is still largely to be qualified and demontrated.

Urban-rural interaction is also discovering new dimensions. Beyond the traditional and still relevant competition for land, a future issue is that of the actual integration of non-agricultural settlements into mainly agricultural areas and the role of agriculture related to local urban areas. While discussions in recent years have mainly been focused on the role of agriculture as a landscape producer, more recent attention on retaining profits for agriculture and reducing "food miles" has highlighted the role of local agriculture as a producer of food for local consumers, through farmer's markets and short chain solutions. The roles of agriculture are particularly relevant around urban areas characterised by high historical and landscape values and can develop a willingness to pay on the part of local non-agricultural populations (*Torquati* et al., 2008).

In recent years new attention has also been attracted to productive agriculture and innovation processes. This is due to the general policy context (CAP reform), the push for less protection and higher competitiveness in the market, as well as the strong structural change that is creating a growing number of large entrepreneurial farms that already hold a majority of production. These farms, though mostly open in terms of production processes, including multifunctional activities and policy driven production of public goods, are generally more oriented toward classical agricultural production, and in particular agricultural commodities benefiting from economies of scale.

A past and future issue is the role of diversification of farming activities in the context of multifunctional agriculture. For example, Finocchio and Esposti (2008) investigated diversification of farming activities in the Marche region of Italy, mainly with regard to deepening (organic farming, product processing, quality products (PDO, PGI, TSG), ISO, HACCP certification, and other kinds of certification) and broadening the kind of activities (rural tourism, farm contracting, participation in agri-environmental programs). They found that a move in the direction of multifunctional diversification is encouraged by small farm size, and dependent on location. In fact, this attitude seems also to grow over time. As far as policy is concerned, they found that the correlation with pillar I payments is negative and that the correlation with pillar II is very low, suggesting that diversification activities are more important for those farms which benefit less from CAP support.

An issue somehow touched marginally in the literature compared with the potential major relevance in the future is that of GMO acceptance and coexistence with organic and traditional production, in a context where a strong market strategy has been based on the qualification as GMO-free products and areas.

4.2 Main policy (design) and research issues

Two general policy and research issues can be identified in the lines of research already developed in the last two decades about the effectiveness and efficiency of policies directly aimed to provide incentives for the production of multifunctional goods by agriculture. They concern the documentation of jointness of such goods with agriculture and the ability to measure the changes actually attributable to policies.

On the first point, attention is drawn to the discrepancy between technically/economically demonstrated connections between agricultural, environmental and social effects, and the policy discourse surrounding agriculture, that often emphasises as a product of agriculture also weakly connected or competitive outputs. The trend of the

weakening of the connection between households and farming, even in the most rural areas, emphasizes that also the jointness of agriculture with social concerns is weakening, at least for quantitative issues (e.g. employment concerns). Cultural linkages, on the other hand, are still strong though reshaped by explicit communication/marketing strategies, not always corresponding to the true historical identity of rural areas.

The inability to measure effectively the effects of multifunctionality-related policies strongly affects the policy debate throughout Europe. This concerns, for example, agri-environmental measures (*Finn* et al., 2009). This is also related to a second issue associated with agri-environmental policy concerns, that is the determinants of participation, a theme also having attracted considerable attention in Europe (*Defrancesco* et al., 2008).

The introduction of cross compliance in 2005 has brought forward a number of new policy issues. While initially considered to be a very soft policy and basically dismissed on the research side as a simple matter of the obligation to fulfil existing requirements, it is beginning to raise major policy design questions. First, the costs of cross-compliance are relevant and become part of the decision making process at farm level. At the same time effectiveness is not assured and should be analysed in a moral hazard context, in particular considering the low level of monitoring. This leads us to the problem of the appropriate design for rarely verifiable prescriptions, incentives related to pre-established payments, and sanctions (*Bartolini* et al., 2008a). One additional issue related to cross-compliance is that agri-environmental prescriptions are now connected to the baseline represented by cross compliance, which enlarges the scope for locally negotiated constraints leading to public good production and, more importantly, calls for a joint design of first and second pillar environmental measures (*Bartolini* et al., 2008b).

A major issue for the future of multifunctionality will be the integration between policies. Relevant examples already in the present RDPs are measures that provide compensation for farmers subject to restrictions from the Water framework directive or Natura 2000. Similarly, cross-compliance measures rely heavily on existing regulations, as they refer in most cases to compulsory norms which have already been in place for several years.

In fact, a number of less visible connections exist throughout all second pillar measures. A large part of this integration is actually performed at the local level as both RDP and reference regulations are specified locally. This is the example of WFD, where measures are designed at the basin district level, which is close to, but never coincides, with the nuts II level where RDP (and partly cross-compliance) is designed in Italy.

This leads to the further problem of governance. Coordination at the local level involving a growing number of actors is increasingly required, and is already proving to be a difficult task. In addition, even within the same institution, an issue in coordination between different directorates may arise.

As well as the integration between policies, increased attention has been attracted in recent years by the effects of networking in the connection between agriculture and agri-food industry in either a chain or district perspective. This attention has been emphasised by the diffusion of Leader+ initiatives, that focus on networking, and has tended to move from "mere" economic networking to either the role of social networks and social capital (e.g. *Medicamento and De Gennaro,* 2006; *Magnani and Struffi,* 2009), and the emerging of "knowledge" networks related to development and innovation processes. Altogether, the recent literature seems to suggest an important space for the development in this direction, also taking into account of the increasing complexity of agricultural embedding in rural and non rural society and the pervasive role of globalised phenomena as determinants of local outcomes. A number of potential major issues are now being detected in this direction, but still insufficiently studied, such as Central EU elderly moving to buy houses in Mediterranean areas, "multi-country farms" split between Italy and the Balkans, non-EU immigrants up-taking farms as entrepreneurs, technologies flowing from outside (e.g. biogas digestors from Germany or cereal storage bags from Argentina.

5. Discussion

In recent decades agriculture in Italy has been characterised by a reduction in importance in the national economy and employment, accompanied by major structural change, though they are often poorly reflected in official statistics (e.g. farm size). Agriculture is strongly connected to the food industry, which is, on the contrary, a major component of the Italian economy.

The discussion about multifunctionality of agriculture in rural areas in Italy has developed around the two connected themes of the provision of public goods from agriculture (including the reduction in production of "public bads"), and the development of agricultural-rooted "non-conventional" agricultural activities (diversification). Policy, particularly the CAP, has been a major driver of such developments. However, the marketing strategy based on certified, high quality, environmental and socially friendly, traditional local products has also played an important role in this direction.

The future is characterised by high uncertainty, though some major trends seem to maintain their relevance, such as: farm structural change and the concentration of land in a smaller number of farms, price volatility, concentration of agricultural activities in the most productive rural areas, and attention to environmental and food quality.

In such a context, dichotomies between production-oriented and multifunctionality-oriented farms seem to remain and indeed be strengthened. The same contrasting attitude seems to increase in the contraposition between areas of specialised agriculture and areas of low income, high natural value agriculture.

A key issue concerns the market sustainability of the multifunctional roles of agriculture. In most cases such roles

will remain highly policy dependent. As a consequence, a high attention needs to be paid to key emerging policy design issues, particularly concerning cross-compliance, coordination between first and second pillar of the CAP, and coordination between agricultural and other policies.

This is embedded in the wider issue of rural development and its profound diversification across the different areas of Italy.

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AGRICULTURE IN THE NETHERLANDS: ITS RECENT PAST, CURRENT STATE AND PERSPECTIVES

C. Martijn van der Heide[a,1], Huib J. Silvis[a] and Wim J.M. Heijman[b]

[a] *LEI Wageningen UR, P.O Box 29703, 2502 LS The Hague, The Netherlands.*
[b] *Economics of Consumers and Households, and special chair of Regional Economics, Wageningen University, P.O. Box 8130, 6700 EW Wageningen, The Netherlands.*

Abstract: The driving forces that determine the prospects of the agricultural sector are dominated by international and European developments related to the demand for and supply of products. In this context, European policy, (such as the CAP), and national policy (e.g. nature management) can greatly influence the development of the agricultural sector. A further reduction of the support by the government forms an important element in the expected future developments.

Key words: Dutch agriculture, current state and perspectives of agriculture

1. Introduction

Although their shares in the national economy has declined steadily, agriculture and its allied sectors are still important in the Netherlands. The so-called agro-complex, which covers all the economic activities in production, processing and distribution of agricultural products (food and non-food), equated to 9.6% of the total national added value (i.e. 47.9 billion Euro) in 2007. Moreover, it offers employment to over 600,000 jobs, which equals almost 10% of national employment *(Table 1)*. A Porter analysis of the competitiveness of the Netherlands in 2003 showed that of the one hundred most competitive flows of goods in the Netherlands, about half came from the agriculture and food cluster. It is therefore not without a reason that the Innovation Platform, appointed and chaired by Prime Minister Balkenende, designated flowers and food as the first key area of the Dutch economy (Ministry of LNV, 2005).

Dutch agriculture has become dependent on foreign countries for the import of raw materials and for the export of agricultural products and commodities. As such, the agricultural sector is greatly influenced by the global economy. As *Silvis and Leenstra* (2009) show, the proportion of agricultural products and food in total Dutch exports of goods services is fairly high (17%). Every year, the agricultural sector generates an extensive positive export balance of over €20 billion (€23 billion in 2007). In total, about 70% of the economic significance of the agricultural complex relates to exports, the majority of which (about 80%) are destined for other EU member states. Germany and the United Kingdom are the largest buyers of Dutch agricultural products (Ministry of LNV, 2009). After the United States and France, the Netherlands is the third largest exporter of agricultural products. In combination, ornamental products, meat dairy products and vegetables account for almost 75% of the net exports (*Silvis and De Bont,* 2005).

This article provides an overview of the recent past, the current state and the perspectives of the Dutch agricultural sector. It draws heavily on the work of the LEI (Agricultural Economics

Table 1. Economic significance of the Dutch agro-complex

	Added value (× 1,000 million euros)			Employment (× 1,000 annual labour units)		
	1995	**2001**	**2007**	**1995**	**2001**	**2007**
* Agro-complex (total)	32.4	40.5	47.9	659	717	672
Share of national total (%)	12.0	10.2	9.6	11.6	10.8	9.9
* Agro-complex on basis of domestic agricultural raw materials	20.2	21.5	25.6	430	416	390
Primary production	8.4	7.6	8.0	189	184	169
Processing	3.0	3.2	4.4	54	50	42
Supply	6.5	8.1	9.9	135	137	130
Distribution	2.3	2.6	3.2	53	45	50
* Processing, supply and distribution of foreign agricultural raw materials	10.9	15.3	18.3	190	226	218
* Agricultural services, gardening businesses and forestry	1.3	3.7	4.0	39	75	64

Source: LEI Wageningen UR

[1] Corresponding author. Tel.: +31-70-3358218; fax: +31-70-3358196. E-mail address: martijn.vanderheide@wur.nl (C.M. van der Heide).

Research Institute), which forms part of Wageningen University and Research Centre. The article utilizes a descriptive analytical approach, supported by historical and current data. Its structure is simply based on the second part of its title. That is, section 2 deals with the Dutch agriculture in the recent past (1900-2000). In this section, we pay also some attention to the introduction of the European Common Agricultural Policy (CAP), because this policy formed and still forms the context of today's agricultural reality. Then, section 3 focuses on the current state of the agricultural sector, but will also discuss some Dutch policy issues of topical interest. Section 4 concludes and presents a future outlook by describing the perspectives for agriculture in the Netherlands.

2. Dutch agriculture in the recent past

For centuries, Dutch agriculture has performed many functions in the economy, and has played many roles in society and in caring for the land. Moreover, it has dominated the landscape and the environment in rural areas, as farmers cleared forests to create fields, built houses and outbuildings, laid out gardens, and cultivated the land for agricultural purposes. This section sketches the history of Dutch agriculture. Sub-section 2.1 serves as a sort of preamble and describes succinctly the situation until 1950. Sub-section 2.2 continues with the agricultural developments in the second half of the 20th century.

2.1 1900 – 1950[2]

In the beginning of the last century, agriculture in the Netherlands was concentrated on small-scale mixed farms, with some cows, and some other farm animals, such as pigs for meat and horses as beasts of burden. Arable land and grassland plots were quite small and primarily used to produce fodder for the animals on the farm. The rest of the production was traded on local weekly or monthly markets or used for consumption by the farmers themselves. In general, and probably in line with the daily struggles of farmers in other countries, Dutch farmers worked a hard living, especially from the nutrient-poor sandy soils. Many people earned their livelihood from agriculture; around 1900 there were approximately 2.8 million workers in agriculture.

But then, at the beginning of the 20th century, the situation for farmers became more favourable and rosier. As shown by *van den Ban and Bauwens* (1988, pp. 215–216), "a process of change started on the sandy soils towards a type of agriculture where farmers got their income from the sale of animal products and produced arable crops to feed their animals." This process was accelerated with the introduction of fertilizer, which made it possible not only to increase yields and to overcome the problems of shortage of manure, but also to change heathland into arable land and pastures. But also the development of efficient systems for input supply, processing, marketing and credit, largely by co-operatives, had a significant impact on the traditional livelihood of small farmers, especially in the regions with poor sandy soils.

The economic crisis of the 1930s and the food shortages during and after the Second World War forced European governments to intervene intensively in the agricultural sector. This intervention varied greatly from one country to another (see *Tracy,* 1989). The Dutch government policy was aimed at the recovery of the national economy and increasing industrial production and capital investment. In order to increase the purchasing power of the population, the prices of food and other essential items were kept artificially low. The increase of agricultural production was achieved by making farm labour more effective through a more general use and deployment of machines and through yielding more harvest from both the soil and the animals. Increase of the yield was achieved by, *inter alia*, using artificial fertilizer, pesticides and herbicides, and high-energy fodder. Also land consolidation policies – which tried to reduce the number of parcels, to improve their shape and their location in relation to farm buildings, roads and villages – were seen as important in boosting food production. In fact, land consolidation became a central part of the structural policies for agriculture (*van den Noort,* 1987).

2.2 1950 – 2000

European Integration started on 9 May 1950 with the Schuman Declaration that proposed the establishment of a European Coal and Steel Community. Also agriculture had to become involved in European and international integration processes, because agriculture was and is an important part of the economy. The Treaty of Rome, signed in 1957, was the founding treaty of the European Economic Community (EEC), which later became the European Union (EU). This treaty laid down the initial provisions for the economic community, including the development of the internal market and the common agricultural policy (CAP). In fact, a separate chapter of the EEC Treaty stipulated in its first article that agriculture and trade in agricultural products should be part of the common market (article 38 of the EEC Treaty; currently article 32 of the EU Treaty).[3] Due to the agricultural policies already in force in all member states, this internal liberalization was conditional on the creation of a common agricultural policy as a substitute. The greatest contribution made by European agriculture commissioner Mansholt and his collaborators was to ensure that, despite the inherent difficulties, the chapter on the common agricultural policy did take shape. In consequence, agriculture therefore

2 For a good and accessible overview of the Dutch agriculture until 1950, see Bieleman (2006).

3 The common market refers here to a free trade area with common policies on product regulation, and freedom of movement of the factors of production (capital and labour) and of enterprise.

became a frontrunner rather than an obstacle to the integration process in Europe.

If we look at the Dutch situation more deeply, then it appeared that after the Second World War agriculture was in a process of transformation. New technological developments as well as improved education and better accessibility resulted in a flourishing rural economy. Moreover, the Dutch agriculture changed from a labour intensive mixed farming system, characterised by a diversification of agricultural production, into a highly specialized intensive farming system with high inputs of capital and labour. The new system was totally designed to maximize the production of pigs, cows and poultry. The process of intensification and modernization of the Dutch agriculture started around 1960 creating a type of farm that in academic circles became known as footloose agricultural farms.

The creation of this 'new' type of farm coincides with the expansion of dairy farming in the Netherlands, which – according to the Dutch dairy board (www.prodzuivel.nl) – gained momentum after 1960. Indeed, dairy production, which is one of the most important production sectors in Dutch agriculture, grew enormously since the 1960s. Although the number of dairy farms decreased dramatically, the milk production per hour and per hectare showed a strong increase in particular until 1985 (the European Community introduced a milk quota system in 1984 to control milk production). As a result, from the 1960s onwards, the Netherlands have become a major exporter of dairy products, selling about 60 percent of domestic milk production abroad.

Table 2. Development in dairy farming in the Netherlands (1960–2000)

Period	Land / farm (ha)	Yield / cow (kg)	Cows / farm (#)	New technological input
1961-1965	14	4,120	18	* Wide-scale introduction of milking machines
				* Artificial insemination
1966-1970	16	4,350	22	* Higher fertilizer use on grassland
				* Specialisation in dairy
1971-1975	20	4,875	34	* Milk cooling tank
				* From hay to grass-silage
				* Loose housing system with cubicles
1976-1980	22	5,340	48	* Maize feeding
				* Higher concentrate feeding
1981-1985	25	5,700	54	* Cow identification for individual feeding
				* Wide-scale use USA Holstein-Friesian blood
1986-1990	29	6,575	49	* Embryo transplantation
1991-1995	31	6,975	51	* Environmental protection (e.g. manure injection)
1996-2000	35	7,525	55	* Introduction milking robot

Source: *van Horne and Prins,* 2002, p. 9.

In the period between the 1930s and 2000, the Dutch population doubled, but milk production almost tripled.

These developments should be seen against the background of changes in the economic environment, institutions and market conditions. *Van Horne and Prins* (2002) show that especially technological change has led to a spectacular increase in the total production of milk *(see Table 2)*.

To summarise *Table 2*, the period 1960–1980 can be characterised by a fast growing production of milk per farm. This was accompanied by a strong growth in labour productivity. These developments were largely due to a number of changes in production technology, which were stimulated by the agricultural policy of the Dutch government and afterwards by the agricultural policies of the European Community. As a result, during the 1970s milk production in the European Community increased very quickly. The self-sufficiency grew well over 100%. There were few opportunities to export milk products to destinations outside Europe and these were supported by high export subsidies. In those days, stocks of milk powder and butter became 'mountains'.

In 1984, the European Community imposed a quota on the production of milk to stop surplus production. Due to this milk quota, it became impossible to increase the production of milk any further. In addition, the focus of society became more directed at the quality of the environment. New legislation came into force to protect the environment and to reduce pollution. For the dairy sector, legislation aimed at reducing air and water pollution was particularly important. Dairy farms have to satisfy the criteria for environmental licences, entailing costs in the form of specific investments required to adapt the concern, for example to be able to store enough manure in the right way and to apply it properly to the land. These regulations are also increasingly influenced by European policy. In addition more farmers try to distinguish themselves in the market by sustainable production (organic or ecological products) and thus in some cases obtaining higher prices for their products. From the above, it can be concluded that the development in the dairy sector during the last two decades of the 20th century differed in many respects from that of the period 1950–1980. This conclusion is not restricted to the dairy sector, but applies generally to the whole primary agriculture.

If we compare the importance of the agricultural sector in the second half of the 20th century with that of today, then we see that during 1970, agriculture was a more important sector in the Dutch economy than it is nowadays *(see Table 3)*.

Table 3. Share of agro-complex in the Dutch economy, 1970–2007 (in%)

	Agro-complex (total)		Primary sector	
	Value added	Employment	Value added	Employment
1970	15.3	16.4	5.8	6.4
2007	9.6	9.9	1.6	2.5

The fall in the share of primary agriculture within the Dutch economy was until about 1990 primarily a matter of prices that were becoming unfavourable. Later, the growth in

production volume was also lagging behind, particularly as a result of environmental measures that were gradually being tightened and changed in the agricultural policy of the European Union. In the next section, we will see how these measures and policies have influenced and shaped today's agriculture and food production systems.

3. The current state of the Dutch agriculture

3.1 Current position of the agricultural sector in the Netherlands

Today, primary agriculture and horticulture still account for about two third of the land use in the Netherlands. The area of cultivated land in the Netherlands is approximately 1,930,000 hectares, of which some 53% is classified as grassland and 42% as arable land, while 3% is cultivated for vegetables and fruit and 2% for flowers, ornamentals and seeds.

The number of farms is declining quite rapidly – during the past 25 years, the number of farms decreased by an average of 2.3% per annum (see Table 4). In 1950, there were some 410,000 farms in the Netherlands, while by 2008 the number had decreased to less then 80,000. The total area under cultivation has decreased by only 16% over that same period, so the average farm is much larger today and increases in scale are an important trend. The bigger farms account for a continually larger share of production. At the same time, however, there are still many smaller farms, including part-timers, and farms which are broadening their scope. There is therefore a dual development with the most production and income generation among the big farms. Sustainability is a topical issue, but after rapid improvements until around 2000, further gains in environmental performance are more difficult to achieve (*Silvis and Leenstra,* 2009).

Table 4. Agricultural holdings by the five major types (1985–2008)

	1985	1990	1995	2000	2005	2008
Grassland base livestock	63,381	58,326	54,613	47,075	41,098	38,883
Horticulture	18,907	17,975	15,889	13,281	10,239	8,542
Arable crops	17,560	16,265	14,663	13,749	12,358	11,175
Pigs and poultry	12,756	11,807	10,414	8,382	6,083	5,545
Mixed	17,542	14,778	11,873	9,850	7,532	6,679

Source: LEI Statistics (see www.lei.wur.nl/UK/statistics/)

Let us take a closer look at the three most important agricultural sectors in the Netherlands: the dairy sector, arable farming and horticulture. If we start with the dairy sector then reality dictates that a lot of dairy farmers see further increases in scale as the best way of continuing to operate on a profitable basis even though the price paid for milk is falling (hard). As the Ministry of LNV (2005) shows, in 1980 the Netherlands had almost 50,000 dairy farmers, each with an average of 40 to 50 cows. Currently, there is only half that number, with an average of more than 60 cows. If the trend continues, then there will be about 14,000 dairy farms in 2015 with an average of 80 cows. However, size is not the only significant factor: given the enormous differences in cost price between comparable holdings, many farmers could make their operation more profitable by means of better management. Moreover, not all the farmers want to increase the size of the farm in order to be able to produce world for world market prices. A growing number of farmers is succeeding in finding new sources of income, either at the farm or elsewhere (multifunctional agriculture or diversification). They can provide services for specific target groups in the form of access to nature and nature management running a campsite, care (including childcare), cheese making and farm shops.[4] As a result, small regional supply chains are being set up to provide special high-quality products for niche markets.

In 2008, the Netherlands had about 11,000 arable farms, which employed more than 24,000 people. The predominant arable crops are cereals (especially wheat), fodder crops, sugar beets, table potatoes and legumes. The total area under arable crops is 812,812 ha. Most arable crops are frequently found on sandy soils and therefore it is not surprising that the province of *Noord-Brabant* (in the south) and the provinces of *Gelderland* and *Overijssel* (in the east) have the most arable farms. In recent years, rapeseed is being grown in the northern provinces and its oil is processed to fuel for cars and ships. Dutch arable farms are relatively small in area. Because the price of land is high, the process of scaling up is slower than in other European countries. In the past, this was compensated for by intensive farming practices but environmental requirements sets limit to further intensification.

In terms of production and export value, the horticulture sector is by far the most important sector in Dutch agriculture. Its export value in 2003 was 6.5 Billion euro's. Horticulture includes both the production of ornamentals and of edible crops. The first group – ornamental flowers and plants – is the largest. Dutch producers account for 70% of the total European Union export of ornamentals and 93% of the total export of flower bulbs. The largest bulb buyers are the United States, Germany and Japan. Germany, the United Kingdom and France are the largest buyers of Dutch flowers and plants. The second group of horticultural products consists of edible crops. Nearly a quarter of European vegetable exports

[4] However, not only livestock farms but also (and in particular) arable farms are involved in diversification activities. According to the Ministry of LNV (2005), in 2003 almost 40% of primary agricultural holdings were engaged in such activities. For example, half of the dairy farms are active in nature management. However, as recently shown by Heringa (2009) the economic significance of diversification is rather small especially when compared to the economic value of primary agriculture.

originate from the Netherlands, with Germany and the United Kingdom as the largest buyers. In fact, the Netherlands accounts for more than a third of the total European export of fresh vegetables, particularly mushrooms, tomatoes, lettuce, cucumbers, cauliflower and bell peppers. The Netherlands exports about 540 million kilograms of tomatoes (333 million kg of tomatoes-on-the-vine). The main markets for Dutch tomatoes are Germany and the United Kingdom.

Much of the horticulture is practised under glass (in glasshouses). About a quarter of all the glasshouses in the world are located in the Netherlands, and between 75 and 80% of Dutch glasshouse products is exported. In 2008, more than 60.000 people work in the glasshouse production sector. The oldest glasshouse areas in the Netherlands are the *Westland area* (bordered by the cities of Rotterdam, Delft and The Hague) and the area around Aalsmeer (south of Amsterdam).

3.2 Agriculture, nature and food quality in 2009[5]

The policy of the Dutch Ministry of Agriculture, Nature and Food Quality for 2009 is focused largely on sustainability. The Ministry has defined three core areas: the green economy; food and consumer; nature, landscape, vegetation and a vital countryside. The attention devoted to sustainability is manifested in forms such as the measures for sustainability in greenhouse horticulture, for animal friendly stall systems, and for low-energy and selective fishing methods. The Ministry of Agriculture, Nature and Food Quality is coordinating the bio-based economy theme of the Government's *Clean and Efficient* Programme. The bio-based economy theme includes a review of bio-refinery technology suitable for the optimum utilisation of all parts of plants, in particular the non-edible parts. The Ministry of Agriculture, Nature and Food Quality's *Food and Consumer* policy memorandum will contain a detailed specification of the objective of the food policy in which a 'conscious choice' will be assigned a prominent place. The Ministry intends to ensure that consumers are offered an opportunity to make conscious and sustainable choices when buying food. The nature and landscape policy devotes a great deal of attention to the *Landscape Agenda* and to the designation of the 162 Natura 2000 regions in the Netherlands.

The Ministry of Agriculture, Nature and Food Quality introduced an additional package of incentive measures in April 2009 as part of the *Working on the Future* policy agreement of the Dutch Cabinet. This agreement includes an envelope of 50 million euros for a sustainable agricultural sector. The Minister of Agriculture, Nature and Food Quality intends to use these investments to provide incentives for the economy and to make a contribution to the Government's sustainability targets. In 2009 and 2010, twenty million euros will be allocated to the acceleration of the development of and investments in sustainable stalls: an equal amount will be allocated to the development of combined air-scrubbers for the poultry sector. In addition to these two major measures, the Ministry of Agriculture, Nature and Food Quality is also investing in measures such as the plans for an international algae research centre. The Ministry has also allocated 5 million euros to the clearance of horticulture greenhouses distributed throughout the Netherlands.

3.3 Financial and economic crisis

In 2009, the primary agricultural sector was confronted with a sharp fall in income for the second consecutive year. Although the volume of the sector's production increased by almost 3% in 2009, the price of the products fell by almost 9%. As a result, the entire sector's production value fell by more than 6% to almost 22.5 thousand million euros (including agricultural services) in 2009. The production value of plant products fell by about 4.5%, less than the almost 11% decline in the production value of the livestock farm products. This year's total production value of the horticulture sector is approximately the same as that of the livestock sector (more than 8.5 thousand million euros), while the production value of the arable farm sector – including fodder crops – amounts to more than 2 thousand million euros. The cost of the goods and services purchased by the agricultural and horticultural sector fell by about 4.5% in 2009, primarily due to the approximately 15% lower cost of animal feeds and fertiliser. On balance, the net added value of the sector decreased by more than 15%. The net operating income for the families of the farmers or horticulturalists – after the deduction of interest payments, wages and long-term leases – fell even more sharply, namely by almost 50%. It is striking to note that in 2009 the total amount of the subsidies received by the agricultural sector, primarily comprised of farm payments, is slightly higher than the sector's net income of 800 million euros. When account is taken of the decline in the number of farms and inflation then the purchasing power of the farm family's operating income fell extremely sharply in 2009. In 2008 and 2009, as was the case in the two previous years, the development in the Netherlands' agricultural and horticultural sector incomes is expected to lag behind that in other EU countries (*De Bont* et al., 2009).

4. Conclusions and perspectives for agriculture in the Netherlands

The driving forces that determine the prospects of the agricultural sector are dominated by international and European developments related to the demand for and supply of products. In this context, European policy, (such as the CAP), and national policy (e.g. nature management) can greatly influence the development of the agricultural sector. It is expected that the growth in the world's population will

[5] This sub-section is almost entirely taken from Berkhout and van Bruchem (2009).

decline to around 1% per year over the coming years. However, the global demand for food will be determined more and more by the development of incomes per capita than by the growth in population. For the richer countries a higher income does not mean a greater demand for food. Moreover, due to the continuing individualization the demand for agricultural products is likely to diversify, on the one hand due to increasing immigration and familiarity with other cultures and new possibilities, and on the other hand to the increasing need for variety, perception, convenience, health, quality and image (*Silvis and de Bont,* 2005).

In 2005, the Dutch Minister for Agriculture, Nature and Food Quality published a policy document on the future of the Dutch agricultural sector, titled "The Choice for Agriculture". In this document, the cabinet expresses its faith in the future of the agricultural sector. Favourable prospects are still foreseen for greenhouse and open field horticulture. A further reduction of the support by the government forms an important element in the expected future developments. The policy document sees the setting up of new activities within agricultural holdings – diversification activities – as a possibility for securing the continuity of holdings. In addition, the emphasis is placed on reducing cost prices through increases in scale. According to the document, the entrepreneurs must be given more scope, and the role of the government could be limited. A debate is announced regarding the milk quotas and about the implementation of the income payments. Currently, the payments in the Netherlands are implemented on the basis of a historical reference per farm.

Thus, although the economic significance of the agricultural sector will remain large, it will nevertheless decrease in relative terms. With an average decline of more than 3% per annum, the number of farms will have decreased to fewer than 60,000 by 2015. This is more than 30% below the almost 84 ,000 farms in 2004. But not only the number of farms will dwindle down, also the acreage of agricultural land will continue to decline in the coming years, although the great majority of this land will continue to be used for agricultural purposes. As a result of urbanisation, this decline will be more marked in the west of the Netherlands and the south and east of the country than it will in the north. The horticulture sector will be able to retain its position in the west of the Netherlands. The acreage of arable land will decrease in the north of the Netherlands, since relatively large amounts of the contracting starch potato and sugar beet crops are cultivated in this region. The land no longer required for these crops will be taken over by dairy farms. When expressed in terms of the number of cows, the decline in dairy farming is most pronounced in the provinces in the west of the Netherlands. As a result, the share of the other provinces, in particular those in the north of the Netherlands, is increasing. No major shifts are forecast in the location of the intensive livestock farming complex; these farms are concentrated in the south, middle and east of the Netherlands, and this will continue to be the case (*Silvis and De Bont,* 2005).

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FUTURE ROLE OF AGRICULTURE IN MULTIFUNCTIONAL DEVELOPMENT OF RURAL AREAS

Prof. Henryk Runowski, Ph.D., Prof. Wojciech Zietara, Ph.D.

Warsaw University of Life Sciences

Abstract: In the paper the changes in agriculture in terms of falling share of agriculture in gross domestic product and decrease in the share of persons employed in agriculture in total employment in Poland and selected countries are discussed. The main driver of these changes is a faster pace of development of non-agricultural activities and continually deteriorating relations between the costs of production factors and prices of agricultural products. The rate of growth in labor costs and prices of the means of production for agriculture is much faster than the rate of increase in prices of agricultural products. This causes the decline in profitability of agricultural production which increases the size of farms. The pace is dependent on the level of economic development of the country. The study also identified trends in the structure of farms, functions and systems of agriculture in the generational perspective. The polarization of the farms will deepen. A strong group of commodity farms and a group of so-called self – subsistence social farms will emerge. Agriculture in Poland will have a dual nature. In addition to the production function and social services agriculture will expand the scope of service functions for the environment and society.

Key words: Polish agriculture, technical progress, multifunctional development

Introduction

Agriculture is one of the key sectors of national economy in determining the level of nutrition of the population and food security of the country. Its role and functions are changing along with economic development and social expectations. The shape of changes in farming conditions is determined by economic, legal, environmental, technological, international, institutional, demographic and socio-cultural conditions. Each of these areas, both individually and in conjunction with the other, sets the direction and the logic of transformation in agriculture.

This article aims to attempt to assess the current state of Polish agriculture and to delimit the anticipated changes, in response to the challenges arising from the principles of multifunctionality and sustainable development. The paper will discuss the following issues: a place of agriculture in national economy, the economic drivers of change in agriculture, trends of changes in the level and the relationship between factors of production, trends of organizational changes in agriculture and its functions in the coming years 2020–2025.

Place of agriculture in national economy

The basic indicators for assessing the significance of agriculture include: the share of agriculture in gross domestic

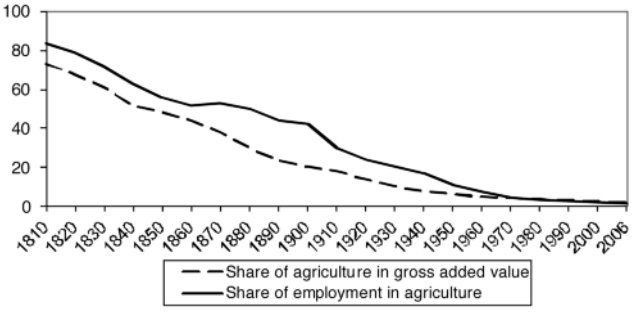

Figure 1. The trend of changes in the share of agriculture in the structure of manufacturing gross domestic product and total employment in the U.S.
Source: Tomczak F.: Od rolnictwa do agrobiznesu. Wyd. SGH. Warszawa 2004. [From Agriculture to Agro-business]

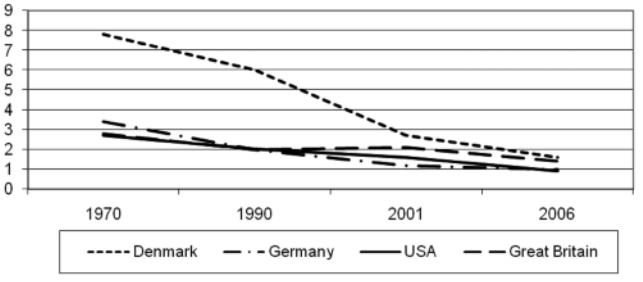

Figure 2. The trend of changes in the share of agriculture in gross value added structure in selected countries
Source: Rocznik Statystyczny Rolnictwa i Obszarów Wiejskich. GUS. Warszawa 2006. Roczniki Statystyczne GUS. Warszawa 1996–2007. [Statistical Yearbook of Agriculture and Rural Areas]

product or value added and share of agricultural employment in total employment. Model example for changes in agriculture involves the United States *(Fig. 1)*. In 1810–2006 the share of employed in agriculture and the share of agriculture in GDP fell from around 84% in 1810 and 73% to about 1% in 2006. Similar trends have occurred in European countries (eg Denmark, Germany, United Kingdom). The trend in values of the share of agriculture in gross added value in these countries in 1970–2006 are shown in *Figure 2*.

Figure 2 shows that in 1970-2006 in the analyzed countries, the agricultural gross value added showed a downward trend. The pace of decline in Britain and Germany was similar to those in the U.S. In 2006, the share of agriculture in gross value added in these countries was around 1%. By contrast, in Denmark, this share was higher and in 2006 it was 1.6%. Similar trends occurred in the analyzed countries in terms of employment *(Figure 3)*.

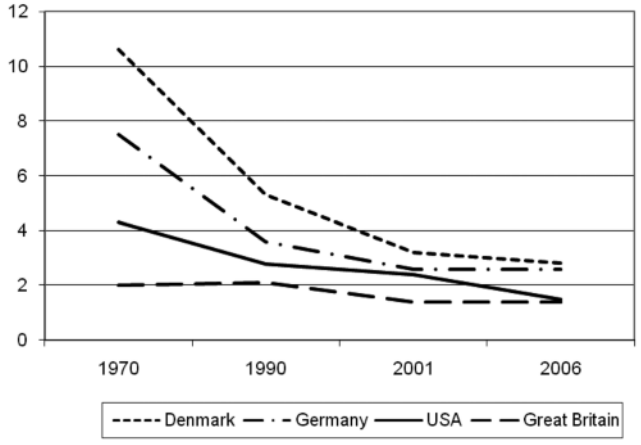

Figure 3. The trend of changes in the share of agriculture in the structure of employment in selected countries
Source: Rocznik Statystyczny Rolnictwa i Obszarów Wiejskich. GUS. Warszawa 2006. Roczniki Statystyczne GUS. Warszawa 1996–2007. [Statistical Yearbook of Agriculture and Rural Areas]

Figure 3 shows that the level and rate of decline in agricultural employment in the UK and the U.S. were similar. In 2006, the share of agricultural employment in total employment was 1.4%. In Denmark and Germany, this share was higher and amounted to respectively 2.8% and 2.6%.

Figure 4 presents the trends of the share of agriculture in employment and gross value added in Poland in 1950–2006. In this period the share of workers employed in agriculture declined from 50% in 1950 to 16.2% in 2006. The reduction was significant, but still the share of employed in Polish agriculture compared to previously analyzed developed countries of Western Europe was very high. Strong downward trends occurred in the share of agriculture in gross value added. In 1950 this share was 30% while in 2006 only 3.7%. The high share of agriculture in gross value added and total employment in Poland in 1950 was typical of a agriculture oriented country. Present trends in this area in Poland are similar to those in Western Europe, however, shifted in time by about 50 years. A similar share of agricultural employment which now occurs in Poland occurred in those countries in the postwar period of 1950 to 1960.

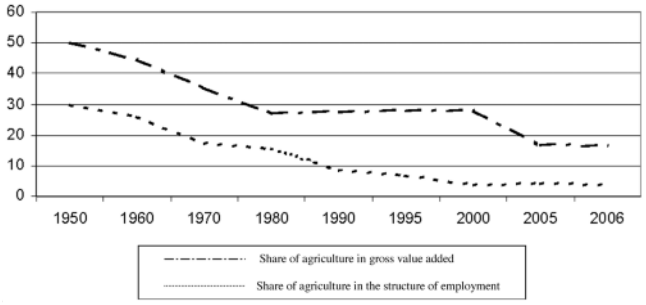

Figure 4. The trend of changes in the share of agriculture in the structure of employment and gross value added in Poland
Source: Rocznik Statystyczny Rolnictwa i Obszarów Wiejskich. GUS. Warszawa 2006. Roczniki Statystyczne GUS. Warszawa 1996–2007. [Statistical Yearbook of Agriculture and Rural Areas]

Despite the decline of the formal share of agriculture in gross value added it is a very important part of the economy and, above all, is the basis for the functioning and development of agricultural processing sector. Furthermore, it is the predominant element in the rural economy [*Wilkin* 2008].

Economic factors of changes in the Polish agriculture

The transformation of agriculture in recent decades in Poland was influenced by changes in the prices of production factors and prices of agricultural products *(Figure 5)*. The highest growth rate in this period involved labor costs showing particularly high growth in non-agricultural branches and slightly lower prices of goods purchased by farmers. However, the increase was much lower in prices of agricultural products sold by farmers. Indicator of price

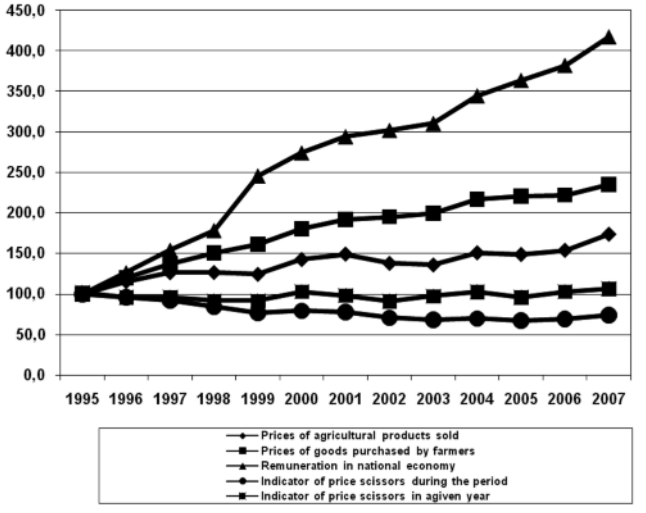

Figure 5. Changes in the prices of production factors and agricultural products in Poland in 1995–2007
Source: Analiza produkcyjno-ekonomicznej sytuacji rolnictwa i gospodarki żywnościowej w latach 1996, 2000, 2005, 2007, 2008. IERiGŻ – PIB. Warszawa. [Analysis of Production-Economic Condition of Agriculture and Food Economy in 1996, 2000, 2005, 2007, 2008.]

scissors in each year averaged to about 100%. In 1998–2000 and 2002–2003, it was below 100% while in other years it exceeded 100%. In 2007, the exceptionally favorable to agriculture, it amounted to 106.5%. Indicator of price scissors in the entire analyzed period was definitely detrimental to agriculture and in 2007 was about 75% taking 1995 = 100%. This means that labor costs and prices of agricultural production grew much faster (25%) than the sale prices of agricultural products.ű

Present trends are characteristic of all market economy countries, with the timeless nature of regularity. They cause fall in unit profitability of agricultural production. Farmers wishing to achieve the income from their farms at least at the parity level (similar to the salaries of workers in non-agricultural departments) must increase the scale of production and implement the technological progress in its broad sense. This objective can be achieved mainly by increasing the size of farms.

In 1990, the Polish farmer's income at the parity level could be obtained from a farm of 10 ha of utilized agricultural area (UAA). In the next two years, the area had risen to over 15 ha. In 1995–2001 parity farm size ranged from 20 to 50 ha [*Ziętara* 2000, 2003]. The results of the farm accountancy in FADN system indicate that the minimum area of a farm parity in 2005 was included in the range of 20–30 ha, depending on the region. [Agriculture-FADN in 2008]. The results given correspond to the results of W. Józwiak, who shows that in 2004–2006 the volume of farm parity was about 35 ha, which corresponded to the economic size of holdings range from 16 to 40 ESU[1] [*Józwiak,* 2008]. Generally it can be concluded that the area of farm parity is still growing. In the next few years it is likely to reach a size of 50 ha of UAA.

Changes in production factors

Evaluation of the basic resource of the Polish agriculture, which is the land, was made by reference to selected countries in Western Europe. It concerns changes in the utilized agricultural area in total and per one inhabitant in 1990–2006. In all countries there is a decline in the UAA in this period, in average by 5%. In Poland, the decrease in surface area was considerably higher and amounted to 15%. UAA in this period declined from 18.7 million hectares to 15.9 million ha. Surface reduction was mainly caused by the exclusion from agricultural use of low quality land [Central Statistical Office (GUS) Statistical Yearbooks 1966–2007].

In terms of UAA per 1 citizen in 2005, Poland had a similar potential as Denmark and France (about 0.5 hectares per capita), but definitely higher than the United Kingdom and Germany, where these rates were respectively 0.28 and 0 21 ha [CSO Statistical Yearbooks from 1966 to 2007].

The decrease of farmland per 1 inhabitant is a constant trend in all countries.

Polish agriculture is characterized by an unfavorable structure of the area. This is proved by the low average farm size, which in 2005 was only 6.4 ha [CSO Statistical Yearbooks from 1966 to 2007]. In the countries compared, the average household size was 6 (France, Germany) to 9 times higher (Denmark, United Kingdom). Other indicators characterizing the structure of the farm area are: the share of holdings of 5 ha and over 50 ha. The relevant data have been presented in Table 1. In Poland, in 2005 the share of farms with an area of 5 ha was 57.4% while in Denmark 4%. In Germany and France it is contained in the range of 23–28% while the UK it was 37%. Despite a significant share of small farms in the UK, over 65% of arable land is in use of farms of

Table 1. Number of farms of the area exceeding 1 ha in Poland in the period 2002-2007 and in selected countries in 2005 (in thousands).

Year	Total	Farm size clusters			
		1–5	**5–20**	**20–50**	**>50**
2002	Number 1,951.7 % 100	1,146.3 58.7	692.8 35.5	95.5 4.9	17.1 0.9
2005	Number 1,782.3 % 100.0	1,031.9 57.9	632.9 35.5	98.7 5.5	18.8 1.1
2007	Number 1,804.1 % 100.0	1,036.5 57.4	643.8 35.7	102.3 5.7	21.5 1.2
Selected countries in 2005					
Denmark	Number 49.0 % 100	2.0 4.1	19.0 38.8	12.0 24.4	16.0 32.7
France	Number 567.0 % 100	148.0 26.1	110.0 19.4	109.0 19.2	200.0 35.3
Germany	Number 390.0 % 100	88.0 22.6	129.0 33.1	88.0 22.6	85.0 21.8
Great Britain	Number 287.0 % 100	107.0 37.3	59.0 20.5	47.0 16.4	74.0 25.8

Source: Charakterystyka gospodarstw rolnych w 2005 r. GUS. Warszawa 2006. Charakterystyka gospodarstw rolnych w 2007 r. GUS. Warszawa 2008 Rocznik Statystyczny Rolnictwa i Obszarów Wiejskich. GUS. Warszawa 2006. Systematyka i charakterystyka gospodarstw rolnych. Powszechny Spis Rolny 2002. GUS. Warszawa 2003. [Characteristic Features of Agricultural Farms. Statistical Yearbook of Agriculture and Rural Areas. Systematics and Characteristics of Agricultural Farms: Public Agricultural Inventory]

[1] ESU (European Size Unit) is a measure of economic size of farm. One ESU corresponds to the equivalent of the EURO 1200 standard gross margin.

Table 2. Forecasted changes in the structure of farms in the period 2007–2030

Specification	Farm holdings (thousands)					
	2007		2020		2030	
	Number	%	Number	%	Number	%
Over 1 ha in this (ha):	1804.1	100.0	1468.5	100.0	1258.5	100.0
1–5	1036.5	57.5	787.0	53.6	591.5	47.0
5–20	643.8	36.5	523.0	35.6	447.5	35.5
20–50	102.3	5.7	120.0	8.2	146.2	11.6
50–100	15.6	0.9	29.0	1.9	56.0	4.5
100–300	4.9	0.3	8.8	0.6	16.2	1.3
300–500	0.6	0.0	0.4	0.1	0.6	0.1
500–000	0.3	0.0	0.2	0.0	0.3	0.0
1000 and more	0.1	0.0	0.1	0.0	0.2	0.0
Average area of individual farms exceeding 1 ha	7.8		9.2		10.7	
Other private forms	3.0		3.0		3.0	
In this cooperative farms	0.9		0.7		0.5	
State owned sector	1.0		0.7		0.5	
Total farms over 1 ha	1808.1		1472.2		1262.5	

Source: Charakterystyka gospodarstw rolnych w 2007 r. GUS. Warszawa 2008 [Characteristics of Agricultural Farms. Yearbook]

over 100 ha [*Steffen* 2004]. For this reason, the average size of farms is high here, i.e. approximately 60 hectares. The share of farms with an area exceeding 50 ha in Poland is extremely low and in 2005 it was 1.1%. And the corresponding rate in the countries surveyed was in the range of 21% (Germany) to 35% (Denmark and France). A highly negative picture of the area structure of farms in Poland as compared to European countries of the highest level of agriculture is mitigated by the analysis of the figures shown in *Table 1*, where are the structure of farms and the change trends in 2002–2007 are given.

The figures shown in Table 1 indicate positive trends. In 2002–2007 the share of farms of the area of 20–50 ha and over 50 ha has increased respectively by 0.8% and 4.4%, while a small decrease in the number and share of holdings in the range of 1–5 ha might be observed. These processes should be assessed positively, although the pace of these changes is slow. However, as concluded by Majewski [2008, p.44] "in the near future stronger demand for agricultural land… and further transfers of land enlarging size of Polish farms and deepening an existing polarization of the farm structure can be forseen". Similar processes occurred in German agriculture [*Reisch* 2004].

The forecast for the next 20–25 years leads to a conclusion that there will be further positive changes in the structure of farms. The relevant numbers have been presented in tables 2 and 3. Still, this structure differs from the currently occurring in the compared countries.

Table 4 contains numbers characteristic for labor resources in Poland and the studied countries in 1996-2006.

There is a fundamental difference between the studied countries and Poland in the number of workers and the share of employed in agriculture in relation to the overall number of employees. A characteristic feature in all analyzed countries was a decline in the number of people employed in agriculture. It was included in the range of 9% (France) to 31% (Poland). High decline in employment in Poland in this period was mainly the result of changes in the employees' in agriculture counting methodology in the Agricultural Census in 2002 [*Systematics,* 2003][2]. Regardless of the change in the methodology of workload counting, the reduction of employment in the Polish agriculture was influenced by the increasing levels of mechanization, and changes in the structure of production. Increase in the proportion of cereals in the crop

Table 3. Forecasted changes in the utilization o f the agricultural area in farm size clusters in the period 2007–2030 (in thousand ha)

Specification	Utilized Agricultural Area					
	2007		2020		2030	
	ha	%	ha	%	ha	%
Over 1 ha in this (ha):	14087.3	100.0	13537.7	100.0	13432.6	100.0
1–5	2603.3	18.5	2217.3	16.4	1964.5	14.6
5–20	6189.1	44.0	5057.1	37.4	4103.5	30.5
20–50	2955.5	21.0	3238.9	23.9	3549.5	26.5
50–100	1044.2	7.4	1524.7	11.3	2064.0	15.4
100–300	757.1	5.3	909.8	6.7	1093.3	8.1
300–500	228.6	1.6	252.4	1.9	277.6	2.1
500–1000	208.9	1.5	237.5	1.7	279.0	2.0
1000 and more	100.6	0.7	100.0	0.7	110.0	0.8
Other private farms	1189.3		1200.0		1200.0	
State owned sector	569.6		315.6		150.0	
Total area over 1 ha	15846.2		15053.3		14782.4	

Source: Charakterystyka gospodarstw rolnych w 2007 r. GUS. Warszawa 2008 Rocznik, own study [Characteristics of Agricultural Farms. Yearbook]

[2] In previous years, resources in agriculture were described by the number of economically-active employees, while in 2002 and next years, the so-called full-time employees were counted, taking into account the working time at a farm

Table 4. Employment in agriculture in Poland and in selected countries of the European Union, in the period 1996–2006 (in thousand and 100 per ha of UAA)

Year	Denmark		France		Germany		Great Britain		Poland	
	Total	Per 100 ha UAA	Total	Per 100 ha UAA	Total	Per 100 ha UAA	Total	Per 100 ha UAA	Total	Per 100 ha UAA
1996	103	3.7	1048	3.5	1076	6.3	512	2.9	3310	17.7
2001	89.9	3.3	971	3.2	942	5.5	391	2.3	2720	15.3
2004	84.6	3.3	994	3.3	832	4.9	356	2.1	2484	15.6
2006	79.4	2.9	953	–	843	4.9	384	–	2300	14.4

Source: Rocznik Statystyczny Rolnictwa i Obszarów Wiejskich. GUS. Warszawa 2006. Roczniki Statystyczne GUS.. Warszawa 1996-2007. [Statistical Yearbook of Agriculture and Rural Areas]

structure, from 60% in 1990 to 73.8% in 2007 [*Characteristics,* 2007], and a reduction in livestock density from 58 LU per 100 ha UAA in 1994 to 49 LU per 100 ha UAA in 2007 [*Characteristics,* 2007].

There were also significant differences between compared countries and Poland in the share of agricultural workers in general employment. In the countries under comparison, this share was in the range of 1.4% (Great Britain) to 4% (France). In Poland this indicator was 22.1% in 1996 and 16.2% in 2006. Very significant differences can also be found in labor resources per 100 ha UAA. In 2006 in the countries under comparison, the labor force ranged from 2 (United Kingdom) to 5 (Germany) persons per 100 ha UAA. In Poland, the rate was 14.4 persons on average. This is on the one hand, a strength of Polish agriculture, on the other hand it is a barrier preventing the increase in the agricultural income. The figures given in *Table 5*, which refer to households with an area of over 1 ha UAA support this statement.

Table 5. Labor force in farm size clusters in the years 2005 and 2007 (thousand of FWU)

Specification		Total	1–5 ha	5–10 ha	10–20 ha	20–50 ha	>50 ha
2005	Total	2 027.1	783.4	551.8	433.3	207.2	51.4
	Per 100 ha UAA	14.9	30.9	20.0	12.9	7.3	2.4
	% labor force	95.3	97.5	96.4	95.3	91.4	67.1
2007	Total	2 047.8	796.8	556.9	426.2	209.3	58.6
	Per 100 ha UAA	14.5	30.6	20.2	12.7	7.4	2.7
	% labor force	95.1	97.5	96.0	94.8	92.0	67.4

Source: Charakterystyka gospodarstw rolnych w 2005 r. GUS. Warszawa 2006. Charakterystyka gospodarstw rolnych w 2007 r. GUS. Warszawa 2008. [Characteristics of Agricultural Farms]

In the smaller farms the labor resources are over two times higher than the country average in comparable countries. The labor force on farms with the area exceeding 50 ha UAA is only similar to the labor force in the compared countries.

The labor potential in agriculture depends largely on quality of labor force, which can be characterized by the education and age of people working in agriculture. In 2007, only 6.6% of farmers held a university degree. The share of farmers with secondary and vocational education was respectively 29.3% and 39.2%. About 25% of farmers had primary complete and incomplete education. In the farms of over 100 ha share of farmers with higher education was about 21% [*Ziętara,* 2009]. It is clear that the level of education of Polish farmers is insufficient as compared to the needs.

The average age of employed in agriculture in 2007 was about 45 years. There is a significant correlation between the area of farms and the age of employees. With the increase in the average age the area decreases.

Characteristic for the agriculture of Poland is a relatively low production intensity level – as an indicator mineral fertilizers in kg NPK/ha can be used *(Table 6)*. This is one of the reasons of lower productivity of land. The average milk yield per cow in the Polish agriculture is also lower compared to other European countries with intensive agriculture.

The above data indicate that the direction of changes in Polish agriculture is similar to that of the comparable Western European countries, but the advancement of these processes is weaker. There is a characteristic time lag. There are many reasons for this. One can mention among them the issues of demographic differences, the level of economic development, and inhibition of natural transformation in agriculture in the first four decades of the postwar period. Under the present conditions, there is a need for new perspectives on the

Table 6. Use of mineral fertilizers in kg NPK/ha and yields from selected production activities

Year		Denmark	France	Germany	Great Britain	Poland
1995/1996 (kg NPK/ha)		160.7	163.5	162.7	126.1	84.5
2002/2003 (kg NPK/ha)		111.3	134.3	152.9	106.1	93.6
Cereals (dt/ha)	1995	62.1	64.6	61.1	68.7	30.2
	2000	62.0	72.4	64.5	71.6	25.3
	2005	62.0	69.8	67.3	72.0	32.3
Sugar beet (dt/ha)	1995	462	668	497	430	346
	2000	565	759	617	525	394
	2005	576	573	602	574	416
Milk litters/cow/year	1995	6657	5517	5424	5703	3231
	2000	7421	5948	6122	6155	3778
	2005	8156	6548	6439	6975	4271

Source: Rocznik Statystyczny Rolnictwa i Obszarów Wiejskich. GUS. Warszawa 2006. [Statistical Yearbook of Agriculture and Rural Areas]

role and functions of agriculture in the context of multifunctionality and sustainability of its development and designation of the directions of changes.

Directions of changes in agriculture in view of generational perspective

Directions of changes in agriculture will be discussed in several areas. These include the strategies of agricultural functioning, use of technological advances, models of agriculture, the functions of agriculture and agricultural production systems.

Strategies of agricultural functioning

In order to survive, Polish agriculture must be equipped with special, durable and defendable types of competitive advantage. Theoretically, these advantages may come from three sources:

- Land and Latour productivity increase,,
- specific skills, which allow to provide the market with distinctive products,
- taking additional non-agricultural activities.

The primary means of achieving competitive advantage is to improve the efficiency of production. Figure 6 shows the key ways to improve efficiency in agriculture

These include improving the economic efficiency and the search by farmers of alternative sources of income [*Runowski,* 2004].

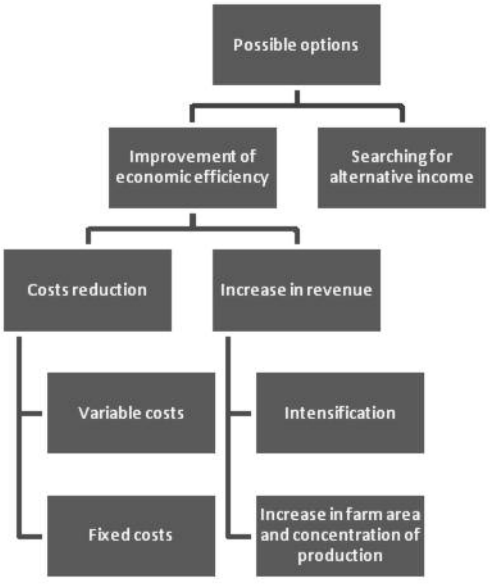

Figure 6. Ways of efficiency improvement in agriculture
Source: Runowski H.: Kierunki rozwoju przedsiębiorstw rolniczych w Polsce. Postępy Nauk Rolniczych, nr 3. Warszawa 2004. [Directions of Development of the Agricultural Holdings in Poland. Advancement in Agricultural Sciences.]

The importance of technical progress in the adjustment process of agriculture

In view of the ever-growing challenges of efficiency in agriculture, the broadly defined technical progress becomes particularly important, as it provides improved efficiency of outlays. Thanks to technological advances, the same quantity of financial outlays causes higher level of production. In the Polish agriculture it is necessary to more widely use various kinds of progress, in this mainly the biological, which is a kind of substitute for substantial investment, and leads to a reduction of costs in agricultural production [*Runowski* 1997].

Evolution of functions of agriculture

In many situations, the chances for increase of farm income from typically agricultural activities are limited. This forces the need to seek other opportunities to improve the economic situation of farming families. Such possibilities result from different instruments of the EU Common Agricultural Policy, or national policies that promote forms of agricultural management more friendly to the environment and animals.

It means that agriculture can and must extend the scope of its existing functions in accordance with the proposals set out in *Figure 7*.

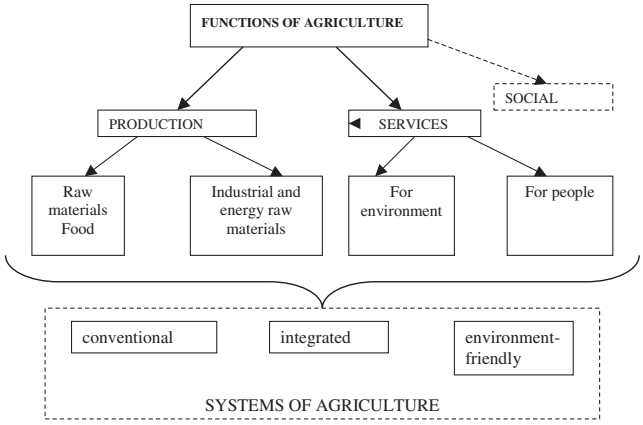

Figure 7. Basic functions of agriculture
Source: Runowski H.: Kierunki rozwoju przedsiębiorstw rolniczych w Polsce. Postępy Nauk Rolniczych, nr 3. Warszawa 2004. [Directions of Development of the Agricultural Holdings in Poland. Advancement in Agricultural Sciences.]

In addition to the production function, there must appear functions of a service nature for the environment, its biodiversity, animal welfare or conservation of traditional plant and animal species as well as services for the public, including, inter alia, tourism [Runowski 2009]. Finally, the social function should be mentioned. It concerns the small farms that produce food products exclusively or in significant advantages for their own needs. Evolution of the proportions of the three functions: manufacturing, service and social services are presented in *Figure 8*.

In addition to the existing feature of the production, the feature of agriculture services for the population and the environment will gain increasing importance. Along with them there will be the social function. This means that future agriculture increasingly will fit into the concept of multifunctionality and development in

rural areas. A typical Polish village in the next few years will continue, however, to be mainly associated with agriculture, but its economic and social landscape will include different, new production and service activities, which are additional sources of income of the farming population.

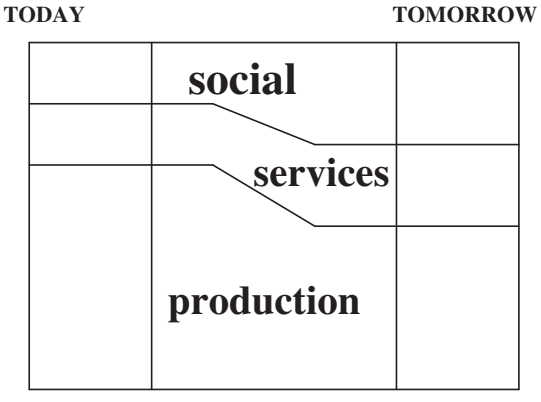

Figure 8. Changes in the proportion of functions of agriculture in time
Source: Own study

Model of the Polish Agriculture

Analyzing trends in changes, an attempt to determine the pattern of development of Polish agriculture was made. This model is affected by many factors, mostly related to globalization and European integration. Despite the external factors, the enormous role is played by permanent concentration processes, which occur in the immediate vicinity of agriculture, mainly in the businesses of trade and agricultural processing. These processes directly lead to an increase in the scale of production on agricultural farms and holdings. They also enforce the increase in quality of agricultural products. Only the production units in agriculture of the adequate scale will be able to meet the demands of trade and agricultural processing [*Ziętara,* 2009]

In our climate zone two extreme organizational models of agriculture can be differentiated *(table 7)*:

- the so-called model of plantation agriculture, characteristic for certain states in the USA, South America and Australia,
- the Western European model of agriculture.

Table 7. Agriculture models in the world

Specification	**PLANTATION**	**WEST EUROPE**
Regions	**USA, South America, Australia**	**Western European countries**
• Features	• Disappearance of traditional farms, mostly family businesses, • Specialized companies in the form of corporations, • Livestock production conducted by industrial methods, • Connections with agricultural processing companies, • Increased burden on the environment, • Low production costs.	•The dominance of family farms, •Smaller scale of production, •Relationships in the form of horizontal integration, •Reduced load on the environment, •Higher production costs

Source: Own study

The plantation model is characterized by the disappearance of traditionally understood family farms. Production of agricultural raw materials is provided by specialized companies having the legal form of equity companies engaged in activities over large spaces. These companies are mostly related by means of capital to the agricultural processing enterprises. Livestock production is carried out industrially on a large scale. This system results in the production of the most significant environmental burden.

Western European model of agriculture is based to a large degree on family farms of smaller production scale, in which more attention is paid to the quality of the environment. There are links between farms in the form of horizontal integration, which increases their bargaining power in relation to the agricultural trade businesses and the relationships of vertical integration nature allowing the farmers to participate in the benefits achieved by the trade and agriculture processing companies.

Taking into account the conditions of our country, one can most likely assume that model of agriculture based on the Western family farms will dominate in the near future *(Table 8)*.

In addition to this form of legal and organizational forms there will also be other legal forms, such as a limited liability company, particularly in the Northern and Western Poland, where until 1990 were dominating state farms. Other forms of companies will also occur in the future, but will not play a decisive role.

Generalizing the previous considerations it can be stated that in Poland in the near, foreseeable future the dual model of agriculture will dominate, which will cover two groups of farms: i.e. the so called social and commodity farms.

Table 8. Models of agriculture for Poland

Domination of the Western European model	Place for large enterprises
Increased role of vertical and horizontal relationships for the farms Polarization: - Significant share of the number of small farms (to 5 ha) - Reduced number of medium farms (5-20 ha) Increased number of large farms (>20 ha)	Increased role of vertical relationships Possible splitting of large holdings into smaller companies – a reaction to the agricultural policy objectives
The growing importance of production to reduce the burden on the environment	
Dual character of development: Commodity farms ↙ ↘ Social farms	

Source: Own study

Systems of agricultural production in Poland

The development of agriculture is associated with changes in management systems. In absolute terms, we can talk about two forms of agriculture: conventional and organic [*Runowski,* 1996; *Majewski,* 2002]. Organic farming produces more good for the environment, and conventional

agriculture more private goods. The existing comparisons of conventional and organic agriculture in the context of sustainable development focus on organic indicators, often without any evaluation of other performance indicators. To assess the relative sustainability of agricultural systems, one must consider their cumulative effectiveness. On the basis of information held, it can be concluded that both organic and conventional agriculture the production and organic capabilities are not yet fully exploited, which means that in both these systems, there are also reserves of efficiency. One could make more environmental goods and private goods in both of them [*Alvensleben,* 2000; *Majewski,* 2008]. Possible efficiencies in organic agriculture is and will be constrained by the strict guidelines established for certified crop farming and animal husbandry. In particular, a total ban on the use of agricultural fertilizers and chemical pesticides may interfere with achieving the improvement of management efficiency and thus reduce their ability to pursue environmental objectives in the long term [*Runowski,* 2004]. Many studies show that consumers are not willing to accept significantly larger differences in prices between organic and conventional products, and in addition accepted differences in the prices of those products have recently been declining [*Bruhn,* 2001]. Similarly, taxpayers can in the future (when the scale of the organic production increases) reluctantly refer to acceptance of a high level of financial support to organic farms from budgetary sources. The total abandonment of the use of artificial fertilizers or chemical pesticides is now a strategy that can be accepted by a small (richer or more conscious) part of consumers and taxpayers.

Conventional agriculture, in turn, by reducing the level of previously used external input of and their better, more accurate application, and the use of biological and technology advances can significantly reduce, in relation to the status quo, its adverse impact on the environment, while maintaining high economic efficiency. By applying the principles of good farming practices, reduced production intensity, and precise application of inputs of industrial origin (the better technical and technological solutions), conventional farming can significantly improve its environmental performance in a short time. This type of farming is called integrated farming. It must be assumed that the future will belong to integrated farming, which occupies an intermediate position between the current conventional agriculture and organic farming [*Runowski,* 1999; *Majewski,* 2002]. This trend does not close the possibility of development of organic farming, which is still classified as the market niche. Trends in Poland are likely to be such as in Switzerland *(Figure 9)*.

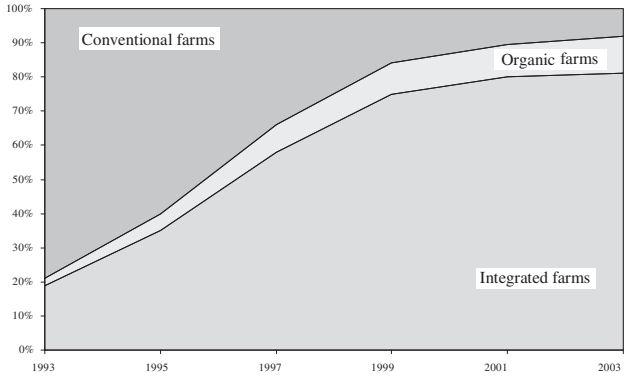

Figure 9. Tendencies of changes in agricultural production systems in Switzerland

Source: *Richter T.,* 2002: Possibilities and barriers for retailing organic products. Research Institute of Organic Agriculture (Switzerland), 2001–2003 own calculations.

Conclusions

Presented considerations entitle to formulate the following conclusions:

1. In the Polish agriculture, there are similar trends as in other European countries, but the level of development in Poland is lower. There is a consistent decline trend in the share of agriculture in gross value added and a drop in the share of employed in agriculture in the total number of employees.
2. In view of the faster pace of growth in labor costs and prices of non-agricultural means of production than the growth in prices of agricultural products, profitability of agricultural production is decreasing.
3. The primary and viable way to bridge the gap between income of employees in agriculture and outside agriculture is the increase of labor productivity in agriculture, which can be achieved due to concentration in the farming sector.
4. The pace of changes in agriculture in order to improve the structure of farms is dependent on the pace of economic development of the country.
5. One way to improve the income situation of farmers may be taking alternative activities. This is possible thanks to the expansion of the functions of agriculture. In addition to the traditional production and social functions, agriculture provides services to the environment and the public.
6. Model of Polish agriculture will have a dual nature in the future. Polarization processes lead to emergence, on the one hand of commercial, on the other hand of subsistence or semi subsistence clusters of farms.
7. Anticipating the changes in agricultural systems in Polish agriculture, it is expected that the importance of integrated agriculture, and partly organic farming, will increase at the expense of conventional farming.

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PORTUGUESE AGRICULTURE AND ITS ROLE IN MULTIFUNCTIONAL RURAL DEVELOPMENT

Maria Raquel Ventura-Lucas[a], Carlos Marques[a], Maria de Belém Martins[b] & Rui Fragoso[b]

[a]CEFAGE-Centro de Estudos e Formação Avançada em Gestão – University of Évora, Portugal
[b]CEFAGE-Centro de Estudos e Formação Avançada em Gestão – University of Algarve, Portugal
[c]ICAAM – Instituto de Ciências Agrárias e Ambientais Mediterrânicas – University of Évora, Portugal

Abstract: Paper aims to demonstrate the ability or inability of Portuguese agriculture to respond to changing economic conditions as well as societal expectations and demands. The main question is to know how the CAP's evolutions through a policy with a double emphasis – on market orientation and competitiveness and on sustainability.

Key words: CAP, multifunctional rural development, quality of life in rural areas

1. Introduction

As in Europe, agriculture in Portugal is supposed to fulfill a multiplicity of roles. It should contribute to supply Portuguese population with quality and safe food, to be viable in a global, competitive, dynamic and aggressive market, to preserve precious cultural landscapes across country through sustainable land management, to assist rural areas to be attractive and feasible and to support employment and social cohesion. Nevertheless, adjustments are expected to adapt to new environmental conditions, mainly climate change, to minimize weaknesses, to hold new opportunities and face new challenges. Otherwise, increases on human desertification, rural areas abandonment and consequent negative effects on territory are predictable.

The EU Common Agricultural Policy (CAP) intends to answer the agriculture's sustainability questions by enhancing the competitiveness of the agricultural sector, ensuring sufficient and secure food supply, preserving the environment and the countryside while providing for a fair standard of living for the agricultural community (EU, 2009).

In the actual context, Portuguese agriculture faces two main challenges that need to be balanced in the next years: food safety and environmental safety. It is imperative to know how to produce enough products to increase substantially the present volume of food supply and it is important to find ways to achieve productivity gains and increase UAA (Utilized Agricultural Area) in order to fight climate changes and promote sustainability of rural landscapes, natural resources and biodiversity. National interests should include struggle the abandonment of rural areas, valuate the territorial occupation and halt losses of biodiversity, achieve the auto-provisioning level of food supply, decrease external dependence of food by increasing export/import rates, define and implement priority actions to protect or sustain biodiversity, sustain farm structure diversity and match it with productive orientations appropriated at demographic, environmental and structural scale.

Following sections aims to demonstrate the ability or inability of Portuguese agriculture to respond to changing economic conditions as well as societal expectations and demands. The main question is to know how the CAP's evolutions through a policy with a double emphasis – on market orientation and competitiveness and on sustainability – can be strong enough to improve the development of Portuguese rural areas supporting farmers' income and environmental sustainability.

2. Portuguese current situation and past trends

This section follows closely EU rural development report structure to characterize rural development situation and past trends in Portugal. Two major aspects should be underlined: first, in Portuguese territory there is a sharp contrast in the location of predominantly rural, intermediate rural and predominantly urban areas according to OECD classification. All predominantly urban areas (NUTS III) are close to the sea and no predominantly rural areas (NUTS III) are found in the seaside. Hence, in this characterization we will refer as rural areas in Portugal to predominantly rural areas of OECD and we are at the same time speaking of inner areas of Portugal. Secondly, all Portuguese NUTS II regions combine seaside areas and large inner areas. Consequently, data for NUTS II averages these areas and so also averages urban and rural areas. To characterize rural areas of Portugal this data is useless and inadequate. Concluding, we will

speak of rural areas as predominantly rural areas of OECD and use only NUTS III data to characterize those areas in Portugal.

2.1 Importance of rural areas

In Portugal, rural areas represented 69.7% of the territory and 21% of the population in 2006. EU averages are 51.1% to 55.5% to territory and 14.7% to 36.1% of population[1].

Traditionally, rural areas have low and declining population densities. Portuguese predominantly rural areas follow that pattern. Population is concentrated in the areas close to the sea and decreases rapidly as we move to inner areas. Average population density is 35 inhabitants / km^2 and there is a tendency to decline. These indicators contrast with increasing population densities of predominantly urban areas, reaching an average value of 697 inhabitants / km^2 in 2006.

Economic activities in these predominantly rural areas account for 16.7% of national Gross Value Added (GVA) and 20.7% of employment. Hence, rural areas in Portugal are particularly important in terms of territory and indicators per capita are much less far from average values then per territorial units.

2.2 Socio-economic situation in rural areas

Portuguese rural areas have, proportionally, less people below 14 and between 14 and 64 and more people above 65 years old than urban areas. Production per capita[2] in rural areas is estimated in 60% (and compares with 88% for urban areas) of EU average. Hence, production levels are low in EU standards and there is a large gap between rural and urban areas. There is almost no change in this economic development indicator for rural areas and a small decrease for urban areas (-4%) from 1999 to 2005.

Gross Value Added (GVA) of rural areas makes 7.6% of total value. Average change in the structure of the Portuguese economy from 2000 to 2006 is characterized by a decrease in the primary and secondary sectors' economic relevance of 1 and 3.3%, respectively, and an increase of 4.3% in tertiary sector. Rural areas follow this general pattern with a 3.4% decrease of primary's sector GVA contribution to economic activity and an increase of 4.4%, for the tertiary sector.

Employment in primary sector still represents 29.6% in rural areas of Portugal in 2006. However, in the period of 2000 to 2006 changes in rural areas' employment in primary, secondary and tertiary sectors of -0.4%, -3.1% and 4% have been lower than their average values of -0.8%, -4.2% and 5%, respectively, indicating lower rates of adjustment, economic activity and opportunities. However, unemployment is lower in rural than in urban areas (7.3 and 9.3%, respectively, in 2007) and change of unemployment rates are slower in rural than in urban areas (2.6 and 4.8%, respectively).

2.3 Agriculture

Agriculture, forestry and hunting in 2006 employed around 589 thousand persons in Portugal representing 11.5% of total employment. The sector added value was estimated in 3 400 thousand € and represented 2.5% of GDP. The relative importance of primary sector is declining in Portugal following EU trend. In terms of employment its share declined 0.7% between 2000 and 2006 (1.2% for EU-27) and 0.2 with respect to added value (0.6% for EU-27).

Agricultural area used in Portugal was 3.47 million hectares in 2007, with 31% utilised for arable crops, 51.3% for permanent pastures and 17.2% for permanent crops.

Farms numbered 275 thousand, of which 3.6% had more than 50 and 72.6% less than 5 hectares. Average farm size was 12.6 hectares, which is also the average size of farm in EU-27. In economic size[3], however, Portuguese average value of 6.6 European Size Units (ESU) is far from the EU-27 average of 11.3. Only 0.8% farms have economic potential for more than 100 ESU and more than half of the farms (57.5%) have less than 2 ESU. Around 93.5 thousand very small farms that could be considered important in semi-subsistence activities have less than 1 ESU (potential for GVA per year less than 1 200 €) and represent 34% of total number of farms.

Family farming based on the farmer or household full-time job represents a large part of the labour force in agriculture that was estimated in 338 thousand annual work units in 2007. Around 11% of farmers had basic or full training in agriculture in 2005. In Portugal the proportion of "young" farmers is very low. In 2007, farmers with less than 35 years represented 3% of the farmers with more than 55 years. This means that Portugal has 1 "young" farmer for each 33 farmers of more than 55 years old. This is the lowest percentage among EU-27 and European average is 11%.

Labour productivity in Portuguese agriculture is 48% of EU-27 average value (12 089 €) per AWU[4]. Gross Fixed Capital Formation in Portugal was estimated in 762 million € in 2007 which represents 35.6% of GVA and is lower than EU-27 average ratio value (37.4%).

2.4 Food Industry

The food industry makes an important contribution to economic activity. In Portugal, food industry accounted for 3 132 million € in 2007 representing 2.4% of total GVA. This contribution increased at a rate of 1.4% between 2000 and 2006.

Investment in the food industry represents 25.9% of GVA and was estimated in 811.5 million € in 2007. The rate of investment decreased (-0.4%) between 2000 and 2006. This industrial sub-sector employed around 110 thousand persons or 2.1% of total employment in 2007. Employment in food industry has also decreased at a rate of -0.3% in the same period.

[1] Depending on group of EU countries considered (EU-12, UE-15 and EU-27).

[2] Evaluated by GDP in p.p.s. per capita and compared to average value of EU-27 =100.

Labour productivity in the sub-sector as increased at an estimated rate of 1.7%. In 2007, labour productivity was around 28.5 thousand €per person employed.

2.5 Forestry

Forest available for wood supply in Portugal covers about 2 009 thousand hectares. Forest productivity was estimated in 6.8 m^3 / tear /ha. Labour productivity is around 51.8 thousand €per person employed, very close to average EU value of 51.5 (EU-15). Investment in the forestry sector in Portugal was estimated in 86.2 million € in 2005 representing 13.6 of the sector GVA.

2.6 Environment

Agriculture and forestry have a fundamental role in preserving environment and landscapes in Portugal. Together they cover 75.3% of land, with natural area being also a relevant category (20.7 of the territory).

Less favoured areas represent 86.6% of the agricultural surface (PDR, p. 6). In 2005, 92.4% of agricultural used area respected to less favoured areas, 30.2% being in mountain zones. This value is considerably higher than EU-27 average (46%). Hence, a major part of agriculture is practiced in difficult conditions. Extensive grazing area where livestock is less than 1 livestock unit per forage hectare is 58.5% of agriculture used area and extensive arable crop area with yield below 60% of EU-27 average was 16.8% in 2007.

Natura 2000 special protection areas and sites of community importance areas represented 10.7 and 17.4% of the territory, respectively. Under Natura area there is 18.5% of agricultural used surface and 18% of forestry area.

Strong environmental pressure is revealed by the percentage of 24.5% of samples that evidence defoliation of trees, but the estimated rate of development of 14% of this process is particularly significant in Portugal. As a positive aspect it should be indicated the average annual increase of forestry area of 40 thousand hectares between 2000 and 2005.

Agricultural production systems also have important impacts on soil and water use and quality. Irrigated area represented 12.2% of total agricultural land used in 2007. Although this share is lower than for other EU Mediterranean countries it is expected to increase with the irrigated area of the Alqueva dam. Only 3.7% of the territory is reported as nitrate vulnerable zone and estimated surplus of nitrogen and phosphorus per hectare were 48 and 15 kg, respectively which compared to EU-average reported values is relatively low for the first and high for the second nutrient. Estimates of soil loss due to water in areas of risk of soil erosion are above 4 tons/ha/year, significantly above EU average value.

Changes to production systems more friendly in environmental terms took place in recent years (for instance, organic farming). Average annual growth rates of utilised agricultural area under organic farming of 17.9% per year between 2003 and 2007 increased this area up to 233.5 thousand hectares which represents a share of utilised agricultural area under these systems of 6.3% of total SAU.

Agriculture also has impact on air quality. With 7 638 thousand tonnes of CO2 equivalents, agriculture in Portugal contributed with 9.3% for total emissions, a share almost equal to 9.2% of EU-27 share in 2007. Annual decrease rate for Portuguese agricultural emissions (estimated in 2% for 2000-2007 period) is higher than average EU-27, reported as -0.9%.

Production of renewable energy from agriculture and forestry around 165 and 2 808 Ktoe represent around 2 and 4.1 of total EU-27 production but increased at slow annual growth rates (1.3%) relatively to EU-27 average increase (4.4%). Utilised agricultural area devoted to energy and biomass production crops of 7.6 thousand hectares and its share (0.2%) in total UAA are very low for EU-27 average standard (1.6%).

2.7 Diversification and quality of life in rural areas

About 25% of Portuguese farmers in rural areas had other sources of income than agriculture in 2007. This value is lower than average share of 36.4% in EU-27. Similar pattern is found to non-agricultural (secondary and tertiary sectors) share of employment in Portugal rural areas (70.4%) vs. EU-27 (84%). Average annual growth rates of non-agricultural employment have been positive (0.5%) but lower than EU-27 average increase of 1.3% between 2000 and 2006. The economic development of non-agricultural sectors can also be evaluated by the share of non-agricultural sector on total GVA. For rural areas of Portugal this indicator (92.4%) is also lower than EC-27 average (95%) and although increasing in rural areas of Portugal (1.9% annually between 2000 and 2006) is growing faster in average terms of EU-27 rural areas (2.5%).

Rural areas have 16.4% of Portugal's bed places installed capacity and this bed availability is decreasing (-1.8% annual growth rate). This share is higher in average terms (26.7%) and is increasing (1.7 annual growth rate) in EU-27.

Internet infrastructure coverage of rural areas is 86% and up-take, the percentage of population in rural areas[5] having subscribed DSL internet was 5.4% in 2008. Rates of change of these indicators were 7 and 2.2% per year, respectively, between 2005 and 2008.

Service sector accounts for 65.1% of GVA of rural areas in 2006. This share is lower than in urban areas (76.8%). Values for these area types in Portugal are slightly above EU-27 average values of 63.5 and 76.1%, respectively. Annual rates of change in% of GVA in services are also higher than EU-27 and are estimated in 4.4% in the period of 2000 to 2006.

[3] In European size units that measure potencial GVA.

[4] Measured by GVA at basic prices per Annual Work Unit (AWU).

[5] In these cases areas are rural if they have less than 100 inhabitants per Km^2.

The following indicators are only available with treatment at the aggregated level of NUTII. Since the unique predominantly rural area at that level of aggregation is Alentejo region of Portugal we are in fact characterizing that region from now on. However, rural inner areas of North to South would not be expected to have more favourable indicators than Alentejo.

Net migration ratio of rural areas was 3.1 per thousand in 2005 but change in that rate was negative (-2.9%) between 2000 and 2005. For urban areas net migration was higher (4.2 per thousand) and the rate of change was positive (0.7%). Migration average values registered for EU-27 were smaller for rural areas (2.3) and larger for urban areas (4.6 per thousand) but rates were larger for both type of areas (1.2 and 6.9%, respectively).

Human potential is a major factor for a country's development. It is particularly important in rural areas, usually less favoured areas that have other factors constraining development. This is a major factor that restraints Portuguese development in general and rural areas particularly. The percentage of adults with medium and superior education in rural areas was 26.7 in 2008. Average in EU-27 is 72.3%. However, this is not a structural problem of rural areas as in urban areas of Portugal this percentage is only 39%. This situation is changing too slowly. Rates of increase of this proportion for the country are 1.8 and 3.4% for rural areas between 2005 and 2008. Even with an average percentage much higher, for EU-27 the average rate of increase was 2.5% in the same period.

Life-long learning should bring solutions to improve human potential in Portugal. Its contribution is positive but in relative terms below EU-27 standard. The percentage of adult participating in education and training in rural areas was 4.5% in 2008. In other areas this value goes up to 5.5%. In EU-27 this percentages are 9.7% and 11.1% for rural and urban areas, respectively.

3. Expected changes in the future agriculture sector

In order to give the sector's increasing competitiveness and market orientation, Portuguese agriculture has received a sustained level of public support since their adhesion to the EU in January 1986. Comparing with those times, at present, both Portuguese and the CAP situation are very different. Agriculture has lost economic weight and the CAP political weight (Patier, 2000) and markets became more global and competitive. Following a course of consecutive reforms since 1992, the CAP is currently centered on three main policy axes, which aim to respectively support product prices, producer income, and structural adjustment (EU, 2009).

Before Agenda 2000 the agricultural system of EU faced an economic crisis, represented by an increasingly minor difference between the total agricultural production, expressed in economic units, and the costs, an ecological crisis, expressed in an intensified production, associated to costs more and more unlinked to nature, perceptible, for instance, on the chemical fertilization that substituted organic fertilization, and a structural crisis, expressed in production increases inhibited by quotas in several products (*van der Ploeg* et al., 2002). Agenda 2000 reinforced the correction of the farmers' role that began with 1992 reform, electing rural development and multifunctionality paradigm as the basis of future's CAP. The actual context of European agriculture represents the end of a cycle of agricultural modernization whit strong protection from policy and public institutions and a progressive abandonment of production structures to international markets regulation mechanisms. Without this protection, the crisis in family small scale agriculture, unable to follow behaviors dictated by modernization needs tends to be generalized also to other forms of agriculture, the attentions being now turned to demand questions, instead of supply questions, to the impact of technical models transformation and to new institutional forms of organization.

The CAP has undergone fundamental reforms over time, which demonstrates its proven capacity to respond to changing economic conditions as well as societal expectations and demands. In this process, the CAP has moved to a policy putting emphasis on market orientation and competitiveness, income support, environment, and the development of rural areas. Nevertheless, CAP is still a changing policy. The challenges ahead are driven by internal factors, such as budgetary constraints and the budget reform, with change on EU political priorities and the loss of the traditional agriculture importance, and also by external factors, such as globalization and the world financial crisis. CAP challenge will be to develop an European agri-food market that can survive in a world competitive market and answers the WTO pressures, respecting the budget, stimulating the agricultural sector competitiveness and promoting products' quality and the respect by environmental concerns and animal welfare. Finally, CAP must ensure a sustainable use of natural resources and an effective rural development.

The evolution will surely continue to be from a sectoral to a territorial approach, slowly re-balancing its two pillars. We can expect Portuguese agriculture to slowly adjust itself to the policy changes with adjustments on agricultural product composition accommodating the reform effects and adjust to a new framework without sudden brakes or disclosers (*Jorge,* et al., in print).

According with the information on farmers' expectations (*Rosário,* 2005), obtained through direct and personal interviews to 928 farmers within the Farm Accountancy Data Network (FADN,) results revealed no great farmers motivation to introduce changes in their production systems in the short (79.3%), or medium term (73.0%), a situation similar to that of the previous years. Intentions to change the current production system corresponded to only 21% of the interviews. In the medium term, this expectation decreases to 18.5% for active situations. Approximately 79% of the farmers do not intend to complement their farm income with

income from other sources. Only 20% of the farmers are willing to resort to off-farm income sources and 5% of the contacted farmers consider developing supplementary income sources within the farm. The difficulties resulting from the Global Economic Framework for the farming activity were the most often referred by the interviews (56%) followed at a distance (15%) by Farms' Structural Hindrances (*Rosário,* 2005).

Rural development, I&D, market regulation and price stabilization are the keys for Portuguese agriculture sector restructuration, but also to encourage diversification and innovation in rural areas. In the next decades, Portuguese agriculture will be faced with the global challenge trade-off of food security and safety (increasing production volumes and reduce external dependence and deficit) and environmental safety (combat climate change and improve natural resources sustainability, biodiversity and landscape preservation). This implies creating conditions for Portuguese agriculture to produce enough food based on environmental, quality and animal welfare's friendly technologies and on competitive market conditions. It also involves the production of rural public goods that contribute to the natural resources preservation and combating climate change, abandon and human desertification. In synthesis, it means improving the quality of life in rural areas based on consolidation and diversification of the economic and business environment (*Avillez,* 2010).

4. Possible Future Multifuntionality Issues

4.1. Food security, food safety and quality

Food security, food safety and quality must be ensured throughout the Portuguese food chain as one of its foremost roles. Latest developments have shown that these issues are not to be neglected and may be accentuated by climate change, by increased water scarcity, by food scandals or crises or by an inadequate or inefficient food chain. The ability to react to these issues depends on agricultural sector performance, competence to maintain sustainable modes of production and consumption linking economic growth and environmental objectives with a steady scheme of trade relationships.

The farmers' difficult task is to supply food in an open and increasing competitive market which supposes both: to produce at competitive prices and to fulfill societal desires and expectations regarding high levels of food, product quality and standards of food safety, animal welfare and environmental friendly farming systems. Relating the Portuguese external trade, namely the exports/imports rate (about 35% in 1998) and the degree of self-sufficiency (87% in 1999), the numbers show a negative situation in most of agricultural products. For consumers, the analysis highlights significant benefits related with the growth, diversity and quality enhancement of food supply. Moreover, consumers have benefited from the evolution of agricultural prices less than proportional to the production level reductions, which were partly appropriated by the processing circuits and distribution stakeholders. The benefits to consumers result evident since accession by the fact that the Portuguese general annual price evolution has been systematically higher than the specific evolution of food prices which significantly contributed to the domestic inflation control. Meantime, the negligible development in agricultural production volume associated with a sharp augment in food consumption and increased integration in European markets led Portuguese agricultural and food products' foreign trade to progress in a very unfavorable way (*Pinto,* 2000). The deficit doubled in approximately one decade till the year 2000 and still rising. Most Portuguese imports come from the EU countries of Spain, Germany, France, Italy and the United Kingdom. Most exports also go to other EU member states.

Portuguese wine and olive oil are especially praised by nationals for their quality, thus external competition (even at much lower prices) has had little effect on consumer demand. Portugal is a traditional wine grower, and has exported its wines since the dawn of western civilization: *Porto wine*, *Vinho Verde* and *Madeira Wine* are the leading wine exporters. Portugal is also a quality producer of fruits, namely the *Algarve oranges*, Cherries from the center east countryside and *pera rocha* (a specific Portuguese type of pear). Other exports include horticulture and floriculture products, beet sugar, sunflower oil, cork and tobacco. Portugal produces half of the world's cork.

In terms of safety, the European food market in general and the Portuguese market in particular have suffered from several food scares of which BSE and nitrofuranes scandals are good examples. Under the glare of intensive media attention, specific consumer food safety concerns can erupt into widespread alarm. Consumers are therefore more and more concerned about food safety and quality, more skeptical about food supply, desiring more transparency in production and distribution channels and, for some products, also more skeptical about the production process. Depending on their perceptions of the risks associated with the product, food scandals led the individual consumers to react in different ways (*Henson and Northen,* 2000).

According *Lucas and Toscano* (2003) Portuguese consumers doesn't thrust about food handle in restaurants and they consider having little information to judge correctly the safety level of a product. Specifically, they consider food not as healthy as it should be; they need more nutritional information as they don't find it on food label. In the consumers' attitudes to food price, a clearly disstisfaction of respondents is the main result. In their opinion a decrease in food price can induce a well balance diet. In relation to the impact of food production processes on environment, consumers are very concerned and they consider the ordinary production system aggressive to the environment. Consumer food confidence is higher in fresh fruit and fresh vegetables, fish, dairy-food, rice, pasta, wine and olive oil then in meat, crayfish, prepared dishes, eggs and mayonnaise. They have

also higher confidence level on food prepared and cooked at home and lower confidence level in crude meat, food with residues of permitted pesticides and fruits and vegetables with artificial colorants. Portuguese consumers read label information frequently and the date of caducity is the information more consulted by the consumers, leaving off other important food safety information and the relation between diet and health, such as the instructions of storage and cooking, the nutritional value and the ingredients. Veracity, content, and product quality association, are label information perceive as truthful.

Because safety and health related issues influence consumers' attitudes and behaviour (*Lucas,* 2006), food safety and freshness are determinant in defining food experienced quality. In an empirical research with beef consumers, *Marreiros* (2005) found that freshness and butcher's advice are very important cues for meat buying-decision. Colour is the other main cue for choosing meat. The importance of fat as an attribute for experienced meat quality and as a choice cue is not confirmed in the study, and consumers' awareness and knowledge about the quality labels and about the PDO meat brands was found to be rather low. On the other hand Lucas (2006) concluded that these guarantees or certifying labels are valuable decision-making criteria for some Mediterranean consumers segments (*Lucas,* 2006). The country-of-origin or region-of-origin of meat are products attributes with complex effects on consumer behaviour as they have high symbolic meaning, reflecting geographical differences in the food culture, both between and within countries.

4.2. Land Management

Although the farming past has shaped the rural character, often the specific farming practices that helped generating those features lost their competitiveness. In some areas, notably those with a low productivity of soils or economically unfavorable structures, agricultural activities and land management as such are at risk. The disappearance of farming results in losing the associated environmental and cultural assets, such as typical landscapes and valuable habitats. Those assets have the characteristics of public goods, because the demand and supply cannot be satisfied through market mechanisms. Besides its traditional function of producing food, agriculture has a determinant role in the maintenance and evolution of rural characteristic landscapes and in environmental and biodiversity preservation. Policy measures are needed for ensuring delivery of these goods. However, public goods cannot be delivered without the necessary farming capacity being in place – "public money for public goods" can only be delivered where there is an agricultural presence to which this condition can be attached.

One of the key issues of land management is the possible abandonment of rural areas in a near future. The trends after 2013 (*Jorge,* et al., in print) point to diverse effect depending on the Portuguese regions. The North and Lisboa, with production systems more difficult to extensify, are those who demonstrate a greater abandonment potential.

4.3. Viable Rural Areas

As looks upon the economic would-be of rural areas, agriculture offers a stand for economic diversification in rural areas. The multiplicity of activities not only allocates agricultural systems continuity but generate employment and supplementary profits in specific regions. In spite of the decline in the relative economic weight of the primary agricultural sector, rural tourism economic role remains significant, particularly in remote Portuguese areas where agriculture as such has a significant share in employment. In this context, the development of sustainable tourism is of special importance. Many of possible future projects should support the creation of small-scale infrastructure, of recreational infrastructure offering access to natural areas and the development of tourism services relating to rural tourism. However, the rural tourism option should be integrated in the specific regional contexts in order to multiply effects on economy and society that interact with other farm activities and sharing territory. Being a cross- activity, the rural tourism sustainability depends more on establishing relationships (local people, business, tourists, senior administrators) than a monocultural specialization of imported models. The option should always attend the rural tourism decision-making based on opportunity costs comparing with other possible solutions. It should not be a direct consequence of the absence of other options or the apparent attractiveness of foreign models which opportunities are cyclical. The strategy and actions should be based on horizontal and vertical structure of production, where rural tourism is integrated in space and time with other activities and sectors.

In the context of viable rural areas, innovation plays a crucial role. An activity as agriculture where the flows are increasingly globalized but paradoxically the success of many products depends on the maintenance and valuation of its regional identity, innovation is the guarantor of the constant product renewal due to changing demand profiles. It is the innovation that can induce the ability to create products and services themselves, supplementing them with innovative management, able to enter into these specific value-added chains for the benefit of the region. It supposes a process where horizontal integration is necessary but where integration vertical also should occupy a privileged place in developing strategies and future actions. In addition to the operational measures aimed to strength the productive base, the range of agricultural production is the one that requires innovative procedures: (a) based on quality demand that combine tangible and intangible factors (skills and human resources), (b) develop relational capital (public / private interaction, formation of integrated regional clusters) and (c) target the needs of technology support and enjoy the externalities offered by the consequent development.

The contribution of agricultural Portuguese regions to the economic progress implies also the existence of other attributes such as infrastructure and services which plays important tasks for farmers, for tourists, visitors and other inhabitants of rural areas. Beyond innovation, information and

communication technologies (ICT) and I&D dissemination must play their important role. They make easier connections between rural and urban regions and facilitate employment creation and diversification possibilities inside rural areas. Both, growing internet infrastructure coverage of rural areas and increasing the percentage of population in rural areas having subscribed DSL internet was good indicators. Quality of life of rural population depends by and large of the maintaining of rural area economic development which is close linked with the access to services of general interest. Development can help to promote competitiveness in the agricultural and food processing sectors.

Safety and national defense are public goods when the depopulation problem is focalized because national cohesion (in economic, social and territorial terms) is compromised. To avoid abandon and depopulation of rural zones and consequently inverse concentration in urban centres, agricultural landscape has to preserve their appeal for citizens. Inverse the rural population exodus and promote their return depend intimately of rural attractiveness potential which strongly depends of it capacities to catch new investments, create new employments and promote parity of economic and social opportunities. From the specific measures for regions with high risk of abandonment, it is noted the importance of strengthening and / or adaptation in Portugal of a few already in force, such as income support and early retirement which should aim major rejuvenation of farmers and the resizing of the holdings. Because its direct impact on national security, measures devoted to the vulnerabilities of forest and the combat to forest fires are also of vital importance to the country (*Fernandes,* 2005).

The origin or local provenance should have a growing role, promoting the endogenous development potential of the territory, which passes through the local regeneration with priority mobilization of local actors in the management of local interests, creation of local decision-making centers and oriented economic recovery of endogenous resources. These features enhance and support a diversity of solutions, ranging from agriculture component in the form of traditional high quality products, protected designations of origin (PDO), new crop profitably market (hydroponic and organic), non-agricultural land within the multifunctionality of agriculture as rural tourism mentioned before and other activities such as recreation, crafts, preservation of cultural heritage, including the rural amenities (immaterial tradable goods) as the scenery, the pure water , biodiversity and climate.

It should be noted that support non agricultural activities serves both, supply and demand sides. Considering the consistent increase number of consumers, especially from urban zones, which manifest willingness to access and enjoy such goods, this represents an expanding market.

4.4. Competitiveness in Global Markets

Portugal is a high income mixed economy which occupied the 43rd position out of 134 countries and territories in the Global Competitiveness Report from World Economic Forum (*Schwab,* 2009). Comparing with 2005 where Portugal placed on the 22nd position this showed that the country had dropped twenty one places regarding the actual ranking position. The report "assesses the ability of countries to provide high levels of prosperity to their citizens". This in turn depends on how productively a country uses available resources. Therefore, the Global Competitiveness Index measures the set of institutions, policies, and factors that set the sustainable current and medium-term levels of economic prosperity (*World Economic Forum,* 2009).

Some domestic problems with strong impact on the economy and consequently on country competiveness are possible to identify. Like in other countries with very hot summers and seasonal drying of soils and vegetation, every year large areas of the Portuguese forest are destroyed. This situation has strong economy impact because many people and industries depend on forestry related activities and as well a significant ecological impact associated with a safety issue for the populations. Other problem that commits agriculture competitiveness is the public debt which exceeds 60% of GDP. This problem, in addition with the over-dimensioned public sector, is a threat to the Portuguese economy and the State's financial sustainability.

As previously mentioned, one of the prevalent aspects of Portuguese agriculture is the dominance of production system with dependence on supports and subsidies. Thus, the search for economically viable alternatives involves a process of technical and structural conversion. On the other hand, some effective conversion measures represent an increased risk of abandonment and human desertification. According to Avillez (2010), it is desirable in the future to have in Portugal the following variety of agricultural systems: 1) agro-environmental systems socially sustainable and target for conservation of nature, biodiversity and territorial land management; 2) agro-commercial systems socially sustainable and target for organic and bio-energy production; and 3) agro-commercial systems economically competitive such as vineyards, olive trees, horticulture and quality meat production systems.

The Portuguese farmers will have to face global markets challenges at the same time as they have to value high standards coming from environmental, animal welfare, quality and food safety goals. According natural and structural specificities an adequate response for Portuguese agricultural sector to these challenges will be to ensure increased product and process quality.

4.5. Responding to climate change

As been seen before, CAP has been profoundly reformed in the recent past (EC, 2003) – the role of intervention mechanisms has been significantly reduced, the support is mainly decoupled and subject to conditionality and there has been a reinforcement of Rural Development (CAP 2nd pillar). Additionally, the policy tends also to be more efficient, meaning that the market disequilibrium and public stocks are not so common any more, there has been a raise on

the competitiveness and a change in the agriculture's role on commercial exchanges and there has been a better use of public funds with more efficient income transference.

One issue that is now in the "concerns table" is how to face the new challenges, from climatic changes to hydric resources and biodiversity protection. Simulations made for Portuguese agriculture (Jorge *et al,* in print) point to a general positive result of the future CAP, due to a predictable decrease on animal production activities and forage production extensification – this will lead to a decrease on negative environmental externalities, not due to a reduction on seeded area but to a change on the land cover diversity and its extensification. Additionally, there will be reductions on potential lixiviation, on CH_4 and NO_2 emissions and on the Global Warming Potential (GWP).

Nevertheless, some authors (*Rosário,* 2003) states that agri-environmental measures are not completely recognized by farmers as public support to change practices, as they are still mainly comprised as just subsidies for agriculture and income for farmer and there are still many farmers that don't intend to apply for this support. The same author (*Rosário,* 2003) recommend a bigger effort on environmental education of farmers, on information availability and on environmental training actions, in what concerns amenities, residues and resources as the farmer is the privileged actor that contacts in a constant and professional way with all these situations.

5. Conclusion

A considerable part of Portugal is dedicated to agriculture, although it does not represent most of the economy. Nevertheless, the sector has a crucial importance on the maintenance of national cohesion in economic, social and territorial terms and so an effort must be done to revitalize it.

This effort must accomplish all different agriculture's roles: the main vectors of development must be put in human resources – to train, qualify and rejuvenate human resources –, in the diversification of production basis – new technologies, new products –, in supporting (as a public good) the multifunctionality of agriculture – new rural activities, like tourism, gastronomy, landscape –, and finally in correcting the infrastructural constraints. This could reduce the economic dependence of Portuguese agriculture and its vulnerability to EU support mechanisms and reverse the rural population exodus, creating conditions to raise rural attractiveness.

The evaluation of the potential of agriculture and natural resources capacities in each region can't separate itself from the capabilities generated by farms and from the infrastructural and environmental constraints and spaces where they operate. When the main point is the global competitiveness, innovative capabilities of a country or region depend mostly on the sector dynamics and they remain spatially related to regions, cultures and networks (formal and informal) carrying different conditions to promote endogenous dynamics innovation.

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ROLE OF AGRICULTURE AND MULTIFUNCTIONAL RURAL DEVELOPMENT IN SERBIA

Natalija Bogdanov, Zorica Vasiljević

Faculty of Agriculture, University of Belgrade Nemnjina 6, 11080 Belgrade-Zemun, Serbia
E-mail: natalija.bogdanov@agrif.bg.ac.rs

Abstract: Serbia is mostly rural country, as three fourth of its territory make rural areas, while almost half population is living in rural areas. Serbian agriculture is the sector which is very important for the total economy of the country in respect of resources, participation in GDP, employment as well as importance for rural areas and population. This is the only sector in Serbian economy that shows positive foreign trade balance in the recent several years. There are potentials for development of agrarian entrepreneurship on one hand, but on the other, there are constraints in existence of great number of small family farms whereas the huge share could not have commercial profile and could not live only from agricultural activities. The concept of multifunctional development of agriculture and rural areas is still present mostly in scientific and political sphere without clear explanation or interpretation as well as mechanisms of implementation. Serbia's rural space is heterogenic and devastated in different extent, and therefore extremely complicated for planning of multifunctional development.

Key words: agriculture, rural areas, multifunctional development, Serbia

1. Introduction – Economic Trends and Importance of Agriculture in the Economy

Serbia is located in the Balkan Peninsula, at southeastern Europe and in the Pannonian Plain (a region of central Europe). It is landlocked, although access to the Adriatic is available through Montenegro, and the Danube River provides shipping access to inland Europe and the Black Sea. Serbia covers a total of 77,474 km^2; it has 4,720 settlements of which 187 are urban[1].

According to the data of the last Census (2002) there are 7,498 million inhabitants in Serbia. In the 1991–2002 period the population number dropped by 1% (by 3.65% in rural areas). An average population density is 97 inhabitants per km^2 (289 inhabitants/km^2 in urban areas and 63 inhabitants/km^2 in rural ones). Areas in eastern part of the country, particularly in the southeastern part near the borders with Bulgaria and FYR Macedonia, are low populated areas with significant negative demographic balances. Serbia has for some time been part of the trend of permanent aging of the population[2].

Since 2000 Serbia's economy has been going through recovery from conflict and isolation in the 1990s. In the first eight years of transition, from 2001 to 2008, Serbia has implemented economic reforms that have resulted in the increase of gross domestic product, gradual reduction of high inflation rate, employment growth and in increase of foreign direct investments. In this period, the average annual growth of gross domestic product reached 5.4%, and GDP per capita was increased from EUR 1.709 in 2001 to EUR 4.661 in 2008. In 2007 and 2008, for the first time in decades, there were positive signals in the labor market. The unemployment rate of around 21% was reduced to 18.1% in 2007 and to 14.0% in 2008. Unemployment in Serbia is extremely high and a major problem in economic and social sense. This has largely been the result of privatization and the necessary restructuring of the old overcrowded and inefficient large state-owned companies. This situation is exacerbated by the inherent inflexibility of the Serbian labor market: part-time jobs account for only 7% of the total and temporary work only 13%. The high unemployment rate in the economy can also be attributed to the large size of the informal economy in Serbia. Inflation rate in the entire period was within the targeted inflation limits, and in 2007 it was 6.8%, which is a significant progress relative to the beginning of decade (*Bogdanov, N.* 2008).

Table 1. Selected macroeconomic indicators; 2000–2008; Serbia

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Change in real GDP –%[1]	4.5	5.4	3.6	2.8	8.2	6.0	5.6	7.1	5.5
Inflation rate (annual average) –%[2]	70.0	91.8	19.5	11.7	10.1	16.5	12.7	6.8	10.9
Unemployment rate –%[3]	12.1	12.2	13.3	14.6	18.5	20.8	20.9	18.1	14.0

[1] Calculated from data on GDP at 2002 constant prices
[2] Retail prices

[1] Data for territory of the Republic of Serbia excluding Kosovo (EULEX).
[2] Statistical data show that the average citizen of Serbia is 42 years old, and fertility i.e. the number of children born to a woman is among the lowest in Europe.

Table 2. Share of agriculture in the economy; 2000–2008; Serbia

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Share of agriculture in GDP (current prices) –%	19.0	19.3	14.4	12.7	13.2	11.5	10.6	8.7	:
Share of agriculture in total employment –%	:	:	:	:	23.9	23.2	20.5	20.8	21.4
Share of agri-food exports in total goods' exports-%*	19.0	18.3	25.3	20.9	22.2	20.3	19.4	18.9	31.3
Share of agri-food imports in total goods' imports –%	8.6	10.7	9.8	8.8	8.0	7.4	6.9	6.1	6.4

*Agro-food trade according to Combine Nomenclature of Custom Tariffs (CNCT)
Source: Statistical Office of the Republic of Serbia

Agriculture's contribution to the Serbian economy is as broad as it is deep. During the transition period the share of primary agricultural production in the realized GDP was reduced in comparison with the 1990's, so that in 2007 it accounted for 8.7% *(Table 2)*. The share of the food industry, beverages and tobacco in the realized GDP in this period accounted for 5.5% on the average and also has a trend of permanent decrease. But despite this downswing the share of primary production in agriculture is compared to the EU and to neighboring Western Balkans countries still very high.

The agriculture employs a big portion of the total labor force in Serbia. The main reason for the high reliance on agriculture is certainly reduced employment opportunities, fact that agriculture absorbed labor surplus from other sectors of economy which have already completed reforms and low investment activity in country, also. Compared to other sectors of Serbian economy, the agro-food sector plays a very prominent role in overall trade. The agro-food trade balance was mostly negative during the mid 1990s' and since 2000 it became positive for the first time in 2005. The agro-food sector accounted for some 20% of total Serbian exports. Serbia's main export commodities are cereals (maize, wheat), raw and processed fruit (frozen raspberries, prunes), refined sugar and some livestock and meat products. The share of the agro-food sector in total Serbian imports is about 7%. With regards to agricultural imports a wide range of food and agricultural products is imported, with the EU as the largest origin of imports (*Bogdanov, N.,* 2010).

2. Natural resources

Serbia's terrain ranges from rich, fertile plains of the northern Vojvodina region, limestone ranges and basins in the east, and in the southeast ancient mountains and hills. In Central Serbia, the terrain consists chiefly of hills, low and medium-high mountains, interspersed with numerous rivers and creeks. Four mountain systems meet in Serbia: Dinaric Alps in the west cover the greatest territory, and stretch from northwest to southeast. Apart from the Danube, the chief rivers are its tributaries Sava, Tisa, Drina and Morava. Climate of Serbia is moderate continental with diversity on local level, caused by geographic location, relief, terrain exposition, presence of river and lake systems, vegetation, urbanization etc.

Thanks to the relief and climate conditions in the territory it covers, Serbia has favorable natural conditions for diversified agricultural production. Forest to agricultural land ratio (39:61%) is also more favorable compared to many European countries. Serbia disposes of 5.1 million hectares of agricultural lands (0.60 ha per capita), out of which 3.3 million hectares (65%) fall to arable lands (0.45 ha per capita).

Depending on the quality of soil and above sea level, the agriculture of Serbia covers all the forms of intensive, semi-intensive and extensive farming. Regarding its suitability for agricultural production (soil fertility), the soil potential of Serbia is divided into eight fertility classes, where the first four classes represent better soils, and classes 5-8 include the areas mainly unsuitable for tillage. As for the whole of Serbia, distribution of arable and non-arable land is almost identical. Intensive agricultural production is least restricted in Vojvodina and most restricted in Kosovo and Metohia. The latter territory, similar to that of Central Serbia, has a wide range of natural fertility in narrow geomorphologic units. According to the above sea level, the plain terrains (up to 200 m) cover about 37% of the territory of Serbia. Hills (200–500 m) and low

Table 3. Surface area and land cover (000 ha)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total area*	7747	7747	7747	7747	7747	7747	7747	7747	7747
Forest area	1950	1950	1950	1950	1950	1985	1985	1985	1985
Agricultural land	5106	5108	5106	5112	5113	5110	5104	5090	5096
– Arable land	3353	3351	3346	3340	3342	3326	3315	3295	3302
of which fallow and uncultivated land	175	143	156	169	176	194	248	200	200
– Permanent crops	316	313	317	316	312	305	302	301	303
– Grassland	1402	1409	1407	1420	1421	1441	1448	1455	1453
– Other agricultural area	35	35	36	36	38	38	39	39	38

*Excluding Kosovo (EULEX)
Source: Statistical Office of the Republic of Serbia

mountains (500–1000 m) account for nearly the same percentage, of about 26%, and mountains (above 1000 m) approximately 11%. As regards the slope of the terrain, it is characteristic relatively high percentage (42.6%) of steep and very steep areas (slope over 30%) with shallow lands prone to erosion and inadequate for tillage. Nearly level terrains (slope below 5%) to slightly sloped terrains (5–10%) account for about one third of the land area, and the remaining 24% falls to slopes of 10–30%, whose exploitation for agricultural purposes is conditioned by undertaking appropriate protection measures.

However, a great part of the arable lands is acidulated, as a result of uncontrolled use of chemical agents, and in Vojvodina (the most developed part of the country in terms of agriculture) and salinated, what reduces the yield and raises the production costs. According to the assessments, it is necessary to take measures for amelioration of physico-chemical characteristics of the soil on approximately 1/3 of arable lands. The share of irrigated arable lands in total arable lands is among the lowest in Europe (approx. 1.5%), whereas about 85% agricultural land is endangered by wind and water erosion. At the level of Serbia, the calculation of total nutrient balance is not carried out. For the needs of Serbia Danube River Enterprise Pollution Reduction Project (DREPR), the assessments were made on the nutrient load from agricultural sources (manure and chemical fertilizers) and its consumption – quantities necessary for crops. Comparison of the amounts of nitrogen and phosphorus in manure and chemical fertilizers with the crop requirements showed that the cumulated supply was far from reaching the crop requirements. It indicates that there is a great potential for using manure on crops.

In general, the structure of agricultural land exploitation in Serbia is stable, and there were no significant changes in the past ten years. The only one significant change was in the vineyards' area decrease by cca 5%. Areas under vineyards are getting reduced first of all because of the unfavorable economic position of the grape production, low competitiveness and lack of labor.

Serbia has no accurate records on agricultural land surfaces and there are large discrepancies between statistical data and cadastral records. Official statistics registers about 4% uncultivated surfaces annually, but it is estimated that data much higher. There is uncultivated land particularly in the hilly-mountain regions with emphasized depopulation, as well as in those territorial parts affected by erosion and subject to flooding.

3. Farm structure

Agrarian structure in Serbia is very complex. It consists of micro farms owned by poor farmers or successors of reprivatized land, small semi subsistence farms, large family farms in the northern part of the country, as well as the privatized big properties with mixed ownership structure. According to the statistics, private farmers own approximately 80% of the 5.1 million hectares of agricultural land. The rest of 20% of farmland is utilized by many entities, varying with regard to ownership and farm size. In Vojvodina, there is a higher concentration of larger farms. Ownership rights are poorly defined and recorded in Serbia. This lack of clear ownership rights for a significant proportion of the land is a hindrance to the proper operation of the land market, although land tenure in Serbia is overwhelmingly private. However, today the majority of public property, which originates from confiscated lands it from former proprietors, fiscal and legal entities, remains in state ownership. In 2005, Ministry of Agriculture, Forestry and Water Management (MAFWM) adopted a regulation according to which all state-owned land should be tendered for rent[3].

Serbia has on average a much smaller private farm size than many other European countries. According to the 2002 Census *(Table 4)* there are about 778,900 private farms in Serbia with an average size of 3.6 ha, fragmented in an average of 4 plots per farm, which puts Serbia at Europe's bottom in terms of farm size and fragmentation (*Subić, J., Vasiljević, Z., Cvijanović, D.,* 2009). According to the 2002 Census over 75% of private farms have less than five hectares and fewer than 5% have more than 10 hectares.

Table 4. Family farms number and area farmed*; 1991 and 2002; Serbia

	1991	**2002**	**Change (%)**
Number of farms – 000	997	779	78.11
Area farmed – 000 ha	3460	2869	82.92
Average size of farms – ha	3.5	3.7	106.17

* Data refers to private family farms only (without agricultural enterprises and cooperatives)
Source: Statistical Office of the Republic of Serbia – The Census of the population, households and dwellings 1991 and 2002

The tendency of turning the family farms into big, commercial farms as well as strengthening of dual agrarian structure has been shown in the case of farms of Vojvodina region, particularly in the areas with marked tendency of population aging. The land market is active in this part of the country, but it prevails renting in relation to the land buying and selling. In the central part of the country, around big cities where there is a higher agrarian population degree as well as participation of the mixed farm holdings, the small properties are dominant ones (*Bogdanov, N.* 2009).

Analysis of the property structure change and of the land market is impeded because of lack of reliable data. Namely, the Census of agriculture has included only private family farms, but not agricultural enterprises, whose ownership and holding structure have no record. In addition, in the period between the two censuses there have not been conducted other researches by Statistical Office where the data on land would be innovated. The other researches conducted on a national representative sample (LSMS, 2002 and 2007),

[3] According to estimates 350,000 to 380,000 ha of agricultural land are state owned.

show that there is an increase both in number of farms that rent the land and in size of rented surfaces.

4. Agricultural production and output

Until the beginning of the 1980s Serbia had an impressive agricultural production growth rate (3.5–4%), which stagnated during the 1980s, and in 1990s it declined sharply. Extremely unfavorable production and economic indicators of Serbian agriculture in that period are reflected in the following: production of almost all agricultural products characterized by marked fluctuation and negative trend; the use of agro-technical inputs has been reduced; low labor productivity; low level of market production; production structure acquired the characteristics of extensive production (*Bogdanov N.,* 2009).

Period from 2000 to 2008 was characterized by substantial annual fluctuations of agricultural production, but generally it is still lower than in pre-transition period. Relatively extensive production method caused fall in the physical scale of production, especially in the years of unfavorable climatic conditions (particularly in 2000, 2002, 2003 and 2005, 2007). Agricultural production in Serbia is strongly influenced by the weather conditions – particularly the droughts and uncontrolled activity of waters. The economic transformation process affected the livestock sector more than the crops' sector. In the structure of the realized value of agricultural production, about 67% comes from the plant production, and 33% from animal production, without a pronounced change tendency during the observed period.

Table 5. Agricultural production volume indices*; 2000-2008 (2005=100); Serbia

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	-13.0	19.0	-3.0	-7.2	19.8	-5.3	0.0	-8.0	8.0
– Crops	-27.0	50.0	-4.0	-16.8	44.3	-5.7	-3.0	-18.0	23.0
– Livestock	-5.0	-1.0	2.0	-1.9	-0.2	1.1	-3.0	0.0	-3.0

* Final (net) production only
Source: Statistical Office of the Republic of Serbia

Dominant position in the production structure of agriculture belongs to cereals (maize and wheat). Areas under cereals account for about 60% of arable lands, with pronounced decreasing trend over the past years. Reduction of the areas under cereals is a result of lowered interest of farmers in the production of wheat which was extremely uncompetitive compared to other crops. Value of cereals production is still extremely high and accounts for about 30% of total agricultural production value in Serbia.

Areas sown by industrial plants have recorded permanent growth since 2000. Their share in the arable lands increased in the period 2000–2008 for about 16%. The industrial crops accounts for 7% of total agricultural production value of Serbia. Opening of the foreign market, budgetary support, export subsidies and privatization of the processing capacities, contributed to fast revitalization of the industrial plant production after the crisis in 1990's. More than in other segments of the food chain in Serbia, this sector has set up the trade chain that has also reflected positively on the growth of the lands and production.

Fruit and vegetable production recorded positive trends in the past years and it makes about 11% of the agricultural production value. Fruit and vegetables occupy about 12% of arable land and they are predominantly grown on private holdings in Central Serbia (about 99%). In this sector significant progress has been made in the improvement of standards in the production and processing, as well as in the strengthening of the production linkages. Serbia has ideal climatic conditions for growing many varieties of fruit. The country's territory is rich in microclimates that are perfectly suited for organic fruit production, making development of this sector extremely promising. Over the last years, thanks to favorable credit conditions for purchasing the irrigation systems and building green houses, production has been significantly intensified.

Negative trends in livestock production have been slowed down at the beginning of this decade, while since 2006 the decline has been continued. The number of farm animals in Serbia has decreased significantly since the 1990s (by more than 30%). Falling incomes together with the restricted access to foreign market severely reduced meat consumption. Production has fallen even more than livestock number, due to an additional difficulty of providing adequate feed and veterinary care. The main explanation is the decreased demand for animal products, but a shortage of animal feed and adequate veterinary services maybe also have played a role towards this decline.

Pig meat production avoided the worst depression though there has been some fluctuation (in particular due to high feed prices in some years). In recent years the milk production has been stabilized at the level of reconciliation of the domestic balance needs.

Achieved average yields in agriculture of Serbia compared to EU countries indicate to the prominent technical and technological backwardness as well as absence of technical and technological innovations in practice. The reason for this situation is in an expressed price disparity of agricultural products and basic inputs which causes reduction of the fertilizers' and chemicals' use, inadequate animal nutrition as

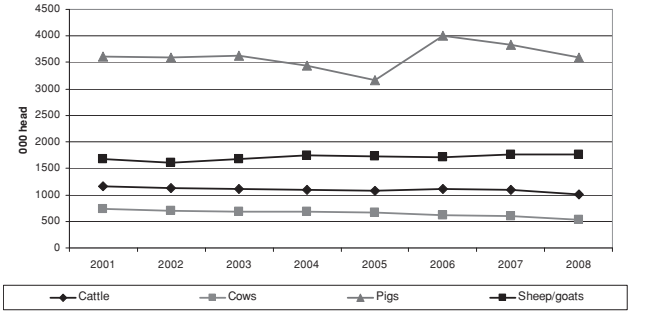

Figure 1. Number of main livestock categories (in 1000); 2000–2008; Serbia
Source: Statistical Office of the Republic of Serbia

well as disrespect of agro-technical requirements[4]. High yields, at the European level, have been recorded only in production of industrial plants (first of all in the case of sunflower and soybean).

5. Serbian rural mosaic

Rural areas in Serbia are highly diverse in economic, social and demographic terms, due to differences in their geo-morphological characteristics, (mountainous, hilly, plain areas), population changes, economic structures, infrastructure, environmental conditions, transport accessibility, etc. In an effort to identify similarities and differences among rural areas in Serbia, as well as to identify their strengths and weaknesses, a typology of rural areas was developed through cluster analysis[5] in the framework of preparing the present National Rural Development Programme (Bogdanov, N., Meredith D., Efstratoglou, S. 2008).

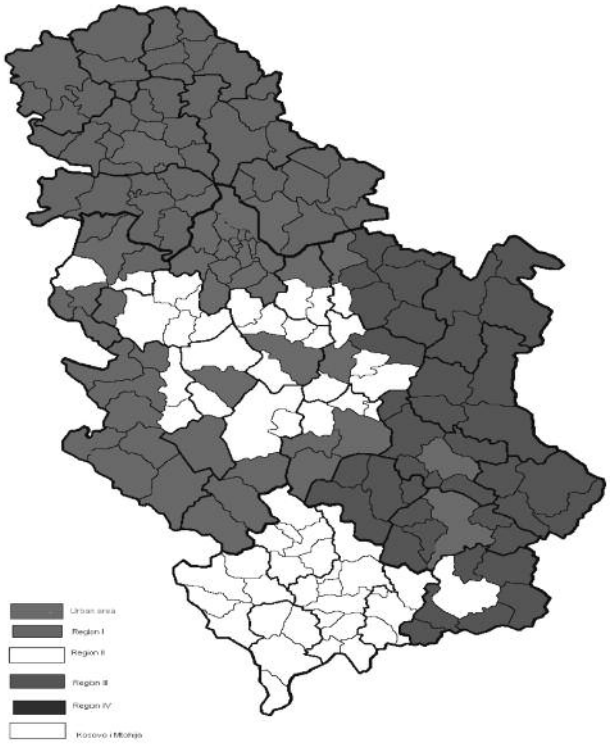

Figure 2. Typology of rural regions in Serbia
Source: "Selection of rural areas in Serbia for rural development programming purposes" by Sophia Efstratoglou, Natalija Bogdanov, David Meredith, EU Project SRDPPS Publication No 06

Region 1 – **Highly productive agriculture and integrated economy** – this region has favorable edapho-climatic conditions and rather appropriate structure of agricultural production dominated by more capital intensive activities, as compared to other rural areas of Serbia. Moreover, this region possesses adequately developed human capital, distinctively progressive entrepreneurship, a sufficiently diversified industrial sector and a well developed physical and economic infrastructure; as a result, this region displays more favorable socio-economic indicators of overall economic development and a more integrated and advanced economy.

Region 2 – Small urban economies with labor intensive agriculture – this region covers the area in the perimeter of urban centers and of bigger towns and their surroundings. The general economic structure and the productivity rate of certain economic sectors are more favorable in this region, compared to other parts of Central Serbia. Taking into account the proximity of this "region" to markets with large numbers of consumers, the structure of agricultural production in this "region" is oriented towards intensive farming producing mainly fruit, vegetables, and intensive livestock products.

Region 3 – Natural resources oriented economies, mostly mountainous – according to its geographical characteristics, this "region" is highly heterogeneous. Its economic structure is based on the exploitation of the rich natural resources – mining and agriculture. Unfavorable demographic trends are a particular characteristic of this area. This region covers the territory of Serbia which has the highest rate of rural poverty and of total unemployment.

Region 4 – High tourism capacities and poor agricultural structures – This "region" represents the part of Serbia with the greatest tourism potential and the highest rate of tertiary sector contribution to its economic structure. The agricultural structure is rather undeveloped and it is based mainly on the utilization of the rather abundant natural resources of feedstuffs.

6. Main Characteristics of Rural Areas in Serbia

Some of the main trends and problems that rural areas in Serbia are facing with are the following:

1. ***Demographic trends.*** Rural areas in Serbia, till the beginning of 1990s, were characterized by a strong out-migratory trend due to the swift growth and development of the other sectors of the economy**,** as was the case in all European states since the 1950s, and the parallel ***agrarian exodus***. During the 1990s, and because of the severe conflicts and war, population movements in rural areas were quite diverse. Rural areas continued loosing population, mainly the mountainous and less fertile areas, but there was, also, an inverse movement of population into the rural areas as well, mainly by internally displaced

[4] For example, in the last decade the wheat yield has only three times exceeded a level of 4 t/ha. In the course of the 1980s the yield has reached even 5 t/ha what is inaccessibly now. In production it is utilized uncertified seed as well, while fertilizer utilization has been reduced to one third of the optimal amount.

[5] "Selection of rural areas in Serbia for rural development programming purposes" by Sophia Efstratoglou, Natalija Bogdanov, David Meredith, EU Project SRDPPS Publication No 06

Table 6. The characteristics of defined rural regions in Serbia

	Total rural	*Region 1*	*Region 2*	*Region 3*	*Region 4*
1. RURAL AREAS –					
Population density	63.10	76.83	85.93	51.32	43.40
2. POPULATION AND HUMAN DEVELOPMENT INDICATORS					
% of change in population number 2002/1991	96.35	100.00	97.34	95.04	90.69
In – out migration rate	-0.14	5.81	0.43	-7.43	-5.43
% of population 15+	16.17	15.91	15.70	18.30	15.91
% of population 65+	17.49	16.29	18.33	14.28	20.33
Population aging rate	1.08	1.02	1.17	0.78	1.28
Population > 15 years					
Without primary education	28.19	24.16	28.67	27.14	34.74
Primary education	26.69	26.41	25.42	28.62	27.51
Secondary school	36.09	41.10	36.69	36.11	27.35
Faculty education	6.95	7.53	7.29	6.55	5.87
Unknown	2.07	0.80	1.94	1.59	4.53
3. EMPLOYMENT					
Employment structure by sectors (%)					
Primary	32.98	30.75	32.68	34.20	36.30
Secondary	30.69	31.20	30.79	31.72	29.11
Tertiary	18.60	20.28	19.41	17.80	15.35
Public	14.84	15.57	14.09	13.94	15.08
activity rate	53.61	53.14	55.43	56.35	50.78
employment rate	42.18	41.23	44.51	43.26	40.46
unemployment rate	21.32	22.40	19.69	23.22	20.33
unemployment rate – female	23.44	24.46	22.27	25.86	21.68
4. GDP					
GDP per capita Serbia = 100%	73.69	96.72	70.32	54.57	51.43
Structure of GDP by sectors (%)					
Primary	32.48	33.24	30.25	24.24	38.63
Secondary	41.12	42.36	39.71	43.36	38.16
Tertiary	26.06	24.14	29.67	32.08	22.64
Public	0.34	0.27	0.36	0.32	0.57
Agriculture	29.81	29.93	28.19	22.35	36.48
Primary sector productivity Serbia =100%	87.38	128.42	74.00	47.00	69.00
Secondary sector productivity Serbia =100%	74.93	102.00	65.00	57.00	53.00
Tertiary sector productivity					
Serbia=100%	62.48	71.00	61.00	60.00	48.00
5. AGRICULTURE					
% agricultural land of total area	65.30	83.29	64.34	53.95	55.03
% forestry	25.83	5.09	27.09	40.67	36.74
Structure of agricultural land					
Arable land	62.78	87.79	60.48	25.79	47.52
Orchards and vineyards	5.59	1.77	11.05	7.10	6.51
Meadows and pastures	30.88	8.64	28.34	67.11	45.93
cattle/100 ha of arable land	24.85	14.62	37.47	47.03	23.96
pigs/100 ha of sown land	91.19	80.20	131.20	96.25	84.00
sheep/100 ha of agricultural land	31.91	13.01	57.99	61.72	26.42
Average farm size	3.94	3.53	3.72	4.76	4.25
Land productivity (GDP in agriculture/ha) Serbia = 100%	88.62	111.48	110.52	48.44	61.77
6. TOURISM					
No of beds/1000 residents	13.71	4.29	17.31	30.53	15.18
% foreigner overnights	4.88	11.71	5.68	3.85	2.13
Overnights/no of beds	78.75	80.00	67.23	96.06	73.00
7. INFRASTRUCTURE					
No of telephone users/1000 residents	284	292	292	261	274
No of residants/1 doctor	512	566	457	584	470

Source: "Selection of rural areas in Serbia for rural development programming purposes" by Sophia Efstratoglou, Natalija Bogdanov, David Meredith, EU Project SRDPPS Publication No 06

persons (IDPs) and the urban unemployed. In total, during the period 1991-2002, population in rural areas of Serbia declined by 3.6% compared to an overall 1% decline in the country's total population.

2. ***Employment trends in agriculture and in rural areas in general***. The employment structure and basic characteristics of labor force in rural areas of Serbia are similar to those in other transitional countries: age and education structure of rural employees are unfavorable compared to those of the Serbia's general workforce; the rate of unemployment of the active rural population is higher, employment is high in primary and low in tertiary sector.
3. ***Diversification of rural economy***. The economic structure of rural areas of Serbia depends largely on the primary sector and the exploitation of natural resources. About 1/3 of the active population in rural areas is employed in agriculture. Agricultural employment shares are among the highest when compared to the EU, reflecting the continuing high importance of agriculture in the national economy and the ***low diversification*** of economic activities in rural areas of Serbia, resulting in the ***lack of alternative employment and income opportunities*****.** Apart from agriculture, the rural workforce is engaged in the food processing industry, wholesale and retail trade, building construction and transport. The manufacturing sector, some other economic and the service sector are still underdeveloped in rural areas. Besides agriculture, the private sector is only recognized in the trade sector. The main limitation for the more intensive development of services and processing is obviously influenced by the non-favorable financial market.
4. ***Traditional, mono-functional agriculture*** is still dominant with Serbia ranking among the most agrarian states in Europe. The range and vitality of natural resources, the private ownership of land and experience in business cooperation, are some of essential preconditions for the diversification of the rural economy. These have not yet been put into good use in Serbia. The large share of GDP coming from agriculture, processing, mining and energy industries is coupled with the low share held by the tertiary sector and this is characteristic of the economic structure of rural areas in Serbia. Serbia's performance with respect to diversification is comparable to that of the surrounding countries, since it is under the influence of almost identical factors: unfavorable position of the agrarian sector and rural areas in developmental policies and set courses, low asset accumulation capabilities of rural households, unfavorable capital market and uncertain investment environment, limited market for the placement of products and services by rural areas, inadequately educated human resources, with low level of private entrepreneurship potential.

5. ***Agriculture*** remains the predominant activity in most rural areas, characterized by small farm units, low productivity and low farm incomes. A large number of farms are subsistence farms with very small surplus production for the market. The findings of the 2002 Census confirmed that most labor force engaged in agriculture in Serbia falls within the category of the labor force producing for their own needs – subsistence production (75%), while only 20% of those involved in farming production for the market. The proportion of women in agriculture labor force which is producing for the market is extremely low (26.1%), and that has been registered in other transitional countries as well. The remaining 5% are working in jobs requiring manual labor (employees)

Table 7. Active agricultural population according to professional skills

	Total	Male		Female	
	Serbia	No	%	No	%
Workers in agriculture – producers for the market	107407	79377	73.9	28030	26.1
Agricultural producers meeting own needs	397278	208475	53.1	188803	46.9
Workers in agriculture for jobs requiring physical strength	24551	17738	72.2	6813	27.8

Source: Census of population, households and housing, 2002

6. ***Unemployment*** in rural areas is also high (21%), reflecting again the problem of lack of employment opportunities. Underemployment seems to be another serious structural problem of Serbian agriculture and rural economy. The position of the young rural population in the labor market in Serbia is characterized by substantially higher unemployment rates and comparatively lower employment opportunities in relation to the total rural population. The unemployment rates of those up to 25 years of age are nearly three-fold higher in comparison to the average one.
7. ***Agricultural productivity***, both land and labor productivity, is below EU averages, due to the low level of input uses (fertilizers, pesticides, seeds) and use of capital (machinery, modern equipment, infrastructure). Agricultural GVA/ha of agricultural land accounts for less than 40% of the EU-25. Agricultural productivity declined severely during the 1990s, due to the war that destroyed significant upstream and downstream industries related to agricultural production (fertilizer industries, machinery factories, irrigation, marketing outlets, processing industries, support services etc) and to international sanctions. The upstream and downstream industries to agriculture are improving gradually as many of those industries are privatized, at low pace though, and the agricultural sector is undergoing a restructuring. These changes have contributed to an increase in the GDP in agriculture and in productivity in the recent years, but productivity remains below its potential, which is considered as very high one.
8. ***Agro-food sector capacity*** linked to agriculture (upstream and downstream industries as well as food processing industries) has declined dramatically during the 1990s. Most of the remaining industrial capacities need modernization and technological improvement.
9. ***Infrastructure*** in rural areas, both physical and social, is poor and underdeveloped and it affects negatively rural areas competitiveness and social basics. Maintenance of up-grading of rural infrastructure can improve rural livelihoods and it is considered as prerequisite for attracting and retaining investors. Low-cost affordable solutions are required to respond to local needs, as well as to the limited financial capacities of local governments and rural households. Establishment of innovative mechanisms for proper maintenance and paying for the costs of existing infrastructure will be the critical thing having in mind the limited financial capacity of both the local administration and rural households. The above mentioned infrastructure is primarily owned by local administration bodies, which will need to strengthen their ability to evaluate their asset base and its condition.
10. ***Rural poverty*** is a much lower incidental in relation to the urban centers. Rural poverty is likely to be high among unemployed, older people who have remained in rural areas despite the deterioration of social services, farmers in more remote areas far from markets, farmers with very small farms and/or those ones with low fertility land and minority rural populations. Regionally, southern Serbia is likely to have higher levels of rural poverty, due to the lower historical levels of household income, greater isolation of rural communities and less favorable conditions for agriculture.
11. ***GDP per capita in rural areas*** accounts for 74% of the national average and it is well below the urban GDP per capita. The 2007 LSMS results as well as those of 2002, confirm that rural poverty represents one of the crucial characteristics of poverty in Serbia: the percentage of the poor population living in rural areas increased from 55% in 2002 to 61% in 2007; rural poverty in 2007 was almost halved compared to 2002 (9.8:17.7%), but it still remains twice as much as in urban areas (9.8%: 4.3%). The gap between rural and urban poverty has been grown from 1.6 to 2.3%, as a result of less reduction of rural population compared to the urban one.
12. With regard the ***environment,*** rural areas of Serbia are rich in ecosystems and biodiversity, which are identified and protected (5 national parks). Environmental pressure from agriculture is not very high due to low input utilization up to now. However, changes in intensity and structure of agricultural production could rapidly make the situation worse. The soil erosion in the hilly land but also in the plain land seems to be an important problem. Another problem is the quality of water that has been deteriorated since the beginning of 1990s, due to lack of obsolete water supply infrastructure and water disinfection. Lack of maintenance in the municipalities' sanitary and sewage systems increase the risk of water contamination.

7. Challenges for Serbia towards multifunctional development of rural areas

In last few decades awareness was raised about need for the integrated approach to rural development in Serbia. The concept of multifunctional development of agriculture and rural areas is still present mostly in scientific and political sphere without clear explanation or interpretation as well as mechanisms of implementation. Serbia's rural space is heterogenic and devastated in different extent, and therefore extremely complicated for planning of multifunctional development. Certain moves forward have been made in order to build institutional capacity to support multifunctional development – decentralization of institutions and rural development support, adoption of legislations, upgrading of knowledge, defining and coordination of programs of support through local and foreign funds, yet the multifunctionality as a concept is still not alive in Serbia as it should be.

Serbia is approaching the definition of national rural development priorities (the social, economic and ecological ones), which should be guided by the generally accepted models of the wider environment, first of all by the EU ones. No doubt one of the basic goals is stopping of the negative demographic and economic trends, as well as preservation of natural and cultural heritage of rural areas. Implementation of the mentioned goals is caused by fulfilling of the following tasks (*Bogdanov, N., Djordjevic-Milosevic, S.* 2005):

- Strengthening of the institutional mechanisms for improvement of socio-economic status of rural areas;
- Support to diversification of rural economy ias well as preservation of cultural heritage;
- Development of sustainable agriculture and stopping of further biological degradation (semi) agricultural systems;
- Establishment of the efficient system of land management (including soil protection against erosion, polution and unadequate utilization);
- Establishment of the system for protection of forests and forest land.

Improvement of life quality in rural areas is closely linked to incentives for diversification as well as the following requirements:

- Development of communal infrastructure in rural areas;
- An incrase of the labour employment both at the farms and out of them;
- Greater participation of women as well as excluded social groups in the rural economy;
- Development of small businesses, particularly those ones that rely on traditional and territorialy specific activities;
- Education, provision of equipment, support in promotion etc.
- Education and training of young population in traditional rural arts and crafts that support development of tourism, recreation, services for environment as well as quality of products;
- Development of tourism in general.

Any further improvement of Serbian rural economy, based on the requirements of the multifunctional development principles, according to recent experiences and knowledges, require several necessary structural and institutional changes as well as adjustments:

1. Strengthening of the local government capacities for the activities linked with implimentation ot the rural development programmes and projects;
2. Establishment of the local partnership and cooperation at all levels;
3. Construction od decentralized system of support to rural development throught strengthening of extension services, partnership between the public and private sector as well as the governmental and non-governmental ones.

In order to enable active support for rural developmen, Srbia has to intensify decentralization processes in such way that the process of da proces of individual competences' taking over should be followed by strong support at local level. Delays and problems that arise at the moment, despite good initiatives at the national level as well as an active financial support of the state, coming from the fact there is neither decentralized system of support nor institutional network for integral approach to the mentioned problem. In order to be utilized available own funds as well as EU funds in the most rationalized way, it is necessary to be constructed capacities for rural development at the local level.

Support for development of specific activities linked with agricultural multifunctionality, as well as the support for low-profitable activities with complex significance for development of rural ambient, have been identified in the governmental programmes as the necessary ones. Apropriate supporting system has not been formulated yet. Support for multifunctional development has necessary be carried out with the assistance of donor funds, but first of all in the transfer of necessary knowledge.

8. Conclusion

The Serbian rural economy is experiencing a number of problems. While some rural communities in Serbia continue to prosper, others are experiencing problems of socio-economic adjustment. Differences between rich North and poor South are drastic. Rural areas live in completely opposite social environment form – extremely rich, with living standard on the urban level or higher, to the extreme poverty lacking even basic infrastructure including electricity and water supply, access to transport, social and physical infrastructure, economic infrastructure etc. Opportunities for employment and wealth creation are very limited, mainly due to the lack of diversification and creation of new and innovative opportunities. This contributes even more to the poverty in rural areas and preventing its overcoming as a persistent problem. The quality of the environment in many parts of rural Serbia has also suffered in the face "misled industrial development" or intensive farming, contributing to the shift of population from rural to

urban areas and often generating sharp tensions between conservation and development.

Although most of these problems stem from broad social, technological and economic changes which go far beyond the national boundaries of the Republic of Serbia, only the national agriculture and rural development policy framework in last few years is trying to address them. However, national policy is still addressing all problems of rural areas integrally, although some rural areas and some sectors of the rural economy of the country have experienced problems of structural adjustment, while others face limits on dynamism and diversification. Redesigning rural development policy and multi-annual programming should in the future overcome these problems. The policy framework is considerable changing and adjusting to comply with EU policies and best practice.

In short, as rural areas are subject to the impact of big social and economic forces, oftentimes of international origin (globalization), rural life is changing rapidly and, for the weakest sections of the rural population, to the worst. The government cannot stop these forces, but it can influence substantially some of the changes and help rural areas to adjust, by elaborating and implementing appropriate policy measures. Depopulation of rural areas as a result of poverty, bad employment opportunities and low living standard is the most critical issue. Rural Serbia is despite of various favorable conditions for rural economy development loosing its rural social capital and population itself striving to reach urban areas. This is not completely new trend, but emerging phenomena observed is that this process is again speeding up despite of economy crisis in urban areas. On the other side there is an interest of surplus of industrial labor to move back to rural areas, however their access to land and credits, or any other prerequisite to start not just living in rural areas, but do economy to survive is terribly unfavorable.

Parallel to this Serbia is in sector of agriculture facing two parallel and key physical processes, and that is intensification of rural economy, including pressure on natural resources in lowland areas and extensification in mountain areas (but also some lowland areas with bad soils), afforestation and deforestation, development and abandonment. These complex processes result in reductions in biodiversity driven by both overexploitation and neglecting or under-management. High mountain/upland farm areas are extremely vulnerable to social, economic, and political changes in Serbia, leading to further depopulation of rural areas and landscape as well as ecological decline.

The lack of regional levels of government will be overcome by providing space for public-civil sector partnership and activation of capacities of local self-authorities to provide more efficient use of available funds from national budget, as much as to address on time problems in light of future absorption of EU funds. Through these channels will be conducted also work on establishment and/or strengthening of existing local action groups (multi-stakeholder and multi-sector groups) is central task in order to ensure future absorption of EU funds.

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METHODOLOGICAL AND INTEGRATION ASPECTS OF ABC-METHOD APPLICATION IN TRADE ORGANIZATIONS

Klychova Guzaliya S.[1] & Bagaev Ilya V.[2]

[1]*Klychova Guzaliya S., Dr.of economics, professor, head of account and audit department of the Kazan State Agrarian University (Russia), kgaukgs@mail.ru*

[2]*Bagaev Ilya V., Candidate of science in economics of the Institute of economics, management and law (Kazan)*

Abstract: In conditions of declining consumer demand and deficit of credit resources more and more managers of Russian companies think of necessity of introducing effective methods and systems of cost management. One of the most relevant is method of "Activity Based Costing" (ABC-method). Since, in western experts' opinion sectors of service and trade are adjusted to use of ABC-method even more than production, we should refer once more to the main methodological and integration aspects of ABC-method application and consider it from position of trade organization.

Key words: ABC-method, ABB-method, allocation of costs, managerial accounting

ABC-method in trade – is the variant of forming reliable information about prime-cost of selling goods, customers in service and taking place in organization business processes (*Vakhrushina M.A.,* 2004), exercised by means of previous distribution of consumed resources between organizations and following transference of operation cost to terminal object of calculation (goods, sales channels, etc.) (*Atamanov D.Y.,* 2003) Schematically ABC-method can be represented in the following way *(Fig. 1)*.

According to fig.1 all direct, relative to subjects of calculation expenses immediately referred to prime cost of respective goods, orders, clients etc., and indirect costs – go through the system of drivers, in the framework of which their distribution goes on.

After distribution of indirect costs between operations, there appears an ability to count the cost of accomplishment of each of them. As intended all operations, made in trade organization can be divided to main, service, and management. Main operations depend directly on the level of sales turnover and itself can affect on it, which conditional upon existence of between them and terminal subject of calculation (delivery operations, packing, setting out on shop window, cash services, etc.). The absence of this operations leads to work stoppage in organization (*Sokolov Y. V.,* 2004).

Service operations are meant for creation conditions, providing normal accomplishment of main operations of the organization (equipment repair, security, stuff recruitment etc.). Presence of management operations conditioned by their interconnection with all service and main operations, since that on any area of work there is a hierarchic subordination of some employees to the others. With the application of the given classification there is a necessity in appropriation of the cost of service and management operations either on main operations or directly on subjects of calculation, for this purpose three methods can be applied (*Ivashkevich V.B.,* 2003; *Horngren C., Foster G., Datar Sh.,* 2007):

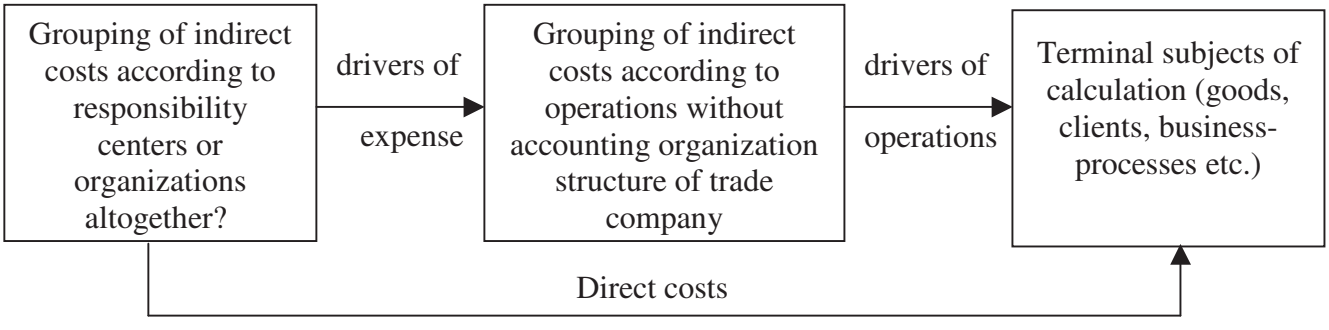

Fig. 1. General scheme of ABC-method.

1. Method of direct distribution: expenses of service and management operations are attributed with the help of drivers to terminal subject of calculation by-passing the main operations and each other.
2. Method of step-type distribution: First, we distribute cost of service operations, accomplished in unilateral manner for the purpose of uninterrupted accomplishment of main and management operations. Then the cost of main and management operations are distributed between terminal subjects of calculation. The variety of step-type distribution is method, implying previous distribution of cost not only service, but management operations, the result of which is full attribution of costs of non main operations on main ones, the cost of which, then transferred on terminal subjects of calculation.
3. Method of mutual distribution is based on definition of the system of multitude linear equations, describing difficult circular interconnections between non main operations. with that we consider situations when:
   a) service operations provide services to each other,
   b) service operation provides services to management operation, which, in its turn affects on service operation.

Sometimes for the purpose of simplifying of ABC-method the cost of service and/or management operations is not attributed neither on terminal subjects of calculating nor on main and service operations, but by analogy with the method of developed direct-cost is placed on decrease of the financial result in the end of accounting period. It is motivated by that the given expenses are "non-relative" i.e. they cannot be reasonably attributed or distributed between intermediate or terminal subjects of calculation.

Calculation of prime cost of terminal subjects of calculation in retail trading presupposes dividing into two groups: product-oriented (item, lot of goods, type of item, group of similar goods) and client-oriented (order, client, group of clients, (market segment), trade channel). In wholesale organizations enumeration of prime cost of subjects of calculation only by goods and clients is unreasonable because front office of trade organization needs to full assessment of expenses. For example, to assess profitability of selling certain lot of goods it is necessary to add prime cost of sold lot to the cost of servicing the client which has purchased that lot. Thus wholesale organization using ABC-method, compound subjects of calculation, such as "goods –clients" and "clients – goods".

Introduction of ABC-method can be implemented on the basis of its integration with other methods and systems, for example, with elements CVP-analysis, traditionally used in trade organizations. Focal point in the process of integration of ABC-method with the elements of CVP-analysis is allocation of variable in the cost of each operation i.e. variable depending on goods turnover, and constant, i.e. part independent from goods turnover. Then goes distribution of variable cost, using driver "Turnover volume", with it it's necessary to take into account interconnection of main and non main operations with terminal subjects of calculation. For example operation of pre-packing relates to only certain list of goods. Distribution of constant cost of accomplishment of each operation goes with the help of standard for ABC-method drivers. With that it should be appreciated that chosen as drivers of operations indexes must, firstly, set interconnection with terminal subjects of calculation, secondly they mustn't imitate the driver "Turnover volume". Thus, the conclusion can be made that as a result of integration with elements of CVP-analysis the methodology of ABC-method keeps being the same to a large extend, because in fact there goes additional detailing of indirect expenses, as a result of which the process of their further redistribution between terminal subjects of calculation goes on in turn – at first for the variable, then for the constant cost of each operation. *(see fig.2)*.

After distribution cost of operations, there comes the stage of calculation of prime cost of terminal subjects of calculation. Since in the process of integration of ABC-method with elements of CVP-analysis there takes place detailing of costs into constant and variable, forms of consolidated and pay-roll records must be added by columns, registering such detailing. Upon completion calculating accounts the analysis is carried on, the results of which are processed as a report to principal officers of trade organization. With that the analysis can be carried out both on the basis of ABC-method data, and on the basis of dividing of expenses into constant and variable (CVP-analysis), the basis of which is finding marginal profit, rate of coverage and breakeven point.

Besides more detailed analysis of the achieved results, integrated variant of ABC-method has other advantages. For

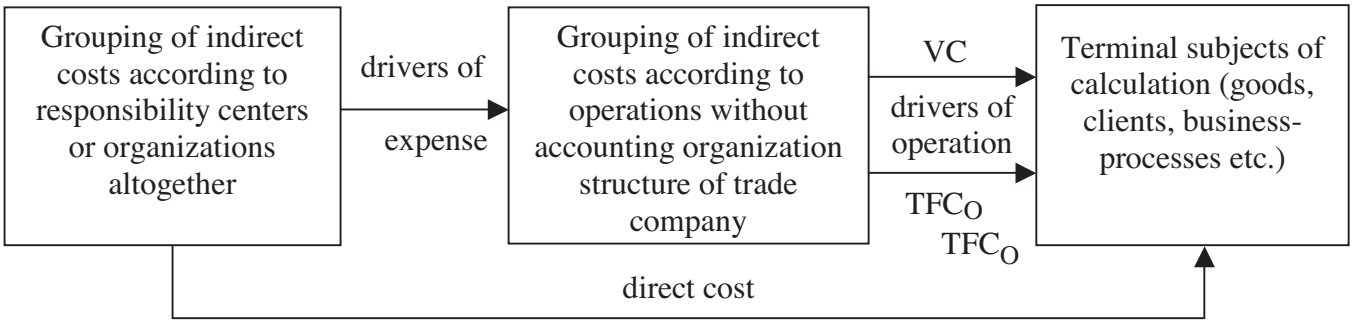

Fig.2. Scheme of ABC-method integrated with elements of CVP-analysis, where VC – variable part in operation cost, TFC – constant part in operation cost.

instance it provides more precise calculation of prime cost of terminal subjects of calculation, in comparison with the simple ABC-method. It can be explained by that, the simple ABC-method does not take into account the variable part of cost of service and management operations, which could be distributed between terminal subjects of calculation proportionally to company's turnover. Thus the level of "irrelevance" of the given operations would be lowered. Along with that, the integrated variant of ABC-method has an ability of previous forecasting cost of operations and terminal subjects of calculation, depending on probable increase/decrease turnover both altogether and in layout in groups of similar goods. Suppose that in the following period, expected increase in organization's total turnover on 7%, which is conditioned: increase in sales volume the first group of goods on 2%; increase in sales volume of the second group of goods on 6%; decrease in sales volume n-group of goods on 1%.

Percent terms of increase/decrease are calculated relatively to the current volume of total turnover of organization. In such case we can apply the following technique of expenses forecasting:

1. Factual variable part in the cost of each operation multiplies by coefficient 1, 07. Thus we find forecasted cost of variable part in the cost of each operation for the next month (VC_{pl});
2. Factual constant part in the cost of each operation remains unchanged ($TFC_f = TFC_{pl}$);
3. We find total forecasted cost of each operation for the next month ($VC_{pl} + TFC_{pl} = \Sigma_{pl}$);
4. We find difference between forecasted and factual cost of each operation ($\Sigma_{pl} - \Sigma_f$);
5. We calculate consumption factor of operations driver by terminal subjects of calculation (d_{pl}/D_{pl}). With that for the common value (D_{pl}) we take 7% forecasted increase of total turnover, and for indexes of consumption of driver by the subjects of calculation (d_{pl}) – percentage value of forecasted increase/decrease of goods turnover, calculated relatively to index of the total turnover of organization of the current period;
6. We find increase/decrease of variable expenditures by the terminal subjects of calculation: $(\Sigma_{pl} - \Sigma_f) * d_{pl}/D_{pl}$;
7. To the increase/decrease of variable indirect expenses, which was found by the terminal subjects of calculation, we add the sum of factual indirect expenses which was found by the terminal subjects of calculation in the accounting month. Integration of ABC-method with elements of CVP-analysis is able to give organization other advantages. For example, it is an ability to calculate breakeven point for service operations i.e. assess efficiency of their accomplishment. Thus we can determine the level of breakeven condition, for instance for legal department, accountants office, security department, repair service, etc. If the results of carried out analysis show that efficiency of accomplishment of service operation is lower than breakeven level, then principal office of trade organization needs to refuse to accomplish that operation or pass its accomplishment over to subcontractors.

In conditions of integration of ABC technique with the system of budgeting (ABB-method) budgets of commercial and administrative expenses of trade organization are replaced by multitude of budget operations, which allows forming indexes for the upcoming period more reasonably. To our opinion we can distinguish four main stages, connected to forming of budget operation indexes:

1. preparatory: finding of preliminary budget cost of operations with the help of rate of operations' drivers, calculated on the data of the past budget period, and also values of the drivers of operations of the next period.. For example, if, according to the results of trade budgeting process there was determined that sales turnover (D) of pre-packed goods will amount in January – 128473 rubles, in February – 119394 rubles, in March – 207491 rubles and so on and annual rate of the driver of operation (r_0), calculated according to the data of the past period, is 0,12 rubles/rubles, then preliminary budget cost by months will comprise:

in January: 128473 * 0,12 = 15417 rubles.;

in February: 119394 * 0,12 = 14327 rubles.;

in March: 207491 * 0,12 = 24899 rubles and so on.

2. analytical: forming and specification of cost items by each operation for the budget period. Technology of forming items of operation budgets in general view can be the following:
   a) determination (specification) of the list of items of expenses, included in the cost of each operation;
   b) determination of drivers for each item of expenses (drivers of expenses;
   c) items of expenses are divided into dependant and independent from driver of operation, determined during the preliminary stage;
   d) determination of norms of spending of drivers of dependant expenses in reliance operation driver unit;
   e) the norm of spending of dependant expenses driver is multiplied by budget value of the driver of operation, as a result of which we find natural term (sometimes – at a time monetary) expression of budget item. Then natural expression of budget item is multiplied by presupposed rate of driver of expenses (hourly wages of an employee, cost of one liter of gasoline, cost of one item of packing material etc.) as a result of which we find its ruble equivalent.
   f) determination of overrun or undershoot of driver of dependant expenses and its matching with the other operations, with the purpose of lowering of its overrun or undershoot. With that, for the reasoning of overrun or undershoot it's necessary as in paragraph "e" to use rates of drivers of dependent expenses;

g) values of independent from the drivers of operations, items of expenses are determined in organization altogether, or by divisions, and then are distributed between operations proportionally to drivers of expenses (sq. meter, unit of similar equipment, etc.);

3. Calculated: finding of the final budget cost of operation accomplishment, and also finding rates of drivers of operations for the next budget period with the help of matrix form table, where horizontally is the information about items and groups of expenses, vertically – about accomplished operations in organization. If trade organization has several divisions it makes corporate-wide matrix of budget cost of operations;
4. Conclusive: calculation of the budget prime cost of the terminal subjects of calculation. The budget of prime cost consists of two parts, the first of which is made for showing the process of distribution of the budget cost of service and management operations on main operations. If distribution goes on with the help of step-type method, then the first part of budget may consist of two and more forms, since their quantity directly depends on quantity of "steps", provided by the technique of distribution (*Dobrovolskiy E., Kabanov B., Borovikov P.,* 2006). The second part of the budget is designed to show the process of calculation of terminal subjects of calculation prime cost. With that budget cost of main operations, distributed with account of secondary expenses is added to budget value of direct cost on corresponding positions of subjects of calculation. By analogy with developed direct-cost the form of the second part of budget may have step structure which can be explained by the presence in ABB system different levels of expenses(item, installment, sort, group of goods.)

Thus ABB – method has specification, distinguishing it from traditional approach to budgeting. With that given specification affects the budget structure, ways of forming the budget indexes, and also on method of analysis and form of budgets. However, changes, necessary for the transformation of traditional system of budgeting to ABB-method do not have global character, because they accomplished only in a part of indirect (administrative and commercial) expenses, for which planning, account, control and analysis must be accomplished in another way.

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MORAL HAZARD PROBLEM FOR POOR UNDER JOINT FOREST MANAGEMENT PROGRAMME EVIDENCE FROM WEST BENGAL IN INDIAN CONTEXT

Debnarayan Sarker

Professor and Secretary, Centre for Economic Studies, Department of Economics Presidency College, 86/1 College Street, Kolkata – 73, Email: sarkar_d_n@rediffmail.com

Abstract: This study explores policy framework on current JFM programme, which secures traditional right of local need subject to the carrying capacity of forest, but face moral hazard problem in which Government cannot legally monitor actions against JFM households- which live below poverty line and that extract TFPs for their livelihood, and thereby threatening to sustainability of forest, whereas the incentive work opportunities that Government provides them is insufficient for their subsistence. A good incentive fee dependent on their work **plus** a lump sum fee (subsidy) are required for their livelihood sustenance and sustainability of forest resources.

JEL. Classification: Q23, Q56, Q01, Q58**.**

Key words: Non-Timber Forest Products, Timber Forest Products, Forest wage work, Poor JFM households

Abbreviations used

JFMP	Joint forest management programme
JFM	Joint forest management
TFPs	Timber forest products
NTFPs	Non-timber forest products
TFPs	Timber forest products
FPCs	Forest Protection Committees

It seems to be an important area of research for social scientists to provide policy prescriptions on the current JFM programme, that tries to secure the tradition right of local need of poor forest fringe communities from degraded forest resources by providing their requirements of fuel wood, fodder, minor forest produce , small timber and the share subject to the carrying capacity of forest, which deal with the moral hazard problem for Government ,the owner of the JFM forest , because the latter , cannot legally monitor actions against the poor JFM households- which live below poverty line and that extract TFPs for their livelihood sustenance, and thereby threatening to the sustainability of forest resource, whereas the incentive work opportunities provided by Government to those poor JFM households is insufficient for meeting up the bare minimum level of subsistence. This study is an attempt to explore this issue based on a field study in West Bengal state in Indian context.

What is the importance of JFM in Indian Forestry? Several strands have contributed to the present emphasis on community involvement in forest protection in the context of Indian forestry. JFM emerges as the latest in a long history of policy changes, attempting to create a new relationship between 'state' and 'community'. The old custodian forest management systems were rendered ineffective due to various reasons, mainly traditional emphasis on production of commercial wood and disregard for local needs (*Sarmah and Rai,* 2001:213; *Poffenberger,* 1995:342-50). To secure the right of local need of poor forest fringe communities from forest resources, the 1988 forest policy of the Government of India recognized the need to fulfill the requirements of fuel wood, fodder, minor forest produce and small timber of rural and tribal people, and emphasized the need to create a massive people's movements for protection and development of forests. But the benefit-sharing arrangements between states and forest communities differ widely between states within the country. But empirical evidence from across the world now confirms that community-based regimes are a viable option for the management of local common property resources (*Baland and Platteau,* 1996; *Berkes,* 1989; *Bromley,* 1992; *Correa,* 1999; *Martin,* 1992; *Naik,* 1995;).

Hence the relevant issue might be: does these benefit-sharing arrangement between states and forest communities under community forest management programme meet up the survival need of poor forest communities from forest and thereby restricting the latter's illegal collection of Timber Forest Products (TFPs)? It is argued that the survival of community needs of poor communities should be recognized on a priority basis as pillars for strengthening community participation (*Mukherjee,* 1995). The most important factors motivating massive local peoples' participation for

protection and development of forests is the expectations of immediate returns via wages and incomes from sale of old plantation and local consumption need to fill the requirements of fuel wood, fodder, minor forest produce and small timbers (*Mukherjee,* 1995; *Naik,* 1997). The Arjuni (an area under JFM programme) experience in JFM of West Bengal shows that unless survival needs of food and livelihood are met, participation in natural resource management would always remain threatened (*Mukherjee* 1995: 3132). This experience goes a long way to show that survival needs are of prime importance and can easily destabilize community rights and benefits to resource management. The findings of *Naik* (1997), based on two case studies in Gujarat, help identify the critical factors (survival needs for food and livelihood) in making JFM successful and controllable. Any JFM which does not recognize the significance of creating strategies for sustaining livelihood – basic food security – at the local level has a doubtful future (*ibid*).

The study of *Sarker and Das* (2006), based on the study of some FPCs under western Midnapore division in West Bengal, shows that for the maintenance of regular consumption needs of the local FPC-households, NTFP is the main source of money income because income from the share of government's timber revenue and wages from forestry work constitute a small part of their total income (p.279–280). Consequently, the NTFP is bound to provide the main and stable source of forestry income and it plays the major role for sustenance of JFM programme (ibid:286). This study also signifies that only government's timber share (without any other share of the forest resource, namely NTFPs) was insufficient to meet the immediate survival needs of poor JFM households. It caused large illicit felling (illegal timber extraction), mainly, by the poor forest communities due to the urgency of meeting immediate seasonal livelihood needs and food insecurity, which plagued the area and led to conditions of semi-starvation among the poor people (p.279).It also implies moral hazard problem for government, the owner of the forest resource, for poor forest communities in particular, because such an illicit felling (illegal timber extraction) might be threatening the sustainability of forest resources.

There are also evidences that despite successful achievements of the JFM programme in West Bengal which safeguards the traditional rights and concessions of the forest fringe communities on forestland by providing them with timber share and the share of NTFPs , Government, the owner of forest resources, also has to face a moral hazard problem for all categories of JFM households in general and for marginal and small categories of one joint FPC village(Baragari JFM village) in particular who engage in the JFM programme as agents of government (*Das and Sarker,* 2009a: 326–330; 2009b:60). Their study reveals that Government, the principal, cannot legally control the major illegal felling of TFPs by these poor households of Baragari JFM village. Consequently, despite the fact that most of the JFM households decrease their illegal extraction of timber forest product after JFM they practiced before JFM situation, households below poverty line in the said joint FPC village((Baragari FPC village) increase their illegal extraction of TFPs. This is mainly because, their study reveals, the change of income from legal forest products of the poor categories of households of Baragari JFM village after JFM is much lower than that of same categories of households in other FPCs. In all FPCs, except Baragari, the change of income from legal sources of forest is highly positive ranging between 42.91 percentage point and 117.17 percentage point; in Baragari, this change is negative (-12.92 percentage point).Also important is that alternative source of income other than forest source for the poor JFM households is insignificant. It clearly indicates, they argue, that force or law cannot effectively control the illegal collection of TFPs of the poor categories of households, which live below poverty line, until and unless a considerable income from legal forest source meets up their bare minimum level of subsistence (ibid).

One may argue that a good incentive fee dependent on the work (output) would be required for livelihood sustenance of the poor categories of households of Baragari FPC and sustainability of forest resource and thereby reduce the moral hazard problem of Government. But the study of *Das and Saker* (2009b: 68; 2008:40-1) reveals that the only work opportunity Government provides to JFM households in these areas is forest wage work .Significantly, the number of working days for poor JFM households as wage labour under forest department (Government) is more or less fixed at a fixed wage rate of Rs. 67.50, which is about a double of the prevailing average local wage rate for usually eight hours of service from 8 a.m. to 4 p.m. One person of each JFM household with a family size of five or less gets the opportunity of forest work from 35 to 40 days per year. If the size of member of a household is greater than five, usually, two persons get the opportunity of forest work for 70 to 80 days in total per year from the same family (ibid).Also important is that the increase of opportunity of forest work by forest department (Government) depends on new plantation programme, which is usually long term in nature. The study of *Sarker* (2009) shows that the production of NTFPs the poor JFM households legally collect from forest do not usually increase within the short period (pp80-1).

In these perspectives one of the vital issues is: if the incentive work opportunities provided by Government to the poor JFM households- which live below poverty line and that extract TFPs for their livelihood sustenance in which government , the owner of the JFM forests, cannot legally monitor actions against them(or force or law cannot effectively control the illegal collection of TFPs) – can hardly be increased in the short period in the JFM forests ,how , then, Government should deal with such a moral hazard problem which is threatening to the sustainability of forest resources. In such a situation a good incentive fee dependent on their work (output) might not be sufficient for livelihood sustenance of poor people and sustainability of forest resources. There seems to be two ways to tackle the situation

by the Government, the owner of the JFM forest– one is to increase the production of NTFPs, fuelwood etc. so that the very poor households may increase their legal collection of those products; the other is to execute a good incentive fee dependent on their work (output) plus a lump sum fee (subsidy) independent of their production for livelihood sustenance of those people and sustainability of forest resources. But the production of forest products (like NTFPs) the very poor households legally collect from forest do not usually increase within the very short period. Then the alternative source to increase the income of the poor households (who live below poverty line and that extract of TFPs for their livelihood sustenance in which government, the owner of the JFM forests, cannot legally monitor actions against them) should be to execute a good incentive fee dependent on their work (output) plus a lump sum fee(subsidy) for livelihood sustenance of those people and sustainability of forest resources by the government.

This study, however, both theoretically and empirically seeks to explore policy framework for dealing with a moral hazard problem for Government who cannot legally monitor actions against poor JFM households, which live below poverty line and that extract Timber forest products, which is threatening to the sustainability of forest resources, for their livelihood sustenance under JFM programme in a situation where the incentive work opportunities provided by Government to those poor JFM households is insufficient for meeting up the bare minimum level of subsistence. The underlying hypothesis is that a good incentive fee dependent on forest wage work (output) for JFM households plus a lump sum fee(subsidy) independent of forest work are required for livelihood sustenance of JFM households and sustainability of forest resources.

This paper proceeds as follows. Section II presents the importance of the study. Section III provides a simple theoretical model based on the hypothesis of the study. The data set and methodology appear in section IV. Section V presents the key results of the empirical study in keeping with the objective of the study. Conclusions are contained in section VI.

Section II

An optimal contracting arrangement by the government – JFM household framework – can be defined as follows: A contract is optimal if it maximizes the expected utility of the government for an expected utility of the JFM household subject to the condition that the JFM household finds it worthwhile to participate in the contract. As is well known, government is the owner of forest land and under JFM programme government employs JFM household (agent) to work under the former for the management of forest resources. Let us suppose that there are only a finite number of output levels (q_1, q_2, q_3, … q_n). Let v and r be two efforts that can be chosen by the JFM household (agent) out of some set of feasible efforts. These efforts influence the probability of occurrence of different output levels. Let us suppose that the probability that the output level q_i will occur if the agent chooses effort v(r) by π_{iv} (π_{ir}). Let $x_i = x(q_i)$ be the amount that the government pays the JFM household if output level q_i is observed. We denote the lump sum fee (subsidy) k, the minimum subsistence level of JFM household, independent of q_i. Then the expected profit of the principal (government), if agent (JFM household) chooses action v, is

$$\sum_{i=1}^{n}(q_i - x_i)\pi_{iv} - \sum_{i=1}^{n} k_i \qquad (1)$$

The expected profit is assumed to be linear in q_i. It implies that the principal is risk-neutral[1]. We assume that the agent is risk-averse[2] and maximizes the expected utility from the payment. We also assume that the JFM household (agent) finds efforts costly, and write c(v) be the cost of effort v. The cost enters into JFM household's utility function linearly. If JFM household chooses effort v, his/her expected utility less cost is given by

$$\left[\sum_{i=1}^{n}\{u(x_i)\pi_{iv}\} + \sum_{i=1}^{n} k_i\right] - c(v)$$

, where u is the Von Neumann-Morgenstern utility function of the JFM household (agent).

Two types of constraints are imposed on JFM household in this self-enforcing contract (non-enforceability in the courts does not make contracts valueless. The contract acts in such a way that each party chooses to adhere to its term) – participation constraint and incentive comparability constraint.

Since the JFM household is a utility maximiser, he/she will choose action u if

$$\left[\sum_{i=1}^{n}\{u(x_i)\pi_{iv}\} + \sum_{i=1}^{n} k_i\right] - c(v) \geq \left[\sum_{i=1}^{n}\{u(x_i)\pi_{iv}\} + \sum_{i=1}^{n} k_i\right] - c(r) \qquad (2)$$

and will choose effort r otherwise.

This constraint is referred to as the incentive compatibility constraint. The second type of constrain says that the JFM household may have other alternatives available that give him/her some utility $\bar{u}$. Then the participation constrain is

$$\left[\sum_{i=1}^{n}\{u(x_i)\pi_{iv}\} + \sum_{i=1}^{n} k_i\right] - c(v) \geq \bar{u} \qquad (3)$$

The expected utility the JFM household gets from this job must be at least as great as the utility he/she could get elsewhere.

If the payment is based on effort rather than on output, then the government is to determine the expected profit from each effort by the JFM household and then induce the effort that minimizes government's expected profit. But as the efforts of the JFM household are hidden, payment to him/her can not be a function of the unobservable effort (v, r). It can be made contingent on the observed output q_i. Attempt has been made to develop results along this line. Suppose that there is no incentive problem. However under the risk-neutrality assumption the government is indifferent to risk and thus there is no need to trade off incentives for risk-sharing. In such a case the principal's (government's) optimization problem is

$$\sum_{i=1}^{n}(q_i - x_i)\pi_{iv} - \sum_{i=1}^{n} k_i$$

subject to $$\left[\sum_{i=1}^{n}\{u(x_i)\pi_{iv}\} + \sum_{i=1}^{n} k_i\right] - c(v) \geq \bar{u}$$

where maximization is taken place over x_i.

In general, government will want the JFM household to choose xi to just satisfy the constraint so that

$$\left[\sum_{i=1}^{n}\{u(x_i)\pi_{iv}\} + \sum_{i=1}^{n} k_i\right] - c(v) \geq \bar{u}$$

The Lagrangian for this optimization problem is

$$L = \sum_{i=1}^{n}(q_i - x_i)\pi_{iv} - \lambda\left(\left[\sum_{i=1}^{n}\{u(x_i)\pi_{iv}\} + \sum_{i=1}^{n} k_i\right] - c(v) - \bar{u}\right)$$

where λ is the Lagrange multiplier.

Government is risk-neutral because her expected profit is linear in x_i. Differentiating L partially with respect to x_i and λ, and setting the derivatives to zero, we have the first order conditions as

$$-\pi_{iv} - \lambda u'(x_i)\pi_{iv} = 0$$

$$\left[\sum_{i=1}^{n}\{u(x_i)\pi_{iv}\} + \sum_{i=1}^{n} k_i\right] - c(v) - \bar{u} = 0$$

The first of the above conditions states $u'(x_i) = 1/\lambda$, a constant. i.e., x_i must be independent of i (x_i is a constant).

The model assumes that that the wage rate for each individual of JFM household, who work under forest department as forest wage labour, is fixed (*Das and Saker* (2009b: 68; 2008:41). What it implies that x_i is independent of i. The wage rate does not depend on the return (high or low) of forest wage work of JFM household.

This theoretical model tries to explore that a good incentive fee dependent on their work (output) might not only provide livelihood sustenance of poor people living below poverty line and ensure sustainability of forest resources; rather a good incentive fee dependent on their work (output) plus a lump sum fee (subsidy) are required for livelihood sustenance of those people and sustainability of forest resources. This theoretical model is important in that moral hazard problem that appears from asymmetric information is a trade – off between risk bearing and incentives; but such a trade-off cannot provide livelihood sustenance to poor people living below poverty line under JFM programme, because the potential financial and economic liabilities the government have to bear for their agents (poor JFM households) is more than the former's expected return(i.e., the return of the incentives) they expect to receive from their agents- work (output).

Section III

As is well known, The Forest Conservation Act of 1980 and the 1988 National Forest Policy in India marks a major departure from the earlier policies which emphasis on production of commercial wood and disregard for local need (*Poffenberger,* 1995; *World Bank,* 2006: xvi; *Sarmah and Rai,* 2000: 213), because Government of India, then, could understand that until and unless the benefit of forest fringe communities is secured, neither forest resources nor forest management can be sustainable. In order to execute sustainable forest management system, the active participation of local forest communities in forest management for conservation and development plans of forest resources and the participatory forest management on usufruct sharing basis for safeguarding their traditional rights subject to the carrying capacity of forest was first introduced and implemented by the National Forest Policy of 1988.

If we look into the historical perspective of Joint Forest Management programme in West Bengal in particular, we find that, in keeping with the other parts of India, the local forest fringe communities of West Bengal have also mobilized repeatedly from long past against the custodian forest management system (commercial need either of the government or of the rulers of India) to protect their traditional right on forest (*Poffenberger,* 1995). With regard to the south West Bengal *(Midnapore, Bankura, Purulia Burdwan and Birbhum)*, including our study area, is concerned, *Santal, Bhumij* and *Mahato* tribal, with some low caste Hindus, mobilized repeatedly against *Mughal* and *British* rulers to protect their traditional rights on forestland from long past. *Chur Rebellion* (from 1767 to 1805), *Naik Revolt* (1806–16), *Hul Rebellion* (1855) are the glaring examples of the history in south West Bengal where forest fringe communities organized resistance against rulers of India to protect their own right in forestland.

However, far-reaching developments in the historic, demographic, economic, social and environmental fields have resulted in the revision of the National Forest Policy in 1988. But despite the fact that successful examples of joint forest management in India were beginning to emerge in the Arabari Hill in Midnapore district of West Bengal during the early 1970s (*Sundar and Jeffery,* 1999:28), the JFM movement gathered momentum when in 1989 a programme of resuscitation and reestablishment of *moribund sal* and other hardwood forests in the districts of Midnapore, Bankura, Purulia, Burdwan and Birbhum in south West Bengal was initiated by the government with the active participation and involvement of the local people. In keeping with the JFM movement in India, West Bengal government's resolution was also issued in 1989, declaring the principles of sharing of duties, responsibilities as well as the usufructs from the forests to the participant local people living in the fringe of the forests. The procedures for establishment of the institution called Forest Protection Committee (FPC), comprising of these participants as members, were also defined.

The foundation of an innovative forest protection system and the participatory forest management was thus laid for the forests of south West Bengal which covers approximately 38 per cent of the total forest area of the State. While explaining the achievements of JFM programme in West Bengal, West Bengal State Forest Report (2000) clearly mentions:

"*As a result of participatory and joint forest management activities in south West Bengal the vast tract of scattered,*

over-exploited and degraded forests containing mainly the sal were resuscitated and restored to productivity with great improvement in quality and density " (SFR, 2000:47).These participatory activities are now progressing in other areas of the state as well.

Government report (SFR, 2000) reveals that the overexploitation of trees for timber was so severe that thousand and thousand hectares of forest lands in the south West Bengal except *Sundarban* were almost treated as bare plain land, when the JFM was established; but such lands are almost secured after JFM programme. Secondly, government revenue from the degraded forest was almost nil when the JFM was established, but it has significantly increased after JFM (*Das and Sarker,* 2008: 82–91; *Sarkar and Das,* 2008:22; *Das and Sarker;* 2009a: 324).

Despite such a successful achievement of JFM programme in West Bengal, some poor JFM households have higher incidence in the illegal extraction of Timber Forest Products (TFPs) to meet up their bare minimum level of subsistence in which law or force cannot effectively control the illegal extraction of TFPs of these poor JFM households, which live below poverty line (*Das and Sarker,* 2008:91; *Sarker and Das,* 2008:35; *Das and Sarker,* 2009a:59; 2009b: 326–330; *Sarker,* 2009:78). It is, no doubt, a moral hazard problem for the Government because such an illegal extraction of TFPs by the JFM household might be threatening the sustainability of forest resources. Moreover, the pressure of population on forests in the long run might lead to substantial damage of forest resource, causing acute environmental damage for West Bengal in future.

This empirical study, however, tries to explore policy framework as to how both livelihood sustenance of poor JFM households and sustainability of forest resources can attained simultaneously. This empirical study is important in that it might help us examine whether the 1988 Forest Policy of India and thereafter West Bengal Government' JFM resolution in June 1989, which for the first time specifies the rights of the protecting communities with the help of establishing Forest Protection Committees/Village Forest Committees over forest lands, has been effective on meeting the local needs in particular of the tribal and the poor living near the forests and in safeguarding their traditional right and concession subject to the carrying capacity of forests .

Section IV

In order to examine our stated objectives based on both female and joint FPCs, we mainly depend on field survey in Midnapore and Bankura districts of West Bengal. The inclusion of Midnapore district under our field survey is due to the fact that the key precursor to JFM from the managerial perspective was a local level initiative, which was started from the Arabari hills under Midnapore district of West Bengal during the early 1970s. Moreover, as we attempt to examine the stated objectives in both the female and joint FPCs, some female FPCs are also in operation along with joint FPCs in Midnapore district. The main argument behind the inclusion of Bankura district under our study may be judged by the fact that female FPCs were first established in Bankura districts in West Bengal during early 1990's and the majority of female FPCs are now running in Bankura district. As per the official records (State Forest Report, Government of West Bengal 2000) 17 female FPCs are in operation in Bankura district – 4 in Bankura North, 9 in Bankura South and 4 in Panchet forest divisions (Sarker and Das, 2002:4410). However, during the first year of my UGC Minor Research Project entitled "How to execute the Joint Forest Management Programme with Sustainability?" a study of Joint FPC and Female FPC in four divisions under Midnapore and Bankura districts in West Bengal, we conducted our field survey in four FPCs based on stratified random sampling method from different forest ranges under two forest divisions – one in West Midnapore (Midnapore district) and the other in North Bankura (Bankura district). First, forest divisions and then forest ranges were selected by purposive sampling, but the selection of sub-samples- FPCs- from within the selected ranges depends purely on chance. Two FPCs were selected from Gidini Range and one, from Hatibari Range under West Midnapore division. Two Female FPCs are in operation in Gidini Range under West Midnapore district – Kherajhore Female FPC and Depudanga Female FPC. Kherajhore Female FPC was randomly selected from them for our field study. We also randomly selected one Joint FPC based on the total Joint FPCs under Gidini Range. Under Hatibari Range in West Midnapore division, no Female FPC is in operation. However, we randomly selected one Joint FPC (Goulbur Marshal) from out of all Joint FPCs under Hatibari Range. One Joint FPC was also randomly selected from Gangajalghati Range under North Bankura division (Bankura district) as there is no female FPC in this range. However four FPCs – one Female FPC and three Joint FPCs – were selected based on stratified random sampling method. Firstly, districts, forest divisions and then forest ranges were selected by the purposive method. Finally, the selection of sub-samples of FPC from three forest ranges depends purely on chance (Simple Random Sampling Without Replacement). The subdivision of the population into strata is done by the purposive method, but the selection of sub-samples within the final strata (forest ranges) depends purely on chance. However, our final survey considers all units of households (134 in number) – Kherajhore (32), Khatgeria (17), Goulbermarshal (59) and Amjuri (26) – in four FPCs. The data of these four sample FPCs were considered for two situations – before JFM and after JFM. The period of collecting data for 'after situation' in all FPCs is same- between February and October 2005. But the period of data for 'before situation' was not same to all FPCs. JFM programme in Kherajhore, Khatgeria, goulbermarsha and Amjuri was started on March 1994, August 1995, May 1994 and July 1995 respectively. 'Before situation' for each FPC is considered for the preceding one-year period from the starting of JFM programme in the respective FPC. For

example, 'before situation' in Kherajhore FPC was between March 1993 and February 1994. It is worth mentioning that each FPC was formed in the respective village; so the FPC/village is synonymous in this study. They will be referred to as 'JFM village 'in the section of the' key results of the empirical study'.

In the empirical part this study considers simple technique of measurement like arithmetic mean, proportions, paired t test for equality of two means for examining our stated objectives, and tabular analysis for examining our stated objectives.

Section V

All sample villages fall into the semi-arid agro-climatic category with red soils, insufficient rainfall and not good in terms of moisture retention. The socio economic profile of the sample villages is presented in *Table 1.* It shows that all households belong to either very poor or poor category in two (Goulber Marshal and Amjuri) out of four villages. Out of the remaining villages the incidence of very poor and poor category in Kherajhore and Khatgeria works out to about 93.75 and 70.59 per cent respectively. Although more than two-fifths of the households are landless in all JFM villages, the incidence of landless households is relatively high in Amjuri (73.07 per cent) and Goulbur Marshal (57.62 per cent). Worthwhile to mention that both very poor and poor income group in all JFM villages live below poverty line. These classifications (very poor, poor and medium) have been taken from *Bezbaruah* (2004). Also important is that , one may calculate real income after deflating the money income by cost of living index; but there would be, hardly, any change in the money income for the classification of households (very poor, poor and medium) that appears from *Bezbaruah* (2004) during the period of our survey(between February and October 2005). As regards the caste status is concerned, all the households in two (Goulber Marshal and Amjuri) out of four villages belong to ST category and the average size of household members in these two

Table 1. Socio – Economic Characteristics of the Sample FPCs/Village

FPC/ Village	No. of HH	Average size of HH	Average size of Land Holding (acres)	HH belonging to Wealth Category			% of H H belonging to		% of FPC member	
				Very Poor*	Poor**	Medium***	SC	ST	Illiterate	Primary Edn.
Kherajhore	32	4.30	3.25(24)	18[14]	12	2	6.25	3.13	56.25	37.50
Khatgeria	17	4.68	3.52(18)	7[7]	5	5	-	14.18	58.82	29.41
Goulber Marshal	59	6.38	2.65(49)	38[34]	21	-	-	100	66..10	20.34
Amjuri	26	6.02	1.35(14)	23[19]	3	-	-	100	69..23	26.92

Note: HH=Households. Figures in ( ) indicate percentage of area under Wastelands. Wastelands include private as well as common lands that are not being cultivated. Figures in [] indicate number of landless labour households.

* Indicates per capita annual income within the range of Rs.0-8500;

** implies per capita annual income within the range of above Rs.8500-11000;

*** represents per capita annual income within the range of above Rs.11000-13000. Both very poor and poor income groups live below poverty line. These classifications (very poor, poor and medium) have been taken from *Bezbaruah* (2004).

Source: Sample Survey.

Table 2. Change (%) in the Availability of Fodder (per standard cattle per day)

FPC/ Village	Category of HH (Wealth)	Fodder availability (Kg/Day/Standard Livestock) in the sample Households		
		Before	After	% Change*
Kherajhore	Very Poor	4.8(3.8)	8.2(6.4)	70.83(2.6)
	Poor	6.3(5.4)	9.5(8.6)	50.79(3.2)
	Medium	12.6(10.6)	16.8(14.8)	30.33(4.2)
Khatgeria	Very Poor	5.3(4.2)	12.6(9.6)	137.74(5.4)
	Poor	8.5(6.3)	12.5(10.8)	47.06(4.5)
	Medium	12.5(9.4)	16.4(13.8)	31.20(4.4)
Goulber Marshal	Very Poor	6.5(5.6)	11.6(10.4)	78.46(4.8)
	Poor	9.8(7.4)	12.8(10.6)	30.61(3.2)
Amjuri	Very Poor	5.3(4.8)	12.6(11.4)	137.73(6.6)
	Poor	8.2(6.3)	13.8(90.6)	68.29(4.3)

Note : Standard livestock is arrived at by converting small livestock on a 3:1 ratio to big livestock.

Figures( ) indicate average number of standard cattle unit per household

* Indicates that the difference is statistically significant at 5 per cent level.

Source: Sample Survey.

Table 3. Change (%) in Fuelwood collection per day

FPC/ Village	Category of HH (Wealth)	Quantity of Fuelwood (Quintals)		
		Before	After	% Change*
Kherajhore	Very Poor	21.00(1.17)	40.00(2.22)	19.00(1.05)
	Poor	9.00(0.75)	18.5(1.54)	9.5(0.79)
	Medium	0.30(0.15)	0.35(0.18)	0.05(0.03)
Khatgeria	Very Poor	5.00(0.71)	14.5(2.07)	9.5(1.36)
	Poor	2.00(0.40)	7.5(1.50)	5.5(1.1)
	Medium	-	-	-
Goulber Marshal	Very Poor	28.00(0.74)	43.5(1.14)	15.5(0.4)
	Poor	10.00(0.48)	19.5(0.92)	9.5(0.44)
Amjuri	Very Poor	15.75(0.68)	42.00(1.83)	26.25(1.15)
Poor	1.25(0.42)	4.20(1.40)	2.95(0.98)	

Note : * Indicates that the difference is statistically significant at 1 per cent level.

Figures in ( ) indicate average quantity of fuelwood(Quintals) per household.

Source: Sample Survey.

Table 4. Change (%) in the Non-Timber Forest Products (NTFPs) collection by the Sample Households per day.

FPC/Village	Category HH (Wealth)	Quantity of NTFPs (KG)								% Change of total*
		Before				After				
		Sal Leaves	Kendu Leaves	Others	Total	Sal Leaves	Kendu Leaves	Others	Total	
Kherajhore	Very Poor	42	15	10	67 (3.72)	128	69	22	219 (12.17)	226.87 (8.45)
	Poor	20	08	06	34 (2.83)	69	37	14	120 (10.00)	252.94 (7.17)
	Medium	02	-	-	02 (1.0)	-	-	-	-	-100 (-1.0)
Khatgeria	Very Poor	16	10	07	33 (4.71)	47	25	18	90 (12.86)	172.73 (8.15)
	Poor	07	08	06	21 (4.20)	28	19	11	58 (11.60)	176.19 (7.40)
	Medium	-	02	-	02 (0.40)	-	05	-	05 (1.0)	150 (0.60)
Goulber Marshal	Very Poor	80	64	32	176 (4.63)	92	106	67	265 (6.97)	50.57 (2.34)
	Poor	38	28	16	82 (3.90)	47	45	36	128 (6.10)	56.10 (2.20)
Amjuri	Very Poor	72	-	11	83 (3.61)	167	-	32	199 (8.65)	139.76 (5.04)
	Poor	07	-	02	09(3.0)	20	-	07	27 (9.0)	200 (6.0)

Note: Figure in ( ) indicate average quantity of NTFPs (KG) per household per day.
*Indicates that the difference is statistically significant at 1 per cent level.
Source: Sample Survey.

FPCs/Villages is relatively high in relation to the rest ones. The majority of households in other two villages belong to general category. In fact, agriculture and its allied activities are the main source of income of the households in our sample villages. A considerable portion of land in each village is under wastelands, which are not cultivated. Therefore, dependence on forest resources under JFM programme is expected to have a substantial impact on the livelihood of most of these households.

But the dependence of forest resource for JFM households in the area we surveyed is measured in terms of changes in access to fodder, fuelwood, NTFPs and TFPs (Timber Forest Products) that act as a flow input into livelihood activities of household as well as community level in the study. Livestock rearing is an important livelihood strategy in the sample JFM villages. The availability of fodder on a sustainable basis is the key for the sustainability of livestock rearing. *Table 2* shows that fodder availability has made a significant increase in all the sample villages for JFM Programme, the rate of increase being more prominent among the households of very poor category, and medium category is the least beneficiaries by these shifts. This is also true in terms of changes in access to daily fuelwood collection *(Table 3)*, daily collection of NTFPs *(Table 4)*, which are also a key to the livelihood security for households we surveyed. But with regard to the changes in the collection of timber forest products (TFPs) per day by the sample households are concerned, *Table 5* shows that the rate of change of quantity of TFPs (Kg) per day has significantly

Table 5. Change (%) in Timber Forest Products'(TFPs) collection per day

FPC/ Village	Category of HH (Wealth)	Quantity of TFPs (Kg) per day		
		Before	After	% Change*
Kherajhore	Very Poor	65(3.11)	6(0.33)	-90.77(-2.78)
	Poor	16(1.33)	4(0.33)	-75.00(-1.0)
	Medium	5(2.50)	-	-100.00(-2.50)
Khatgeria	Very Poor	24(3.43)	5(0.71)	-79.17(-2.72)
	Poor	13(2.6)	2(0.40)	-84.62(-2.20)
	Medium	12(2.40)	-	-100.00(2.40)
Goulber	Very Poor	42(1.11)	162(4.26)	285.71(3.15)
Marshal	Poor	19(0.90)	35(1.67)	84.21(0.77)
Amjuri	Very Poor	30(1.30)	10(0.43)	-66.67(-0.87)
	Poor	5(1.67)	2(0.67)	-60.00(-1.0)

Note : Figures in ( ) indicate average quantity of TFPs(Kg) per household .
*Indicates that the difference is statistically significant at 1 per cent level.
Source: Sample Survey.

decreased in three JFM villages except one (Goulber Marshal) for the execution of JFM Programme. The significant decrease of the collection of TFPs in most of the JFM villages is desirable because law forbids the collection of TFPs by the households other than Forest Department/Government. Rather the members of the JFM village are entitled to have a fixed share of TFPs (usually 20 to 25 per cent of total income from TFPs) from forest department/government. Despite the fact that law prohibits the collection of TFPs, very poor and poor households under our

Table 6. Incremental Annual Net Revenue (Rs.) from All Sources of Sample Households.

FPC/Village	Category HH (Wealth)	Before			After			% Change		
		Net Return from Forest sources	Net Return from other sources	Net Return from all sources	Net Return from Forest sources	Net Return from other source	Net Return from all sources	Net Return from Forest source*	Net Return from other sources*	Net Return from all sources*
Kherajhore	Very Poor	314079 (17448.83)	177427 (9857.06)	491506 [63.90]	517608 (28756)	132664	650272 [79.60]	64.80	-25.23	32.30
	Poor	191253 (15937.75)	227945 (18995.42)	419198 [45.62]	293522 (24460.17)	228773 (19064.42)	522295 [56.20]	53.47	0.36	24.59
	Medium	20623 (10311.50)	70216 (35108)	90839 [22.70]	18972 (9486.00)	86060 (43030.00)	105032 [18.06]	-8.01	22.56	15.62
Khatgeria	Very Poor	114247 (16321)	80383 (11483.29)	194630 [58.70]	195727 (27961.00)	14592 (2084.57)	210319 [93.06]	71.32	-81.85	80.61
	Poor	79024 (15804.80)	103776 (20755.20)	182800 [43.23]	117865 (23573.00)	97579 (19515.80)	215444 [54.71]	49.15	-5.97	17.86
	Medium	42340 (8468)	186165 (37233)	228505 [18.53]	49805 (9961.00)	245597 (49119.40)	295402 [16.86]	17.63	31.92	29.27
Goulbur Marshal	Very Poor	687328 (18087.58)	430805 (11336.97)	1118133 [61.47]	1275764 (33572.74)	252136 (6635.16)	1527900 [83.50]	85.61	-41.47	36.65
	Poor	341093 (16242.52)	532992 (25380.52)	874085 [39.02]	659358 (31398.00)	534940 (25473.33)	1194298 [55.21]	93.30	0.37	36.63
Amjuri	Very Poor	475577 (20677.26)	293027 (12740.30)	768604 [61.88]	837200 (36400.00)	289315 (12578.91)	1126515 [74.32]	76.04	-1.27	44.67
	Poor	51284 (17094.67)	620114 (206704.66)	671398 [7.64]	86625 (28875.00)	70407 (23469.00)	157032 [55.16]	68.91	-88.65	-76.61

Note: Figures in ( ) indicate average net return from forest/other sources per household.
Figures in [] represent percentage net return from forest sources of net return from all sources.
* indicates that the difference is statistically significant at 1 per cent level.
Source: Sample Survey.

sample JFM villages are engaged in illegal collection of TFPs[3], although the quantity of collection has significantly decreased in JFM villages after JFM Programme in relation to their past when the programme was not in operation. But, more importantly, the illegal collection of TFPs has substantially increased to one(Goulber Marshal) out of four JFM villages by both very poor and poor categories of households *(Table 5)*. This is, mainly, because the rate of increase of the collection of other legal Forest Products (FPs) –like Fodder *(Table 2)* Fuelwood *(Table 3)*, NTFPs *(Table 4)*. – which are also one of the main sources of livelihood security for very poor and poor categories of households, in the particular village (Goulber Marshal) by both the categories of households is substantially lower than that of the collection of same type of other legal FPs by same categories of households(very poor and poor)in other three villages. What it implies is that if the NTFPs ,Fodder and Fuelwood (which are allowed to collect legally under JFM programme) are more (less) available in the JFM forests ,the forcible extraction of TFPs (which are illegal under JFM programme and that are threatening to sustainability of forest resource) by the poor and very poor categories of households significantly decreases (increases) in the JFM forests. It seems to imply that law cannot forcibly control the illegal collection of TFPs of the very poor and poor categories of households, who are almost dependent on FPs for their livelihood security, until and unless they are guaranteed with minimum livelihood security by other sources.

If we consider the break-up of net annual income (in Rs.) of JFM households, the legal and illegal income from JFM forests by JFM households will be clearly demarcated. First, we consider annual net return (in Rs.) of sample households from all sources, Table 6 shows that while the JFM Programme is in operation the contribution of net return (in Rs.) from forest sources out of the net return (in Rs.) from all sources works out to the major source of income for very poor and poor categories of households in all sample villages. It is also observed that the forest source was the major source of net income (in Rs.) particularly for very poor category of households before the execution of JFM Programme when the forest was mainly used for commercial purpose and the forest fringe communities were not legally allowed to use forest resources for their livelihood security. Despite the fact that the incidence of forest income for poor and very poor JFM households has considerably increased after JFM. as may be seen from Table 6, the net annual income (in Rs.) and net annual average household income (in Rs.) generated from forest resources for very poor and poor categories of households in sample villages have significantly increased due to JFM Programme compared with the past when the programme was not in operation, the rate of net increase for very poor and poor being in the range of 64.80-85.61and 49.15 -93.31 respectively. On the other hand, the rate of increase in net return (in Rs.) is around 18 per cent for medium category of households in one JFM Village (Khatgeria), whereas in another JFM village(

Table 7: Incremental Net Return (in Rs.) from Forest Sources of Sample Households Per Year.

FPC/ Village	Category of HH	Before						After						% Change of net return*
		NTFPs, Fuelwood Fodder		Return from Timber sale	Return from Timber Share	Wage income from forest	Net Return from all Forest source	NTFPs, Fuelwood Fodder		Return from Timber sale	Return from Timber Share	Wage income from forest	Net return from all forest source	
		Consumption	Sale					Consumption	Sale					
Kherajhore	Very Poor	105120 (5840)	197100 (10950)	11859 (659)		6324 (351)	314079 (17449)	124830 (6935)	315360 (17520)	39420 (2190)	6498 (361)	31500 (1750	517608 (28756)	64.80
	Poor	91980 (7665)	96360 (8030)	2913 (243)		2175 (181)	191253 (15937)	100740 (8395)	157680 (13140)	17520 (1460)	4332 (361)	13250 (1104)	293522 (24460)	53.47
	Medium	16060 (8030)	3650 (1825)	913 (457)		-	20623 (10312)	18250 (9125)	-	-	722 (361)	-	18972 (9486)	-8.01
Khatgeria	Very Poor	38325 (5475)	71540 (10220)	4382 (626)		2728 (390)	114247 (16321)	48545 (6935)	114975 (16425)	12775 (1825)	5852 (836)	13580 (1940)	195727 (27961)	71.32
	Poor	36500 ((7300)	40150 (8030)	2374 (475)		925 (185)	790241 (15805)	43800 (8760)	62050 (12410)	3650 (730)	4180 (836)	4185 (837)	117865 (23573)	49.15
	Medium	40150 (8030)	-	2190 (438)		-	42340 (8468)	45625 (9125)	-	-	4180 (836)	-	49805 (9961)	17.63
Goulbur Marshal	Very Poor	235790 (6205)	443840 (11680)	7698 (203)		1476 (39)	687328 (18088)	177400 (4668)	268670 (7070)	817650 (21517)	3724 (98)	8320 (219)	1275764 (33573)	85.61
	Poor	158297 (7538)	176295 (8395)	3833 (183)		2668 (127)	341093 (16243)	191625 (9125)	222285 (10585)	229950 (10950)	2058 (98)	13440 (640)	659358 (31398)	93.31
Amjuri	Very Poor	111888 (4865)	352590 (15330)	5457 (237)		5642 (245)	475577 (20677)	142715 (6205)	562465 (24455)	100740 (4380)	-	31280 (1360)	837200 (36400)	76.04
	Poor	19470 (6490)	30660 (10220)	914 (305)		240 (80)	51284 (17095)	32995 (10998)	50180 (16727)	2190 (730)		1260 (420)	86625 (28875)	68.91

Note: *Indicates that the difference is statistically significant at 1 per cent level.
Figures in ( ) indicate average net return from forest/other sources per household. Source: Sample Survey.

Kherajhore) this change is negative for medium category. It might suggest that very poor and poor categories of households are more dependent on income from forest resources; but medium category of households is more dependent on their income from non-forest sources.

As regards average household annual net forest income from legal wage work is concerned, Table 7 shows that the average household wage income under forest department for poor and very poor households after JFM is considerably higher in all JFM villages except one (Goulber marshal). It is important to mention that government wage rate for forest wage labour is fixed at Rs. 67.50, which is about a double of the average local wage rate. But the number of working days as wage labour under forest department for the poor forest fringe communities under JFM programme is more or less fixed. Usually, one person from each poor household gets the opportunity of forest work from 30–40 days per year. Moreover, significantly, the opportunities of legal wage income under forest department for the poor forest fringe communities in Goulber marshal JFM village is much lower than other JFM villages, because unlike the other JFM forests, the expansion of scope of wage work opportunities for the poor and very poor JFM households by the Forest department(Government) in Goulber marshal JFM forest depends on the new plantation programme, which seems to be not viable in the very short period,

As regards average household' annual net forest product income from legal and illegal source is concerned, *Table 7* reveals that the legal average household income that income from the share of government's timber revenue and wages from forestry work constitute a small part of their total income, whereas income from the sale of NTFPs,Fuelwood and Fodder constitute the significant part of their total income. But, the legal average household income that appears from the sale of NTFPs ,Fuelwood and Fodder is significantly higher in all JFM villages compared with the rest (Goulber Marshal) for poor and very poor households after JFM , whereas the illegal average household income that appears from the sale of TFPs is significantly lower in all JFM villages compared with the rest (Goulber Marshal) for poor and very poor households during the same period. It might suggest that if the NTFPs, Fodder and Fuelwood (which are allowed to collect legally under JFM programme) are more (less) available in the JFM forests, the forcible extraction of TFPs (which are illegal under JFM programme and that are threatening to sustainability of forest resource) by the poor and very poor categories of households decreases (increases) significantly in the JFM forests. It clearly seems to indicate that force or law cannot effectively control the illegal collection of Timber Forest Product (TFPs) of the very poor and poor categories of households until and unless a considerable collection of legal forest products like fuelwood, NTFPs meet their minimum livelihood security.

Section VI

Can IFM Programme sustain rural livelihoods, and thereby ensure sustainability of forest resources? The JFM Programme based on the National Forest Policy of 1988 in India lays emphasis on meeting local needs by supporting them fuelwood, fodder, food, NTFPs and limited use of TFPs

for self consumption, prohibiting the free collection of TPs by the local people to maintain the carrying capacity of forest. Instead of free collection of TFPs by the local people, they are given a 25 per cent of share from the sell of timber by the forest department/government. But despite forbidden by law regarding the free collection of TFPs, the very poor and poor categories of households in one FPC/Village have substantially increased their collection of TPs after JFM Programme, mainly, because the other source of forest income – legal collection of fodder, fuelwood, NTFPs and wage income etc. – is substantially low for them in relation to the same categories of households in other three FPCs/Villages. Clearly, it implies that force or law cannot effectively control the illegal collection of TFPs for the households living below poverty line, which mainly dependent on forest resource for livelihood security, until and unless a considerable increase in the collection of legal forest products – NTFPs, fuelwood etc. – and wage income from forest meets their minimum livelihood security.

What are the probable policy prescriptions in order to overcome this situation? There seems to be three ways to tackle the situation . As regards the issue is concerned, as the production of forest products (like NTFPs) the very poor households legally collect from forest do not usually increase within the very short period. Regarding the second issue, as appears from this paper, a good incentive fee dependent on poor households' work (output) might not only provide livelihood sustenance of those poor living below poverty line and ensure sustainability of forest resources because the number of working days as wage labour under forest department for the poor forest fringe communities under JFM programme is more or less fixed and, and cannot be increased considerably within the very short period due to production constraints. Also important is that unlike the other JFM forests, the expansion of scope of work opportunities for the poor and very poor JFM households by the Forest department(Government) in Goulber marshal JFM forest , which witnessed high incidence of the forcible extraction of TFPs for bare minimum level of subsistence for very poor and poor JFM households, which consist of about 44 per cent of total households under survey (59 out of 134 cases) ,depends on the new plantation programme; but such a programme seems to be not viable in the very short period .However, the third- a good incentive fee dependent on very poor and poor JFM households' forest wage work (output) under forest department plus a lump sum fee – might be the immediate viable option for livelihood sustenance of those JFM households and sustainability of forest resources. Together with it, more pro-poor programmes under both Government and non-Government initiatives that complement the benefit of JFM Programme need to be introduced.

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Notes

1. JFM household is risk-averse because they prefer a certain given forest income either from legal source or from illegal source to maintain minimum subsistence needs to a risky income with the same expected value.
2. Government is indifferent between a certain given income and an uncertain income with the same expected value. It may be judged by the fact that SFR (2000) clearly mentions "as a result of participatory and joint forest management activities in south West Bengal the vast tract of scattered, over-exploited and degraded forests containing mainly the sal were resuscitated and restored to productivity with great improvement in quality and density" (p. 47). Thus due to execution of JFM programme the large scale illicit felling of TFPs, which destroys the sustainability of forest resource, have been largely stopped mainly due to free access of NTFPs by the poor forest communities in most of JFM forests. However, the impact of little illicit felling does not seem to make any significant change between a certain given income and an uncertain income with the same expected utility.
3. Never did the respondents say that their source of income was illegal; rather, while examining the answers from the respondents regarding the break-up of their source of income, the distinction between legal and illegal source was clearly demarcated.

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REGIONAL EXAMINATION OF CERTAIN FACTORS INFLUENCING THE QUALITY OF LIFE

Anett Sőrés & Károly Pető

University of Debrecen, Faculty of Applied Economics and Rural Development 4032 Debrecen Böszörmény út 138.

Abstract: The rate of unemployment in Hajdú-Bihar County is several percent higher than the national average and the actual number of unemployed people is the highest, resulting in considerable social problems. The majority of families living under the minimum subsistence level cannot cover their housing maintenance costs. These costs include the rents of tenement flats, public charges, water, electricity, gas and district heating charges. Cutting the number of unemployed people and stimulating economic activity is a high priority. Important tools towards achieving these goals include the promotion of non-agricultural activities by households engaged in agriculture, incentives for rural micro-enterprises, the development of rural and agro-tourism and support for traditional arts and crafts. As for general subjective well-being, although its average value is positive, merely 50% of the population is contented. Naturally it does not mean that we are unhappy. 4 respondents out of 5 claim that they are rather happy. This may suggest that the picture is not so pessimistic as it is revealed by questions about living conditions.

Key words: Unemployment, Quality of life, Rural development

I. Introduction

On what bases can a nation's quality of life be assessed, and in making such an assessment, how should one gauge the current state of affairs and developmental history of e.g. such a relatively small environment as that of Hajdú-Bihar County? Are conclusions from such an assessment drawn unconsciously on the basis of findings with the help of a mathematical formula or is a single "indicator" simply chosen (e.g. income, number of friends, professional accolades) to help us in the assessment of quality of life?

We might agree that it is much easier to answer the question as to why one even bothers measuring the quality of life, than to find an answer to the question as to how this should be measured. Accordingly, one should perhaps begin by answering the easier question. Quality of life should be measured because life is much more than survival. On the one hand, any improvement of public health is judged in terms of any increase in a population's average lifespan, while on the other hand, it is equally judged in terms of the improvement of overall life quality (e.g. quality of palliative care, improvement in the ability to of health care professionals to function properly).

Today, policy-makers have started to realize that the effectiveness of economic and social policies preaching slogans, such as "job creation", "GDP growth" and "motorway construction" to alleviate the resentment at their failure to improve the nation's quality of life are running out. Increasingly, Hungarians feel that more meaningful decisions will also be needed to make them contented enough to give their votes to any political party, than has been the case since 1990. But what does this actually mean? To answer the question, many use the measuring sticks of life quality and contentment to recalibrate political for the future. In other words, the level of the quality of life of the citizens of a nation, and especially its improvement, is the gauge by which one should distinguish between good and bad governance. The way forward, which leads governments responsible for the realization of the "public good" by adopting quality of life-centred economic and social policies, appear necessary. Of late, interest in the analysis of life quality has increased and the idea of life quality-centred planning has already emerged in Hungarian public administration. (*Kovács-Horkay-Michalkó,* 2006)

II. Assessment of the quality of life

Research on well-being consistently reveals that the characteristics and resources valued by society correlate with happiness. For example, marriage (*Mastekaasa,* 1994), a comfortable income (*Diener & Biswas-Diener,* 2002), superior mental health (*Koivumaa-Honkanen* et al., 2004), and a long life (*Danner, Snowdon, & Friesen,* 2001) all appear as factors in reports of high happiness levels. Such associations between desirable life outcomes and happiness have led most investigators to assume that success makes people happy. This assumption can be found throughout the literature in this area. For example, *Diener, Suh, Lucas, and Smith* (1999) reviewed the correlations between happiness and a variety of resources, desirable characteristics, and favourable life circumstances. (*Diener, King, Lyubomirsky,* 2005)

In this decade, empirical studies related to subjective well-being have been made with particular attention paid to

developing economies. Some of the key publications on this topic include the work of *Graham and Pettinato* (2001, 2002), *Gough and McGregor* (2007), *Kingdon and Knight* (2006), *Rojas* (2008) and *Pradhan and Ravallion* (2000). When dealing with rural areas in emerging economies, studies must take into account differences in the determinants of subjective well-being between people from developed and developing economies.

There are subjective and objective sides in life quality researches. The two significant life quality research models are the Scandinavian, starting with the availability of resources and their possession, thus laying emphasis on objective factors; and the American, which rather finds subjective perception and evaluation important. A kind of mixture of these two is the life quality approach used by Erik Allart. Following Maslow's model, he also created a hierarchy of needs and distinguished 3 levels:

"Having, loving, being" (material–environmental and social needs and needs for personal development as well). Moreover, he differentiated objective factors and the related subjective attitudes on all the three levels. In the present study the level of "having" is the most relevant, so objective and subjective indicators will be highlighted at this level:

- Objective: objective measurement of the standard of living and environmental conditions
- Subjective: contentment with the standard of living, the feeling of contentment (*Utasi,* 2007)

Inglehart and Klingemann claim that the communist past of certain countries or their democratic conditions looking back to previous traditions are significant factors in the assessment of the subjective quality of life.

In formerly socialist countries, the evaluation of individual welfare is lower than in traditional democracies; moreover, it is often far below the level of those of presently communist systems. *Veenhoven* (2003) finds the reasons for this state of affairs in the fact that the more equal distribution of happiness is rather characteristic of those countries where income differences are low and social security is high. *Lengyel and Hegedűs* (2002) suggest that the economic crisis and the ensuing political transformation in itself exerted a negative influence on citizens' well-being in post-socialist countries. This situation has been further aggravated by – immediately or at least quickly developing – disappointments in the fulfilment of expectations related to the transformation, decreasing social security and its concomitant uncertainty of existence. (*Inglehart – Klingemann,* 2000)

1. Factors influencing the quality of life

The precise determination of our quality of life and living standard is a complicated task. However, the following figure *(Figure 1.)* attempts to summarize those areas (based on existing research findings) which exert the greatest influences on our living standard.

The first highlighted area is health. Unfortunately, Hungary lags behind the European Union in this respect. In the past three decades, the health of the Hungarian population has deteriorated significantly and showed a markedly unfavourable picture in international comparison.

The physical or man-built environment primarily includes infrastructure and housing circumstances. The relevant viewpoints in their assessment are the accessibility of residences, the reliability and headway of transport modes, the quality of road networks, public lighting, coverage of telephone network and shopping facilities. Personal relationships and security must also be mentioned, as these two factors are closely linked. Personal relationships primarily refer to the family and security provided by it. However, priority will be given to individuals' secure livelihood as well. Families' secure livelihood is determined by the degrees of accumulated wealth and whether stable job opportunities are available for family members in the vicinity of their residences, in accordance with their qualifications and skills and also, of course, by the public security of their residential area.

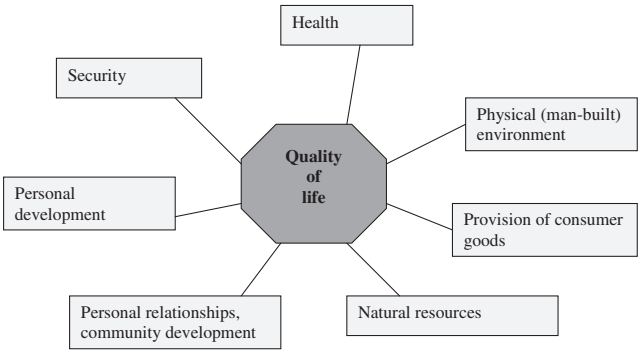

Figure 1. Factors influencing the quality of life (Source: Author's own work)

2. Contentment with the quality of life in Hungary

In Hungary, the rate of contended citizens lags well behind the average measured in all the EU member states (78%) by the Eubarometer. The positive attitude of Denmark (98%), Luxemburg (96%), Sweden (96%), the Netherlands (95%), Finland (95%) and the United Kingdom (91%) are worth mentioning. In the spring of 2009, 56% of the respondents in Greece were pessimistic, but their rate decreased to 42% within 6 months, whereas the rate of contented citizens grew from 44% to 58%. (Eurobarometer 72, 2010)

Almost all the Hungarian respondents claim that the state of economy (97%) and employment are definitely poor (96%). Somewhat fewer people think that the state of the world economy (77%) and the European economy (76%) are far from being ideal. Three quarters of the respondents worry about the state of the environment as well.

EU citizens can compare the state of their countries with that of the European Union. As for Hungarians (96%), the states of our economy and labour market are worse than in EU countries in general (2009). The same percentage of

respondents say the cost of living also tends to be unfavourable. Almost the same amount of people think that the quality of life (95%), energy prices (92%) and the state of the environment (81%) show a much worse picture in our country than in other EU member states. Compared to the above respondents, the number of those who claim that the life of Hungarian children could be better if they immigrated to other countries (31%) might seem to be low. This statement is not accepted by 45% of Hungarians and one-fifth of the respondents believe that the successful life of the youngest generation abroad depends on several other factors as well. (Eurobarometer 72, 2010)

Interestingly, in the light of the above, young people between the ages of 15–24 are included in the largest range (67%), or those who feel fine in their current situation. The least happy are people between 40–54: 70% of them thinks that their current circumstances are far from being ideal. This means that on average, approximately double the number of the current domestic income would be needed for families to have no worries – by their own admission. Average respondents are rather contented with their jobs than with their income, whereas contentment with their life standard is between the two. As for general subjective contentment, although its average value is positive, merely 50% of the population is contented. Naturally, this does not mean that we are unhappy. 4 respondents out of 5 claim that they are rather happy. This may suggests that the picture is not as pessimistic as is revealed in their responses about living conditions. (*Utasi,* 2007)

III. location of the studied county

Hajdú-Bihar County is located in the northern frontier of the North-Great Plain Region, including 82 settlements, with its population living in 21 towns and 61 townships *(Figure 2)*.

Figure 2. Counties in Hungary (Source: Central Statistical Office)

To expedite efficient operation, the settlements of the country have formed 9 small regions. Their natural endowments are rich; they are invaluable in respect of nature protection, recreation and environmental protection.

The county *(Figure 3)* plays a leading role in the Eastern-Hungarian region. Its county seat is Debrecen, which has been the centre of scientific and cultural life of the Great Hungarian Plain and the East Tisza Region for centuries. Debrecen is the economic, intellectual and cultural centre of North-eastern Hungary, as well as a favoured destination for tourists.

Browsing central statistical data and databases of questionnaire surveys, it immediately becomes evident that data in the region actually show improvement in some areas; however, they do not reveal the decrease in inequality. As it is well-known, inequality (wealth and income differences, differences in the supply and demand for different types of work) may be one of the primary reasons of discontentment. Hajdú-Bihar County is a good example for regional inequality, as several disadvantageous and cumulatively disadvantageous small regions and settlements are located here. However, economically and socially speaking, a number of settlements feature the characteristics of developed towns.

Figure 3. Hajdú-Bihar County

IV. Objective indicators studied in Hajdú-Bihar County

In the analysis of living standard and living conditions, objective indicators include primarily earnings, labour-market status, the availability of consumer goods and other similar, material indicators. In general, per capita GDP and various indices, mainly those formed from national economic indicators, may also be analysed.

The present study investigates solely objective indicators, as subjective ones (which may be mainly determined from questionnaires) will be published as part of a doctoral dissertation in a future study.

1. The varying number of population

In Europe, the major reason behind critical demographic conditions is not the diminution, but rather the ageing of, the population. Consequently, the burden of maintenance grows gradually and cyclically. The cyclic character is induced from generation to generation by the cyclic life course of the

"baby-boom" generation born after World War II. These demographic conditions are general throughout Europe (also in Hungary); and although the levels of ageing are markedly different, in sum, they are extremely high in certain member states. The core of the process of ageing is the transformation of the entire age structure, a shift towards an elderly population, i.e. the elongation of the age tree. All these shatter the existing economic, social and welfare systems substantially.

Demographic processes followed a similar trend in Hajdú-Bihar, as well. According to data from 2007, 543,802 people live in the county. The figure below *(Figure 4.)* demonstrates that the population has dropped in the past 10 years. This downward tendency is not merely characteristic of Hajdú-Bihar County, but unfortunately, of the whole country.

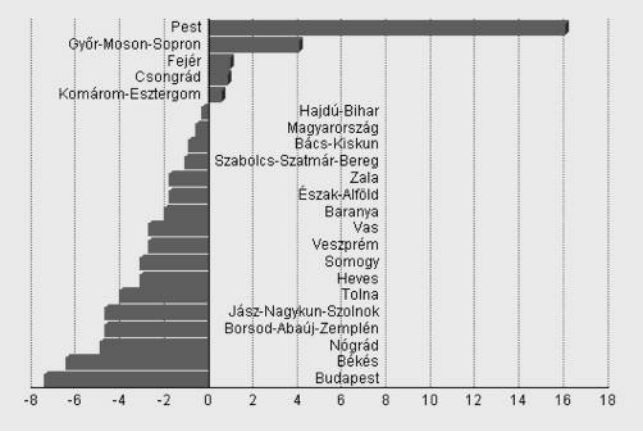

Figure 4. Changes in population in the past 10 years
Source: KSH TSTAR, 2009

An ageing society poses a grave problem for social security schemes and age exerts a significant influence on the quality of life, as well. The Eurobarometer concludes that people over 50 are the most contented with their quality of life.

2. Labour market

Out of the objective indicators of life quality, our study focuses primarily on the labour market, as it is a major problem not only in the country as a whole, but particularly in Hajdú-Bihar County. Recalling the data of the Eurobarometer 72 (2009) survey, it can be stated that unemployment is the primary problem for the Hungarian population. Access to jobs and adequate employment is essential for contentment and positive assessment of life quality.

Table 1. General features of the labour market

County	Rate of unemployment	Unemployed people	Employed people	Inactive people	Rate of employment	Rate of activity
Hajdú-Bihar	13.39 %	26680	172538	212191	41.9%	48.4%

(Source: Public Employment Service)

The summary of the general features of the labour market in Hajdú-Bihar County are demonstrated in *Table 1.* This will bring us to the next point, the analysis of selected indicators, as compared to other counties.

In Hajdú-Bihar County, the rate of agricultural employees is high; we are the fourth as compared to other counties. This is not surprising, as the Great Hungarian Plain has good quality and spacious production areas. This is a serious problem in the present economic situation. The significance of agriculture has diminished and production has fallen, as is the case in other economic sectors. More significantly, agriculture as a sector has lost its crucial role in county employment. Unfortunately, agriculture fails to provide a secure source of personal income. It has largely become a kind of supplementary activity and it proves to be more significant for self-sufficient farms. Therefore, the III. pillar of the New Hungary Rural Development Program is of great significance, as it strives to improve the quality of rural life, focuses on the diversification of rural economy and provides the necessary funds for such activities.

To relieve employment stress and to extend earning opportunities, rural economic potentials are to be enhanced which contribute to the improvement of employment by creating jobs beyond agriculture in rural areas. The most significant means towards achieving this goal include the promotion of non-agricultural activities by households engaged in agriculture, incentives for rural micro-enterprises, the development of rural and agro-tourism, traditional arts and crafts.

If the rate of unemployment is investigated on county level, unfortunately we take a leading position. The county average was 13.39 % in 2009 *(Figure 5.)*. This is due to the economic crisis, which also affected our country. The most conspicuous sign of the crisis was and still is soaring unemployment as a result of increased company wind ups and cost cuts expected from lay-offs.

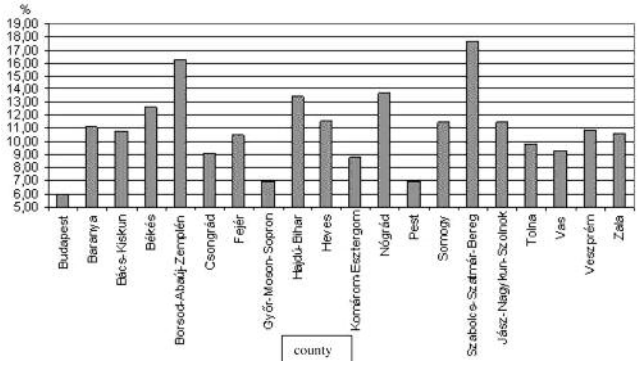

Figure 5. Rate of unemployment on county level (2009) (Source: Authors' own work based on ÁFSZ data)

According to the definition used by the International Labour Organization (ILO), the rate of unemployment published recently by KSH is **11.8%,** showing **national data** for the 15–74 year-old population for March 2010, on the basis of a national survey. As compared to data published a month earlier, this data shows an increase of 0.4% and exceeds the

2009 level by 2.1%. (KSH, 2010) The rate of unemployment in Hajdú-Bihar County is several percent higher than the national tendency. The reason for this trend lies in the fact that both Hungarian and international capital arrives here in lower than average volumes, so the number of unemployed people *(Figure 6.)* is the highest here and in the northern counties, resulting in critical social problems. These social problems also negatively influence the assessment of life quality.

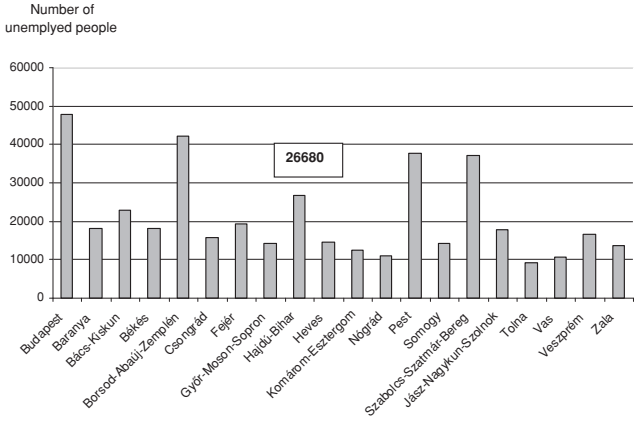

Figure 6. Number of unemployed people on county level (2009) (Source: Authors' own work based on ÁFSZ data)

Figure 7. presents one of the most critical problems on the labour market: the high rate of inactive population. This category includes people with a partial incapacity for work who suffer from physical or mental deficiencies or whose opportunities to find employment decreased radically after medical rehabilitation. A focal problem is that equal opportunities are not ensured for disabled pupils/students in education and training either. In Hajdú-Bihar County, the rate of people incapable of working is approximately 8–10% of those registered as being unemployed, whereas the rate of offers for jobs which would be appropriate for them is merely 1–2%, mostly in the social sphere. Support opportunities are further restricted by their low willingness to receive training and the fact that they need special forms of cooperation from the employment organization. They rather prefer easy physical work and the Piremon Non-profit Ltd. plays a significant role in their employment. These people have to cope not only with the loss of income as a result of their unemployment, but with social inclusion and their disabilities as well. This everyday struggle may induce the negative assessment of their life quality.

The group of inactive people also includes dependants who generally do not have earnings or income and their living is provided by private individuals or institutions. Numerically, this means 212,191 people, i.e. 39% of the population in the county. The rate of activity is not any better, it is merely 48%. The formation of this ratio is largely due to the gypsy population. Low school qualifications are the key factors behind the social and

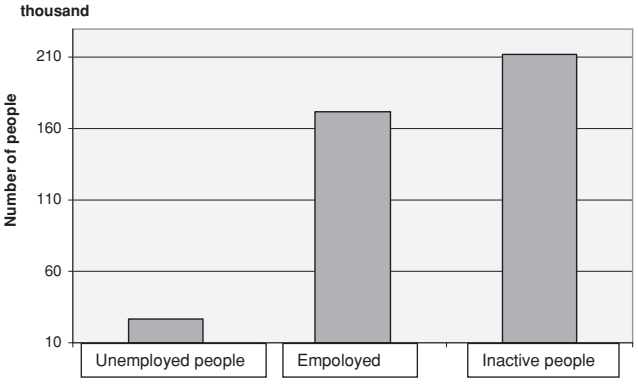

Figure 7. Selected labour market indicators in Hajdú-Bihar County (2009) Source: Authors' own work based on ÁFSZ data

economic backwardness of the Roma population; therefore, short and long term programs targeting the improvement of conditions for gypsies identify education as the most highlighted priority.

3. Income

GDP is the most often used macro-economic indicator in every country and international business organization. A good example for this is that economic, social and territorial cohesion policies (i.e. The Structural Funds) are used for the classification of regions receiving EU co-financing on the basis of GDP per capita.

However, GDP has been increasingly and harshly criticized as to whether it is capable of correctly representing the social-economic conditions of territories and regions.

One should remember that the formation of GDP per capita in some regions might be affected by commuters. The inflow of workers can raise production to a level which would be impossible to reach through the local active population. Consequently, GDP per capita can be overestimated in areas attracting labour force and in those ones where labour outflows, underestimated.

Table 2. Formation of basic wages and earnings in 2010

	Basic wages (HUF/person/month)				Earnings (HUF/person/month)			
	physical	intellec-tual	man	woman	physical	intellec-tual	man	woman
Hajdú-Bihar County	98865	183747	142622	135041	118320	227844	177028	162612
Hungary	108519	226530	176907	157373	132415	275025	218041	188147

(Source: Authors' own work)

Income and material goods predominantly determine the quality of life. Without money, it is difficult to satisfy our demands. Statistical data show and long years' experience suggest, not surprisingly, that the earnings of those living in the nation's capital are much higher than the national average. Szabolcs-Szatmár-Bereg County ranks last, with its income only 65% of those living in Budapest. Moreover, this

figure is significantly lower than average per capita GDP. The analysis of per capita GDP shows that the situation is somewhat better in Hajdú-Bihar County *(Figure 10.)*, as the county exceeds the regional value, but basic wages and monthly earnings *(Table 2.)* lag behind the national average. An intellectual worker earns 227,844 HUF in Hajdú-Bihar County, whereas the national average is almost 50. 000 HUF higher. The difference between the earnings of men and women producing equal quality work also raises various questions. This constitutes discrimination, which induces discontentment, and discontentment triggers the negative assessment of life quality.

4. State of health

Our state of health clearly affects our quality of life and relationships. The following factors influence our state of health fundamentally:

1. **Individual factors**
   - Congenital genetic endowments
   - Acquired characteristics
   - Age, gender
2. **Lifestyle, way of life**
   - Dietary habits
   - Physical activity
   - Consumption of luxury products
3. **Living environment**
   - Physical characteristics of built environment (noise, radiation)
   - Town-village
   - Availability of services
4. **Working environment**
   - Physical and psychological stress at work
   - Physical factors
   - Chemical factors
5. **Social and economic factors**
   - Migration, unemployment, impoverishment, crowded residential areas without proper hygienic conditions
   - Globalization of food industry
6. **Health care and social system**
   - Quality of health care and availability of medicine
   - Availability of care

The health of the population exerts a fundamental influence on the quality of human resources. It has already been established that Hajdú-Bihar County, similarly to the whole country, has an ageing social structure and on the grounds of current demographic tendencies the health care system faces increasing challenges in the future.

Due to gradually increasing environmental loading and generally characteristic unhealthy lifestyle the number of inhabitants affected by the "ills of civilization" (cardio-vascular diseases, diabetes, malignant tumours etc.) is permanently high. Similarly to the ills of civilization, addictions affecting increasingly wide circles of the population also cause crucial problems.

Although in Hajdú-Bihar County, the number of live births is higher (10.2/thousand inhabitant) and mortality is lower (12,300 inhabitants) than in the North-Plain region or in Hungary, the shrinking of the (natural) population is typical, numbering -2,000 inhabitants according to data published in 2009. Most deaths in the country are caused – both in men and women – by circulatory diseases. Mortality caused by ischaemic heart diseases here is more unfavourable than in the country as a whole. The second most frequent cause of mortality in both sexes are cancers; the third most common cause for men is accidents or suicide, while this is diseases of the digestive tract for women.

It is noteworthy in the analysis of general mortality in the region that the Püspökladány and Hajdúhadház sub-region, belonging to the catchment area of Kenézy Hospital, located in Debrecen, is highly at risk. The results of Hajdú-Bihar County in diminishing mortality are outstanding because, in terms of employment, education, earnings, family structure and the high level of Roma population, it belongs to the category of less-favoured areas.

(Information on the health of the population in the county, 2009)

V. Conclusions and recommendations

The above-mentioned data suggest that politics and social sciences should really focus on the harmonic, long-term improvement of life quality and the development of personalities capable of creating real human relationships and evolving communities.

The rate of unemployment in Hajdú-Bihar County is several percent higher than the value of the national tendency. The reason lies in the fact that both Hungarian and foreign capital is channelled here in a lower than average quantity, therefore the number of unemployed people (Figure 8.) is the highest here and in the northern counties, resulting in considerable social problems. To cut the number of unemployed people and to stimulate the activity of inactive labour force the following measures are to be taken:

- incentives to seek gainful employment,
- development of job-hunting services,
- improvement of employability for disadvantaged people,
- incentives for access to employment,
- preservation of employment activity,
- development of an integrated employment and social service-provider system,
- support for life-long learning.

As already mentioned before, the high rate of inactive people is a crucial problem. Besides the deficiencies of their qualifications, the key reasons of the underemployment in the roma population are the following:

- Drawbacks in settlements (the majority of romas live in small settlements)
- Lifestyle strategies originating from the poverty trap (welfare policy supports often exceed the volume of earnings, there is no motivation to work)
- Newly established enterprises primarily prefer qualified workforce

- Employment discrimination is continuously present, but difficult to prove.

The analysis presented above suggests the clear and evident priority that Roma children should graduate from secondary schools to have opportunities in the labour market. Another solution could be to link the payment of family allowance to children's school attendance or to spend part of the allowance to cover the costs of schooling or to receive some allowances in kind (transport, catering, hostel accommodation in senior classes). The driving force of these measures is worth investigating.

The majority of families living under the minimum subsistence level cannot cover their maintenance costs for housing. These costs include the rents of tenement flats, public charges, water, electricity, gas and district heating charges but these fail to cover the actual running expenses. The Law on Social Welfare states that the amount of support shall be a contribution to the preservation of dwelling conditions. In practice, this amount is excessively low. A national, guaranteed and uniform system of housing allowance should be introduced in the framework of the Law on Social Welfare.

The alleviation of employment stress in rural areas, the expansion of income potentials can merely be realized through strengthening rural economic potentials which may improve employment by creating jobs outside agriculture in rural areas. Highly important tools in achieving these goals include the promotion of non-agricultural activities by households engaged in agriculture, incentives for rural micro-enterprises, the development of rural and agro-tourism, traditional arts and crafts.

Furthermore, the competitiveness of the investigated county is to be enhanced, local economy is to be invigorated, local communities should be prepared for the acquisition of EU and other available funds which expedite the support of sustainable social, environmental and economic development.

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THE FUTURE ROLE OF AGRICULTURE IN MULTIFUNCTIONAL RURAL DEVELOPMENT

Elena Kovtun, Kateryna Gnatyshak, Lyudmyla Chornenka

Faculty of Agricultural Management
National University of Life and Environmental Sciences of Ukraine

Abstract: This paper is focused on analysis and evaluation of the future role of agriculture in multifunctional rural development in Ukraine and also reviewing of the significant basic factors which have influence on it.

Key words: multifunctionality, rural development, agricultural potential, Ukraine

Introduction

Multifunctionality has progressively become a central component of modern agriculture. Multifunctionality in agriculture is generally defined as pointing to the benefits of farming rather than just producing food. Some of these benefits include but are not limited to the increase of food and environmental quality, production of bio-energy, facilitating recreation and tourism, and sustaining a viable habitat for animal welfare. Proponents of multifunctionality also purport that it also is responsible for shaping the landscape and positively effects social and cultural systems. In essence, a combination of all these benefits fundamentally contributes to a country's economic growth. It has not been long since this concept was introduced in the country, yet, it quickly found numerous followers. In order to discuss the role of agricultural multifunctionality in the rural development, it becomes imperative to discuss its three main dimensions, namely economical, social and environmental. The economical aspect of the agricultural multifunctionality embraces the characteristics of Ukraine's current agricultural status.

Results and Discussion

Ukraine occupies an area of 603,67 square km and is one of the largest European countries being the home to 46,2 million people. Ukraine is a land of wide, fertile agricultural plains, with large pockets of heavy industry in the east. Ukraine's agricultural sector represents an essential part of the country's economy. Throughout Ukraine's history agriculture has played a dominant role in the development of rural areas and in the shaping of rural landscapes. After the collapse of Soviet Union, the situation in the Ukrainian economy as well as in the agriculture started worsening from year to year, which resulted in weakening of Ukraine's leading position on the world agricultural arena and in the lost of its huge profits gained due to the effective development of agriculture. Ukraine lost a lot of effective production technologies during 1991–2006, what made a negative impact on the development of the country's agriculture and economy in general. However today, agriculture still remains a key economic activity and vital aspect of the creation of wealth and employment in many rural areas.

Ukraine possesses a significant amount of arable lands and therefore the majority of the national lands are suitable for crop production. Arable lands account for more than half of Ukraine's total land area *(Table 1)*. Of this, agricultural land covers approximately 69% or 41,7 million hectares of its territory. The largest areas of agricultural lands are concentrated in the Central and Southern parts of Ukraine (Chernigiv, Poltava, Dnipropetrovsk, Kharkiv, Zaporizhzhya, and Odessa regions). Taking into consideration that the most fertile black earth covers 60% of Ukraine's area, the land resources represent one of the country's most valuable assets.

Table 1. Land distribution by their type as of January 1, 2008 (in 1000 ha)

All lands, total	**60 354,8**
Agricultural lands, total	42 868,7
Including farm lands, total	41 650,0
Including:	
Arable Lands	32 433,7
Fallow lands	383,9
Perennials	899,0
Hayfield lands	2 419,8
Pastures	5 513,6

Source: Ministry of Agrarian Policy of Ukraine

Through the property ownership reforms in the 1990s, the ownership rights of smaller lands farmed by large collective farms had to be returned to its local rural residents. However, the majority of these local residents faced some difficulties

and was neither ready to farm these fragmented farmlands on their own because of financial constraints nor were they able to unite and form a more powerful business structures. Hence, farming of the lands was done on the basis of land lease meaning smaller farms were mainly rented to companies delegated on the basis of the former collective farms. Today, large agricultural enterprises comprise a higher percentage of arable land than compared with smaller individual farm households. These individual farms use substantial portion of its land for hay production and for orchards. The structure of current land use in Ukraine is shown in *Table 2*.

Table 2. Farm Land Use as January 1, 2009, (in 1000 ha)

	Farm lands	**Including arable lands**
Total Ukraine	42 844,8	32 473,4
Including:		
Rural residents (individual households)	15 604,0	11 374,6
Agricultural enterprises	17 252,2	15 695,4
Private family farms	4 031,9	3 817,0

Source: State Statistics Committee of Ukraine

According to the data of Ministry of Agrarian Policy of Ukraine, in 2007 over 14,9 thousand agricultural enterprises of various organizational forms were engaged in the economic activity, among them were 7,4 thousand economic partnerships, 4,2 thousand private enterprises, 1,3 thousand production cooperatives, 0,36 thousand state enterprises, 1.6 thousand enterprises of another incorporation forms. To assure equity and enforcement the functioning of those entities is regulated by the Law of Ukraine "About Economic Partnerships", "About Agricultural Cooperation", "About Enterprises" and by the number of the other legislative acts. These agricultural enterprises retain 17,5 million agricultural lands for their use, mostly attracted through lease of the peasants' land shares. If classified by the area of land use, agricultural enterprises remain the largest of all agrarian entities. The average land use size in one enterprise constitutes 1200 hectares. Additionally, during the years of reforms farms have become an integral component of the rural economy. Organizational and legal principles of their operation are regulated by the Law of Ukraine "About Farming Enterprises" (2003). At present the number of farmers in Ukraine approximates to 135 000 persons. 43 thousand of farms plant about 3,7 million hectares of agricultural land. On the average, one farm cultivates 85 hectares and 50,4% of farms cultivate the areas of more than 500 hectares.

Currently, Ukraine contains nearly five million individual peasant households which operate nearly 15,7 million hectares of agricultural lands. Individual households have become a stabilizing factor of employment for persons leaving agricultural enterprises. The number of persons involved in individual households reaches 3 million people. Individual peasant households started an effort at revitalization after the CMU Decree "About Land Plot Privatization" which was approved in 1992. Prior to this Law, land plots were transferred for free into private ownership in order to run individual households. Maximal size of such plots was increased to 2 hectares. Further expansion in size of such households was affected through the addition of land plots received as the land shares during reformation of collective agricultural enterprises. Organizational and legal framework for individual peasant household operation is regulated by the Law of Ukraine "About Individual Peasant Households" (2003).

All these agricultural organizational entities face a challenge to operate efficiently based on the outdated agricultural infrastructure. However, there have been some progress on their pace of improvement the technical base of the Ukrainian agriculture. Agricultural enterprises are gradually increasing investment into fixed assets, thus outrunning the industry sector and the economy in the whole by the increment rate. Although the portion of buildings, structures and transmitting devices in the agricultural fixed assets has decreased, the portion of modern machinery, equipment and means of transportation has grown. Thus, the Ministry of Agrarian Policy of Ukraine provides the following information: in 2007 the stock of machinery and tractors in agricultural enterprises contained 182,5 thousand of tractors (10 pieces per 1000 hectares of arable land); 44,3 thousand of grain combine harvesters (4 pieces per 1000 hectares of grain crop acreage without corn); 7,7 thousand of beet harvesters (15 pieces per 1000 hectares of beet crop acreage); 4,2 thousand of corn harvesters (7 pieces per 1000 hectares of corn crop acreage). Power capacity in agricultural enterprises reached nearly 5932 million h.p. (322 h.p. per 100 hectares of crop acreage). Individual farmer and other households due to their smaller production volumes possess less machinery, namely 150,1 thousand tractors and 16,5 thousand harvesters.

The labor force in the Ukrainian agricultural accounted for 3,6 million people in the year 2007. The number of farmers approximates to 135 thousand persons and those, involved in individual households reaches 3 million. However, Ukrainian farmers play far more important role to Ukrainian society than just work in within the agri-industrial complex. Sometimes farmers are considered to be the

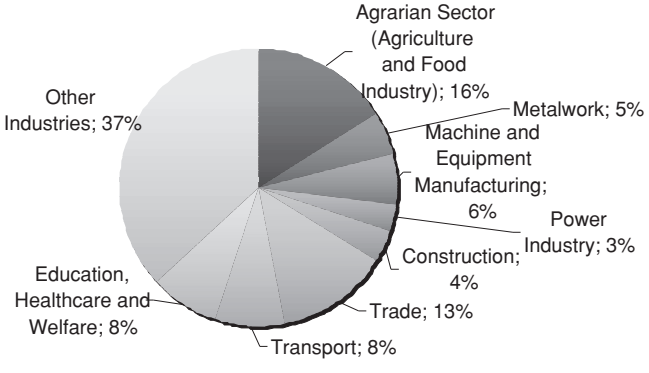

Figure 1. Agrarian Sector in Gross Domestic Product (GDP) of Ukraine
Source: Ministry of Agrarian Policy of Ukraine

guardians of rural customs and traditions and of an age-old way of life. The rural customs and traditions continue to be passed on to future generations through the farming population, but they can also be perpetuated through clubs and cultural associations whose non-farm members share a profound appreciation of traditional rural values.

Ukraine's agricultural sector makes a significant contribution to the national economy. The input of agri-food sector to the GDP equals to such important industries as metallurgy, machine building, power and construction all together *(Figure 1)*.

During 2007 agrarian enterprises paid taxes and dues to the consolidated budget totals 10.4 billion UAH or 2,2 times more in comparison with 2000. In particular, agricultural sector revenue was almost 1.4 billion UAH or 2,4 times more than the figure of 2000.

Introduction of market changes to the Ukraine's agrarian sector had a positive impact on the dynamics of the country's agricultural production. Since 2000 in all categories of agricultural entities a gradual increase in the gross output volumes of agricultural production had been observed *(Figure 2)*.

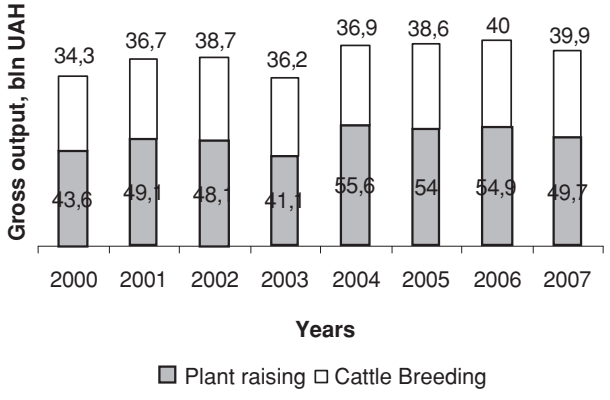

Figure 3. Gross Output of Agriculture, bln. UAH (against the 2005 prices)
Source: Ministry of Agrarian Policy of Ukraine

As previously mentioned, in 2008 the volume of agricultural production has slightly increased in comparison with the previous years and reached 150,8 billion UAH. Gross output of plant crops is provided by agricultural enterprises and individual households in the proportion 1:1,2 and more. Agricultural enterprises are the major supply forming subjects at the grain, sunflower and sugar beet markets, while individual peasant households prevail at the potato, fruit and vegetable markets. In 2000–2006 over 70% of cattle breeding products were provided by individual peasant households. They play the leading role in supply formation at the milk, beef and pork markets. At the same time, production balance between individual households and agricultural enterprises is gradually changing in favor of the latter. In 2007 agricultural enterprises increased manufacturing of cattle breeding products by 7,1%, while individual households reduced the production by 7,3%. Agricultural enterprises account for nearly 70% of the poultry meat production. The reason is the increasing importance of the agricultural production effectiveness and its innovative character. Thus, in 2008 in the agricultural enterprises of all types of ownership the volume of production has increased for 1,5%, and in the individual farm households – decreased for 1%. Regardless of the numerous positive figures in the preceding examination, in the time of current economical crisis, the agri-industry needs state support even more than before. Ukrainian agriculture enjoys a significant fiscal support from the state coming in a form of Budget expenditures and Tax expenditures (tax privileges, tax arrears, and tax write-offs).

The current trend shows agriculture is growing in terms of government expenditure and industry revenue.

The total fiscal support to agriculture and rural areas grew almost threefold, fluctuating around 2% of Ukraine's GDP. This figure has been much higher in Ukraine, since significant non-fiscal measures benefit domestic agricultural producers as well. In the 2007 budget of Ukraine financing of agriculture grew 2,8 times in comparison with 2003 and constituted 4,5 billion UAH. From this amount, nearly 812 million UAH were forwarded to maintain educational institutions and 97,2 million UAH to carry out scientific researches *(Table 3)*. Within 2008 state support measures will become more sophisticated in line with the WTO requirements; however this will not impact negatively the total scope of support.

Table 3. Financing by the State Budget from the Ministry Expenses in 2003–2007, mln. UAH

Expenses	2003	2004	2005	2006	2007
Ministry of Agrarian Policy total	2291,8	2476,0	4887,3	6278,3	7952,0
including:					
Agriculture	1608,9	1614,4	2246,0	3057,9	4556,1
out of them:					
Support to manufacturing products of cattle breeding and crop planting		540,5	753,1	2017,0	2313,0
Financial support to agribusiness through cheap loan mechanism		95,4	415,1	333,5	551,3
Education	270,8	341,2	523,3	667,4	811,8
Science	281,5	20,9	56,5	63,5	37,6
Other directions	130,6	499,5	2061,5	2489,5	2546,5

Source: Ministry of Agrarian Policy of Ukraine

The Ukrainian government provides financial support to the agriculture in other forms of direct and indirect subsidies. According to the existing in Ukraine practice the country, Ukrainian's government provides its support to the agricultural producers in different forms. An additional form of state support to agriculture come as a state financing of land plants development programs, cattle breeding and live stock breeding programs, fishery development programs, reclamation projects development and environmental

programs, financial support to agricultural producers through special loans, gardening sector support programs, veterinary development and safety protection programs, agricultural science development, rural infrastructure development, rural sector's social infrastructure development programs, programs on support to producers of agricultural equipment, etc. Clearly, many of these traditional items, which are included into the list of the supporting measures, cannot be considered the agricultural subsidies. For example, rural infrastructure and social development programs as well as agricultural science development programs cannot be considered as those agricultural subsidies. However, other subsidies can be the subject of such agreement. In any case, it's crucially important to know the existing in Ukraine structure of state financial support to the agricultural sector with a breakdown on specific measures, in which this support is directed.

The total agricultural budget expenditures (TABE) are allocated through different ministries, e.g., Ministry of Agrarian Policy, Ministry of Finance, State Committee for Land Resources, etc., are the main source of direct and indirect subsidies. These monies grew from 1,47 billion UAH in 2002 to the planned UAH 6,68 billion for 2006. At the same time the share of TABE in total budget expenditures has been growing from 3,3% to 4,9% over 2002-2006. If we compare the dynamics of both types of expenditures to 2002 benchmark then total budget expenditures grew by 3,1 times in 2006, whereas TABE grew by 4,5 times over the same period. The ratio of tax proceeds from agriculture to TABE shows that the agriculture sector received almost two times more from the budget than contributed to it, which together with significant tax expenditures creates an imbalanced tax burden on Ukrainian economy, thus potentially decreasing whole economy competitiveness.

The highest weight in the total structure of the state support to agricultural sector has land plants development programs, which obtains 16% in the total amount of support. Those items, which are not subjects to the WTO regulations reclamation projects development and environmental programs – 12%, programs on support to producers of agricultural equipment – 9%, rural infrastructure development – 9%, agricultural science development – 6%, veterinary development and safety protection programs – 3%, rural sector's social infrastructure development programs – 2%. All in total the non-related to WTO restrictions items accounts to some 41% of the total amount of subsidies coming to the Ukrainian agriculture. As on the state of 2004 the absolute amount of money, which was transferred for these six items accounts to around UAH 2 billion (USD 394 million), while the rest of the items, which can be considered as related to the WTO agreement items, was UAH 3,1 billion (USD 584 million).

Analyzing planning and execution of the state support programs over several years, one would definitely observe some important facts, revealing problems with budget expenditure planning. The existence of a particular program in a state agenda is not sustainable and lacks continuity. This reveals that Ukrainian government and Ministry of Agrarian Policy in particular do not have a long-term strategy for use of the budget funds on agricultural and rural development, which reflects that Ukraine does not have any officially adopted strategy of agriculture and rural development yet. Budget programs are often underfinanced and not uniformly distributed over the whole year. This lack of strategy and erratic expenditures pattern makes long-term investment planning for agricultural enterprises in the sector very difficult and increases entrepreneurial risks.

However, the amount of agricultural subsidies to the Ukrainian producers (i.e., farmers) was rather virtual than real one. These were not transfers of the financial assets from the state budget to budgets of the producers. Although the state budget has been fixing the certain funds to be transferred as an agricultural subsidy it was almost never transferred to the final recipients (i.e., agricultural products producers) in a full amount. Final recipients of the agricultural subsidies were able to receive only a certain portion of the planned amount of subsidy. According to the data of the Ukrainian State Statistical Committee in 2001-2003 the average annual arrears on agricultural subsidies accounted some 36% of the planned amount of subsidy. This reflects the low level of fiscal discipline, which exists in the country and lack of financial resources, which government was planning to spend for subsidies.

Tax privileges remain one of the most used forms of Ukraine's state support to agriculture. They are huge compared to other sectors, exceeding even budget expenditures, should have compensated the lack of funds in a budget. However this was not the case. A bulk share of Ukrainian tax expenditures is excluded from WTO domestic support reduction commitments, meaning the absence of external leverage to eliminate them. Since the agrarian lobby is considerably strong in Ukraine, it is very likely that tax privileges for agriculture will persist in the future. Unfortunately, agriculture contributes much less to the budget than it gets from it, thus creating a tax burden bias in Ukrainian economy. Fiscal support, from an economic point of view, should leverage government policies to increase productivity and competitiveness of the agriculture and food value chain. If the efficiency of fiscal support is neglected and dominated by the influence of particular lobby groups in specific sub-sectors, the impact of fiscal support can become negative. Relying heavily on different production subsidies, however the Ukrainian government ignores efficiency and productivity as an objective for agricultural policy. Instead, the government pursues the goal of food self-sufficiency by increasing output utilizing high subsidies, import tariffs and non-tariff barriers. Therefore policymakers try to sustain existing farm structures and procedures of granting aid and tax privileges to producers. Fiscal support is designed so as to stimulate large agricultural producers, for whom it is much easier to get financial assistance from the budget than for private farmers, for example. Finally, agricultural policy makers implicitly rely on agricultural producers in providing social services in rural areas and their development, thus delaying structural reforms in the sector.

The next point which should be outlined within this paper is Ukraine's agricultural production and trade during the period of increasing world food prices, or in other words, in the frameworks of global financial and economic crisis. The world food crisis both poses challenges and presents opportunities for Ukraine. The solution to the challenges lies in the appropriate macroeconomic policies and targeted social support, not in the interventions on the food market. Measures to protect the poor and vulnerable from the food price increases need to be separated from agricultural market policy, so that Ukraine can seize the emerging opportunities:

An appropriate agricultural policy framework and public investment program would provide incentives for private investments so needed to build Ukraine's export-oriented and competitive agriculture sector. An increase of productivity in agriculture would also make Ukraine less vulnerable to possible low harvests. Ukraine's accession to the WTO and the beginning of negotiations on a free trade agreement with the EU provides key impetus to the required reforms, and the Ministry of Agricultural Policy of Ukraine has already taken several initial steps.

Some key reform and investment areas include:

- trade policies (including refraining from export restrictions);
- transportation, storage;
- market information infrastructure and agricultural statistics;
- institutional framework for land market;
- access to finance and risk management instruments;
- research and extension, and vocational training of agricultural specialists and farm managers;
- veterinary and food safety control system compliant with regulations in target markets.

The negative impact of the increasing domestic food prices as a result of global food crisis should be cushioned by targeted social assistance programs, complemented with tighter macroeconomic management to reduce overall inflation. Ukraine already operates a number of targeted social transfer systems that are quite efficient at identifying and supporting the most vulnerable subjects. For instance, the "last resort" program for the very poor has a targeting efficiency of 73% among the poorest population. Support to single mothers and to young (0-3 years) children is also effective. These programs could be scaled up to support those most affected by rising food prices. This would be cheaper and more sustainable than the blanket increases in all social payments implemented in recent years. At the same time, numerous benefits that do not effectively target the poor, such as housing subsidies, could be scaled back.

In order to help national economy to overcome the crisis, the Ukrainian government created a number of state programs that support the agricultural sector. Some of these programs are briefly discussed next.

The Government of Ukraine has established a program for the 'Agroindustrial Complex and Development of Rural Areas' which, if implemented, would make a significant contribution to escalate the sectoral competitiveness and reduce disparities between the rural and urban areas of Ukraine. This program is based on the three pillars: rural development, competitiveness of agriculture, including quality and safety issues, and natural resources management and environmental sustainability. It includes provisions for the improvement of social and physical infrastructure in the rural areas of Ukraine, for the development of key markets associated with agriculture (finance, land, insurance), for the adoption of international food safety and quality standards, for a transition to efficient mechanisms of state support (decoupled payments), and for enhancement of efficiency in agricultural based on innovations and knowledge transfers.

On the other hand, the Ministry of Agricultural Policy of Ukraine has prepared an advanced draft of a national program for rural development until 2015. Citing relevant laws such as the Law of Ukraine "On basis principles of national agrarian policy for the period until the year 2015", the Law of Ukraine "On state support for the rural economy of Ukraine", and the Law of Ukraine "On the priority of the development of rural space and agro-industrial sector in the national economy", MAP has prepared a detailed draft of a national program aiming at improving Ukraine's competitiveness on domestic and foreign markets, ensuring food security for the country, and the preservation of rural way of life and peasantry as the carrier of Ukrainian identity, culture, and spirituality.

If implemented effectively and timely, the above mentioned measurements can create favorable conditions for the recovery of both the agricultural sector and the national economy as a whole. But there are still some other factors which should be taken into consideration in order to fasten the process of the economic revival in Ukraine.

First of all, public and private investments are particularly needed to improve the efficiency of the marketing systems of agricultural products. Even if spreading of excessive price on agricultural goods due to export restrictions was completely eliminated, farmers in Ukraine would still get less for their products than their counterparts in other countries because of the high marketing costs.

Another policy priority is a completion of institutional arrangements for the property rights registration (including land) and removal of the moratorium on land sales. Land purchase and sale would not lead to rapid, dramatic changes, but it would set in motion a virtuous circle whereby the availability of collateral increases investment and productivity in agriculture, which in turn leads to the increase in land values, which makes yet more collateral available, and so on. It would also, together with the enforcement of bankruptcy procedures in agriculture, increase the pressure on less efficient farmers to leave production and make the resources that they have been using poorly available to other more efficient farmers. One of the largest handicaps that Ukraine's agriculture has to face is the persistence of a very high proportion of highly inefficient farms, many of which are subtracting rather than adding value as they produce.

Compliance with international quality standards will be critical for Ukraine's further integration into the global

economy. Ukraine has recently completed its lengthy negotiations on WTO accession, and has entered into negotiations with the EU on a free trade agreement (FTA). The extent to which Ukrainian agriculture benefits from WTO membership and a FTA with the EU hinges on its ability to comply with international quality standards. For example, Ukraine is currently able to export most livestock products (meat, milk) to only a small number of mainly former Soviet countries. If agronomic practice and product quality do not comply with market requirements and internationally recognized guidelines and standards, it will result in the lower quality products for domestic consumers (food safety), delays in completion of trade agreements, and in the inability to access to high-quality-high-price foreign (and domestic) markets.

The Ukrainian government has also to revise country's handling, storage and transportation infrastructure. Ukraine's agricultural market and supply chains continue to be characterized by significant post-harvest losses, high transaction costs, and in transparent price formations due to the information asymmetries. This leaves producers with unnecessary unfavorable deals and limited marketing options, causing further low farm-gate prices and hence creating disincentives for private investments in agriculture. It also increases consumer prices. Public investments, especially in to the infrastructure with public good characteristics, such as road and rail networks, waterways, can intensify the competition by reducing regional market power, and therefore can act as an important catalyst for private investment in other links of the supply chain. For example, incentives to expand on-farm storage capacity (which would enable farmers to avoid being forced to sell products into the post harvest glut markets) depend on reliable, low cost transport channels to more than one possible purchaser.

And finally, Ukrainian agriculture urgently needs centers of excellence in higher education and research to produce future agribusiness leaders, analysts and experts in administration, who will form the human resources needed to ensure the steady growth of Ukraine's agroindustrial complex and its economy as a whole.

The characteristics and issues of the Ukraine's agricultural sphere described its economical role in the multifunctional rural development. The next dimension of multifunctionality is presented by the social function of agriculture. Despite numerous positive trends in the economic matters of agriculture, the examination of its social aspect revealed a number of problems that rural areas are facing today. Regardless of the general positive tendency of increasing wages and reduction of the poverty in the entire country, rural areas remain the milieu with the highest level of poverty. This fact presents a real problem for the country, since more than 30% of the Ukrainian population permanently lives in the countryside *(Table 4)*.

Disparity in the material status of the rural residents is best uncovered by their expenditures. Thus, in 2007 total consumptive spending of one rural resident were 20,1% lower than those of an urban resident and accounted for 566,92 UAH per month (in comparison to 709,95 UAH similar spending of urban residents).

Table 4. Correlation between the urban and rural population in Ukraine in 2005–2009

Year	Urban Residents		Rural Residents	
	mln persons	%	mln persons	%
2005	32,0	67,7	15,3	32,3
2006	31,9	68,0	15,0	32,0
2007	31,8	68,1	14,8	31,9
2008	31,7	68,3	14,7	31,7
2009	31,6	68,5	14,6	31,5

Source: State Statistics Committee of Ukraine

After 9 months of 2008 the average total spending of a rural resident was still lower than its equivalent of an urban resident, and reached 2203 UAH against 2743 UAH, which is 19,7% difference. Life conditions in the rural areas are also complicated by the absence of necessary road network and telecommunication systems (more ¼ of the rural settlements do not have bus stops, only 44,5% have asphalt roads, only 7,3% have street lights); appropriate water supply (134,3 thousand rural residents do not have permanent access to water), few social-cultural entities (70,3% of villages do not have kindergartens, 51,1% – schools, 58,8% – post offices, 33,2% – hospitals). During the years of administrative economy agricultural enterprises were responsible for development and functioning of the social infrastructure objects. Today mission of these enterprises that are participants of market relations does not include protectionism of the social sphere. However, satisfactory condition and availability of social sector would have fostered development of commercial activities in the rural areas, improved socio-demographic situation, etc. Problems mentioned above caused another negative tendency in the rural area which is the ongoing shrinkage of the number of rural settlements. In the beginning of 2006 there were 28,57 thousand villages in Ukraine. 227 of them, which is 0,8% from the total amount, did not have any population left. Quantity of the rural communities with population less than 50 persons accounted for 13,8% of the total amount. Therefore, rural areas in Ukraine have traditionally been associated with underdevelopment and backwardness. A major share of young rural generation strives to migrate to urban areas in pursuit of a "better life" in the form of better facilities, social and physical infrastructure, etc.

The next component in analyzing the social status of Ukraine's rural areas is to describe major trends in the rural employment. As indicated in Table 5, a significant share of the rural population is engaged in agriculture (about 10%), but approximately the same share is employed in non-farm sector (education, healthcare, extracting industry, etc). On the other hand, approximately 71% of the rural population is non-employed. These include those seeking work but not able to find it (unemployed), pensioners, pupils, students etc.

However, one should take into account the specifics of rural life in Ukraine. Most rural households, including those involved in nonfarm sector, tend to spend a considerable amount of time on subsistence or subsidiary farming as well. For example, rural, households produce about 2/3 of Ukraine's total raw milk production. Moreover, according to official statistics, households produce about 60% of the gross agricultural produce of Ukraine. The rural non-farm employment profile is more or less similar across all regions.

Table 5. Sectoral profile of rural employment of primary occupation in Ukraine, 2004,%

	Branch of activity	Ukraine	West	North	Center	South	East
Self – employed	Agriculture	9,27	4,76	11,09	9,92	13,58	10,48
	Fishery	0,11	0,09	*	0,03	0,16	0,23
	Extracting industry	0,50	0,38	0,25	0,40	*	1,82
	Processing industry	2,12	2,63	2,46	2,07	0,83	2,05
	Electricity, gas and water supply	0,62	0,71	0,86	0,58	0,42	0,89
	Construction	1,55	1,68	1,28	0,99	2,56	1,29
	Whole- and retail sale	1,95	1,74	2,43	1,65	156	2,65
	Hotels	0,25	0,39	*	0,33	0,29	0,18
	Transport and communication	1,60	1,11	2,64	1,84	1,67	1,52
	Finance	0,13	0,12	0,15	0,04	0,25	0,15
	Real estate	0,04	0,05	*	0,10	0,03	0,07
	State government	2,07	2,56	1,91	2,53	1,71	1,79
	Education	3,83	4,05	3,59	3,35	4,29	3,22
	Healthcare	2,05	1,96	3,17	2,08	1,85	1,73
	Public services	0,45	0,55	0,29	0,37	0,86	0,13
	Servants	0,01	0,03	*	*	*	*
Non-employed (pensioners, pupils, students, unemployed, children, etc)		73,43	77,07	69,85	73,71	69,94	71,76

Note: * no records

Source: Calculation of Institute for Economic Research and Policy Consulting in Ukraine on the basis of household survey conducted by the State Statistics Committee of Ukraine in 2004

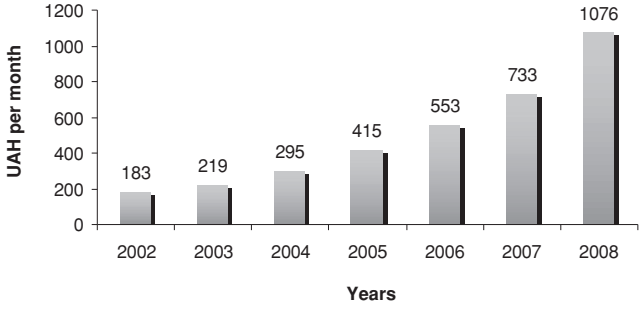

Figure 3. Dynamics of the average monthly salary of agricultural workers, UAH

Source: State Statistics Committee of Ukraine

The most popular sectors, in terms of rural employment, are the food processing industry, wholesale and retail trade, transport and education. The relative importance of employment in agriculture largely reflects the degree of regional agriculture specialization. For example, in the leading Southern and Eastern regions higher percentages of the rural population are employed in agriculture than in other regions.

Agricultural production in Ukraine remains the economic activity with the lowest level of wages. According to the information of the Ministry of Agrarian Policy in January – November 2007 average monthly salary of an agricultural worker account 712,2 UAH or 54% of the average salary rate among all sector of economy. In 2008 it did grow for 95%, but stayed among the lowest if compared to the other industries *(Figure 3)*.

Taking into account the fact that the majority of rural inhabitants are employed in agriculture, low wage together with other economic factors, such as high unemployment, poor living and working conditions, appear to be the key factor which forces them to look for a better place of work not only in urban areas of Ukraine, but also in foreign countries. The official data provided by Ukrainian Ministry of Statistics has proved this fact, indicating that net migration is positive only in urban areas while it is very negative in rural ones *(Figure 4)*. In 2007, for example, migratory growth in cities and towns was equal to 0,3 people per 1000 inhabitants whereas the number of dwellers in countryside decreased by 1,7 per 1000 population due to intensive external migration.

Realizing the importance and depth of the aforementioned issues, Ukraine's government makes an effort to revitalize the area and help its dwellers through its policy and programs.

Thus, state policy in social and economic development of rural settlements includes such objectives as promotion of policy implementation for integrated development of the rural locality by means of close cooperation between governmental agencies, local self-governments, rural communities, NGOs and private sector. Ukraine's authorities try to introduce mechanisms for partnership and support to rural social area development by the state and

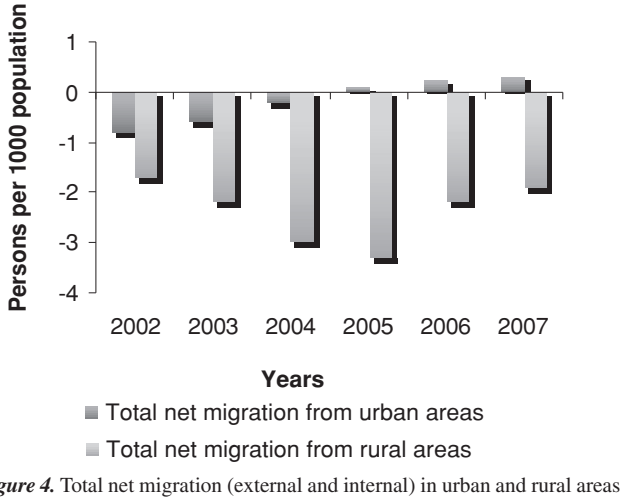

Figure 4. Total net migration (external and internal) in urban and rural areas of Ukraine (persons per 1000 population)

Source: State Statistics Committee of Ukraine

local budgets, enterprises and organizations located within the rural territories, in line with the programs of community social and economic development. The government also strives to improve the quality of life in rural localities, personal enhancement by approximating the quality of education, medical and cultural services, living conditions and rural infrastructure to the urban one. Government's expenditures on rural development in includes following several state programs, managed by Ministry of Agrarian Policy of Ukraine and other ministries: state privileged crediting of individual rural builders; restructuring and development of public utilities in rural areas; development of physical training and sports among rural population; investments in health-care institutions, gas supply networks, roads, seaports, development of financial services in rural areas, etc.

And the last, but not less important issue to be discussed in the framework of multifunctionality is the environmental status of Ukraine's agriculture. The natural conditions and climate in Ukraine are fundamentally favorable to agriculture. Ukraine's soil is widely recognized as a major national asset thanks to its tremendous fertility and outstanding agricultural qualities. According to data compiled by the State Committee for Statistics, agriculture currently occupies 72% and forests 17,2% of the total land area (60,4 million ha). However, the Ukraine is one of the countries that exemplify the seriousness of land degradation in the region as described in the Regional Implementation Annex for Central and Eastern Europe, of the Convention.

During the era of the Soviet Union, the mass intensification and expansion of agriculture resulted in soil degradation. In 1998 changes took place in the structure of land resources. In comparison with 1997, the area of arable land decreased by 27800 hectares, with the area of tillage being reduced by 223400 hectares. While some of these changes are the result of expansion of previously planted protective forest plantations and strips, silt-catching basins and river-bank reinforcements, most of the change has occurred due to the change of ownership and abandonment of previously intensively-tilled agricultural land. Through this, the redistribution of land has contributed to a considerable decrease in the amount of land conservation and restoration activities in the last decade. The ecologically sound proportion between areas of arable lands, pastures and forests has been neglected. Low productive plots, including river meadows, marginal lands and slopes were reclaimed into crop production without proper fertilization and up-keep. Anti-erosion measures, such as planting shelterbelts and terracing slopes have been almost non-existent in the last decade. The amount of irrigated lands has been decreasing due to the difficulties in their maintenance. With no recultivation and gradual deterioration of soil and water conservation systems after a long span of unsustainable practices, agricultural land faces a crisis with intensified erosion, nutrient depletion and loss of protective forest coverage. The annual rate of soil dehumification in Ukraine runs as high as 0,6 to 1,0 thousand hectares, and the eroded land area measures now 40% of the total territory. Up to 500 million tons of soil are washed from hillsides annually, which results in the loss of 11 million tons of humus, 500 thousand tons of nitrogen, 400 thousand tons of phosphorus and 700 thousand tons of potassium. The average annual rate of increment of eroded area is 80 thousand hectares. The negative balance of the soil nutrition elements reaches 100 kg per hectare and more, and nearly all the tillage soil is over-condensed. Serious concern arises from the fact that in some regions soil does not receive enough important microelements such as molybdenum, manganese, and iodine. The total environmental and economic damage is estimated at about 4 billion USD.

Another major concern of the environmental aspect of agricultural multifunctionality is the use of fertilizers in agriculture. In Ukraine the level of their use started to increase from the mid-1960s onwards. During the period from 1966 to 1970 an average of 1,4 million tonnes (or 46 kg/ha) of fertilizers were applied annually. In the second half of the 1980s this figure reached 4 to 4,7 million tonnes of fertilizers. The increase in the application rates of mineral fertilizers influenced favorably the yields of agricultural crops. After the collapse of the USSR, state financing was reduced at the time because of a general crisis in the Ukrainian economy. Private investment became the source of finance for fertilizer manufacturers. The exportation of fertilizers was the only means of covering the cost of reconstruction of the enterprises, due to the insolvency of the agro-industrial sector in Ukraine.

According to the official statistics, fertilizer consumption fell from 4,2 million tonnes of nutrients in 1990 (when admittedly fertilizer was excessively and wastefully applied) to 424 thousand tonnes in 1999. There is no shortage of mineral fertilizers in Ukraine and the fall is due to unfavorable economic conditions in agriculture. In 2002, 456 thousand tonnes of mineral fertilizer nutrients were applied *(Figure 5)* or 14,6 kg/ha. This is 28 percent more than in 2000. The present consumption level of mineral fertilizers is very low compared with 1990, particularly in the cases of potash and phosphate. In 2005, nitrogenous fertilizers accounted for 72 percent (in 2000, 80,1 percent) of total nutrient consumption, phosphorus and potash for 18 percent (13,5 percent) and 10 percent (6,4 percent) respectively. In 2004, mineral fertilizers were used on 45,5 percent of the total area under agricultural crops (6,4 million ha), while in 2000 less than a quarter of the sown area was fertilized.

Because of the sharp decline in the quantities of organic and mineral fertilizers applied on the majority of farms in Ukraine, the balance of nutrients has generally become negative. There has been a 5 to 13 fold decrease in the use of organic nutrients, mostly from manure, in the different zones of Ukraine. This has

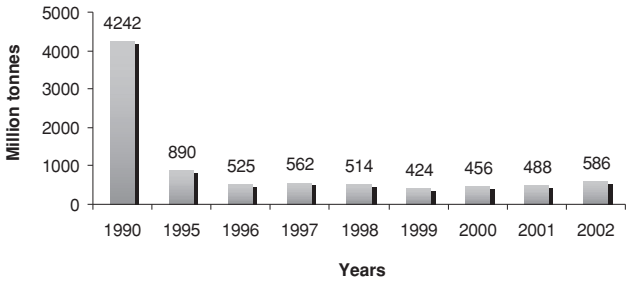

Figure 5. Fertilizer consumption in Ukraine
Source: State Statistics Committee of Ukraine

resulted in a sharp deterioration of the humus balance in the soil. Dehumification is of particular concern in Polissya region, where during the last 10 to 15 years the humus deficit has increased five times. In Ukraine as a whole, the balance of nutrients during the past decade has deteriorated sharply. In particular, the balance of nitrogen has changed from -3,1 to -41,5 kg/ha, phosphorus (P2O5) from +24,9 up to -16,1 kg/ha and potassium (K2O) from -0,5 to -56,4 kg/ha. Besides more than 4 million tonnes of fertilizers, about 175 000 tonnes of chemical pesticides are used annually in agriculture. Of 170 pesticides used in Ukraine, 49 are particularly harmful as highly toxic, supercumulative and stable. However, the tendency towards a decrease in the use of chemicals and an increase in the use of biological plant protection has begun to appear in Ukraine only in recent years. Since the current stage of the development of agriculture in the country is characterized by complications in the ecological situation, the government once again steps in and provides a support for agriculture. Spending on environment protection is precisely determined within the framework of the state programs, e.g. protection and effective use of forest and water resources etc.

Conclusions

Summarizing, it should be said that agriculture remains an important force in sustaining operation and growth of the whole Ukraine's economy. In 2008 this sector alone composed 16% of the Ukraine's GDP and taking into consideration the resource potential of Ukraine's agriculture, it will most probably continue further expansion in the long run. Thus, 18,9% of the total are sod Europe's agriculture is concentrated in Ukraine, including 26,9% of its arable land. According to FAO experts only 40% of agricultural potential in Ukraine is properly used. Specialist from World Bank has also positively evaluated the potential of the country and concluded that Ukraine's agricultural production can be doubled in case of proper management and suitable governmental support.

Hopefully, future growth of the agri-industrial sector, and consequently the increase in the budget sum, will make it possible to foster the development of the infrastructure and social-cultural sphere of the rural areas. Unfortunately, current situation is characterized only by existence of negative trends. Poor condition of streets and roads in villages, insufficient number of schools, hospitals, post-offices, libraries, etc, high unemployment rate and migration from rural areas of Ukraine represent only the top of the list. The condition of the countryside is neglected to a degree, where little improvement can be done without government intervention and financial support. State police should target the maintenance and dynamism of rural communities, since it's basic to sustaining agro-ecology and improving the quality of life of rural residents. Later on, more attention should be paid to social viability, which includes maintenance of the cultural heritage of the rural areas, since numerous societies in Ukraine still identify intensely with their historical origins in agrarian communities and rural lifestyles.

The environmental function of agriculture relates to land use and can have both beneficial and harmful effects on the environment. At this time there is a number of environmental problems observed in Ukraine. Improper use of the arable lands has exhausted them and was followed by soil degradation and its dehumification. These issues are often underestimated due to the large amount of arable lands in Ukraine. However, without accurate land management the country might soon find itself facing food crisis, since one of its major agricultural resources will be devastated.

The relative importance of the three aspects of the agricultural multifunctionality (economical, social and environmental) expressed in the article will depend on the future strategic choices at the local and national levels. Since the multiple functions of agriculture may be relevant at many scales, from local, over national and regional, to global, and operate over different horizons it is extremely important for Ukraine to integrate into global community and incorporate world experience in order to enjoy overall economic and environmental benefits of the country's multifunctional agriculture.

Additional research and analysis needs to be conducted on this subject to allow Ukraine to truly utilize its agri-industrial complex in the most efficient and effective means and aspire to its highest potential. Knowing and understanding the immense benefits of multifunctionality is key, and will inevitably lead to a more successful and prosperous future of Ukraine.

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CORPORATE BRANDING EFFECTS ON CONSUMER PURCHASE PREFERENCES IN SERBIAN TELECOM MARKET

Gajo Vanka

Abstract: This research is carried out to know the role of corporate branding in mobile phone network along with different influencing factors involved in the purchase of mobile telephone connections. This paper discusses corporate branding from consumer's point of view that how much they value it and what type of role it has.This is a quantitative study. A questionnaire is used in order to investigate corporate branding and other influencing factors involved in purchase decision of the customers. Population selected for this study are Belgrade University students which is the most of Serbian youth segment and is a valuable source that gives precise information with high probability about market preferences according to the Research of Serbian republic statistical office. Primary data are obtained by collecting data from questionnaire and interview, while the secondary data are collected from various reliable sources. Primary data provide reliable content in accordance with a secondary data obtained by Serbian republic statistical office and with a Research of competitor and consumer preferences insight provided by Telenor Company. The analysis of the data has been performed in accordance with the chosen theories and summarized in a table, which serves as a tool for deriving reliable and relevant conclusions. The sample size was determined by conducting a primary study and defining the variance of primary sample and the intended number of samples was selected carefully and randomly from the population. Then the validity and reliability of the questionnaire was determined. The used questionnaire in this research consisted of 7 common, and 30 specialized questions which were supporting the hypotheses of the research. Data was analyzed using the frequency percent techniques, and in the chapter related to the deductive statistics, one-sample t test was used to analyze and approve/disapprove the questions supporting the research hypotheses. The analysis of this study reveals different set of results while making comparison between literature and empirical. It investigates the relative importance of the corporate branding to the customers in mobile phone telecommunication industry while making purchase decision. The findings of this study provided useful information which is helpful not only for the students but also for the brand managers of mobile telecom operators that how they can improve their company's strategic position for longer period of time through corporate branding to trigger more customers and for a good brand.

Key words: Corporate branding, Services & Quality, Loyalty & Trust, Price, Switching and Mobile Network service providers

1 Introduction

In mobile telecommunication, purchase settings are continuous and different than the purchase settings of retails stores etc (*Ranaweera & Prabhu,* 2003). In this industry most of the customers maintain long term relationships with the operators (*Ranaweera & Prabhu,* 2003). Where factors like trust, image, and satisfaction are not easy to measure. But also factors like switching are easy to measure because in this industry switching is more than simply walking to another Store. Because it requires considerable time and effort due to the presence of switching barriers and switching decision is made after considerable thought. And most importantly this sector provides an environment of high automation which makes the customers *Think Twice* before leaving (*Ranaweera & Prabhu,* 2003). The linkage between core values and corporate brand is described by a firms brand equity and competitive position (*Ozer,* 2004). A customer has brand building in his mind through the process of controlled and uncontrolled communication (*Ozer,* 2004). Today, for every firm a critical question for its success is that how it can maintain its current customers and how it can make them loyal to the brands. Loyal customers pay important role in building businesses by making different moves like buying more, by paying premium prices and most importantly providing companies different sets of new customers by positive word of mouth (*Ganesh* et. al. referred in *Aydin* and *Ozer,* 2004). In fact telecommunication companies lose their customer quite regularly. So it's very challenging task for the mobile phone operators to retain existing customers as well as bringing new customers towards their brands and creating loyalty in them. It happens in almost every industry but especially in telecommunication services, it is said that when customers are connected to a particular service provider or operator then their long term relationship with the operator is of great importance for the success of the company in the competitive market (*Gerpott* et. al. 2001 referred in *Aydin* and *Ozer* 2004). Another factor which is very important in telecommunication industry is price. Price is a very sensitive issue in this industry, which is very dynamic factor in this industry; customers are very price sensitive in this industry. *Kay,* (2006) argues that brand meanings are incorporated into the lives of consumers so brands are social or cultural property rather than company property.

This study involves different sections to find out the result of the research. Analysis is one of them with high importance, as it comprise of a comparison between primary data and secondary data. Major problem during the purchase of a particular mobile phone connection is discussed mainly in relation with corporate branding and with other factors as well. The purpose is to analyze the role of corporate branding and to know about influencing factors during purchase of a mobile phone connection.

2 Objective

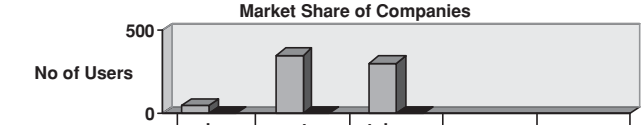
It is seen the most of the companies in mobile phone telecommunication promote more their corporate name than the product/service they offer to the customers. The purpose of this study is to analyze the role of corporate branding in mobile telecommunication industry. What are reasons that make customers purchase mobile phone connection of any particular company. Either it is because of corporate brand or it is because of the service, loyalty, price or any other reason. This research will examine that in mobile phone telecommunication either corporate brand is sufficient for a long term customer base, and that brand association or there are any other factor for long time survival of the company. As product/service brands are not long term brands as compared to corporate brand in mobile phone telecommunication so focus will be to know about corporate brand and its presence in the consumer's mind. Corporate brand has more dominant reflection in mind of mobile phone consumers and which has long lasting association with consumers. This research is carried out to find out the approximate solution of identified problem with the help of literature and Questionnaire.

3 Methodology

This is a quantitative study. A questionnaire is used in order to investigate corporate branding and other influencing factors involved in purchase decision of the customers. Population selected for this study is Belgrade University students which is the most of Serbian youth segment who are studying here, and is a valuable source that gives precise information with high probability about market preferences according to the Research of Serbian republic statistical office. Primary data are obtained by collecting data from questionnaire and interview, while the secondary data are collected from various reliable sources. Primary data provide reliable content in accordance with a secondary data obtained by Serbian republic statistical office and with a Research of competitor and consumer preferences insight provided by Telenor Company. The analysis of the data has been performed in accordance with the chosen theories and summarized in a table, which serves as a tool for deriving reliable and relevant conclusions. The sample size was determined by conducting a primary study and defining the variance of primary sample and the intended number of samples was selected carefully and randomly from the population. Then the validity and reliability of the questionnaire was determined. The used questionnaire in this research consisted of 7 common, and 30 specialized questions which were supporting the hypotheses of the research. Data was analyzed using the frequency percent techniques, and in the chapter related to the deductive statistics, one-sample t test was used to analyze and approve/disapprove the questions supporting the research hypotheses.

4 Data Collection & Results

Students of Belgrade University were the target population. Questionnaire started with a basic question that either he/she is a student of Belgrade University or not with age and gender information. The total sample population was students of Belgrade University. Out of 702 students, 372 (53%) were female while 330 (47%) were male. Ratio of female and male is almost equal to avoid biasness. According to research topic students were asked that do they have a mobile phone connection and used three main service providers as reference. All 702 students had mobile phone connections. Question; "Which service provider's connection do you have?" The students had three different choices to select a brand. If anyone was not using anyone of the three brands then he/she could mention it in Others category. The result for this is shown in the following figure.



	vip	mts	telenor		
Users	49	351	302		
Percentage Share	7%	50%	43%		

Question: "Why did you choose the above company (Brand)?" To check the response of students as they are customers of service provider, the question had four options to answer. Options are company name (brand), Service & quality (S&Q), loyalty & Trust (L&T) and finally The Price (P). 9% selected company name (Brand), 20% selected S&Q, 10.4% selected L & T, 54% selected price, 1.4% selected L&T+P, 4% selected S&Q+P, and 0.3% selected B+P as a influencing factor for their selection of mobile phone connection. The highest influencing factor for their purchase is price then S&Q, L&T and Brand respectively. The results for this questionare shown in the following figure.

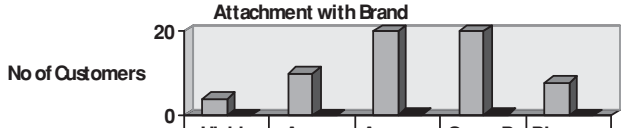
	B	S& Q	L& T	P	L& T+P	S& Q+P	B+P
No of customers	62	142	74	382	10	30	2
Perentage Value	9%	20%	10,40%	54%	1,40%	4,20%	0,30%

4.1 Brand

This section will show different results obtained for corporate brand mentioned as company name (Brand) in the questionnaire. There were 62 respondents who selected brand as influencing factor, which is 9% of total sample population.

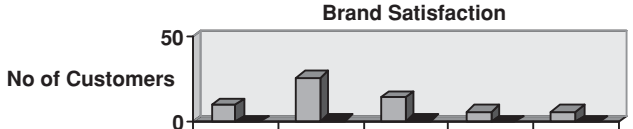
Question: "*Do you have any emotional attachment with your chosen brand?"* This question is put in the sub questionnaire of the brand. In order to know about those respondents who had brand as influencing factor for their purchase. The data is gathered for their emotional attachment with the brand. Different results were obtained.

6% of 62 were highly agree, 16% were agree, 32% responded as average and somewhat disagree and 13% as Disagree that they have emotional attachment with the brand. The results are shown graphically in the figure below.



	Highly	Agree	Average	Some.D	Disagree
No of Customers	4	10	20	20	8
Percentage value	6%	16%	32%	32%	13%

Question: "*Are you satisfied with your chosen brand?"* This question is also contained in the sub questionnaire of Brand. Purpose of this question was to know about the satisfaction level of the respondents who selected Brand as an influencing factor for their purchase. Different set of responses were obtained for this question with 16% of 62 as highly satisfied, 42% as satisfied, 23% as average and 10% as somewhat dissatisfied and dissatisfied. The results are shown graphically in the following figure.

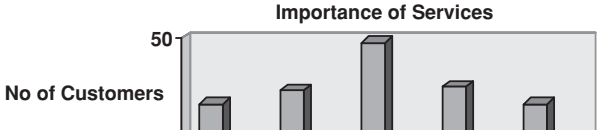


	Highly	Satisfied	Average	Somewh	Dissatisfi
No of Customer	10	26	14	6	6
Percentage Value	16%	42,00%	23%	10%	10%

4.2 Service & Quality

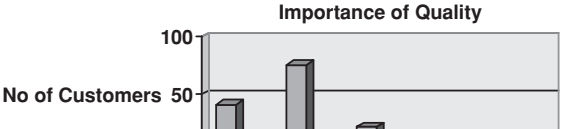
In this part results obtained for service & quality will be explained. There were 142 respondents who selected service & quality as a major factor for their purchase decision. It is 20% of the total sample.

To check the importance of services from those respondents who chose services & quality as their influencing factor for purchase, a question was asked: "*Do you chose this connection only due to services offered?"* 14% respondents of 142 replied that services are highly important that they chose this connection only due to services offered while 16% answer that services are important for their purchase and 34% answered for average which is highest percentage. 20% answered for less important while 14% said that only services are not important for their purchase. The results are shown in following graph.



	Highly	Importa	Average	Less	Not
No of Customers	20	26	48	28	20
Percentage Value	14%	18%	34%	20%	14%

Respondents were also asked about the quality of the brand which they are using in order to investigate the importance of quality associated with that particular brand. They were asked that "*How do you see the quality of this brand?"* . Different results were obtained from this research, 30% of 142 respondents, who selected service and quality as an influencing factor, replied as very good while 54% replied as good. 15% said that it was average. Only 2 respondents said that it was bad. The results are shown in the graph below.



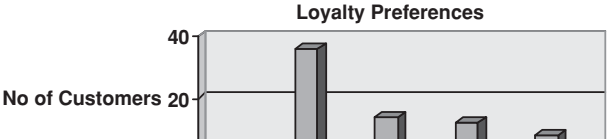
	Very	good	Averag	bad	Very
No of Customers	42	76	22	2	0
Percentage Value	30%	54%	15%	1%	0%

4.3 Loyalty and Trust:

As mentioned earlier that the research questionnaire is comprised of four parts. Loyalty and trust is one of them. The questionnaire has different questions to check the loyalty and trust of those respondents who chose their mobile phone connection because they are loyal to the company as well as have trust on it. 10.4% of the total sample selected loyalty and trust as a reason for their purchase.

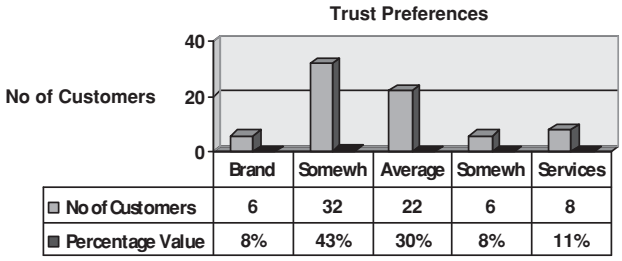
To know the loyalty preferences of the customers either they are loyal to company (brand) or services; this question was asked: "*Does this loyalty with company (brand) or with services?"*

5% respondents of 74 said that they chose this brand because they are loyal to this company (brand). 49% were of the view that they chose this brand because they are

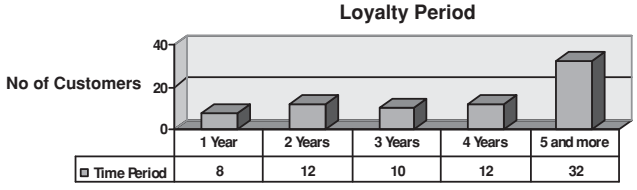


	Brand	Somewh	Average	Somewh	Services
No of Customers	4	36	14	12	8
Percentage Value	5%	49%	19%	16%	11%

service package that you have?" 8% respondents answered for brand as a trust factor while 43% said somewhat brand. 30% said that their trust in on brand as well as on service package. 8% and 11% replied as somewhat service and services respectively. Results are presented graphically below.



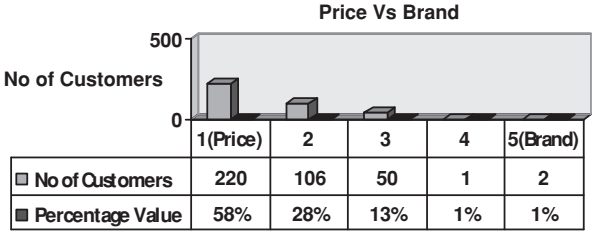
In order to investigate about loyalty and trust of the respondents, a very basic question was asked from the respondents: "*For how long you are using this brand?"* This question revealed data which show respondents as being loyal to the brand. As it is shown in the following graph that the 16 respondents out of 74 are using their brand for 5 or more years, 6 are using for 4 years, 5 for 3 years and 6 for 2 years. Data is shown graphically in the below figure.



4.4 Price

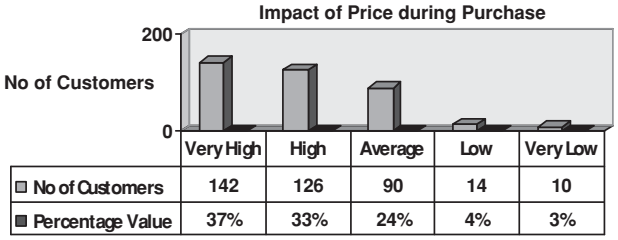
Fourth part of the questionnaire deals with price as a reason for the purchase of the mobile phone connection and also is very important. This part has three different graphical presentations in which relationship of price is discussed with different other factors. This part is 54% of the total sample population, which makes it biggest in all four main categories.

To examine the relationship between price and company (brand), respondents were asked that: "*Do you prefer price or company name (brand)?"* In reply to this question different set of results obtained. It shows quite strange result that 58% respondents said that they prefer price most and only 1% said that they prefer brand to price. 19% said that they prefer price as well as brand while making a purchase decision. 28% were not sure about it but they were more inclined toward price. Following graph shows the results.

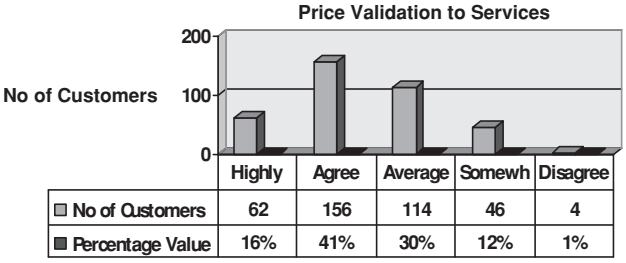


"How high was the impact of price towards your purchase decision?" was the question asked to know about impact of price on purchase, whether it was high or low.

During research it is found that 37% respondents out of 382 replied that the impact of price was very high on their purchase, 33% said that it was high. The impact of price was average for 24% of the respondents. 4% and 3% believed that it is low and very low respectively. The graph below shows the result for this question.



To check the utility of customer which he/she is receiving in the shape of services in accordance with the price, the following question was asked: "*Do you think price paid is justifiable to services?"* 16% respondents of 382 were highly agree, 41% were agree, 30% average, 12% were somewhat disagree and 1% were disagree that services of their chosen brand are good enough with the price of that services. Below the data is presented graphically.



4.5 Switching

Switching is discussed in all four main parts of the questionnaire. In order to know about the switching different set of questions were asked. To investigate past and expected switching whether a customer is switched due to brand or service & quality and will switch due to less price or due to any change in loyalty and trust, for this motive;

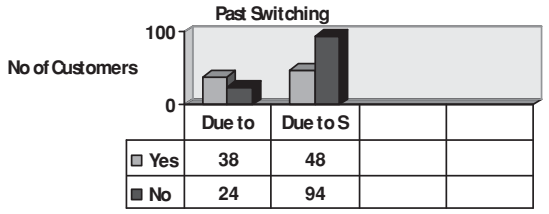
Past switching is discussed in relation with brand and also with service & quality while Expected switching is discussed in relation with price and also with loyalty and trust.

4.51 Past switching

To explore how many respondents switched due to brand two questions were added into questionnaire asking them "*Was it your first choice or you switched from any other brand?"* and "*Switched due to brand or any other reason ?"* 38 out of 62 switched and all switched due to brand.

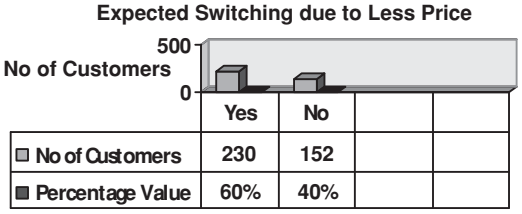
To investigate switching in service & quality, respondents were asked that „ *Did you switch from any other network?"*

48 out of 142 responded as YES while 94 said NO. The data for above two questions is presented graphically in following figure.

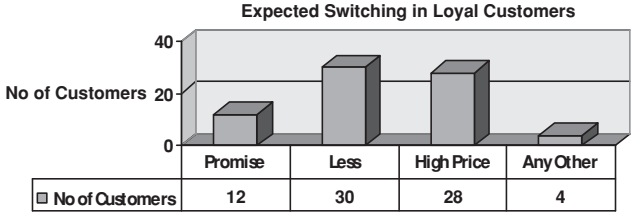


4.52 Expected Switching

As expected switching is discussed in price and loyalty & trust, so in case price respondents were asked that "*Will you switch, if low price brand is offered?"* 60% said YES while 40% said NO.



Whereas in case of loyalty and trust respondent were asked "*Would you like to run off from existing brand?"*. Respondents were given four options, (i) promise breakage (ii) less services quality (iii) charge high price as compared to quality and (iv) any other. 12 out of 74 respondents chose promise breakage as point of switching, 30 pointed out less services quality, 28 respondents will run off if high price is charged for low quality and 4 selected any other. Data is presented graphically in the figure below.



5 Analysis

Marketing theories suggest that corporate branding will boost the consumer awareness about the products as well about the corporation (*Souiden,* et. al., 2006). Strong corporate recognition attracts the customers and employees (*Xie & Boggs,* 2006). Corporate recognition can be gained through corporate branding which is helpful for better market share. Empirical data shows that price has a dominant factor for a customer during the purchase of a mobile phone connection. MTS has 50% share among the sample population and their slogan is "Always the cheapest one" gives the advantage for this high market share. Telenor is at 2nd place with 43% share. *Kotler,* (1994) states that price is the one element of marketing mix and is very important. This is shown in this study that the company having low price strategy is dominating the telecommunication market in the perfect competition. As this study indicates customers are more willing to pay less prices and are more inclined towards MTS. MTS has made strong recognition as a low price brand which is communicated to consumers.

5.1 Affect of Brand Image on Market Share

Souiden, et. al., (2006) states that sales and market share is directly affected by corporate image and building up loyal customers. Empirical data shows that MTS has high market share among sample population and Telenor has slightly lower market share than MTS even it entered in the market in 2006 because Telenor has worldwide recognition. High market share is helpful in building up corporate image, so empirical implies to this theory. Importance of corporate brand in telecommunication is not same like other industries. In mobile phone telecommunication purchase settings are continuous and different than the purchase settings of retails stores ((*Ranaweera & Prabhu,* 2003). Empirical data shows that 382 out of 702 argue that they chose the connection because of price factor. While 62, 142, 74 said that they like brand, S&Q and L&T respectively. So the preferences of the customers about the connection are different but more centered on price. So it satisfies the above theory of Ranaweera & Prabhu, (2003) that purchase settings are different in mobile telecommunication industry as compared to other industries. MTS and Telenor have high market share as compared to VIP because they have good brand image which helps them in gaining this share. Telenor is having more market share around the globe as compared to MTS or VIP. But this study shows MTS having slight edge over Telenor due to price other factors remaining constant.

5.1.1 Attachment with the Brand and Role of Corporate Brand

Customers have emotional attachment with the brand as stated by *Kay* (2006), that brands are incorporated into the lives of the customers. But this research presents that 32% of 30 respondents of this study, who purchased their connection because of brand, argued that they have average attachment with the brand while 32% are somewhat disagree to the question of emotional attachment with the brand. Role of corporate brand in such situation is a communicator of offers i-e low price, wider network, new services etc. the results are in accordance with the theory of *Souiden* et. al., (2006) that corporate branding will boost the consumer awareness about product and corporation.

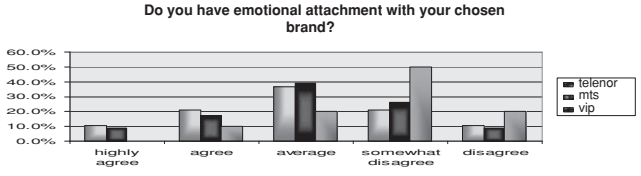


Table 1. Emotional attachment to the brand

	Brand	Descriptive statistics			Omnibus Test	Mann-Whitney U-test	
		N	Mean	SD	Kruskal-Wallis ANOVA	MTS	VIP
Do you have emotional attachment with your chosen brand?	Telenor	19	3.00	1.16	0.033*	0.772	0.028*
	MTS	23	2.91	1.08		–	0.025*
	VIP	20	2.20	0.89		–	–

In terms of emotional attachment *(Table 1)*, the difference between the three brands was statistically significant. Telenor and MTS users reported a significantly higher emotional attachment then VIP users, while difference between Telenor and MTS was not statistically significant.

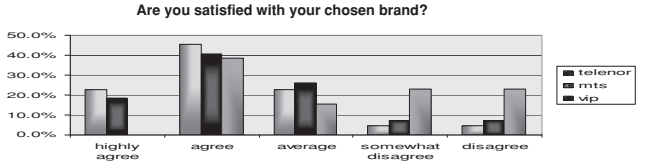


Table 2. Satisfaction with the brand

	Brand	Descriptive statistics			Omnibus Test	Mann-Whitney U-test	
		N	Mean	SD	Kruskal-Wallis ANOVA	MTS	VIP
Are you satisfied with iou chosen brand?	Telenor	22	3.77	1.02	0.042*	0.497	0.020*
	MTS	27	3.56	1.12		–	0.056
	VIP	13	2.69	1.25		–	–

Telenor users were satisfied with their phone service provider more then VIP users (Table 2). The differences between Telenor and MTS and between MTS and VIP were not significant.

5.2 Service & Quality

5.2.1 Services and the brand

Whenever anyone purchases any product or service for the first time, there is always some risk associated with it. And this risk is more common in case of services. Degree of perceived risk is highest when customer can't evaluate services before purchasing them (Ozer et. al., 2005). In order to investigate this phenomenon respondents were asked about this factor and to know the importance of the services to the respondents that "*Did you purchase this connection only due to services offered?"* 20% respondents of 142 replied as somewhat disagree while 14% replied as disagree.

Remaining are indifferent in this regard. This shows that whenever a customer is faced with services he/she is not sure about it that either it will be good or bad because of the feature of services like heterogeneity, intangibility etc given by *Ozer* et. al., (2005).

Until unless customers do not have any experience with the services they can not evaluate its importance. But it must be remembered that it is only in case of services not in case of products. 8 out of 142 respondents had MTS connection and were highly agreed as well, thus MTS was on top with highly agreed. 16 respondents had Telenor connection and were agree to the question, so Telenor is top in this category while VIP is at second in this category with 6 users. And 34 respondents who responded as average have Telenor connection, while 10 had VIP connection in this category.

Respondents who were somewhat disagree with this connection 10 of them have MTS connection while 10 have VIP connection. 3 having Telenor and VIP each were disagree to this question. This presented a result that Telenor is good at services and customers do know that a particular package has good services or not but overall Telenor. The big reason for this in mobile phone telecommunication is that a company has a single net work for all customers but services may vary in customer services for different groups' e.g. corporate connection but this research only includes the sample population of Belgrade University.

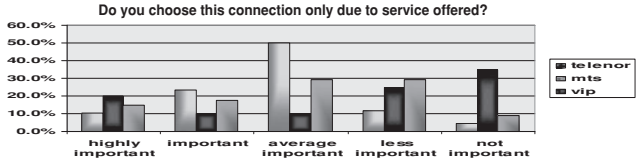


Table 3. Importance of services

	Brand	Descriptive statistics			Omnibus Test	Mann-Whitney U-test	
		N	Mean	SD	Kruskal-Wallis ANOVA	MTS	VIP
Do you choose this connection only due to service offered?	Telenor	68	3.24	0.95		0.005*	0.229
	MTS	40	2.55	1.55	0.014*	–	0.094
	VIP	34	3	1.21		–	–

Services were more important to Telenor users in comparison to the MTS users (Table 9). Differences between Telenor and VIP and between MTS and VIP were not statistically significant.

5.2.2 Quality and the brand

Quality is over all judgment about excellency and superiority of the service (*Ozer* et. al., 2005). The research shows that 20% of total sample population selected S&Q as a reason for buying a connection which is greater than brand

and L&T but less than price. And the difference is not very small between price and S&Q. the research shows than 67, 63, and 12 respondents out of 142 are using Telenor, Mts, Vip, respectively, which show Telenor being a leader in service & quality. As Ozer & Aydin (2005) state that quality of a service is hard to measure but customers need a good service quality with price even it is difficult to measure. Research shows that 4% of the total sample selected S&Q with price. Which gives an idea that one factor is very important but if supported by another factor. Those who chose service & quality as a measuring tool during the purchase process, 54% of them replied that the quality of the brand is good and they are enjoying it. While 30% said that it is very good. Respondents for this question also had different mobile phone connection, 20, 18 and 4 had Telenor, Mts and Vip respectively and also said that quality of their chosen brand is very good. While 41, 27 and 8 have Telenor, Mts, Vip respectively and said the quality of their brand is good. 12, 8 and 2 said that quality of their brand is average. While only 2 respondent having Telenor responded it as bad quality brand. The result shows that Telenor has high number of customers, who have experience of good quality with Telenor. So they see Telenor as a high quality brand and this is good for the future of Telenor and for a big customer base.

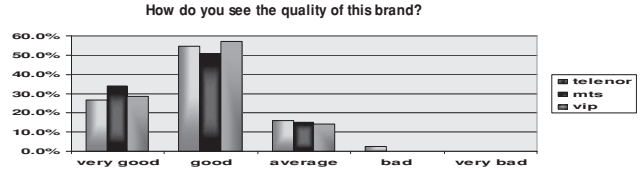


Table 4. Quality of the brand

	Brand	Descriptive statistics			Omnibus Test
		N	Mean	SD	Kruskal-Wallis ANOVA
How do you see the quality of this Brand?	Telenor	75	4.05	0.73	
	MTS	53	4.419	0.68	0.631
	VIP	14	4.14	0.66	–

Quality of the brand was said to be on the same level by respective users of the three providers *(Table 4)*. The differences were not statistically significant.

5.3 Loyalty and Trust

Customer loyalty is very necessary for the firms to be become market leader and for a big customer base with long term relationship (*Ozer* et. at., 2005, *Souiden* et. al., 2006, *Ranaweera & Prabhu,* 2003). It is a very difficult in GSM technology to make loyal customers when there is a chance for switching. But it is part of service provider that they make strategies to get loyal customers. It is not a mature industry and also dependent on information technology so rapid changes are there. In this situation a big customer base is needed which can be gained through different offers but if company make loyal customers. It is beneficial for a company in long term. This study involves a question regarding loyalty that a respondent is either loyal to brand or services, which he/she is using. From sample population 10.4% respondents said that they are loyal to the company and they trust on it. Even it is a small proportionate to price and S&Q but is giving a view about corporate brand loyalty or services loyalty. Services loyalty means if another company offers same services then he/she can easily switch to that company. The result shows that 2% and 49% respondents of 62 answered for brand and for somewhat brand respectively, while 6% and 4% replied for somewhat services and services. The results shows that majority of the customers are loyal with brand. In this question it is also seen that customers are having different brands. Like four customers having Telenor connection replied that they are loyal to company. While 16, 14, 6 customers having Telenor, Mts and Vip respectively replied as somewhat brand. 4, 6 and 2 customer having Telenor, Mts and Vip connections respectively replied as average importance for the brand and the services. While 2 and 10 customers having Mts and Vip connections respectively replied as somewhat services. While there were only 2, 4 and 2 customer having Telenor, Mts and Vip connections respectively replied that they are fully in favor of services. This result shows a scattered result for the loyalty of the customer. There is no single brand which came up as leading brand in loyalty preferences.

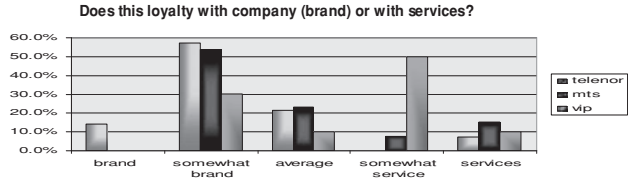


Table 5. Loyalty to the brand vs. loyalty to the services

	Brand	Descriptive statistics			Omnibus Test	Mann-Whitney U-test	
		N	Mean	SD	Kruskal-Wallis ANOVA	MTS	VIP
Do this loyalty with company (brand) or with services	Telenor	28	3.71	0.98		0.051	0.001*
	MTS	26	3.15	1.12	0.002*	–	0.083
	VIP	20	2.6	1.05		–	–

When asked where their loyalty lies, Telenor users declared a higher degree of loyalty to brand vs. loyalty to services, when compared with the VIP users *(Table 5)*. The other two comparisons were not statistically significant.

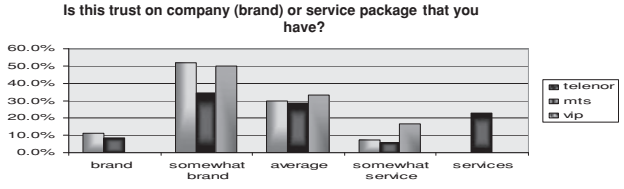


Table 6. Trust on the company vs. trust on services

	Brand	Descriptive statistics			Omnibus Test
		N	Mean	SD	Kruskal-Wallis ANOVA
Is this trust on company (brand) or service package that you have?	Telenor	27	3.67	0.78	
	MTS	35	3.00	1.31	0.130
	VIP	12	3.33	0.78	–

The degree of trust on company was not statistically significant between the three providers *(Table 6)*.

When customer has trust in a brand it means customer has positive buying behavior towards the brand (*Ozer & Aydin,* 2005). Trust is strong predictor of customer retention and customer must realize that they will continue getting benefits in the future as well (*Ranaweera & Prabhu,* 2003; *Ozer & Aydin,* 2005). In this research respondents, who selected L&T as an influencing factor for their purchase, were asked that either they trust their selected brand or they trust on the services. 8% replied as brand being a trust worthy element in their mutual relationship while 43% replied that somewhat brand is important for long term relationship between company and them. While only 8% and 11% thought that somewhat services and services are important respectively. This is in accordance with the theory that trust is key factor for long term relationship and it must be between company and the customer. It is also seen from this question that 3 and 3 customers having Mts and Telenor brands replied that they trust their brand. While 16, 10 and 6 customers having Telenor, Mts and Vip connections respectively were in favor of somewhat brand. 8, 10 and 4 customers having Telenor, Mts and Vip connections respectively were average respondents. 2, 2 and 2 customer having Telenor, Mts, Vip respectively replied as somewhat services. While there were only 8 customers who are using Mts brand were in favor of services as a trust worthy element. This also indicates a scattered result for the trust preferences of the customers. There is no single brand which can be considered as a leading brand among customer choices.

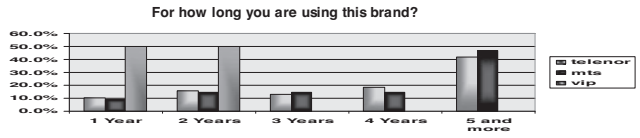


Table 7. Loyalty period

	Brand	Descriptive statistics		Omnibus Test
		N	Mean (years)	Kruskal-Wallis ANOVA
For how long you are using this brand?	Telenor	38	4	
	MTS	34	4	0.138
	VIP	2	1.5	

There was no statistical significance between the three brands in terms of the duration of the loyalty period, though lack of power is obvious due to the small sample of VIP users *(Table 7)*.

5.4 Price

There are many factors available for pricing of any product/service. The price is set according to many factors like stage of product life cycle, competitor's price, segmentation, positioning of product or service or any differential advantage. So price is very important in marketing mix.

Price has very important role in any purchase decision. It is important for company's point of view during the process of planning as well as for the customer when making purchase of any particular product. Companies use different set of pricing strategies, as given by *Daly,* (2002), in order to attract customers. Like MTS is presented and perceived as a company with low calling rates.

5.4.1 Impact of price

Customers are also very price sensitive in Telecommunication sector (*Ozer & Aydin,* 2004). Price is very sensitive and dynamic issue. As in this research respondents were asked that "*How was the impact of price on their purchase decision?"*.

In answer to this question 37% of 382 respondents, who chose price as an influencing factor, replied as very high while 33% replied as high. There were 24% customers who said that impact of price on their purchase decision was average and 4% & 3% replying as low and very low respectively. This discussion yields result that price has very high impact on the purchase decision of the price sensitive customers, as stated in theory. Role of the pricing can't be neglected even in other cases where customers are not price sensitive but it dominates where customers are price sensitive.

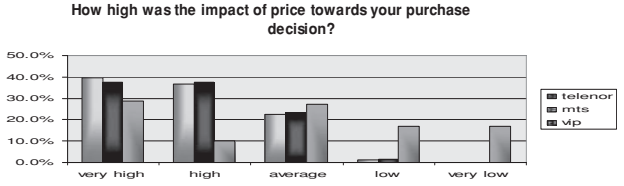


Table 8. Impact of price on the purchase decision

	Brand	Descriptive statistics			Omnibus Test	Mann-Whitney U-test	
		N	Mean	SD	Kruskal-Wallis ANOVA	MTS	VIP
How high was the impact of price towards your purchase decision?	Telenor	174	4.1	0.81		0.694	0.001*
	MTS	149	4.11	0.81	0.001*	–	0.001*
	VIP	59	3.17	1.45		–	–

The impact of price on purchase was statistically significantly different between the three brands *(Table 8).* The price was of greater impact on the purchase decision for MTS and Telenor users when compared to VIP users. There was no significant difference between Telenor and MTS.

5.4.2 Price Vs brand

Price affects all service providers but it affects more when there is a perfect competition (*Shi* et. al., 2006). This study includes the Serbian mobile phone industry and competition is very high in this industry. Companies are well established in the market and targeting customers with low price packages having same services. 382 respondents of total sample population chose the price as a major factor for buying a connection. To find out the view of the customers about price and brand a question was asked: "*Do you prefer price or brand?"* 58% respondents said that they like price, 28% replied as somewhat price, 13% said that they prefer price as well as the brand. Remaining replied in favor of brand which makes only 2%. *Shi* et. al, (2006) states that consumer has its own preferences for services. These results satisfy the *Shi* et. al., (2006) theory that price affects all service providers so this case as well. Research shows that customer preference is not the brand but the price and according to theory customer has own preferences for choice of services. *Munnukka,* (2005) argues that customers are price sensitive in mobile phone industry, so it is proved by this research.

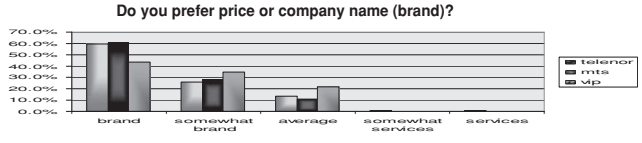


Table 9. Price vs. brand

	Brand	Descriptive statistics			Omnibus Test
		N	Mean	SD	Kruskal-Wallis ANOVA
Do you prefer price or company name (brand)?	Telenor	151	4.43	0.8	
	MTS	181	4.5	0.69	0.070
	VIP	46	4.22	0.79	

There was no significant difference in preferences toward price or brand between the users of the three providers *(Table 9).*

5.4.3 Price for services

Customer buying behavior has a direct relationship between price and service quality of the product/service, so tradeoff between these two makes increase or decrease in sensitivity towards other factors involved in long term relationship (*Munnukka,* 2005). Price and service quality are directly proportional, if service quality is high then customers are willing to pay high for it and vice verse. Daly, (2002) has stated different strategies for pricing and value pricing is one of them which could apply in a situation when services have unique value or have a good quality. In this research respondents were asked that "*Do you think price paid is justifiable for services offered?"*.

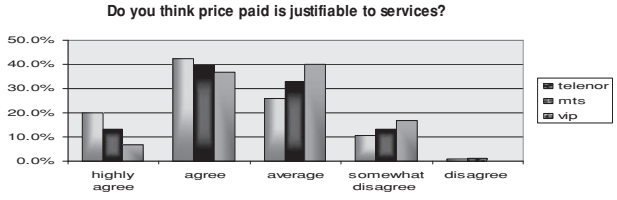


Table 10. Do services justify the price

	Brand	Descriptive statistics			Omnibus Test	Mann-Whitney U-test	
		N	Mean	SD	Kruskal-Wallis ANOVA	MTS	VIP
Do you think price paid is justifiable to services?	Telenor	200	3.7	0.94		0.039*	0.030*
	MTS	152	3.5	0.93	0.027*	–	0.317
	VIP	30	3.33	0.84		–	–

Telenor users declared that services of that provider justified the price they paid in a significantly higher degree, than did MTS and VIP users for their respective companies. The difference between MTS and VIP was not statistically significant *(Table 10).*

As customers are price sensitive in this industry and corporate brand is a main ambassador of its services and price. Customers are used to get idea about services of a company from price. This research shows that 54% of total sample chose price as a dominating factor for purchase. They chose it because they are satisfied from services.

Answer for above question shows that 16% and 41% of 382 said that they are highly agreed and agreed respectively while 30% selected average. These results show that price paid for services is good enough and justified. Also these results are same to the theory of *Munnukka,* (2005).

5.5 Switching

Switching in telecom is moving from one operator to another due change in service quality, loyalty & trust, price or brand. As stated in literature, by *Ozer* et. al. (2005), switching is present not only in monetary shape but it can also be in physical, psychological shapes as well. In this research switching discussed in two ways; past switching and expected switching. Past switching is covering any kind of switching due to brand or service & quality. While expected switching is covering any kind of switching due to less price offered or change in loyalty to customer.

5.5.1 Switching in past

Switching is easy to measure in telecommunication industry as compared to other industries because in telecommunication switching is more than walking to another store (*Ranaweera & Prabhu,* 2003). The reason for the ease of measurement could be that customers can be asked simple question to know about their switching. This was done in this research as well, where respondents were asked very simple questions in shape of yes or no. And from results it was very easy to know about their switching. For switching in past due to company name (brand) shows that 19 out of 31 replied as yes, that they switched because of brand, while 12 replied as no. whereas in service & quality, results show that 48 out of 142 switched because of service & quality whereas remaining 94 did not switch. Results show that switching is not hard to measure in mobile telecommunication industry, but it is difficult to switch in this industry.

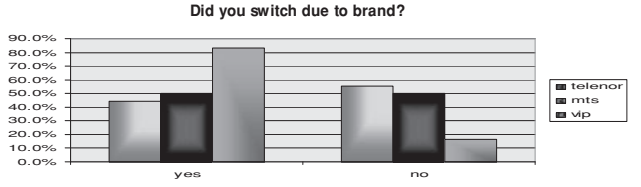


Table 11. Past Switching due to brand

	Brand	Descriptive statistics n (%)			Omnibus test	Pairwise X²-tests	
		N	Yes	No	X²-test	MTS	VIP
Did you switch due to brand?	Telenor	168	8 (44.4)	10 (55.6)	0.017*	0.732	0.008*
	MTS	165	10 (50.0)	10 (50.0)		–	0.018*
	VIP	49	20 (83.3)	4 (16.7)		–	–

The percent of VIP users who switched due to brand was higher than those of Telenor and MTS users *(Table 11)*. Difference between Telenor and MTS users was not statistically significant.

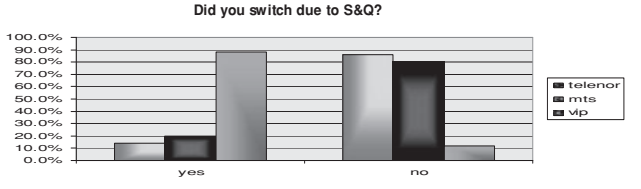


Table 12. Past Switching due to services and quality

	Brand	Descriptive statistics n (%)			Omnibus test	Pairwise X²-tests	
		N	Yes	No	X²-test	MTS	VIP
Did you switch due to S&Q?	Telenor	168	8 (13.8)	50 (86.2)		0.388	<0.001*
	MTS	165	10 (20.0)	40 (80.0)	<0.001*	–	<0.001*
	VIP	49	30 (88.2)	4 (11.)		–	–

The percent of VIP users who switched due to services and quality was higher than those of Telenor and MTS users *(Table 12)*. Difference between Telenor and MTS users was not statistically significant.

5.5.2 Switching in future

Loyal customers and price sensitive customers were asked about that either they will switch in the future or not. *Ozer* et. al., (2005) argues that the loyalty of a customer is being affected by switching and also the trust and satisfaction. This research shows that loyal customers may also be affected and can think about switching because of different reasons, like low quality services are provided, high price is charge, promise breakage etc. The results show that 12, 30, 28 and 4 respondents' loyalty will be affected for promise breakage, low quality service, high price as compared to quality and any other.

Another aspect regarding expected switching is less price offered to price sensitive customers in future. Respondents were asked that "*will you switch if low price is offered in the future?"* The results indicate that 60% of 382 replied as yes while 40% replied as no.

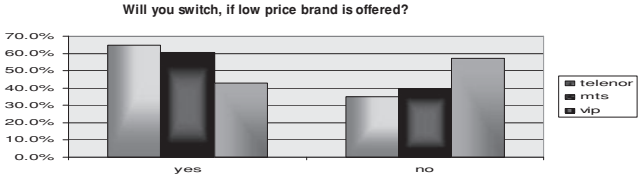


Table 13. Expected switching due to price

	Brand	Descriptive statistics n (%)			Omnibus test	Pairwise X²-tests	
		N	Yes	No	X²-test	MTS	VIP
Will you switch, if low price brand is offered?	Telenor	168	109(64.9)	59(35.1)		0.420	0.006*
	MTS	165	100(60.6)	65(39.4)	0.021*	–	0.028*
	VIP	49	21(42.9)	28(57.1)		–	–

The percent of VIP users who would switch due to price was lower than those of Telenor and MTS users *(Table 13)*. Difference between Telenor and MTS users was not statistically significant.

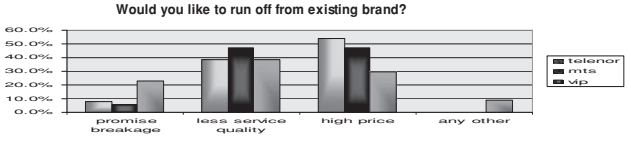


Table 14. Reasons for switching

	Brand	Descriptive statistics n (%)					Omnibus tests
		N	Promise breakege	less service quality	High price	Any other	Fisher's exact test
Will you switch, if low price brand is offered?	Telenor	13	1 (7.7)	5 (38.5)	7 (53.8)	0 (0.0)	
	MTS	17	1 (5.8)	8 (47.1)	8 (47.1)	0.(0.0)	0.631
	VIP	44	10 (22.7)	17 (38.6)	13(29.)	4 (4.91)	

High price and lower service quality were two major reasons for possible switching. Furthermore, promise breakage was named by 22.7% of VIP users. Differences were not statistically significant *(Table 14*).

6. Conclusion

This research was conducted to know the role of corporate branding in telecommunication industry from different perspectives. This study enables to understand the different views of corporate brand in this industry and also focuses on corporate brand that how it works to capture more and more customers for a big customer base. It is the output of marketing mix that how brand managers' position their brands in the selected industry. The research showed that during positioning of a corporate brand in mobile phone telecommunication industry managers must consider what is the benchmark in the target market to build up a good market share with long term relationship. This research was conducted with one particular group of students with limited income level and they knew about their brand and reason that why did they choose it. This group sees its corporate brand as good services with low price. It is the game of right positioning at right time for a corporate brand to make more as well as loyal customers. The research indicated that customers can switch if they feel that good quality services are being offered from any other service provider with cheap rates. So it is the role of corporate brand to make minds of the customers about it especially in this industry to add new customers. Telenor introduced Olimpic Games and popular singer Vlado Georgiev in Serbia to target a particular segment, which is price sensitive but Telenor is using its name along with it in order to show that they are powered by Telenor, because customers consider it as a good quality service provider with best services. Along with it, Telenor pushes infront the competitors by giving interaction, satisfaction and fun of Telenor's one-stop comprehensive offer in new store's, especially in Telenor's new flagship store, opened in Knez Mihailova Street in Belgrade. In its store which pushes boundaries of customer experience forward in regard to layout, design and service concept, Telenor provides its subscribers with high technology enabling them to choose a service and a phone at their preference in an easier and more entertaining manner. The store boasts with materials and lighting equipment not seen in our country before. The outlet is designed as a place where Telenor subscribers meet and chat. The idea was to use interactive communication in educating and entertaining subscribers while testing everything they are interested in. With this flagship store in Knez Mihailova Street along with other 40 stores across Serbia based on the interactive shopping concept, Telenor has been another step closer to subscribers, since it represents an ultimate result of this concept development and progress.

It was found that majority of the customers in this industry are price sensitive; as this industry is not mature yet and new companies are getting into it, so every firms is focusing hard in broadening its customer base. It was found that corporate branding had nothing to do with the purchase decision of the customers but it is main source that communicates with customers about marketing mix of a company. Corporate brand promotes different factors and these different factors were considered important for customer's purchase. As a whole, services offered are almost same for every company; companies just differentiate them by corporate brands. Service & quality is another big issue in this industry along with price. This study showed that S&Q and price are very much interrelated but promoted through corporate brand.

As Telenor is a big corporate brand as compared to other companies involved in this research but Mts has little edge over Telenor because Mts represents itself as cheapest along with best coverage where found. Corporate branding is providing information to the customers about services but it is not an influencing factor for the customers. Customers were asked about their expected switching from existing brand and even loyal customers replied that they will switch in future if they think that company is charging high price as compare to quality. Also price sensitive customers said that they will switch if any competitor brand offers them low price. It means corporate branding cannot influence the customer but works as a medium of communication between company and customer. Customers can only have information from different sources e.g. from print media or broadcast media, about any particular corporate brand. But customers do not go for purchase until or unless certain specific purchase influencing factors like price, service and quality etc are not highlighted with the corporate brand as well.

7. Recommendation

This study can be helpful for brand managers in a way that instead of putting more efforts on corporate branding, they must also put more effort in investigating factors which influence customer buying behavior. After a specific period of time it is also very important to reposition a corporate brand; if companies do not do then these companies may face switching from existing customers. It is the era of globalization not only in manufacturing of products but also in service industry. Brands are also getting globalize. Fundamental are same in every market but some factors vary according to market situation. If a brand gets recognition in the international market then it is easy to go into new markets. One big issue in this research is that segment involved into this research belongs to young generation and everybody is a student. It will be interesting to investigate this idea with two or more segments and involving people belonging to all age groups. This will be interesting because the segment involved in this research belongs to only one age group, so one can expect similar results. But when there will be people from all age segments and also from different fields of life then one can check and compare the results of this research with that one. And can better analyze the role of corporate branding in telecommunication. This research will also be helpful for managers to know about the point of view of consumers about corporate brand. This will also help managers for better positioning of their brand to get target recognition for a better and longer relationship. Finally this

research will be supportive in marketing mix concepts, that how a firm can introduce service, price associated with the particular service and promotional activities to position the correct image of corporate brand as required by managers.

Recommendation for success: How CLM can Optimize Revenue in Today's Telecoms Market?

Customer Lifecycle Management is a new approach to business that is taking the telecoms world by storm. Its focus on delivering true one-to-one dialogues through targeted marketing campaigns has been instrumental in helping some operators drive up ARPU by 20% and reduce churn rates by between 40-60%. *Is this the future of marketing?*

It focuses on the success of Danish CLM provider Agillic and how the company's technology has helped to improve the fortunes of GSM operator Telenor SONOFON. In today's telecoms world it takes a lot more to keep a customer happy. With so much competition and services available, there is very little reason for any user to stand by an operator that isn't delivering the best services with the best prices in town. Attracting customers and ensuring their loyalty is the main business objective for any operator wanting to compete in today's advanced markets.

But what if everyone seems to be offering the same services? Which operator will the customer choose as a life network provider, and most crucially, how will telecoms providers manage to control the cost of acquiring and retaining these loyal customers in the long run?

The answer to these problems lies in the way in which operators are communicating with each of their customers. With so many telecoms providers to choose from, customers have become immune to traditional and impersonal methods of marketing. Direct campaigns such as telemarketing and direct mails have been used in the past by most operators but they are now becoming too costly to run and are largely ineffective. They also give few options for differentiated marketing. In today's competitive mobile world, a more individualized communication approach is needed to help create a one-to-one dialogue with each high value customer and to help win greater loyalty and trust for an operator's brand. More Customer Interaction research, confirms that any operator that tries to simply push offers onto customers rather than developing an individualized customer interaction is doomed to fail. Inbound interactions- like an online transaction or a customer a customer service call- are initiated by a customer with a specific need. Firms must first ensure that the customer need is addressed by positioning offers or other marketing-driven content in the context of the interaction, The report also stresses that Inbound channels of communications must not be used to simply shove more products towards the customers, as this merely creates negative customer experiences and lowers their satisfaction with their mobile operator. It also leads to greater attributions and ultimately degrades the company's brand.

"To avoid these potential pitfalls, firms should evaluate interaction management software which applies business rules and real-time analytics to a customer profile made up of historical and contextual data. This lack of customer loyalty was the result of Companies inability to communicate more effectively with each of their subscribers and to do so with cross channel synergy. We needed to address this serious challenge before we could implicate possible improvement of their performance in the market. There is therefore a need for companies to find an alternative to adding customer value to their business. One way of achieving this result is by establishing a better relationship with the end user, a bond that can offer a real interaction with individual customers in a relevant and timely way. CLM can make this happen. Providers can learn from Agillic's exceptional technology and customer support. Agillic's CLM solution provided the foundation for launching a communications strategy that could manage both inbound and outbound communications with each customer. It was designed to support successful customer interactions by delivering one to one communication- a capability that Serbian Telecom companies were desperate to gain with their core customers. The solution also gave us the potential to build a relationship with each customer over time by learning from every dialogue. It could also support real-time interaction, allowing us to react swiftly to customer behaviors. So if a user clicked on a web link we could automatically send out a message that was pertinent for that moment in time.

All of these capabilities can help the company to create a targeted marketing campaign that fit the user profile of each individual high value customer. This defines individual approach as Customer Life Cycle Management (CLM). Customer Life Cycle Management (CLM) is next generation CRM. In the past, operators would just target customers with different messages to sell services. CLM is different. You are looking at things from a lifecycle perspective and you are focusing on the individual customer. The big difference between CRM and CLM is that with CRM you are communicating to segments of users when you believe they need something. CLM is more about one to one communication- it's about knowing what they want and delivering it when they want it. Questionnaires and forms are not always reliable when comes to assessing customer preferences. CLM is a big step up from the traditional process of asking customers to fill out a profile sheet. With CLM, an operator can take every interaction that has taken place with each customer and apply special promotions and deals. This communication is triggered automatically when a customer repeats a pattern known to the system. So let's say a user sends many texts in one day- the system can automatically generate a message back to that customer informing them that they can get a special deal on SMS. Another big benefit of CLM is its ability to minimize customer acquisition and retention costs by using low-cost digital channels. This approach also offers low cost of ownership for the operator with a hosted solution that does not require network integration. The result is an easy to use system that provides a flexible, on-demand marketing tool that allows operators to gain full control over their programs.

Through the use of real-time behavioral based marketing, CLM is a new innovation that is designed to enable operators to manage, evaluate and automate customer interactions to support one-to-one dialogues, based on user profiles and previous exchanges. The focus of CLM is to create a bond between the operator and the customer throughout the customer's lifecycle so that the operator knows exactly what the customer wants and providing that service to them in real-time. This approach has consistently proven to lower churn and increase ARPU for customers.

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AGRI-PRODUCT EVALUATION AND BIODIVERSITY MEASUREMENT

Szilvia Kovács

University of Debrecen, Faculty of Agriculture, Hungary, H-4032 Debrecen, Böszörményi út 138.

Abstract: This paper is meant to be the first part of a two part unit that will be published next. The objective of this paper is to be an introduction of agri-product evaluation, within which a short summary of essentials of diversity measurement is given and to share experience on evaluation of environmental friendly agri-product. For biodiversity measurement and extern effects, literature of related publications was processed and experience gained over experimental projects on environmental-friendly technologies was summed up. Methods applied were based on influence-response approach which guided us all through the research work.

It can be stated that one diversity measure or one diversity function fails to describe communities of living beings; therefore, at least two methods should be used in parallel. Scale-dependent description of diversity is necessary, which provides us with new information that can not be revealed by traditional methods. To identify external effects, we have to take influences of use of a specific product into account and the responses generated by use of that product. Influences might appear in parallel or can build up one another, similarly to the generated responses of environment. To be as precise as possible, it is suggested that we take into account only clear responses. Influence-response relations are shown here using terms and concepts in broad sense and in general. More sophisticated application of terms and concepts is needed to evaluate properly and in monetary terms. We will make efforts to clarify terms and their use in the future.

Key words: biodiversity measurement, agri-product, external effects, influence-response

1. Introduction

External effects of any product or applied technology stemming from operations intervening ecosystems have been getting more in focus, but they are far not stressed upon. A lot of troubles have been identified so far which are very difficult to handle. A well known trouble is the wetlands in danger all over the world (*Kerekes* et al., 1994; *Kerekes and Szlávik,* 1999). Biodiversity is a real challenge to measure, since it is very difficult to look into, being so complex and dynamic. Nowadays expressing the value of biodiversity is also calculated in monetary unit, but it also demands efforts because of value factors independent of use. There are tools developed and used, but they differ in applicability. Evaluation of such tools by *Pearce* et al. (1999) is available in order to embed them in practice. At the same time evaluation of agri-products has not embedded properly in practice, but some reports related to the theme are available (*Felföldi,* 2008a; 2008b).

This paper is meant to be the first part of a two part unit that will be published next. The objective of this paper is to be an introduction of agri-product evaluation, within which a short summary of essentials of diversity measurement is given and to share experience on evaluation of environmental friendly agri-product.

2. Material and method

Influencing biodiversity as an external effect might be a characteristic of any product or intervention, which is highly true for a production technology. For biodiversity measurement and extern effects, literature of related publications was processed and experience gained over experimental projects on environmental-friendly technologies was summed up. We processed relevant data of two experimental projects such as environmental friendly soil cultivation and its effects on diversity of weed communities, and usage of mixture of seeds as multifunctional agri-product. The first is technology centered, focusing on effects on diversity of weeds by variants of soil cultivation as an operation within the technological process of crop production. The second is focusing on the use of an agri-product that is a final product meant to be applied e.g. in game management. To evaluate the effects of this final product of agricultural origin we applied influence-response approach which guided us all through the research work. There were two experimental spots with relatively small-sized plots for mixtures differing in ingredients of seed. Vegetations of different mixtures were left on the spot for all year round. Year round monitoring provided us with data to be processed from many aspects, covering biodiversity, too.

Experience on diversity measurement and the place of diversity as field from which responses can be identified are presented in chapter 3.1. and 3.2., respectively.

3. Results and discussion

3.1. Diversity measurement

Researchers noted that there was need to work out measures and functions in order to make comparisons between species, taxons, ecological systems etc. Total number of species (ST) as a diversity measure is to determine the pool of species. This measure fails to reflect status of mass, furthermore, this does not allow us to compare communities. The methods besides the components take into account status of mass and structure of dominance. These methods use such measures as those of which rise when being an increase in the number of species, as well as being more even distribution of status of mass.

There are texture examinations based on distribution and not based on distribution. These latter ones are called diversity indices (*Whittaker,* 1972,). Methods based on distribution could represent textural relations but failed to give structural relationship. Diversities not based on distributions concern abundance (N) in the sample. Disadvantage of ST/N ratio is the low value we often get and that non-linearity which often occurs between number of species and abundance. *Therefore, Gleason* (1922) and *Menhinick* (1964) advise to use S/logN and S/√N, respectively.

Table 1. Basic statistics of diversity for variants of tillage (summer time)

SUMMER	Direct drilling	Field ploughed by disk-ripper	Shallow ploughed field	Traditional tillage
Species Total (ST)	22,0	9,0	15,0	10,0
Average species (S_{aver})	8,4	4,6	6,0	2,8
Median of species	7,0	4,0	7,0	2,0
Number of individual plants (N)	191,0	179,0	197,0	157,0
Average number of individual plants (N_{aver})	38,2	35,8	39,4	31,4
ST/N	0,115	0,050	0,076	0,063

Note: figures in the table only as examples here

There are some often used diversity measures and basic statistics in *table 1*. Figures belong to 3 variants of an environmental friendly operation and the control operation, being here as an example only. It is the number of species that naturally refers to diversity. The total number of species informs on total of species on research area. If it is the ST/N ratio that we use to measure diversity, then we might get different result in ranking diversity.

The next group of diversity measurement is represented by classical diversity functions *(table 2.)* that are based on abundance- dominance structure of a community. Thus, it is taken into account how many individuals of a genus exist in the community. They are common in ordering functions rareness /R(i;p)/ to genus i. of the (S;p) community (*Patil and Taillie,* 1979).

Classical diversity functions reasonable to use are Shannon-diversity sensible to rare species, Simpson diversity and Berger-Parker diversity sensible to dominant species.

Table 2. Classical diversity functions for variants of tillage (summer time)

SUMMER	Direct drilling	Field ploughed by disk-ripper	Shallow ploughed field	Traditional tillage
Shannon diversity (HS)	2,5836	1,7153	2,3219	1,9476
Evenness	0,8358	0,7807	0,8574	0,8458
Simpson diversity (DQ)	0,8906	0,7791	0,8786	0,8267
Evenness	0,9330	0,8765	0,9413	0,9186
Diversity by Berger-Parker	4,0445	3,0675	4,4204	3,4602

Note: figures in the table only as examples here

Tóthmérész (1997) stated that examining the same community with using different diversity functions could result in contradictions. Solving the contradiction, *Alfréd Rényi* (1961) published the generalisation of Shannon-function which was followed by a study by *Patill and Taillie* (1979). They suggested that diversity profiles should be used to describe diversity and to compare communities. In case the profiles of communities to be compared with do not cross, the communities can be ordered by diversity and the one is more diverse, which has the profile running higher. If the curves do not cross, then the communities cannot be ordered by diversity. This is because one community is more diverse for rare species than the other, and opposite is the case for dominant species. The -ordered entropy by Renyi *(Figure 1.)* is only one of the one-parametric diversity functions that are discussed by *Tóthmérész* (1997).

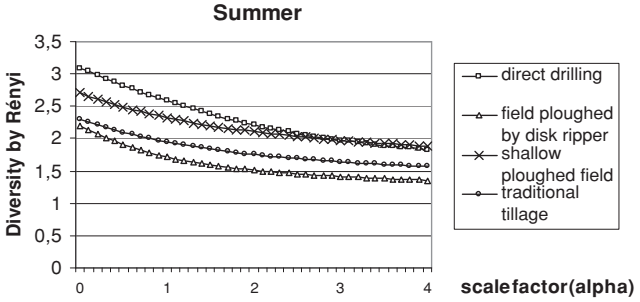

Figure 1. Diversity ranking by Rényi of variants of tillage (summer)
Note: figures in the table only as examples here

Our experience assists the suggestion that a community should be examined by more functions in parallel in order to avoid failures. If these diversity functions result in doubtful ranking, therefore, it is reasonable to do diversity ordering.

3.2. External effects

External effects of agricultural origin can be generated by mainly two ways. One is production of food and non-food produce, and the other one is doing activities with purpose of agro-environmental protection. For food and non-food production, external effects are generated as indirect (connected) outputs. For activities with special purpose of environmental protection they are direct outputs, which are mainly common goods, so is the biodiversity, too.

Table 3. Influence-response relations

Influence	Response								
	scene	soil-life	air	bio-diversity	wild life dynamics	harm	tourism	agric. production	human environment
More diverse environment	+	+	+		+		+		+
Life-place				+	+	+	+		
Shelter				+	+		+		
Source of feed				+	+				
Arable land reserved								–	

Source: Felföldi, 2008a

To identify external effects, we have to take influences of use of a specific product and the generated responses by use of that product. In our case the product is an agri-product as input for non-food activity. To express external effect in monetary term, the beginning step is to be aware of the influence-response relations. Influences might appear in parallel or can build up one another, similarly to the generated responses of environment. To be as precise as possible, it is suggested that we take into account only clear responses (*Felföldi,* 2008a). The use of an agri-product can be described by influence-response relations in general from aspects of external effects. A specific agri-product is described from this aspect in *Table 3*.

The influence-response relations shown here is to present the fields from which responses can derive, but we used terms and concepts in broad sense and in general. More sophisticated application of terms and concepts is needed to evaluate properly and in monetary terms.

For the agri-product examined, we found more diverse environment, life-place, shelter, and source of feed for wild life, and field reserved as main influences. The latter one refers to croplands tied up instead of production such as for example the set-aside.

As responses we found more scenic environment, richer and better soil-life and air, and more diverse life. At the same time, wild life dynamics can get better, but harms caused by the wild can decrease. More scenic environment, diverse wild life and better wild life dynamics – including game dynamics – will attract tourists, furthermore, travellers and people during activities of recreation will be happy with them too, considering game in abundance e.g.. They can generate good feeling and better atmosphere among people, which can be considered as better human environment.

Lands used for application of these agro-products will decrease agricultural production, whatever food or non-food production they are. It might not be considered to be a reasonable decision from profit oriented view.

4. Conclusions

Diversity profiles should be used to describe diversity and to compare communities. It is established that using only one diversity measure or one diversity function fails to describe communities of the living beings, therefore at least two methods should be used in parallel. Scale-dependent description of diversity is necessary, which provides us with new information that can not be revealed by traditional methods. Classical diversity functions reasonable to use are Shannon-diversity sensible to rare species, Simpson diversity and Berger-Parker diversity sensible to dominant species. If these diversity functions result in doubtful ranking, it is reasonable to do diversity ordering.

To identify external effects, we have to take influences of use of a specific product and the generated responses by the use of the product. Since influences might appear in parallel or can build up one another, similarly to the generated responses of environment, it is suggested that we take into account only clear responses.

Influence-response relations are shown here using terms and concepts in broad sense and in general. More sophisticated application of terms and concepts is needed to evaluate properly and in monetary terms. We will make efforts to clarify terms and their use in the future.

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ON TESTS FOR LONG-TERM DEPENDENCE: INDIA'S INTERNATIONAL TOURISM MARKET

Prasert Chaitip[1], Péter Balogh[2], Kovács Sándor[3] & Chukiat Chaiboonsri[4]

[1]Faculty of Economics, Chiang Mai University, Chiang Mai, Thailand E-mail: webadmin@econ.cmu.ac.th
[2]University of Debrecen, Centre for Agricultural and Applied Economic Sciences, Faculty of Applied Economics and Rural Development, Institute of Economic Analitical Methodology and Applied Informatics, Department of Economic Analysis and Statistics E-mail: baloghp@agr.unideb.hu
[3]Centre for Agricultural and Applied Economic Sciences, Faculty of Applied Economics and Rural Development, Institute of Economic Analitical Methodology and Applied Informatics, Department of Economic Analysis and Statistics E-mail: kovacss@agr.unideb.hu
[4]Faculty of Economics, Chiang Mai University, Chiang Mai, Thailand E-mail: chukiat1973@yahoo.com

Abstract: There have been growing interest in studying behavior of long memory process in tourism market. In this research examine the behavior of India's international tourism market based on long-memory analysis. The international tourism market of India combined with nine countries: USA, UK, Canada, Germany, France, Japan, Malaysia, Australia and Sri Lanka. Moreover, three statistical tests for long-memory process such as R/S test, Modified R/S test and GPH-test are employed to test in these market. The empirical findings in general provide more support for no long memory process or no long-term dependence in international tourism market of India.

Key words: India, Long-memory process, Long-term dependence, International Tourism Market

1. Introduction

The international tourism industry in India is of great importance as it has positive impact on India's economy. Fore example, contributing to the nation's gross domestic product is 6%–7% in during period of 2003–2004, India's foreign exchange earnings through tourism is 5,731 million US. Dollar in 2005 and contributing to labor market is 9% of India's employment in during period of 2003–2004. Tourists to India spent $ 372 on their visa cards in the year of 2005. This is a 25% rise from the year 2004 thereby, making India the fastest growing Asia -Pacific market for the International tourist spending. According to the World Travel and Tourism Council, the Indian tourism demand will grow at an annual 8.8% over the next ten years, fueled by higher incomes and lower air fares. Moreover, In 2005 India earned US $ 6.9 billion from inbound foreign tourists, which is more than twice the US $3.1 billion earned during the year 2002. According to the latest balance of payments figures released by the *Reserve Bank Of India*, 2005 was the year of fastest growth in foreign inflows from foreign travel, during which inflows went up 36%. The above mentioned information has motivated us to understand the international tourism market behavior more and conduct the present research study.

Time series with long memory process was appeared in many contexts such as in financial economics, macroeconomics series, hydrology, cardiac dynamics, networks traffic, meteorology. Evidence of long memory process was first proposed by *Hurst* in 1951 when he testing the behavior of water levels in the Nile river. In 1971, Mandelbrot was among the first to consider the possibility of long range dependence or long memory process in asset returns. And in 1998, *Wright*, J. studied about the detection evidence of long memory in stock returns in many emerging market such as in Korea, Philippines, Greece, Chile and Colombia. Moreover, *Caporale and Gil-Ala* (2002), studied the S&P 500 daily returns and they found that the degree of dependence remains relatively constant overtime, with the order of integration of stock returns fluctuating slightly above or below zero. *Olan* (2002) studied the long memory in stock returns from an international market perspective and also found no evidence for long memory in UK, U.S., Hong Kong, Singapore and Australian stock markets. However, evidence for long memory can be found in the German, Japan's, South Korean and Taiwan stock market. In connection with international tourism the long memory process analysis was begun by *Gil-Alana* (2005). He examines forecasting properties of short-term arrivals at Auckland international airport and finds that the ARFIMA models outperform the non-ARFIMA ones in practically all case. After that *Chu* (2008) incorporates ARFIMA models into Singapore's tourism forecasting and compares the accuracy of forecasts with those obtained by earlier studies. Recently, *Sriboonchitta* et. al. (2010) used forecasting method based on both ARFIMA models and

ARFIMA-FIGARCH to forecast the number of international tourists arrival to Thailand and they also found that the long-memory process behavior in their model to forecast. In many articles authors have not yet tested the long memory process in international tourism market based on R/S Test, Modified R/S Test and GPH Test. For this reason this paper would like to apply tests of Long–memory in international tourism market of India based on data from the period of 1981–2007.

2. Research Aim and Objective

This research aims to test the long memory behavior in both the Indian and Thailand's international tourism market between 1981–2007.

3. Scope of this research

The scope of this research covers during period of 1981-2007 and mostly the data was secondary data. The countries were used for testing the long memory behavior are all the countries have impact on the international tourism industry of India such as USA, UK, Canada, Germany, France, Japan, Malaysia, Australia and Sri Lanka (*Ministry of Tourism, Govt. of India* 2009). The variables used in this research were the numbers of international tourist arrivals to India from the above mentioned countries during 1981–2007.

4. The research framework of Long Memory Tests

The concept of the long memory process was developed by Harold Edwin Hurst in 1906. He was a young English civil servant, came to Cairo, Egypt, which was then under British rule. As a hydrological consultant, Hurst's problem was to predict how much the Nile flooded from year to year. He developed a test for long-range dependence (Long Memory Test) and found significant long-term correlations among fluctuations in the Nile's outflows and described these correlations in terms of power laws. This statistic is known as the *rescaled range*, *range over standard deviation* or *R/S* statistic. From 1951 to 1956, Hurst published a series of papers describing his findings (*Hurst* 1951). Hurst's rescaled range (*R/S*) statistic is the range of partial sums of deviations of a time series from its mean, rescaled by its standard deviation. The definition of long memory process can be explained by the so called autocovariance function γ (k), where k is the lag parameter. The long-memory process can be defined as follows:

$$\lim_{k\to\infty} \gamma(k) \sim k^{-\alpha} L(k)$$

where $0 < \alpha < 1$ and L(x) is a slowly varying function at infinity. Because L(x) is a slowly function if lim x -> ∞ L(tx)/L(x) = 1 (see *Embrechts* et al., 1997). The degree of long memory is given by the exponent α; smaller α means longer memory. The long memory is also discussed in terms of the Hurst exponent *H*, which is simply related to α. For a long memory process $H = 1 - \alpha/2$ or $\alpha = 2-2H$. The short memory processes have $H = 1/2$, and the autocorrelation function decays faster than k^{-1}. A positively correlated long-memory process is characterized by the Hurst exponent in the interval (0.5, 1).

4.1 Test for Long Memory: R/S Test

The Long Memory test based on R/S test has been developed by *Hurst* (1960) and *Mandelbrot and Wallis* (1969) method allows computing parameter *H*, which measures the intensity of long rang dependence in time series. The time series of length T is divided into *n* sub-series of length *m.* For each sub-series m = 1,…,n, we have to find the mean (E_m) and standard deviation (S_m), and subtract the sample mean using the formula below:

$$Z_{i,m} = X_{i,m} - E_m \text{ , for i = 1,…..,m.}$$

After that we could produce a time serie from the sample means as $W_{i,m} = \sum_{j=1}^{i} Z_{j,m}$ where i = 1,..,m and the range is calculated as the below given formula:

$$R_m = \max\{W_{1,m,\ldots..,} W_{n,m}\} - \min\{W_{1,m,\ldots..,} W_{n,m}\}.$$

The rescaled range is calculated by $\frac{R_m}{S_m}$ as well as in case of time series *R*, *S* and *H* can be defined according to the formulas below:

- where R is the distance covered by the variable, *k* is a constant and T is the length of the time.

$$R = k \times T^{0.5}$$

- where R/S is the rescaled range, m is the number of observations, k is a constant and *H* is the Hurst exponent, can be applied to a bigger class of time series.

$$\frac{R}{S} = k \times m^{H}$$

- The Hurst exponent can be calculated as:
  $\log(R/S)m = \log k + H \log m$

  and can be interpreted as:

- If *H* value = 0.5 then time series follow a random walk and are independent.
- If *H* value =(0, 0.5) then time series are anti-persistent, process covers only a small distance than in the random walk case.
- If *H* value =(0.5, 1) then time series are persistent series, process covers bigger distance than a random walk (long memory process).

4.2 Test for Long Memory: Modified R/S Test

The modified R/S test is developed from the classical R/S test which was proposed by *Hurst* (1951) while studying hydrological time series of the River Nile. For a return series $\{x_1, x_2, \ldots\ldots, x_T\}$, *Lo* (1991) refined the classical test by defining (see equation (1))

$$Q_T = \hat{R} / \hat{\sigma}_T(q) \quad (1)$$

where

$$\hat{R} = \underset{0\le i\le T}{MAX}\sum_{t=1}^{i}(X_i - \overline{X}) - \underset{0\le i\le T}{MIN}\sum_{t=1}^{i}(X_i - \overline{X})$$

$$\hat{\sigma}_T^2(q) = \hat{\sigma}^2 + 2\sum_{j=1}^{q} w_j(q)\hat{\gamma}_j,$$

$$w_j(q) = 1 - |j/q|,$$

and define that:

$\hat{\sigma}^2$ = the usual sample variance of data

$\overline{X}$ = the mean of data

$\hat{\gamma}_j$ = lag – j autocovariance for the data and the truncation lag q is determined by equation 2

$$q = \text{int}\left[((3T)/2)^{1/3}((2\hat{\rho})/1-\hat{\rho}^2)^{2/3}\right] \quad (2)$$

Where $\hat{\rho}$ is the first the first-order sample autocorrelation coefficient and int [ ] is the integer function. Under the null hypothesis of no long memory or no long rang dependence, *Lo* (1991) presented that the limiting distribution of the Q_T statistics in *equation 1* is given by the distribution function of the difference between maximum and minimum of Brownian bridge on a unit interval. Therefore, it can easily obtain the p-value of the test.

4.3 Test for Long Memory: GPH Test

The GPH Test for Long Memory process was developed by *Geweke.* and *Porter-Hudak* (1983) and they proposed to estimate of the OLS estimator of *d* from the regression: (*Equation 3*)

$$\ln[I(\xi)] = a - \hat{d}\ln[\sin^2(\frac{\xi_\lambda}{2})] + e_\lambda, \quad (3)$$

where

$$I(\xi) = \frac{1}{2\pi T}\left|\sum_{t=1}^{T} e^{it\xi}(x_t - \overline{x})\right|^2 \quad (4)$$

And the *equation 4* is the Periodogram (estimator of spectral density) of x at a frequency (ξ)

as well as the bandwidth v is chosen such that for

$$T\to\infty, v\to\infty \quad \text{but}\frac{v}{T}\to 0$$

Geweke and Porter-Hudak consider that the power of T has to be within (0.5, 0.6) and for the null hypotheses of no long memory process, the slope of regression d equals zero and the usual t-statistics can be employed to perform the test.

4.4 Data Description

Table 1 presents the number of international tourists arrived to India during 2003-2007. In 2003 the number of international tourists arrived to India was 2.7 million and in 2004 this number increased to 3.4 million comparing with last year. Moreover, in 2005 the number of international tourist arrivals to India also have increased continuously. In this year the number of tourists came to India was 3.9 million. Table 1 clearly suggests that the number of international tourist arrivals to India has increased from year to year. *Table 2* presents the foreign exchange earnings from international tourist arrivals to India during the period of 2005-2007. In 2005 Indian economy received foreign exchange earnings from international tourism industry was 1.5 thousand million US Dollar. Moreover, in 2006 the India's economy received 1.7 thousand million US Dollar as foreign exchange earnings from this industry. Finally. the foreign exchange earnings from this industry have increased 2.06 thousand million US Dollar in 2007 (*Table 2*). Based on these data we could clearly confirm that the international tourism industry of India will definitely become the potential industry for the future.

Table 1. Number of the international tourist arrivals to India between 2003 and 2007

Denomination	2003	2004	2005	2006	2007
January	274,215	337,345	385,977	459,489	532,088
February	262,692	331,697	369,844	439,090	498,806
March	218,473	293,185	352,094	391,009	444,186
April	160,941	223,884	248,416	309,208	333,945
May	141,508	185,502	225,394	255,008	267,758
June	176,324	223,122	246,970	278,370	310,104
July	225,359	272,456	307,870	337,332	377,474
August	204,940	253,301	273,856	304,387	360,089
September	191,339	226,773	257,184	297,891	325,893
October	260,569	307,447	347,757	391,399	440,715
November	290,583	385,238	423,837	442,413	510,987
December	319,271	417,527	479,411	541,571	575,148
Total	2,726,214	3,457,477	3,918,610	4,447,167	4,977,193

Sources of data: *Ministry of Tourism, Govt. of India,* 2010

Table 2. Foreign exchange earnings from international tourist arrivals to India between 2005 and 2007

Unit: US $ Million

Months	2005	2006	2007
January	532.19	632.43	744.58
February	536.07	594.67	680.41
March	505.74	547.17	636.05
Total	1,574.00	1,774.24	2,061.04

Sources of data: *Ministry of Tourism, Govt. of India,* 2010

5. The results of various tests for Long Memory Process or Long-term dependence process

Table 3 shows the results of various tests for long memory process regarding R/S Test, Modified R/S Test and GPH Test of India's international tourism market between 1981and 2007. Several countries are international tourism markets of India. For instance, USA, UK, Canada, Germany, France, Japan, Malaysia, Australia and Sri Lanka (*Ministry of Tourism, Govt. of India,* 2009).

Table 3. Results of Various Tests for Long Memory based on R/S Test, Modified R/S Test and GPH Test

Country	R/S Test	Modified R/S Test	GPH Test
USA	2.010*	1.2659	1.4874
UK	2.0402*	1.2838	1.3577
Canada	2.0219*	1.2784	1.5063
Germany	1.1541	1.1392	0.6048
France	1.7879	1.1729	1.0971
Japan	2.1268**	1.3809	1.2209
Malaysia	2.0735*	1.294	1.6528
Australia	2.0369	1.323	1.2145
Sri Lanka	2.1529**	1.4117	1.3119

Sources of data: computed
Null Hypothesis: no long-term dependence or no long memory process.
For GPH test, Null Hypothesis: **d = 0**.
* : significant at 5% level, ** : significant at 1% level

The test results are summarised in *Table 3*. For each test, the test statistics and the corresponding significances are given. If the value of R/S Test, Modified R/S Test and GPH Test are significant at 1% level or at 5% level then there is a long-term dependence or long memory process in the time series data. Otherwise no long-term dependence or no long memory process exists in the time series data. The empirical results of long memory process analysis based on both Modified R/S Test and GPH Test proved that all the international tourism markets of India have not a long-term dependence in themselves. Otherwise, based on R/S Test we can claim that most of the international tourism markets have a long memory process in themselves On the other hand we could not decide on direction of the arrival changes. However, the Modified R/S Test and GPH test have already confirmed that the international tourism markets of India have not a long-term dependence process in themselves, only the R/S Test has already confirmed that the international tourism markets of India have a long-term dependence process in themselves except Germany, France and Australia.

6. The conclusions of research and policy recommendations

This research provides various tests for long memory process (R/S Test, Modified R/S Test and GPH Test) to study the international tourism markets of India during the period 1981–2007. The empirical results of this research concluded that most international tourism markets of India are not long memory processes. The Long Memory or Long range dependence means that the information from "today" is not immediately absorbed by the price in the market and investors react with delay to any such information (*Bardos,* 2008).

This fact implies that the international tourism markets of India are effected by any information immediately or quickly. This result was different from the results of previous empirical studies of long memory process in international tourism market (*Gil-Alana*, 2005; *Chukiat and Prasert*, 2009).

If these results can be generalized for future years, then it suggests that both the Indian government sector and the private tourism industry sector of India need to protect the bad information of this industry and information can not go outside from India to other country. Otherwise, experts should develop tourism market of India more and further develop tourism product in India too. In terms of the tourism market development, experts need to launch an active marketing campaign, promoting India's exclusive culture and natural beauty through every channel especially the internet, and keep high quality of accommodation, restaurants, and services in tourism market of India as well. In terms of tourism product development, experts need to keep on improving both the quality and management of tourist products in India. Fore example, to develop tourist destinations in India, provide educational of tourism to people in the tourism industry of India and decrease the negative image of tourist destinations in India. Moreover, keeping tourist destinations clean, keeping tourist destinations beautiful, keeping tourist destinations safety and to protect the environment of tourist destinations. The private tourism sector and the India government tourism sector should maintain good management of tourist destinations in India. Such as maintaining the amenities of the tourism products, keeping good accessibility to the tourism products, keeping a good image of tourism products, keeping the right price of tourism products and keeping the competitiveness of tourism products (*Chaitip and Chaiboonsri*, 2009).

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SIGNIFICANCE OF WHEAT PRODUCTION IN WORLD ECONOMY AND POSITION OF HUNGARY IN IT

István Kiss

PhD student
University of Debrecen, Faculty of Applied Economics and Rural Development kissistvan@agr.unideb.hu

Abstract: This article intends to introduce the significance of wheat production in world economy and role of Hungary in it on the basis of statistic database of FAO. Importance of wheat production in world economy is proven by its share of 15% from 1500 million hectares arable land in the world. This rate is equivalent to 225 million hectares of wheat area based on FAO figures for 2009. From its world economy significance viewpoint, on the basis of some significant features it sets order of ranks among wheat producing countries, accompanied by Hungary too. Setting of rank orders is based on the quantity of wheat produced by countries, cultivated area and exported, imported wheat quantity. As regards wheat export in 2008, Hungary was placed as 11. in the world while on the basis of produced quantity and cultivated area it did not achieve any of top 20 countries. Wheat import of Hungary is negligible since its wheat production is greatly over the self-sufficiency level in one production year. Our logistics disadvantages indicate one of considerable difficulties of market access for primary materials in domestic plant production.

Key words: plant production, wheat, quantity produced, export, import

1. Introduction

World economy role of wheat production is significance both in terms of cultivated land and food supply, feeding and commerce. In my opinion this significance has to be tried to make clear as well as it is worth to examine the role and importance of Hungary in it.

Hungary has 4.5 million hectares of arable land. Shares of cereals' sowing area from Hungarian arable land fluctuated between 68.4% and 69.9% in period of 2004 and 2008. Difference between different years is negligible. Significance of wheat and corn is nearly the same within cereals. Both plants meet with approximately rate of 28% in comparison to entire arable land. (KSH, 2009)

In connection with international trade of Hungarian wheat production our country has to cope with considerable competitive disadvantages. Since we have to cope with logistics handicap, the reason of it is that due to geographical situation of Hungary in many cases we are not able to transit our agricultural products at a competitive price. Other countries, such as the United States, with maritime transport, by much more logistics costs, stay easier competitive at international markets. In spite of this, Hungary as regards exported wheat quantity is placed as 11. of the world in 2008.

2. Materials and Methods

This study shall be considered as a secondary research. For its completion I called FAO statistics database. This study is based on FAO database due to the existing differences among the available statistics. I performed statistical evaluation on this data and in terms of some change, tendencies I did logical argumentation. Aim of the study is to prove significance of wheat production in world economy and introduction, revelation of Hungary's role in wheat production of the world.

I deemed it necessary to introduce and analyse of sowing structure in the world. Ranking of top 10 countries on the basis of yield quantity of wheat, cultivated land, imported and exported quantity. According to the meaning different countries are included in each rank. In ranks beside top 10, Hungary also appears with its own rank and value representing the basis of ranking. For completing the article, I presented the previously mentioned results by the means of coloured figures.

3. Results and Discussion

3.1. Production

World has plant production area of around 1500 million hectares. Figure 1. shows the sowing structure of the world in 2009. In this figure it can be properly seen that growers are producing cereals on 48% of sowing area in the world. Corn, rice and wheat have to be pointed out within cereals. Share of these three plants is 36% from entire sowing area, which is equivalent to 546 hectares. Wheat has the largest proportion within cereals. Owing to its sowing area of 225 million hectares it occupies 15% of area being under plant production in the world. Proportions of three main cereals are stable on average of number of years. As per me in the future significant displacement are not expected in sowing structure.

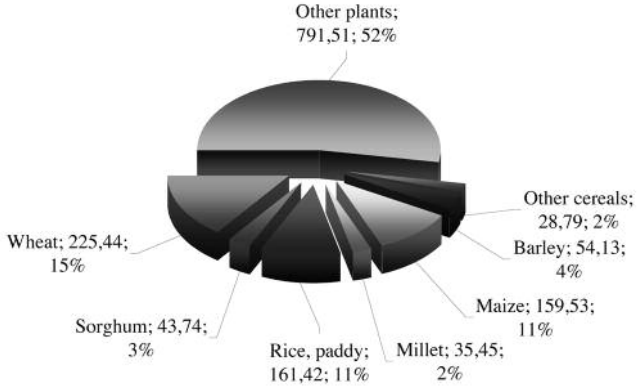

Figure 1. Division of sowing area in the world in 2009 (in million hectares and percentage)
Source: FAO, 2011

Beside wheat, proportion of the previously mentioned rice and corn is also significant. Proportion of remaining cereals in comparison to entire sowing area of the world is under 5%.

From Hungary's point of view wheat and corn production have highlighted role. These two plants occupy approximately 58–60% of 4.5 million hectares of domestic arable land. Considering the territorial proportion of rice production in Hungary its significance is negligible, however in terms of the utilization of areas having poor productivity its role is deemed to be significant. Further in this article I specifically intend to concentrate on wheat production.

Table 1: Wheat production is between 1990 and 2009

Years	Area harvested *(million hectars)*	Production *(million tonnes)*	Average yield *(t/ha)*	Area/capita *(hectar/capita)*	Production/capita *(kg/capita/year)*
1990	231,26	592,31	2,56	0,0437	111,9880
1991	223,35	546,88	2,45	0,0416	101,8027
1992	222,49	565,29	2,54	0,0408	103,5951
1993	222,95	564,47	2,53	0,0403	101,9122
1994	215,12	527,04	2,45	0,0383	93,7892
1995	216,32	542,60	2,51	0,0379	95,1881
1996	226,85	585,20	2,58	0,0392	101,2357
1997	226,25	613,36	2,71	0,0386	104,6855
1998	220,11	593,53	2,70	0,0371	99,9768
1999	213,34	587,62	2,75	0,0355	97,7170
2000	215,44	585,69	2,72	0,0354	96,1781
2001	214,60	589,82	2,75	0,0348	95,6557
2002	213,81	574,75	2,69	0,0343	92,0721
2003	207,66	560,13	2,70	0,0329	88,6559
2004	216,88	632,67	2,92	0,0339	98,9515
2005	219,74	626,84	2,85	0,0340	96,8895
2006	211,82	602,89	2,85	0,0324	92,0959
2007	216,65	612,61	2,83	0,0327	92,4841
2008	222,76	683,41	3,07	0,0332	101,9860
2009	225,44	681,92	3,02	0,0333	100,6256

Source: FAO, 2011

Table 1. shows the tendency of world's wheat production from 1990 to 2009. There are minimal differences in case of sowing area regarding each year.

There is a little increase in yearly crop yield comparison to the year 1990. The reason for this is not in development of sowing area, but the slow and successive increasing of the average yield. Average 2.5 tons wheat was produced on one hectare crop land in the world in the first half of 1990s, however this value was about 3 tons in 2009.

In the world per capita wheat producing area continuously decreased between 1990 and 2009 considering the change of world population. There was no significant change in wheat producing area in this period. However due to the improvement of average yields there is some fluctuation in each year considering the per capita production, but there is no considerable decline. In 1990 per capita production was 111.98 kg/capita/year, while it was already 100.62 kg/capita/year in 2009. The decline is evident and the per capita production level of the year 1990 can not be feasible simultaneously with the growth of world population in spite of the increased average yields. In the whole period the lowest per capita production was in 2006.

Figure 2. shows the hierarchy based on produced amount of wheat by EU 27 countries in 2009. The European Union produced 138.7 million tons wheat in 2009 and the first 10 countries produced the 86% of this amount. France is the biggest wheat-producer in the EU. The French produced 38 million tons wheat in 2009. Germany stays on the second place with its 25 million tons. The UK is the third with its 14 million tons yield. In the hierarchy based on produced amount of wheat France and Germany take place within the top 10 list of the world's wheat-producer countries.

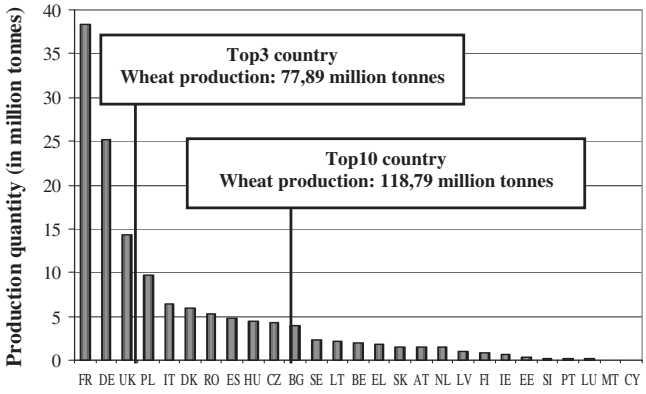

Figure 2. The EU's 27 countries ranked in terms of wheat production in 2009
Source: FAO, 2011

The harvested production of 4th placed Poland was 9.7 million tons in the examined year. There are not so many differences between the productions of the countries in the 5th to 10th places of the list, than in case of the top 3 countries. Italy produced 6.3 million tons wheat in 2009, while Czech Republic made 4.3 million tons. Hungary stays in the 9th place in the hierarchy in the examined year. Czech Republic has been overtaken by our country with minimal difference. Our country produced 4.4 million tons in 2009.

Figure 3. demonstrates the production quantity produced by the ten largest wheat producing country in the world in comparison to Hungarian volume in production year 2009. In the given year 681 million tons were produced, from which share of top 10 countries is 69.6%. 659.8 million tons were consumed from the wheat produced in the given year. 69.8% of the total consumed quantity used for food supply, 18.5% used for feeding, the remaining 11.5% were used for other purposes. (FAO, 2010)

In ranks of leading wheat growers in the world the participants are the same apart from minimum deviation between the period of 2000 and 2009. In relation to different years there are not significant differences in sequences. In the given period there was an example that two large wheat producing countries changed their place in the rank certain years. Considering an exact case is for example the USA and Russia. Between 2003 and 2008 the USA were the third largest wheat producing country of the world while in 2009 Russia gained the third place of the imaginary stage. The position reached in the rank of the above-mentioned two countries will also be interesting in 2010, thus significant yield decrease is experienced in both countries due to unusual weather.

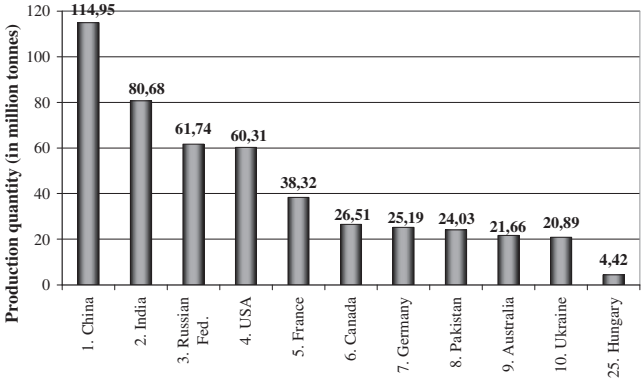

Figure 3. Production quantity of the top 10 wheat producing countries in the world and situation of Hungary in comparison to them in 2009
Source: FAO, 2011

In connection to the given year Hungary was placed as 25th considering the wheat production of the world. This position of Hungary is comparatively stable between the period of 2000 and 2009, in the given period Hungary was between 20th and 25th in the quantity rank of the wheat production in the world in various years. Between 2000 and 2009 the domestic produced wheat quantity was around 2.9 and 6 million tons each year. The reason of this fluctuation is the different amount of precipitation fallen in different production year. It is clear that wheat quantity of 2.9 million tons is in droughty year while quantity of 6 million tons is the result of a good year.

Figure 4. shows the rank of top ten 10 countries occupied largest harvested area in the world. There are differences in consideration of rank between produced quantity and cultivated area. Not the country with the largest production produces wheat on the largest territory. The reason of this can be searched in various natural endowments of each country and various technological level of its production.

In the given year wheat were produced on 225 million hectares in the world, from which the share of 10 countries occupied the largest harvested area is 71.3% that is equivalent to 160.6 million hectares.

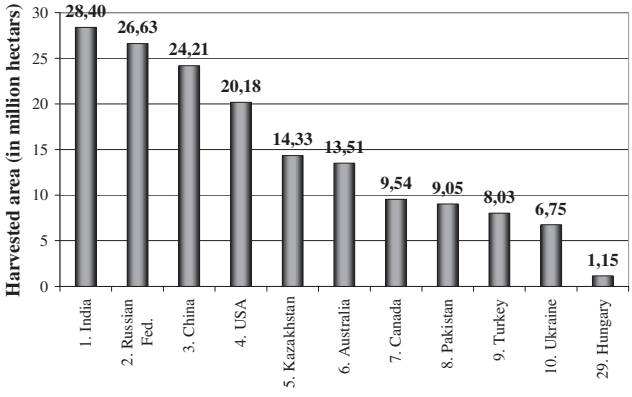

Figure 4. The rank of top 10 countries occupied largest harvested area in the world and situation of Hungary in comparison to them in 2009
Source: FAO, 2011

In the given year wheat were produced on 225 million hectares in the world, from which the share of 10 countries occupied the largest harvested area is 71.3% that is equivalent to 160.6 million hectares.

From both the produced quantity's and cultivated area's viewpoint it can be stated that the production is considerable concentrated at international level.

In 2009, Hungary with 1.15 million hectares of wheat producing area was placed at 29th in the world rank. Minimum differences are experienced regarding area being under wheat production in Hungary. Sowing area of the wheat decreased in Hungary compared to 2009 both in 2010 and 2011. This had various reasons on behalf of growers. Profitability of wheat production was low in 2009, due to it a number of growers decided for the change of sowing structure, causing disadvantages of the wheat. Sowing period in autumn, 2010 was exposed to various meteorological conditions and varied by internal water troubles; due to these a number of growers could not sow the previously planned wheat areas. To sum up it has to be stated that compared to 2009 both in 2010 and 2011 wheat production area in Hungary decreased in Hungary, however there were completely different reasons of decrease in case of two years. In 2010 the profitability of the wheat, in case of honest average yield due to increased buying-in prices, considered to be satisfied.

3.2. Consumption

Table 2. presents the wheat consumption by regions and it also illustrates the per capita wheat consumption in the regions.

Per capita wheat consumption is the highest in Europe its value is 108.24. (FAO, 2011) Wheat consumption in Europe is 18% from the world's all culinary uses of wheat consumption.

Asia represented the biggest rate (58%) of the culinary uses of wheat in the world. However the wheat consumption per capita per year is 63.62 kg. (FAO, 2011) This amount is much lower than the consumption in Europe, whereas the rice plays much bigger role in their diet.

Table 2: Global wheat consumption by region in 2007

Regions	Consumption (kg/capita/year)	Consumption (million tonnes)	Share (%) world consumption
Asia	63,62	252,16	58%
Europe	108,24	79,08	18%
EU 27	*102,89*	*50,77*	*12%*
America	63,16	57,22	13%
Africa	45,58	43,48	10%
Oceania	70,66	1,94	0,45%
World	**65,92**	**433,88**	**100%**

Source: FAO, 2011

The consumption is 63.16 kg/capita/year in the American continent, its share 13% from the world's consumption. In Oceania's consumption is 70.66 kg/capita/year, witch means a negligible part from the world's wheat consumption. (FAO, 2011)

Africa's wheat consumption per capita per year is low, exactly 45.58 kg/capita/year. Africa's rate is only 10% from the world's wheat consumption.

In 2007, 433.88 million tons was used for culinary purpose on the world. The average wheat consumption of the world is 65.92 kg/capita/year. (FAO, 2011)

In 2007 per capita wheat consumption was 20.15 kg in the least developed countries. It was 53.32 kg/capita/year in developing countries. (FAO, 2011) In comparison with the European consumption there is a huge gap between the life of us and the third world.

3.3. Trade

In *Figure 5.* the rank of 10 largest wheat importer countries can be seen in relation to imported quantity. In 2008, 2008-ban 139.1 million tons wheat got into the world trade, 39.7% of it got into the 10 largest wheat importer countries in the world. From Hungary's point of view it is important to highlight that among the 10 largest wheat importer countries three EU members can be found, which can mean buyer's market for domestic primary materials.

Wheat import of Hungary is negligible. The rank set on the basis of quantity imported by countries of the world, Hungary occupies the position 144 in the given year. In 2008 22 thousand tons wheat were imported. Between 1990 and 2009 on the basis of FAO data wheat import of Hungary in relation to each year changed between 0 and 89 thousand tons. In the light of the several million tons product quantity per year it can be stated that such amount of import wheat is not significant in terms of domestic grain market. Hungary will not need special amount of import wheat in the future either, thus it produces greatly over the self-sufficiency level.

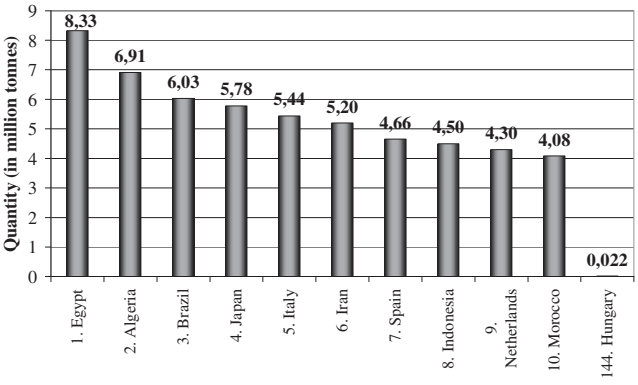

Figure 5. 10 largest wheat importer countries in the world and quantity of wheat import in Hungary in 2008
FAO, 2011

Figure 6. shows the rank of the 10 largest wheat exporter countries of the world and position of Hungary in production year, 2008. 81.4% of 139.1 million tons wheat got into the trade in 2008, came from the 10 largest wheat exporter countries of the world. In relation to this, it can be stated that the fact of concentration expressed previously in connection with production is increasingly true for the international trade of wheat too. There are minimum differences in the rank of top 10 countries concerning each year. Between 2000 and 2008 the United States were the largest wheat exported in the world every year.

In 2008, Hungary is placed as 11th in the list of wheat export of the world, which is respectable performance from such a small country in international relations. According to the rank set on the basis of product quantity and area being under wheat production, it can be stated that for example the stressed role of the USA in international trade is not surprising. However Hungary was left behind from top 10 countries in this rank. In ranks set based on exported quantity, Hungary achieved position 14th and 11th among wheat exporter countries of the world in period of 2000 and 2008.

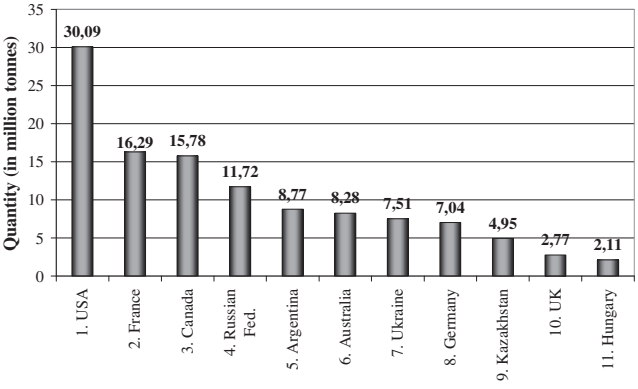

Figure 6. 10 largest wheat exported countries of the world and quantity of wheat export in Hungary in 2008
Source: FAO, 2011

In 2008 2.11 million tons Hungarian wheat got into the international trade that is except from Great- Britain considerably behind from quantity exported by top 10th This

is not surprising as our facilities are in many respects limited. On this I especially mean our logistics disadvantages. „Besides the distance of goal market, the available forwarding infrastructure and trend of freight cost, competitiveness and market access of agricultural products are considerably influenced by the existing storing, loading, drying, cooling, freezing etc. capacities. In the first place the agricultural development programme was production-centred, aimed development of value-added logistical systems (transport, forwarding, storing, distribution) of agricultural production did not get into the priorities, without this the agriculture got into considerably competitive handicap." (*Potori,* 2009)

3.4. Prices

Figure 7. demonstrates the tendency of producers' prices of wheat between 2000–2008 in different countries. The selection of the countries can happen by based on the role in EU 27, as well as on the basis of proximity to our country in the export market.

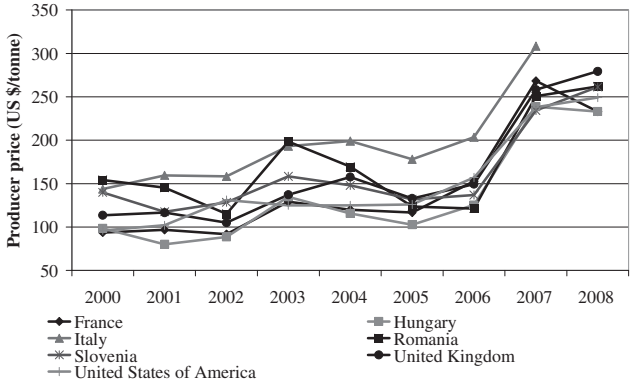

Figure 7. Producer price of wheat is between 2000 and 2008
Source: FAO, 2011

In total, according to the chart the Italian producer' prices were the highest in several years. In my view the reason for higher Italian prices is that the FAO does not record the tendency of durum wheat prices, which can distort the tendency of Italian prices.

The Hungarian producer' prices expect some years the were the lowest. The reasons for domestic low producer's prices can be the subject of later examination. It is imaginable, that price is low because of geographical position of Hungary. May be, it can be another reason, that in our country the milling-industrial cartel more years of directly influenced the trend of pieces

Based on AKI PÁIR database wheat price in June 2010 was around 31 to 33 thousand HUF/tonne. Wheat price in the Budapest Stock Exchange is 76,500 HUF/tonne with transportation in March 2011, while with transportation in May it is 80,000 HUF/tonnes. Calculating with 200,37 HUF/US $ MNB central rate this price in dollar is 381.79 and 399.26. "The Middle East and North African Countries – mainly Algeria, Tunisia and Egypt – are behind this price increase, where continually growing food prices cause disorders and it will probably lead to increase in their wheat import." Although Egypt (the world's largest wheat importer) announced he would not chance his purchasing strategy, but the market did not take it granted. Currently Egypt has sufficient wheat stock for 6 months. (*Agrárszektor,* 2011) High wheat price leads to increase in food price in the near future. High price of bread can remain in 2012 as well due to the extreme weather conditions in Hungary which result that sawing area of wheat fall even further in 2011 as well.

3.5. Conclusion

Considering the world wheat production there was no significant change in wheat producing area of the last 20 years, but average yields improved over the years. World market position of Hungary is not favourable due to its specific geographical situation. In case of transportation we have to calculate with high shipping expenses towards Rotterdam and Constanta as well. In spite of this fact our wheat export is respectable. Hungary has negligible market share in world trade of wheat in spite of its favourable place among wheat exporter countries. In the future we might have to calculate with the decline of wheat producing area because wheat production was not able to compete with maize production in income-generating capacity. The year of 2010 can be an exception; however the major part of the increased prices on the product market will not be realized by the producers but by the corn-merchants at the end of 2010 and in the beginning of 2011.

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DUTCH, HUNGARIAN AND GERMAN DAIRY FARMS TECHNICAL EFFICIENCY COMPARISON

Krisztián Kovács[1], Dr. Grigorios Emvalomatis[2]

[1]University of Debrecen (Hungary)
[2]Wageningen University (The Netherlands)

Abstract: The abolishment of the dairy quota system in the EU is expected to increase competition across dairy farms in Europe. Assuming a common price for milk in the EU, only the most efficient farms will survive in the new environment. The main objective of the paper is to compare dairy farms in Germany, The Netherlands and Hungary about their technical efficiency. In the first part of the research, the efficiency is measured by partial efficiency indexes using one dimensional efficiency measuring. In the second part, the Data Envelopment Analysis (DEA) have to be used to measure efficiency in a multidimensional space, using six inputs and two outputs.

It appears from the results that the highest efficiency farms are in the Netherlands, and then Germany and Hungary follow. If we want to eliminate the low sample size effect, we can assume a common frontier, which decreases the efficiency scores a bit, and makes the Hungarian results more reliable.

With respect the abolishment of the dairy quota system, our results suggest that the Dutch farms are the most efficient, thus probably they will increase their production after the quota system. But because the size of the country we cannot expect dramatic changes in the European Dairy market. The Germans farms efficiency is lower, but their efficiency is also lower, so we won't expect high increase about the dairy supply. The Hungarian dairy sector is not so efficient like the Dutch, and the size of the sector has also small among the European countries, thus if they want to survive the quota system demolishing, they have to increase their technical efficiency.

Key words: efficiency, dairy quota system, dairy farming, Data Envelopment Analysis

1. Introduction

The world milk production shows a continuous rising trend since 1961. In 2005 the world total fresh milk production was 541 million tonnes (FAOSTAT 2010). Since the introduction of milk quotas in 1984 the European Union (EU) production has stagnated around 149 million tonnes (EUROSTAT 2010). The milk quota system was introduced to stop over-production in Europe.

The biggest milk producer in the EU is Germany (18.98%), the second is France (16.13%), and the third is the United Kingdom (9.83%). The Netherlands and Hungary account for 7.31% and 1.22% of total EU production, respectively (FAOSTAT 2010). Currently, dairy farms in a given EU country are expected to be more or less competitive when compared to dairy farms in other countries. A reason for that is the quota system, which does not allow trading between countries, may protect farmers from international competition. Given that the quota system will be abolished in 2013, this will put pressure on less competitive farms in different countries. The issue of optimal use of resources becomes important.

As noted by *Bauer* et al. (1998), policy makers are particularly interested in the potential impact of their decisions on performance of firms. A firm that is inefficient is wasting inputs because it does not produce the maximum attainable output, given the quantity of inputs used, and hence the possibility of reducing average costs. Irrespective of whether a developed or developing economy is under consideration, findings from the study of technical efficiency have far-reaching policy implications.

Studying farm efficiency and the potential sources of inefficiency are therefore important from a practical and a policy point of view. On the one hand, farmers could use this information to improve their performance. On the other hand, policymakers could use this knowledge to identify and target public interventions to improve farm productivity and farm income (*Solís* et al., 2009).

The first objective of the research is to measure dairy farms efficiency in Hungary, Germany and The Netherlands. Based on the results, we can assess the potential of dairy farms in the three countries to survive of the abolishment of the dairy quota system. The second objective is to compare parametric and non-parametric methods of efficiency measurement in practise. The research questions of this thesis are: What are the differences and the similarities in the Dutch, German and Hungarian dairy sectors? The dairy farms in which country (the Netherlands, Hungary or Germany) are more efficient compared to their national frontier?

1.1 Introducing the Dutch, German and the Hungarian dairy sector

The European Union is the largest milk producer in the world and the EU dairy sector is one of Europe's most

important farming sectors. To compare the three countries dairy farms efficiency, it is essencial to examine the structural differences between the countries.

The hungarian dairy farms are mainly large in terms of land. 70 percent of the farms use more than 100 hectares of land for their business. The German farm's represent a mix of small (less than 50 hectares land), medium (between 50 and 100 hectares land) and big (more than 100 hectares) farms. The Dutch dairy sector consists of many small and middle-sized farms, with the big dairy farms accounting for only 8 percent of the whole land. The Hungarian dairy sector is land extensive in contrast to the Dutch dairy sector which is land intensive. This intensive farming practices can involve very large numbers of animals raised on limited land which require large amounts of food, water and medical inputs. The German dairy sector about the land use is somewhere in the middle of the other two examined countries. This specialisation will be discussed in later sections.

Another way to compare the dairy farms size examines the distribution of dairy farms according their size in terms of dairy cows (DC) in percentage. 73 percent of the Hungarian dairy livestock which means 0.19 million dairy cows live in big farms where there are more 100 dairy cows are kept. The average herd size is 22 dairy cows per holding (EUROSTAT 2010b).

The German farms characteristics are still the same as the previous comparison, so there are several types of farm working in Germany. 55% of the cows, which means 2.25 million dairy cows, live in big farms, where there are more than 100 dairy cows. The average size of the herd is 40.7 dairy cows per holding (EUROSTAT 2010c).

The Dutch farms are more specialised about dairy cows, so they own less land, but they keep the dairy cows in a big (more that 100 DC per farm) farms. 64 percent of the Dutch dairy cows, which means 0.946 million dairy cows live in dairy farms, with more than 100 cows. The average size of the herd is 59.9 dairy cows per holding (EUROSTAT 2010a).

The EU-25 produced around 146 million tones of whole fresh cow milk in 2005 (EUROSTAT, 2010), which was 27.5 percent of the world production. Among the three countries Germany is the largest milk-producing country with 28.49 million tonnes. The Netherlands and Hungary produced 10.98 million and 1.94 million tonnes respectively.

The milk production was stable, but a small reduction was observed on the number of dairy cows during the examined period. The country with the biggest cow population was Germany (4164 million heads in 2005) and the reduction was approximately 7 percent from 2001 to 2005. The Dutch dairy cows' number was 1486 million heads in 2005, which was quiet stable during the examined period. However a 4.2 percentage decrease occurred from 2001 to 2005. The Hungarian dairy cows' number was 285 thousand heads in 2005, which decreased 17.4 percent from 2001. Hence this was the highest decrease among the three countries.

An interesting observation is that during the examined period the number of cows decreased in all chosen countries, but the milk production was quite stable. This was caused by the increasing performance of the cows. The average milk production per year per cow is the highest in The Netherlands (7615 kg); and lower in Germany (6984 kg) and Hungary (6850 kg).

Based on *Table 1.1* the Dutch farms are more efficient regarding the technical partial productivity indexes. It seems that after the dairy quota system abolishment the Dutch farmers will increase their production potential and they will reach the best efficiency results among the three countries. After the quota system abolishment the Hungarian farms should have to increase their technical efficiency, otherwise they will decrease their production potential, now it seems that they are producing extensively, but in a big volume per farm. The German farms are lied in between of the other two countries.

Table 1.1: Partial productivity indicators in the examined countries in 2005

	Germany	Hungary	The Netherlands
Milk production per cow (kg/DC)	6 984	6 850	*7 615
Milk production per total operating cost (kg/€)	1 828	2 900	*3 369
Milk production per total labor (kg/AWU)	172 464	85 374	*333 553
Milk production per forage area (kg/ha)	7 324	5 849	*12 572
Milk production per total input (kg/€)	939	*1 928	1 603
Milk production per farm (kg/farm)	332 856	*584 814	540 356

AWU: annual working unit; DC: dairy cow; *the best result among the three countries
Source: FADN REPORT 2010.

So far we measured the efficiency only through partial productivity indicators. Although it is impossible to decide which counties technical efficiency is the highest. So far the different countries measuring was limited by measuring one input and one output performance of the farms. Thus the measuring of the inputs and the outputs was separately, during the following chapters the efficiency performance measuring regard with respect to all inputs and all output as many authors called (*Farrel,* 1957; *Begum* el. al. 2009; *Coelli* et. all 2005., *Tauer*, 1998; *Jaforullah and Whiteman,* 1999; *Stokes* et al., 2007; *Kumbhakar and Lovell,* 2000; *Emvalomatis,* 2010) in the literature the *"multiple input and output measurement"*.

2. Materials and methods

Measuring efficiency is a widely used concept in economics. Economic (or overall) efficiency expressed as a combination of technical and allocative (or price) efficiencies. Technical efficiency is the ability of the farmer to obtain maximal output from a given set of inputs while allocative efficiency measures the ability of the farmer to use

inputs in optimal proportions, given their input prices and technology (*Begum* el. al. 2009; *Coelli* et. all 2005). There have been several methods to measuring efficiency; the generally used methods are data envelopment analysis (DEA), which involves mathematical programming and econometric methods, respectively.

Farell (1957) distinguishes input and output orientated measures depending on which factor we assume altering. So in the input orientated measure the input quantities changing without changing the output quantities. The assumed objective is to reduce the input quantities as much as possible, without changing the output quantities.

The other measure of efficiency regarding to *Farell* (1957) and *Coelli* et. al. (2005) is the output orientated measure, which is the opposite of the input orientated. By this measuring the question is: *"By how much can output quantities be proportionally expanded without altering the input quantities used?" (Coelli et. al. 2005).* If the technology is characterized by constant returns to scale the two orientations produce the same technical efficiency score. Differences, however, appear under variable returns to scale.

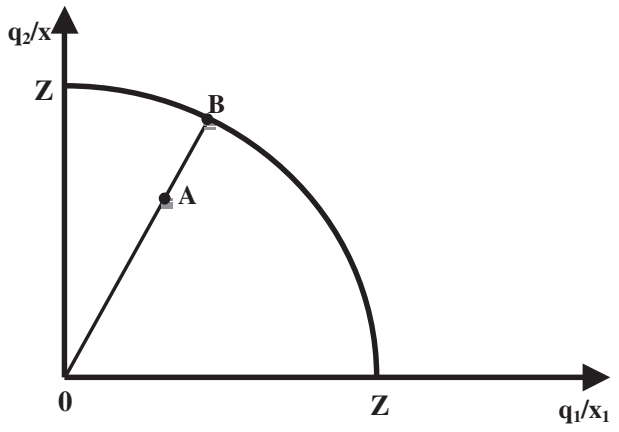

Figure 2.1: Technical efficiency from an output orientation

Figure 2.1 presents the technical efficiencies from an output orientation, here following Coelli et. al. (2005) and considering a firm with two outputs (q_1 and q_2) and a single input (x_1) and keep the input quantity fixed (because it is an output orientation measure), ZZ' represents the production possibility curve and point A the inefficient firm *(Figure 2.1).*

The distance AB measure the technical inefficiency, hence the output orientated technical efficiency is the ratio of 0A and 0B, which shows the percentage by which outputs could be increased without requiring extra input.

The input and the output orientated models estimate the same frontier and identify the same set of firms as being efficient, the difference is the efficiency measures associated with the inefficient firms that may differ between the two methods (*Coelli* et. al. 2005).

In practise the efficient isoquant is not known, the researchers have to estimate it from the sample data using different kinds of analyses. These will be introduced in the following sections. These analyses are the non-parametric data envelopment analysis and the parametric stochastic frontier analysis.

2.1 Introducing the Data Envelopment Analysis (DEA) Method

This section is divided into several subsections. The first part introduces a basic DEA model, in which a constant returns to scale (CRS) technology is assumed, the following part describes a more general variable returns to scale (VRS) DEA model.

The framework for the Data Envelopment Analysis (DEA) approach has been introduced by *Farrell* (1957) at first and popularized by *Charnes, Cooper & Rhodes* (1978). Data envelopment analysis is a non-parametric mathematical programming approach to frontier estimation.

The first and widely applied model was the input orientated CRS models, which solves the following linear programming problem for each firm to obtain the efficiency score:

$$\begin{aligned} &\max_{u,v} && (u'y_i / v'x_i), \\ &\text{constrains:} && u'y_j / v'x_j \le 1,\ j=1,2,...,N, \\ & && u,v \ge 0 \end{aligned} \qquad (1)$$

Where regarding to *Coelli* et. al. (2005), assuming K inputs and M outputs for each N firms. For the i-th firms the column vectors are represented by x_i and y_i respectively. X indicate the K*M input matrix and Y shows the M*N output matrix for all N firms. To measure efficiency we want to obtain the measure of the ratio of all outputs over all inputs, like $u'y_i / v'x_i$ where u represents the M*1 vector of output weights and v represents the K*1 vector of input weights. The obtained efficiency score will be less than or equal to one. There is one problem with this formulation, because it has an infinite number of solutions. *Charnes, Cooper & Rhodes* (1978) solve it by adding one constrain $v'x_i = 1$ and reformulate the objective function a bit, this form we known as the multiplier form of the DEA. Using the duality linear programming method from the multiplier formula the envelopment form can get, which is the following:

$$\begin{aligned} &\min_{\theta\lambda} && \theta, \\ &\text{constrains:} && -y_j + Y\lambda \ge 0, \\ & && \theta x_i - X\lambda \ge 0, \\ & && \lambda \ge 0, \end{aligned} \qquad (2)$$

where λ represents the vector of peer weights. θ is a scalar and the value of it will be the efficiency score for the i-th firm, the value of 1 indicate the frontier and hence a technically efficient firm (but in practise it is not exist). This linear programming problem must be solved N times, once for each firm in the sample. Hence, each firm has its own θ efficiency score (*Coelli* et. al., 2005).The points of the fully efficient firms determine the fully efficient frontier line.

Regarding to the Eq. (2), takes the *i-th* firm and then seeks to radially contract the input vector, x_i, as much as possible, while still remaining within the feasible input set. The inner boundary of this set is a piece-wise linear isoquant

(refer Eq. (1)), determined by the observed data points which are the firms in the sample. The radial contraction of the input vector, x_i, produces a projected point, $(Y\lambda, X\lambda)$, on the surface of this method. This projected point is a linear combination of these observed data points. The constraints in Eq. (2) ensure that this projected point cannot lie outside the feasible set (*Coelli* et. al. 2005).

The constant returns to scale assumption is acceptable if the firms in the sample are operating at an optimal scale, but in practise the firms with imperfect competition do not behave like that. *Banker, Charnes and Cooper* (1984) suggested a model which can deal with variable returns to scale (VRS) situation. This model is quite similar to the CRS model except by adding a convexity constraint ($N1'\lambda = 1$) to the model, which accounts for the variable returns to scale. The model regarding to *Banker, Charnes and Cooper* (1984) and *Coelli and Perelman* (1996) presents an output oriented model, when the firms have fixed quantity of resources (capital, labour, livestock, land) and want to produce output (milk, calf) as much as possible. This model is very similar to the input orientated model. So the formula of an output orientated VRS model is the following:

$$\begin{aligned} &\max_{\phi\lambda} \phi, \\ &\text{constrains:} \quad -\phi\, y_j + Y\lambda \geq 0, \\ &\qquad\qquad x_i - X\lambda \geq 0, \\ &\qquad\qquad N1'\lambda = 1 \\ &\qquad\qquad \lambda \geq 0, \end{aligned} \tag{3}$$

where the N1 is an N*1 vector of ones moreover $1 \leq \phi < \infty$ and ϕ-1 is the proportional increase in output that could be achieved by the i-th firm, with input quantities held constant. $1/\phi$ determine the technical efficiency score, which lies between zero and one.

The DEA VRS formula envelopes the data points more tightly and provides higher or equal efficiency scores than the CRS model. The difference between the VRS and CRS technical efficiency scores is the scale inefficiency.

2.2 Description of the data

In this research we use a database from the European Farm Accountancy Data Network (FADN). From the database we selected the dairy farms from Germany, Hungary and the Netherlands from 2001 to 2005. We focussed mainly on those dairy farms, whose revenues from cow's milk production are at least 75% of their total revenues for every year.

We use two outputs in our model, the revenues from cow's milk production and the revenues from other outputs. This other output revenues includes revenues from beef and veal and other output production that a dairy farm can produce. For the better estimation to account for the dependence of revenues on inflation, the output revenues and the input costs are deflated with country-wide price indices for each category of products, with prices obtained from EUROSTAT.

The analysis uses six deflated (base year is 2000) inputs categories, which cover the whole input side of the dairy business. These categories are the following:

1; Capital (K) consists of the buildings and fixed equipment like: tractors, lorries, milking machines, cleaning machines, feeding automats.
2; Labour (L) is measured in working hours and includes both family and hired labours.
3; Land (A) is measured in hectares, and includes the total utilized agricultural area (UAA) of the holding. Does not include areas used for woodland, roads, non-farmed areas.
4; Total material inputs (M) includes all deflated farm specific costs, that arise in the dairy business like: seeds and plants, fertilizers, crop protection, crop and livestock-specific cost (storage cost, marketing cost, veterinary cost) and energy (fuel, electricity, heating) costs.
5; Livestock (S) is measured in standardized livestock unit (LSU) which is the total number of livestock heads on the farm aggregated with European standard weight coefficients.
6; Purchased feed (F) is measured in deflated monetary value, and includes purchased feed and concentrates for grazing and home-grown livestock, but excludes the value of feed produced within the farm.

The following *Table 2.1* contains the descriptive statistic from the used dataset

Table 2.1: Variable averages in the examined countries

	Germany	The Netherlands	Hungary*
Milk revenues (€)	104 587	186 221	154 573
Other revenues (€)	32 553	32 807	52 265
Capital (€)	167 258	196 327	89 124
Labor (AWU)	4 085	4 251	16 038
Land (UAA)	63	50	164
Material inputs (€)	44 699	52 230	81 718
Livestock (DC)	92	113	159
Purchased feed (€)	20 448	33 099	58 596

AWU: annual working unit; UAA: utilized agricultural area; *time interval is 2001 to 2008 for Hungary
Source: Own calculation based of the FADN database 2001-2005.

2.3 Empirical specification of the DEA model

The objective of this section is to compare dairy farms efficiency in Germany, Hungary and the Netherlands. We assume the farms produce two kinds of output, which are the revenues of cow's milk and the revenues of other output. The other output includes all the other outputs of the farms which are valuable except the cow milk. The other outputs variable is equal to the difference of the total outputs and the sum of the farm use production and the total cow milk production.

The model uses output orientation variable returns to scale (VRS) configurations. We assume output orientation, instead of the input orientation, however the European dairy

market is restricted by the quota system, but the dairy farmers can trade with the quotas among themselves (inside the country) in every examined country. On the other hand we assumed that the dairy farms easily can buy more quotas if it's necessary than change the quantity of their inputs. So we assumed that the inputs are more fixed than the outputs. This output orientated VRS model is quite similar to the constant returns to scale (CRS) model except by adding convexity constraint (N1'$\lambda = 1$) to the model, which account for the variable returns to scale.

The model is an output oriented model, when the firms have fixed quantity of resources (capital labor, land, total material inputs, livestock and feed) and wanted to reach as much revenues, which is measures the quantity of the outputs (milk, other) as possible. The farms have six inputs, which covers approximately all the input what they use to produce milk. These inputs are: capital (machinery and buildings), labor, land, total material inputs, livestock and feed.

We estimate the technical efficiency for the three countries for every year individually. That procedure gives the German and the Dutch technical efficiency score from 2001 to 2005 and from 2001 to 2008 for Hungary, thus we can create an average technical efficiency score for the countries, to compare them.

3. Results of the DEA

Table 3.1 presents the estimated mean values of technical efficiency which on average for 2001 to 2005 is 83 percent assuming variable returns to scale (Vrste) for Germany with 982 observations per year. The scale efficiency is the ratio of the constant and variable returns to scale (0.80/0.83), which is on average 0.96 and indicate that the difference between the constant and variable returns to scale is only 4% which is close to constant returns to scale (CRS) part of the technology.

Table 3.1: Summary of the technical efficiency in Germany

Year	Crste	Vrste	Scale	Observations
2001	0.80	0.84	0.96	982
2002	0.80	0.83	0.96	982
2003	0.80	0.83	0.97	982
2004	0.80	0.83	0.97	982
2005	0.81	0.84	0.96	982
Average	0.80	**0.83**	0.96	982

Note: crste = technical efficiency from CRS DEA; vrste = technical efficiency from VRS DEA; scale = scale efficiency = crste/vrste
Source: Own calculation based of the FADN database 2001-2005.

Table 3.2 presents the estimated mean values of technical efficiency which on average for 2001 to 2005 is 92 percent assuming variable returns to scale (Vrste) for the Netherlands with 178 observations. The scale efficiency is on average 0.96 and indicates that the difference between the constant and variable returns to scale is only 4% which is also close CRS part of the technology.

Table 3.2: Summary of the technical efficiency in The Netherlands

Year	Crste	Vrste	Scale	Observations
2001	0.88	0.92	0.96	178
2002	0.89	0.92	0.97	178
2003	0.90	0.93	0.97	178
2004	0.89	0.92	0.97	178
2005	0.89	0.93	0.97	178
Average	0.89	0.92	0.96	178

Note: crste = technical efficiency from CRS DEA; vrste = technical efficiency from VRS DEA; scale = scale efficiency = crste/vrste
Source: Own calculation based of the FADN database 2001-2005.

The Hungarian database is quiet problematic, because of the small specialised dairy farm number of the sample. Thus to deal with the small sample size, we used aggregate dataset over time (from 2001 to 2008) and we weren't apply that restrictions, that the farms have to be in the database at least five years. *Table 3.3* presents the estimated mean values of technical efficiency which on average for 2001 to 2008 is 90 percent assuming variable returns to scale (Vrste) for Hungary with 94,5 observation on average. The scale efficiency is on average 0.96 and indicates that the difference between the constant and variable returns to scale is only 4% like the other two countries. The high technical efficiency score caused by the low number of observation and the big specialised dairy farms in Hungary in the sample.

Table 3.3: Summary of the technical efficiency in Hungary

Year	Crste	Vrste	Scale	Observations
2001-2004	0.86	0.90	0.95	120.0
2005-2008	0.86	0.89	0.96	67.0
Average	0.86	0.90	0.96	94.5

Note: crste = technical efficiency from CRS DEA; vrste = technical efficiency from VRS DEA; scale = scale efficiency = crste/vrste
Source: Own calculation based of the FADN database 2001-2008.

Table 3.4: Comparing technical efficiency assuming common frontier using DEA

	GERMANY				The NETHERLANDS				HUNGARY			
Year	**Crste**	**Vrste**	**Scale**	**Obs**	**Crste**	**Vrste**	**Scale**	**Obs**	**Crste**	**Vrste**	**Scale**	**Obs**
2001	0.74	0.76	0.98	982	0.87	0.89	0.98	178	0.70	0.82	0.87	51
2002	0.75	0.77	0.97	982	0.87	0.89	0.98	178	0.76	0.84	0.92	33
2003	0.74	0.76	0.97	982	0.88	0.90	0.98	178	0.75	0.80	0.93	20
2004	0.76	0.78	0.98	982	0.87	0.90	0.97	178	0.81	0.88	0.93	16
2005	0.75	0.78	0.97	982	0.88	0.91	0.97	178	0.79	0.84	0.94	15
Average	0.75	0.77	0.97	982	0.88	0.90	0.98	178	0.76	0.84	0.92	27

Note: crste = technical efficiency from CRS DEA; vrste = technical efficiency from VRS DEA; scale = scale efficiency = crste/vrste; Obs=Observation per year
Source: Own calculation based of the FADN database 2001-2005.

Table 3.4 displays the average technical efficiency of the German, the Dutch and the Hungarian sample respectively, calculated under the assumption of a common frontier across three countries. In our case common frontier was necessary to eliminate the Hungarian low sample size and merge the three country dataset in one for the better estimation. The common frontier case assumes that the three counties can access to the most efficient technology.

Results show that the superiority, in terms of technical efficiency average, of the Dutch sample in the dairy sector remains when using the common frontier (average technical efficiency (assuming VRS) of 0.9 for the Dutch farms, 0.77 for the German farms and 0.84 for the Hungarian farms). This suggests that more Dutch dairy farms are closer to the efficient common frontier than Hungarian or even the German dairy farms. Furthermore this suggests that, if it is assumed that there is common technology between Dutch, German and Hungarian farms, the Dutch farmers make a more efficient use of this technology in the dairy sector.

Table 3.5 presents the technical efficiency results using DEA method. There are two cases inside the analysis, which are assuming national or common frontier. Observable that in the common frontier case all the countries technical efficiency scores under variable returns to scale are lower than the national frontier cases (VRS TE). That might have caused the bigger sample size, and the assumption that all the examined countries can operate in the same environmental conditions and can employ the same technology.

Table 3.5: Comparing summary of the technical efficiency using DEA

Type of the DEA frontier	Country	CRS TE	VRS TE	Scale	Observations
NATIONAL frontier	Germany	0.80	**0.83**	0.96	982
	The Netherlands	0.89	**0.92**	0.96	178
	Hungary*	0.86	**0.90**	0.96	23.4
COMMON frontier	Germany	0.75	**0.77**	0.97	982
	The Netherlands	0.88	**0.90**	0.98	178
	Hungary	0.76	**0.84**	0.92	27

Note: CRS TE = technical efficiency from DEA constant returns to scale; VRS TE = technical efficiency from DEA variable returns to scale; scale = scale efficiency = CRS TE / VRS TE

Note: * The Hungarian data's are unbalanced assuming national frontier from 2001-2008

Source: Own calculation based of the FADN database 2001-2005.

Table 3.5 shows that using DEA and assuming the national frontier, the highest efficiency score is 0.92 for the Netherlands, the second is Hungary (0.9), but the sample size in that case is quiet low So that result is not trustable, because it might represent just the biggest farms which are using the best technology in Hungary. Assuming the common frontier makes our technical efficiency scores lower, earlier we mentioned the reasons of it.

If we combine the two kinds of frontiers results and take the averages of the two methods and the two kinds of frontier, we get that the most efficient farms are in the Netherlands with 90–92% efficient. The German farms are 77–83% efficient. The Hungarian farms are 84–90% efficient.

4. Discussion

The method in this research was suitable and the most widely used method to compare dairy farms efficiency for farm and national level. The DEA method that has been used in this research help to measure technical efficiency with using multiple outputs and multiple inputs. From the literature review we saw that it is hard to compare countries using just the partial productivity indexes, where we can examine the farms efficiency in just one dimension. Using DEA method, we can examine the farm's technical efficiency in a multidimensional level.

The database of the research has been collected by the European Union's FADN system from 2001 to 2005 and from 2001 to 2008 for Hungary. The small number of observations per year is the reason why the Hungarian database continues more years in the sample. Thus the time horizon of the data is 5 or 8 years, but it can be longer like 10 or 20 years to get more valid results for the comparison. The number of dairy farms in the sample per year is 982 for Germany, 178 for the Netherlands and 23 for Hungary. In the future research it is desirable to increase the numbers of Hungarian dairy farms in the sample as high as the other countries farms number to get more clear view about their management for the comparison. But in the present FADN database for Hungary is not that wide about the specialised dairy farmers. On the other hand it is also possible that the Hungarian farms are not as specialised only for milk production as the Dutch or the German farms.

We can see in our database, that there are only few specialised big farms comparable to the Dutch and German farms, that's one reason for the small Hungarian sample. Although we can see that the farms are relatively efficient in the Hungarian sample comparing their national frontier. Nevertheless to get a better view about the break points of the different countries dairy efficiency, we need to make a SWOT (strength, weakness, opportunity, threats) analysis or examine allocative efficiency for their dairy sector, which require more time, capital and more experts opinions. Thus this can be a good topic for future research.

Directions for the future research can be also to estimate allocative efficiency models where the different countries, different inputs and outputs prices are also play an important role to compare efficiency among countries. Unfortunately the FADN database directly cannot contain information about prices, but indirectly we can calculate it. These analyses needs more time and more complicated model to estimate the frontiers. To get better view about the dairy sector efficiency in the future we need to analyse other important countries or sectors (feeding industry, plan cultivating sectors) which play important role of the sector or the examined country import-export market and use other

methods to measure efficiencies like the Stochastic Frontier Analysis (SFA) or the total factor productivity (TFP) indexes.

The usability of these methods for other country, region sector is possible, if they have proper data for the analysis. The method is available to compare not just countries but regions inside the counties. The adaptability of this model is wide so we can analyse different sectors in the agriculture and different industrial sectors as well.

5. Conclusions

In this research we compare three countries partial efficiency indexes, which mainly comparing ratio of one input and one output. According to the results we can establish the dairy sector characteristic of the three countries. The biggest milk producer is Germany; the smallest is Hungary among the three countries. About the applied technology, the Hungarian dairy sector are land and labor extensive in contrast to the Dutch dairy sector which are land and labor intensive. This intensive farming practices can involve very large numbers of animals raised on limited land which require large amounts of feed, water and medical inputs. The German dairy sector about the land and labor are somewhere in the middle of the other two examined countries.

So far the measuring of the inputs and the outputs was carried separately, the next step was measuring the efficiency performance with respect to all inputs and all output called *"multiple inputs and output measuring"*. The non-parametric DEA method that has been used in this research help to measure technical efficiency with using multiple outputs and multiple inputs. The DEA method measures the relative efficiency of a farm in the presence of multiple inputs and outputs, without knowing the functional relationship between inputs and outputs and given the assumption that statistical noise does not exist.

We used two outputs in our models, the revenues from cow's milk production and the revenues from other outputs. For the better estimation to account for the dependence of revenues on inflation, the output revenues and the inputs are deflated with country-wide price indices for each category of products. The analysis used six deflated inputs categories, which cover the whole input side of the dairy business. These categories were the following: capital, labor, land, total material inputs, livestock and purchased feed.

The European Union's FADN database has been used for this research which contains data from 2001 to 2005 and from 2001 to 2008 for Hungary, because of the small sample size. The number of dairy farms in the sample per year was 982 for Germany, 178 for the Netherlands and 23 for Hungary. We define specialised dairy farm like those dairy farms, whose revenues from cow's milk production are at least 75% of their total revenues for every year.

It appears form the results that the Netherlands has highest technical efficiency; the second is Hungary and Germany. But the Hungarian results are less trustable than the others, because of the low sample size. Eliminating the low sample size effect with assuming a common frontier, which decrease the efficiency scores a bit, and it makes the Hungarian results more reliable. If we combine the two kinds of frontiers results and take the averages of the two kinds of frontier, we get that the most efficient farms are in the Netherlands after Hungary and Germany follows.

We can assume that if the quota system abolished and assuming a common price for milk in EU, only the efficient farms will survive the higher competition among the countries. In our case the Dutch farms are the most efficient, thus probably they will increase their production after the quota system. But because the size of the country we cannot expect dramatic changes in the European Dairy market. The Germans farms efficiency is lower, although their dairy sector size is bigger than the other two countries, so we won't expect high increase about the dairy supply. The Hungarian dairy sector is not as efficient as the Dutch, and the size of the sector is also small among the European countries, thus if they want to survive the quota system demolishing, they have to increase their efficiency.

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EXPLOITATION OF RELATIONS AMONG THE PLAYERS OF THE MUTTON PRODUCT CYCLE

Béla Cehla, Sándor Kovács, András Nábrádi

Abstract: The continuous weakening of Hungarian sheep sector and its low effectiveness in terms of value added have posed crucial problems in recent years. The focal problem has been partially caused by economic and market problems. Among these issues, mostly the poor mutton supply chain gives rise to difficulties; therefore the present study seeks to reveal the factors/input variables which predominantly influence the generation of value added.

We have constructed a model for the mutton product cycle to represent the relations of phases but mutton trade is not included. The most significant aim of our investigation was to identify the volume of value added generated during processing in various phases of the product cycle and the change of which inputs affected this volume.

The received findings suggested that in case of capital uniformity the output of processing was mostly influenced by sheep progeny on the bottom level of the mutton product cycle.

Key words: Sheep sector, Hungary, mutton product cycle

Introduction

Hungary looks back on rich sheep breeding traditions; however, it represents only 1% of the total production value of agriculture and merely 2% of products of animal origin (*Cehla,* 2009/a).

According to records by Hungarian Sheep and Goat Breeders, the number of ewes was 969182 in 6892 stock farms in 2010; along with ewe lambs over 6 months in total 1 015 556 females were recorded in Hungary (MJKSZ, 2010). The average farm size means currently 141 ewes. Mutton consumption in Hungary is about 0.3 kg/person.

The viability of the sector decreases year by year and there are several underlying factors.

The greatest part of revenues in Hungarian sheep sector has been generated by live animal sales (*Cehla,* 2009/a). At present there is no lamb processing in Hungary: although sheep are slaughtered in numerous places all over the country, their number is not significant. In fact, one slaughterhouse operates in Hungary where not only primary processing takes place but production as well. However, due to low domestic demand, this slaughterhouse also fails to utilize its potentials.

On the grounds of stock farm data from the test farm data system of the Agro-economic Research Institute it can be concluded that sheep breeding is a loss making sector in Hungary *(Table 1)*.

Nábrádi (2009) finds the focal problem in the deteriorating competitiveness of Hungarian seep sector and in its low efficiency in terms of *value added* and innovation; therefore it is not sustainable in the long run.

Table 1: Costs and revenues of ewe keeping, lamb rearing

	Denomination	Unit of measurement	Individual	Collective	National average	Dominant production companies
			farms			
1.	***Production value***	***USD/ewe***	***101***	***96***	***101***	***102***
22.	**Total direct variable costs**	**USD/ewe**	**92**	**82**	**91**	**87**
32.	**Total production costs**	**USD/ewe**	**123**	**154**	**127**	**120**
33.	**Standard gross margin**	**USD/ewe**	**9**	**14**	**10**	**15**
34.	**Output of sector**	**USD/ewe**	**-22**	**-58**	**-26**	**-18**
35.	Average sector size*	ewe/plant	125.34	279.42	133.39	413.93
36.	Average staple output	lamb/plant	118.99	279.18	127.36	400.06

Source: Béládi-Kertész, 2009

The basic problem can be broken down into three areas: firstly social and welfare problems, secondly economic and market problems and thirdly environmental problems. This situation has been mostly caused by the poor Hungarian mutton supply chain; therefore the authors seek to find answers to economic-market problems: namely which

factors/input variables exert the most influence on value added generation. *Szőllősi* (2009) carried out similar survey in the field of chicken meat product chain.

Material and method

Calculations were performed by using one of the improved versions of Cehla's (2010) mutton-source material producing model. As for the logic of product cycle models, *Cehla* (2009/b) modelled the correlations of product cycle phases (based on his own definition) up to the second phase of the mutton product cycle.

Due to limited available information, trade was not included in the model. The full model has three sub-modules:

1. source material producing sector (lamb rearing)
2. lamb fattening farms (fattening lambs produced by source material producers)
3. slaughterhouse (slaughter of fattened lambs and production)

In the evaluation of model input data we were guided by the fact that with the application of a given technology and the exploitation of capacities, the growth of stock size had the potential to increase the effectiveness of production.

Therefore, simulation for source material producers was run with the farm sizes of 500-1000 ewes.

For value added calculation, the method used by the Central Statistical Office (KSH, 2010) was applied and our calculations were completed by taking the following concepts into consideration:

Gross value added at basic prices: + output (at basic prices) – intermediate consumption (at purchaser's prices)

Output: the sum of all products and services produced by the given economic unit for external producer and service provider units and also products and services used for its actual final consumption. Outputs are evaluated at basic prices by national accounts.

The value of specific slaughterhouse output was calculated by the product of multiplication from useful lamb body parts and prices applied at the investigated slaughterhouse Cehla-Nábrádi, (2010).

Intermediate consumption: during production, the value of products and services purchased from another producing unit in the accounting period which is used for the production of new products and services. However, the depreciation of tangible assets is not included in intermediate consumption. Intermediate consumption is evaluated at purchaser's prices. Similarly to output calculations, slaughterhouse intermediate expenditure was calculated separately in the case of intermediate consumption.

Slaughterhouse intermediate expenditure is the sum of slaughter lamb buying-in price and the costs of materials used. *Table 2* simulates the correlation of sub-modules in the product cycle model

The most significant objective of the investigation was to identify the volume of value added generated during processing in various phases of the product cycle and to find out what input changes affected this volume. These calculations are indispensable for the selection of inputs in the regression function which exert the most significant influence on the volume of value added generated during slaughter.

Table 2: Correlation of sub-modules in the model

	Phases of investigated product cycle	**Connection points**
1 Phase	Source-material producing sheep farm (lamb production): - 130 input variables - frequented calving - 12–months' cash flow - produced lambs broken down by 12 months	Lambs are sold for fattening farms at cost price. Final slaughter weight and starting fattening weight are influenced through body mass growth.
	Lamb fattening farm (fattening lambs produced by source material producers): - 56 input variables - purchased lambs broken down by 12 months - 12–months' cash flow	Lambs are sold for fattening farms at cost price. Final slaughter weight and starting fattening weight are influenced through body mass growth.
2 Phase	Slaughterhouse (Slaughter of lambs for further fattening and production): - 143 input variables purchased lambs broken down by 12 months - 12–months' cash flow - Product composition of 12 months - Value added	Lambs are purchased for fattening farms at cost price

Source: Authors' own work

Operating principle of the Crystall Ball and OptQuest module

In our investigation we applied Monte Carlo simulation, using the Crystall ball software package including the OptQuest module for optimization. Crystall Ball is embedded in the EXCEL program as a macro function and it models risk by varying input data with a pre-set probability distribution. OptQuest is a multiple optimization tool of Crystal Ball developed by *Glover, Kelly and Laguna* (1996) on the basis of the so-called "scatter search methodology" principle. "Scatter search" is a population based method which bears common similarities with so-called genetic algorithms, but it is basically built on another search philosophy (Laguna, 1997). The detailed description of the model is demonstrated in Glover's and Laguna's works (1996 and 1997).

In our model decision variables – of which values are given by the authors -, input-output data, the distribution of inputs and restricting conditions for decision variables and objectives are to be defined first. A simulation is run for each and every value of decision variables. During simulations, the values of investigated output variables are saved by the program and the value combination of inputs and decision variables resulting in the given output are also logged. With varying input values, the OptQuest module of Crystall Ball searches for the optimal values of decision variables.

In OptQuest the objectives (e.g. the minimization of gross value added distribution or the maximization of gross value

added or its fall between two values) are actually values which become known merely after the Excel model has been evaluated for actual input values (*Laguna,* 1997).

After this, the program regards the given solution viable if our objectives and the restricting conditions for decision variables are fulfilled.

OptQuest processes restricting conditions with the Solver of Ecxel written for linear programming problems, which absolutely guarantees the occurrence of a viable solution at the end of optimization (*Laguna,* 1997). To accelerate optimization, a neural network filter can be activated to monitor whether the Excel model is likely to provide a viable solution for the given input values (*Laguna,* 1997). If the filter indicates a non-viable solution, further calculations are not carried out. The use of this filter is only advisable if running time would be too long due to several calculations.

Response Surface Methodology

During simulation, response surface methodology was used to describe the function of input values saved by the program and gross value added. Response surface methodology (*RSM*) is a combined method of mathematical and statistical techniques, which is especially instrumental if the modelled variable is a function of several other variables (Montgomery 2005). In addition, we also attempt to optimize and exploit the multi-dimensional surface generated by dependent and independent variables, its local maximums, minimums and terrain and to identify the location of the area where the optimal (maximum, minimum) values of the dependent variable can be found (*Bradley,* 2007).

Quadratic response surface methodology is a mixture of polynomial and factorial regression. The regression function includes the secondary polynomials of variables and the interaction effects (i.e. the products of variables in pairs) (*Statsoft,* 2011; *Bradley,* 2007):

$$y = \beta_0 + \sum_{j=1}^{q} \beta_j x_j + \sum_{j=1}^{q} \beta_{jj} x_j^2 + \sum \sum_{i<j} \beta_{ij} x_i x_j + \varepsilon \qquad (1)$$

Simulation result

In the first step, optimization was performed for "Gross value added" in the case of a slaughterhouse. During optimization, the ratio of Easter, Christmas and August lambs and progeny was set, the value of "Gross value added" was identified and values of decision variables providing the best values were also determined.

The model was run 500.000 times in two steps. In the first step there were 500 runs where the values of decision variables (ratio of Easter, Christmas and August lambs, number of ewes) were varying, then the values of decision variables were fixed and merely conditions (input variables: feed prices, fodder prices, feed sales, body mass growth, gross wages etc.) varied.

The second step included 1000 runs. During the program the two steps varied alternately, resulting in 1000 runs in the course of 500 runs respectively, in total.

Following all the above mentioned, we selected the values of decision variables where deviation from the best target function value was maximum 20% during optimization and then the average of the selected values was calculated *(Table 3)*.

Table 3: Run results: step 1.

Denomination	*Best*	*Minimum*	*Average*	*Maximum*	*Standard deviation*
Gross value added	*6447.4*	*-14014.9*	*3508*	*6447.4*	*4764.42*
Ewe	*790*	*500*	***816.6***	*1000*	*139.984*
Distribution of Easter lamb (born in January)	*0.49*	*0.35*	***0.457***	*0.5*	*0.044*
Distribution of August lamb (born in June)	*0.21*	*0.21*	***0.293***	*0.35*	*0.049*
Distribution of Christmas lamb (born in October).	*0.30*	*0.16*	***0.251***	*0.3*	*0.045*

Source: Authors' own work

The averages of run results were recorded in the model and Monte Carlo simulation was also run 500.000 times where only the values of conditions varied according to pre-set distributions and the values of decision variables were fixed. The distributions of conditions (in the case of inputs) were fitted on the grounds of time series data from previous years, farm level data and expert assessments.

During simulation, saved data were analyzed and a sensitivity report was prepared on gross value added, which revealed which conditions (input data) and in what way influenced gross value added more significantly. The results of the sensitivity examination provided the basis for creating a function of gross value added and influential variables. Key influential variables are represented on sensitivity plot *(Figure1)*.

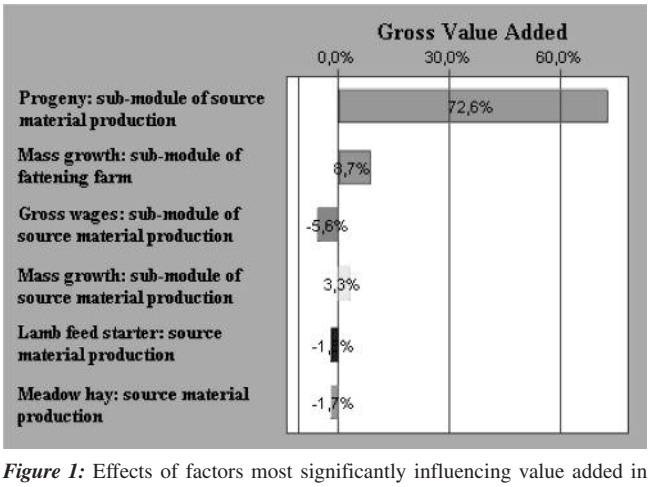

Figure 1: Effects of factors most significantly influencing value added in slaughterhouse
Source: Authors' own work

Figure 1. reveals what percent of gross value added variance is due to the effect of certain variables. It shows that progeny fluctuation accounts for 73% of the variance of

gross value added and the combined effects of the other 5 factors are only responsible for 27% of variance.

The second most significant factor is the sub-module of mass growth (its effect is of 9%) -fattening farm. The effect of the factor of sub-module: mass growth – source material production is approximately one-third of that of the variable of mass growth-fattening farm. Rectangles stretching to the right indicate that the increased values of the given variable positively influence (rise) the gross value added, whereas rectangles stretching to the left act oppositely (they reduce the gross value added).

The following basic statistical relations were concluded for the gross value added *(Table 4)*:

Table 4: Basic statistical data of value added generated during slaughter

Statistics	*Gross Value Added Slaughterhouse*
Average	*2 567.3*
Median	*3 087.7*
Standard deviation	*2 660.2*
Variance	*7 076 464.7*
Skewness	***-1.77***
Kurtosis	***7.89***
Coefficient of Variation	*1.04*
Minimum	*-15 430.5*
Maximum	*9 055.7*
Average standard error	*3.8*

Source: Authors' own work

Descriptive statistical calculations suggest that the average value added is 2567 HUF/lamb.

The median of distribution is 3088 HUF/lamb, which means that this value can be reached with the probability of 50%. Average deviation from the average value is about 2660 HUF/lamb. The maximum reachable value of 9056 HUF/lamb and negative values – 15430 HUF/lamb may also occur. The question arises immediately: how can negative values occur and the answer is very simple. As sub-modules pass lambs into the other's possession at cost prices, if production costs are higher, revenues from processing are evidently lower than the total cost of source materials. The value of variational coefficient is rather high, which assumes extreme fluctuations in gross value added.

This is the consequence of the occurrence of outstandingly high negative values. The -1.77 value of skewness indicates that distribution is skewed to the left. All these signify that the left margin of distribution is longer than the right one, i.e. most values are concentrated on the right side (situated to the right of the average). It shows that positive gross value added still occurs with higher probability and negative values are relatively few. The high positive value of kurtosis – 7.89 – indicates leptokurtical distribution. This suggests that as compared to normal distribution, the probability of values to approximate the average is lower and the probability of the occurrence of outstanding values is high as compared to normal.

Percentile shows in what percent of simulation runs the given value occurs at most.

Table 5 shows the percentile values obtained during the investigations.

Table 5: Percentiles of slaughterhouse gross value added

Percentiles	**Slaughterhouse gross value added *HUF/lamb***
0%	*-15 430.5*
10%	*-527.1*
20%	*1 071.3*
30%	*1 942.6*
40%	*2 568.6*
50%	*3 087.7*
60%	*3 557.4*
70%	*4 026.2*
80%	*4 534.1*
90%	*5 186.4*
100%	*9 055.7*

Source: Authors' own work

In 50% of simulation runs a value over 3087.7 HUF/lamb was obtained for the rate of gross value added and in about 10% a value of -527.1 HUF/lamb or lower. The probability that gross value added should be lower than 1071.3 HUF/lamb was 20%. The probability of the occurrence of 4534 HUF/lamb gross value added or higher was also of 20%

Description of the function of gross value added formed on the basis of simulation results

The 500.000 simulations of the product cycle model allowed the examination of how the formation of the gross value added was influenced by the conditions selected in the sensitivity report. The simulations produced a database which was the basis of forming the response surface function of slaughterhouse gross value added in the mutton product cycle. We applied the following abbreviations *(Table 6)*:

Table 6: List of abbreviations in the response surface modell

Variable	*Abbreviation*
$PROG_{smp}$	***Progeny: sub-module of source materian production***
MG_{ff}	***Mass growth: sub-module of fattening farm***
GW_{smp}	***Gross Wage: sub-module of source material production***
MG_{smp}	***Mass growth: sub-module of source materian production***
LFS_{smp}	***Lamb feed starter: sub-module of source material production***
MH_{smp}	***Meadow hay: sub-module of source material production***

Source: Authors' own work according to figure 1.

Applying the abbreviations in Table 6, the form of the response surface function is as follows according to formula (1):

$$GVA_{slaughterbase} = -101424 - 0{,}1 \cdot GW_{smp} - 36 \cdot MG_{smp} + 0{,}1 \cdot (MG_{smp})^2 + 18753{,}2 \cdot PROG_{smp} - 5027{,}3 \cdot (PROG_{smp})^2 - 229 \cdot MH_{smp} - 10 \cdot LFS_{smp} + 25 \cdot MG_{ff} - 2{,}4 \cdot MG_{smp} \cdot PROG_{smp} + 107{,}1 \cdot PROG_{smp} \cdot MH_{smp} + 5{,}4 \cdot PROG_{smp} \cdot LFS_{smp} - 0{,}1 \cdot MH_{smp} \cdot MG_{ff} - 0{,}1 \cdot LFS_{smp} \cdot MG_{ff} \quad (2)$$

Parameter estimates and confidence intervals can be seen in *Table 7.*

Table 7: Response surface methodology: parameter estimation and confidence interval

Variable	*Lower confidence interval of 95%*	*Parameter*	*Upper confidence interval of 95*	*P*
Intercept	***-11113.9***	***-10142.4***	***-9170.97***	***0.000***
GW_{smp}	***-0.1***	***-0.1***	***-0.05***	***0.000***
MG_{smp}	***-39.1***	***-36.0***	***-32.99***	***0.000***
$(MG_{smp})^2$	***0.1***	***0.1***	***0.10***	***0.000***
$PROG_{smp}$	***18400.3***	***18753.2***	***19106.11***	***0.000***
$(PROG_{smp})^2$	***-5080.1***	***-5027.3***	***-4974.49***	***0.000***
MH_{smp}	***-260.7***	***-229.9***	***-199.09***	***0.000***
LFS_{smp}	***-18.9***	***-10.0***	***-1.07***	***0.028***
MG_{ff}	***21.9***	***25.0***	***28.04***	***0.000***
$MG_{smp} * PROG_{smp}$	***-3.1***	***-2.4***	***-1.75***	***0.000***
$PROG_{smp} * MH_{smp}$	***99.2***	***107.1***	***115.09***	***0.000***
$PROG_{smp} * LFS_{smp}$	***3.2***	***5.4***	***7.66***	***0.000***
$MH_{smp} * MG_{ff}$	***-0.1***	***-0.1***	***-0.01***	***0.016***
$LFS_{smp}p * MG_{ff}$	***-0.1***	***-0.1***	***-0.09***	***0.000***

Source: Authors' own work according to formula (1) and (2); R-square statistic = 92,7%

The evaluation of the above data suggests that if the progeny rate varies by one tenth, gross value added increases by 1875 HUF/lamb as a result of *progeny* fluctuations, which is to be corrected by 503 HUF/lamb on account of the quadratic effect; therefore variation is 1372 HUF/lamb *(Table 7)*.

Insofar as interaction effects are calculated, this value will be 1482 HUF/lamb. The price change of 1 HUF for meadow hay will cause a reduction of 230 HUF/lamb in gross value added (if interaction effects are included, the reduction is merely 123 HUF/lamb), whereas a change of 1 HUF in lamb starter feed (fattening farm) price causes a decrease of up to10 HUF/lamb. A change of 1 gram in fattening farm mass growth brings about a reduction of 25 HUF/lamb. The change of mass growth in source material production causes an indirect decrease of 36 HUF/lamb (with interaction effects this is 38 HUF/lamb) *(Table 7)*.

The analysis of interaction effects reveals that in source material production the negative effect of mass growth change is mitigated if progeny also varies. The price rise of meadow hay and starter feed per unit decreases gross value added, but if during this time progeny varies, this effect gets more enhanced but it still increases gross value added by up to 107 or 5 HUF/lamb respectively.

Table 7 also represents the confidence intervals of 95% i.e. the upper and lower thresholds with the reliability of 95%. For example, as a result of 1 HUF change in meadow hay price, a decrease of 200–260 HUF/lamb is expected in gross value added, with the probability of 95%.

Conclusions

Continuous deterioration in the competitiveness of Hungarian sheep sector and its low efficiency in value added have been focal problems in recent years. The key problem is partly caused by economic and market issues. Among economic and market factors, primarily the low level of mutton supply chain poses difficulties, therefore the present study seeks to reveal the factors/input variables which predominantly influence the generation of value added .

We have constructed a model for the mutton product cycle to represent the relations of phases but mutton trade is not included. The most significant aim of our investigation was to identify the volume of value added generated during processing in various phases of the product cycle and find out what inputs changes affected this volume.

In the first step, optimization was performed for "Gross value added" in the case of a slaughterhouse. During optimization, the ratio and number of Easter, Christmas and August lambs and progeny as decision variables were optimized. After the selection of those decision variable values which presented the best gross value added during optimization, we formed the average of decision variables. Average values were recorded in the model and Monte Carlo simulation was also run 50000 times, while only input values varied. During simulation, an analysis was performed on saved data (input-output pairs) and a sensitivity report was prepared for gross value added, which revealed that the variance of gross value added was caused by the *progeny fluctuation in about 73%,* whereas the combined effects of the other 5 factors only accounted for 27% of variance. The result of the sensitivity analysis correlated only 6 inputs with gross value added. Based on these inputs, *a secondary response surface methodology function of value added in slaughterhouses, in the mutton product cycle* was formed. The analysis of function parameters showed that a fluctuation of one-tenth in **progeny** rate ***increased*** gross value added by ***1482 HUF/lamb***.

The price change of 1 HUF for meadow hay caused a reduction of 123 HUF/lamb, whereas a change of 1 HUF in lamb starter feed (fattening farm) price caused a decrease of up to 10 HUF/lamb.

In fattening farms the variation of 1 gram in mass growth induced an increase of 25 HUF/lamb; in source material production the change of mass growth triggered an indirect decrease of 38 HUF/lamb.

As a conclusion, the development of processing industries in itself is not sufficient to solve the focal problem of sheep breeding. The values of value added function explicitly prove that the primary objective is to increase progeny, which significantly affect revenues in the sector.

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STRATEGY FOR SOIL PROTECTION IN CROSS-BORDER REGION OF HUNGARY AND ROMANIA

János Lazányi, Gábor Demeter

University of Debrecen, Hungary

Abstract: Within the Hungary-Romania Cross-Border Co-operation Programme for 2007-2013 the University of Debrecen and the University of Oradea is to elaborate a soil strategy for the Nyírség and Bihor Mts region. Project partners expect the strategy will support and strenghten national, regional and local soil policies and contribute to the competitiveness of the region by protecting and developing various soil functions. Project partners also expect to prevent cross-border problems with soil and reduce the competition caused by cost differences. The elaboration of the strategy includes the problems of erosion, deflation, compaction, water-deficiency, inland water-threat, problems induced by the usage of fertilizers, loss and substitution of soil organic matter, amelioration (bentonite, sewage sludge, fermented biogas). Based on summarised data of former examinations and new experiments a concise database will make it possible to calculate and apply the Sustainability Index Model, which may be useful in order to address EU supports properly based on objective calculations, and may be useful to determine the optimal culture. The project also encourages the farmers to keep in mind the cross-compliance, since EU gives financial support to realise sustainable soil strategy based on EU directives. This may enhance the options to initiate the take off of rural areas with shrinking export facilities, to mitigate social tensions and the effect of migration processes.

Key words: Hungary-Romania Cross-Border Co-operation, Soil Framework Directive, Soil Thematic Strategy, Nyírség

Introduction

The European Commission adopted proposals for a Soil Framework Directive under the Thematic Strategy for Soil Protection on September 22, 2006. The comprehensive strategy takes into account all the different functions that soils can perform, their variability and complexity, and the range of different degradation processes, while also considering socio-economic aspects. Hungary-Romania Cross-Border Co-operation Programme for 2007–2013 is based on the results and experiences of the past Interreg IIIA in Hungary and Phare CBC programmes in Romania. The goal is to bring the people, communities and economic actors of the border area closer to each other in order to facilitate the joint development of the co-operation area, building upon the key strengths of the border region. The programme provides for two Priority Axes, such as (i) improvement of the key conditions of joint, sustainable development in the co-operation area, and (ii) strengthen social and economic cohesion of the border area, which reflect the main streams of cooperation. This means, that cross-border region of Hungary and Romania is ahead of the game and establish firm bases for co-operation. The project entitled "Elaboration of a Sustainable Soil Strategy for the Nyírség and Bihor mountain region" is a good example of cross-border co-operation to enhance and realise EU politics. The goal of the project is to elaborate a sustainable soil strategy for two landscapes of different characteristics (hilly region and sandy plains), both with disadvantageous social and physical geographical background in accordance with Soil Framework Directive, COM (2006:232) and Soil Thematic Strategy, COM (2006: 231).

Background to the project

Soil can be considered a partly-renewable resource, as it takes hundreds of years to produce a few centimetres of fertile layer, yet soil degradation is accelerating in many regions of the European Union. Some threats are naturally occurring such as erosion by water or wind. Other soil problems are linked to industrial sites, mining, illegal or poorly managed landfills, sewage sludge, and certain agricultural practices. Some problems are linked to the sealing of soil for housing, roads and other infrastructural purposes, and the effects of floods and landslides. Soil degradation has a strong impact on other areas such as water, human health, climate change, nature and biodiversity protection, and food safety. The soil strategy ensures that soils of Europe remain healthy and productive.

The propose of soil strategy is to establish a common approach across the EU, but leave national governments flexibility to implement this approach in a way which fits local situations best. Public authorities in EU countries will be required to undertake activities to tackle threats such as landslides, contamination, soil erosion, and sealing of soil

wherever they occur, or threaten to occur. Soil Strategy for cross-border region will provide a framework for soil protection of sandy soil and through better organic matter management it will contribute to handle the challenges set by climate change. Soil degradation was identified as a pressure for water quality, but only with respect to erosion and contamination, but relevant information on organic matter decline, deflation, compaction and soil microbiological activities are limited. On the other hand, farmers receiving direct payments in the region are subjects to compulsory cross-compliance standards.

General and specific objectives of the project

The major threats to soil, as identified in the Thematic Strategy for Soil Protection, include: erosion, decline of organic matter, compaction and loss of soil biodiversity. Soil Strategy for Nyírség and Bihor takes into account all the different functions that soils can perform, variability and complexity of soils in the region, and the range of different degradation processes, while also considering socio-economic aspects. The overall objective is the protection of soil and preventing further soil degradation. Technological information is vital in terms of enabling farmers to achieve improved agricultural productivity, to make effective use of the natural resources, increase their income, and produce quality food that is safe, accessible and available to all. The study identifies, describes and evaluates reasons that directly or indirectly contribute to the mitigation of the soil threats and measures taken by the farmers of the Nyírség region under Cross Compliance (CC) to improve the soil management.

The project has three main objectives:

1. The assessment of the soils in the 2 regions, the promotion of mitigating degradation, the enhancement of sustainable land-use, increasing the competitiveness of the 2 landscapes as rural regions
2. Mitigation of soil degradation and enhancement of environmental consciousness due to the soil assessment and better knowledge on driving processes
3. As a result of the above mentioned, the productivity and the competitiveness of the region may improve

As the region is characterised by increasing poverty and high natural reproduction rates, the sustainable management of soils is inevitable to maintain and enhance the subsisting capacity of the agriculture in this rural area, in order to decrease the migration of population masses towards overpopulated urban centres and also to mitigate social tensions. Specific goals include:

Efficient dissemination of results among the target groups

Elaboration of know-how of application of Sustainability Index (SI) Model for the 2 areas
Creation of database serving as basis for the SI model
Creation of maps using SI model for the 2 territories

Better assessment of status and processes of soils in the 2 areas

Databases and maps regarding the present status of soils
Experiments, data and maps of processes on the 2 territories
Optimal soil management and amelioration

Objectives of the project are served by conference, books published for farmers; newsletter published on best management practices. Results and proposals will also be published on the internet. These efforts will contribute to the protection of soils from further degradation, as threats of compaction, nutrient loss, wind-erosion, misuse, water-deficiency etc.

Short summary of the project activities

Elaborating and applying the Sustainability Index Model for the Nyírség: The Sustainability Index Model aims to create variables easily identifiable to allow land use decisions in relation to subsidies and land use policy. It further allows for comparisons between soil cultivation methods, which aids the society to allocate resources to participatory approach based programs, environmental schemes and in policy making. Three factors, Condition (C), Impact (I) and Benefit (B) are weighted on a simple scale from 1 to 5; 1 being positive and 5 being a negative effect of the land use. The current condition of the land is valued using site or land use specific methods (e.g. presence of A horizon, SOM, vegetation cover on rangelands). The impact (e.g. fertilizer pollution, danger of soil erosion) is valued separately and it considers different threats. The benefits of each practice are balanced against needs. Subsidies or aid can be determined and given if the SI meets certain criteria.

Examination and evaluation of the potential deflation in the Nyírség: In the first phase of the work the experts using the results of 50 formerly sampled soils and examining 50 more samples, thus creating a dataset containing 100 samples, undertake to evaluate the potential soil erodibility based on textures, and also to visualize the results on maps of erodibility while enhancing public access to data. Beside creating a map of erodibility based on soil textures (one feature), more sophisticated comprehensive maps – containing few more features influencing the potential erodibility – will also be produced. The investigations include the determination of the critical wind velocity on different dry and wet soils (without vegetation) and on soils with different crops sown. The second-third parts contain field observations and measurements of soil erodibility and wind velocity at sites with different land-use, vegetation cover near Nyíregyháza, Kisvárda and Nagykálló using wind-velocity samplers. These investigations examine the role of shelter-belts of different types. In the 4th part of the investigations we create a database using aerial photographs to map and evaluate the shelter-belts, and try to give proposals for the enhancement and modification of the shelter-belt-system to create a comprehensive system enhancing the efficiency of

the present status. Based on these examinations a digital potential map of erodibility will be composed.

The environmental assessment of the hydrological features of the Nyírség: Experts undertake to digitize data of monitoring wells and to evaluate the results using the created and purchased databases, in order to visualize the results on maps offering greater publicity. The first phase of work includes the evaluation of surface waters, canalisation processes, the capacity and present-day exploitation. The second phase comprises the examination of long-term ground-water trends, types of ground-water oscillations. A series of ground-water maps on the Nyírség is to be created: highest level ever, lowest level ever measured, 10 year averages, average of long-term minimums, average of long-term maximums, oscillation of ground-water levels calculated both on altitude above sea level and on depth measured from surface. In the third phase of our examination we investigate the connection between precipitation, surface water levels and ground-water levels, determining which factor from among the aforementioned 2 has greater influence on the latter at certain terrain types using the methods of mathematical statistics. A special task force will deal with the identification of inland water threat using satellite pictures and GIS methods.

Instruments of sustainable nutrient-management in Nyírség region: The goal of sustainable agriculture is to bring together people and resources, to promote an agriculture that is efficient, profitable, socially acceptable and environmentally sustainable for the indefinite future. The primary objective is to provide a model where the agricultural system and community are taken into account as a whole, in which agriculture is not separated from the natural ecosystem of a region. The most critical challenge is to consider the needs of agriculture and society, and to provide an educational environment for local inhabitants. Developing an appropriate crop rotation scheme is one of the most challenging tasks for sustainable agriculture. Green manure crops play an important role in regenerative soil conservation strategy. Green manure adds organic matter to the soil, assists in dissolving nutrients, brings up nutrients from the subsoil and improves the water holding capacity of the soil. The crop rotation system should improve soil condition by including deep rooted plants and plants with a fibrous root system, to improve the stability of soil aggregates. There is also evidence suggesting that an improved soil structure increases biological activity in the soil and enables plants to utilise soil moisture and nutrients more effectively. Crop rotation can also contribute to soil conservation strategy.

Amelioration of sandy soils in the Nyírség: Our aim is to investigate how the different properties of Nyírség sandy soil under different cultivation influence the quantity of soil microorganisms, quality components of microbes, as well as to the soil biological activities. In the course of laboratory investigation the quantity of total number of bacteria, numbers of microscopical fungi, some important physiological groups of bacteria, as well as some important soil enzymes' activity are in the focus. We investigate the effects of bentonite and bentonite+manure as soil amendments on the physical, chemical and microbiological properties of sandy soil. The bentonite contains high amount of mineral colloids, manure contains high amount of organic matter, so they can be used for amelioration of sandy soil. Fermented biogases will have increasing role in the future in substituting nutrients. Another possibility of supplying nutrients for sandy soils is the usage of compost. Mulch, organic matter, farmyard manure and microbiologically fermented products also have effect on nutrient-supply.

Soil erosion and agriculture on hilly regions: The Romanian project partner will examine the role of erosion on physical features of soils formed on slopes, the role of erosion on chemical features of soils formed on slopes, the effect of soil erosion on the hydrology and water-management of hilly areas. Activities include measuring soil loss caused by erosion, the effect of erosion on the productivity, developing agriculture and the application of fertilizers on mountain regions.

Cross-border impacts

The overall objective of the soil strategy is the protection and sustainable use of soil in Nyírség region, preserving its functions and preventing further soil degradation. Most important direct beneficiaries of the project are local farmers and their organisations were involved in the planning of the project. Indirect beneficiaries are those, who are living in the region and their local communities. Furthermore both countries can be considered indirect beneficiaries, if the results of the project provide possibility to enhance the agricultural capacity of the area, as migration processes (depopulation) and social tensions among the inhabitants will decrease offering a sustainable way of livelihood on the long run.

Despite the increasing soil degradation and its negative consequences on human health, natural ecosystems and climate change, as well as on rural economies, Hungary and Romania has no specific legislation on soil protection. Through its various work programs and activities – like conferences, field demonstrations, and publications – scientists, administrators, policymakers and extension workers in the region are given not only the chance to share and exchange technological innovations in the field of agriculture, but also the opportunity to strenghten international technical cooperation with neighbouring countries. It is the first experiment ever to draw up a sustainable soil strategy based on EU directives, therefore its effect (adaptation) may be borderless. The impacts on soil are also regardless of borders especially in connection with surface, and subsurface waters.

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University of Debrecen
4032 Debrecen, Boszormenyi ut 138, Hungary
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ABSTRACT

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Typography: OPAL www.opalmedia.hu