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TABLE OF CONTENTS

Grigorios Gikas[1]
Department of Accounting
Alina Hyz[2]
Department of Accounting
School of Economics and Management
TEI of Epirus
Konstantinos Vasileiou[3]
Department of Business Planning and Information Systems
School of Economics and Management
TEI of Patras
Georgios Georgakopoulos[4]
Accounting Section
Faculty of Economics and Business
Amsterdam Business School, University of Amsterdam
Ioannis Sotiropoulos[5]
Department of Finance and Auditing
School of Economics and Management
TEI of Epirus

Urban and rural dietary patterns in Greece in the years 1957-2008; an economic analysis[6]

Abstract. This paper attempts to describe and study in detail the evolution of urban and rural dietary patterns in Greece during the period 1957-2008, in terms of natural and technical features. Natural features refer to the consumption of animal versus plant products, while technical features pertain to agricultural and industrial products consumption. The analysis leads to a conclusion that the dietary patterns obtain internationalized, industrial origin and growing share of animal products, while the weight of tradition (i.e. Mediterranean plant products and services) weakens in Greece after World War II. Additionally, during this period the urban and rural dietary patterns, by comparison, have evolved at different paces and characteristics; the rural dietary patterns converged to urban ones with 'asymmetric' way, time lag and significant particularities.

Keywords: urban and rural dietary patterns, traditional and industrial food products.

Introduction

During the period 1957-2008 major changes are observed in the dietary behaviour throughout the population in Greece and its subgroups; a prevalence of the industrial international 'Western origin' dietary patterns and a rapid decline of the traditional Mediterranean ones. The inquiry based on the geographical regions (urban and rural)

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highlights similarities, differences and characteristics in the evolution of dietary patterns over time, as well as comparisons in certain time periods (e.g. during the decade of 70s or the decade of 00s, etc.): Urban areas have less traditional features and precede in the adoption of 'Western' industrial behaviours, while stronger traditional behaviours have always been observed in rural areas. After the decade of 70s, the rural dietary patterns rapidly converge to urban ones, a phenomenon already observed since the decade of 50s, but at a slow pace. Noteworthy in this development are the local (prominently of Crete, the case of which has been investigated internationally) and the qualitative particularities with regard to specific characteristics of urban and rural patterns (e.g. the consumption of cereals or legumes or meat, etc.).

Data and methodology

The data for this inquiry were selected from the Household Budget Surveys (HBS 1957/58, 1963/64, 1974, 1981/82, 1987/88, 1993/94, 1998/99, 2004/05 and 2008) of the National Statistical Service of Greece (NSSG - ELSTAT). Descriptive statistics are used for the data analysis. The theoretical approach employed is the 'new consumer theory' [Lancaster 1966] and the general principles of the approach of consumption phenomenon [Deaton 1992].

The 'formula of patterns classification' [Sotiropoulos et al. 2010b] is used in order to identify the relationships between plant and animal components as well as between agricultural and industrial components of diet. This formula, by calculating quantitative data, enables the patterns classification based on components such as plant or animal origin, agricultural or industrial patterns, etc. Thus, the dietary patterns of the decade of 50s are characterized as patterns of plant components, agricultural, traditional 'Mediterranean' and those of the decade of 80s and henceforth are classified as of animal components, industrial, internationalized and of West (Western Europe & North America) influences [Sotiropoulos et al. 2010a].

The 'formula of patterns classification' is:

$$Q_{alimentary\ pattern} = (Q_{plant},\ Q_{animal},\ Q_{agric},\ Q_{indust},\ Q_{biol}),$$

where:

Q_{plant} = plant characteristics

Q_{animal} = animal characteristics

Q_{agric} = agricultural characteristics

Q_{indust} = industrial characteristics

$Q_{biological}$ = biological characteristics

Description and analysis of the main characteristics of dietary patterns

The urban and rural dietary patterns were completely different in the decades of 50s and 60s (Tables 1 and 2). The traditional Mediterranean dietary patterns dominated in rural areas, where the plant components (e.g. cereals) prevailed, and the animal and industrial components were of less importance. In the urban areas, a Mediterranean dietary pattern is observed, which verges to the industrial-internationalized patterns of the higher socio-economic and younger groups of the population [Sotiropoulos 2009]. This verdict is reinforced by the dietary patterns in own consumption [Sotiropoulos 2004].

Table 1. Food consumption patterns in urban areas, %

Consumption component	Household Budget Survey (HBS) of								
	57/58	63/64	1974	81/82	87/88	93/94	98/99	04/05	08
	area of capital	5000-9999 residents	urban areas						
Cereals, bread	14.0	14.4	8.5	8.0	8.3	9.3	8.1	8.0	8.2
Meat	17.0	15.5	26.3	26.7	22.8	19.6	14.6	13.9	13.4
Fish	5.2	5.7	4.0	4.5	4.4	4.7	4.8	5.2	4.7
Vegetable/ olive oil	10.7	9.4	8.1	6.0	4.6	4.2	3.5	3.5	3.2
Dairy products & eggs	12.3	12.1	12.4	12.9	13.5	13.4	12.3	12.1	11.0
Vegetables	13.8	9.1	9.9	9.1	8.5	8.3	7.8	7.4	6.7
Fruit	5.0	8.4	8.5	8.0	8.2	6.4	5.5	5.0	4.6
Sugar & pastry making products	5.9	8.0	6.8	5.0	5.3	4.5	4.0	4.2	3.7
Expenditure on food away from home	12.8	15.4	11.4	16.9	20.6	25.7	35.1	36.1	40.1
Non alcoholic drinks *	0.4	1.4	1.6	1.0	1.7	2.0	2.3	3.7	3.5
Other food categories	2.9	0.6	2.4	1.9	2.2	1.8	2.0	0.9	1.0

* Non alcoholic beverages and ice-cream in H.B.S 1957/58.

Source: [Household…1957/58, 1963/64, 1974, 1981/82, 1987/88, 1993/94, 1998/99, 2004/05, 2008].

Significant differences are found within the same category of patterns (e.g. the urban, the capital area, and other urban and suburban areas), but this is especially the case for agricultural patterns, where much larger differences are observed, such as in the dietary patterns between the largest and smaller villages in the HBS 1963/64. In smaller villages the residents' diet relies almost exclusively on cereals, characterized by a deprivation and a small variety of products [Sotiropoulos 2002]. Malassis [1986] describes these patterns as 'Third World cereal patterns of food deprivation' e.g. Africa).

Table 2. Food consumption patterns in rural areas, %

Consumption component	Household Budget Survey (HBS) of								
	57/58	63/64	1974	81/82	87/88	93/94	98/99	04/05	08
	Rural areas	Up to 199 residents	rural areas						
Cereals, bread	18.0	49.4	13.0	9.9	9.9	11.9	10.4	10.7	10.7
Meat	15.6	18.3	25.3	27.0	24.1	21.8	16.4	15.8	17.4
Fish	6.9	8.5	5.7	6.1	5.8	5.6	5.9	5.5	5.3
Vegetable/olive oil	10.8	0.1	9.4	8.3	5.3	5.1	4.5	3.8	3.8
Dairy products & eggs	8.7	0.5	8.5	9.2	10.3	11.7	10.7	11.4	11.0
Vegetables	9.4	4.7	9.8	8.3	7.8	7.9	8.3	7.5	7.4
Fruit	3.5	3.1	6.6	5.2	5.9	5.8	4.9	4.6	4.5
Sugar & pastry making products	5.5	6.8	6.8	4.6	5.2	5.0	3.7	4.2	3.7
Expenditure on food away from home	13.6	6.6	10.1	18.5	22.5	21.2	30.9	31.9	31.2
Non alcoholic drinks *	1.6	1.9	1.8	0.7	1.3	1.9	2.1	3.8	4.2
Other food categories	1.2	0.2	2.8	2.3	2.1	2.0	2.2	0.8	0.9

* Non alcoholic beverages and ice-creams in H.B.S 1957/58.

Source: [Household…1957/58, 1963/64, 1974, 1981/82, 1987/88, 1993/94, 1998/99, 2004/05, 2008].

A key finding that pertains to both types of areas (urban and rural) is that the importance of traditional dietary patterns diminishes in favour of the animal, industrial Western origin and new market products. This decline is more rapid for the urban population and even faster in the capital. Especially, after the decade of 60s, this phenomenon is accelerated and as a consequence after the decade of 70s the differences between urban and rural patterns are quantitative rather than qualitative.

The evolution of the micro-level behavior over time by product category is rather interesting; for example, the bread and cereal consumption in rural areas, even though it is finally reduced at the end of the fifty years period, is realized by more pronounced fluctuations than those in urban areas. However, the percentage of bread consumption is always higher in rural areas than in urban areas.

Similar behaviours are observed in other major categories such as meat and expenditure on food away from home (lower percentages and fluctuations especially for expenditure on food away from home). This leads to a conclusion that there is a time 'lag' in the convergence of rural with urban dietary patterns, which confirms earlier findings [Karapostolis 1979 & 1983]. This time lag is accompanied by particularities which justify the verdict of 'asymmetrical convergence', which means the adoption of the new patterns by the rural population, but with significant differences to urban ones [Karapostolis 1983].

Description and analysis of dietary patterns structure

The analysis of structure of each product category (such as cereals, meat, etc.) reveals further differences and contributes to a deduction of more comprehensive conclusions. The most evident and general conclusion concerns the extent and the range to which patterns have been internationalized. The industrial products participating in the food expenditure of rural households are fewer than those of urban households. This is also the case for food services and the internationalization of dietary patterns in rural areas. These results confirm earlier conclusions on 'asymmetric convergence', as well as the time lag of rural and urban patterns convergence and that within each food category (Table 3).

Table 3. Structure of dietary patterns for cereals, meat, legumes, vegetables and expenditure on food away from home in urban and rural areas, %

Consumption component	Household Budget Survey (HBS) of						
	57/58	81/82	2008	63/64	63/64*	81/82	2008
	urban areas			rural areas			
Bread & cereals							
Bread	67.0	62.0	64.2	31.3	4.6	47.6	72.0
Flour	6.4	3.6	3.7	24.1	71.5	16.2	4.9
Industrially processed cereals	18.9	31.2	26.2	17.5	17.0	25.9	17.1
Rice	7.5	6.8	6.0	11.1	6.9	10.3	5.9
Meat							
Beef	34.8	50.6	40.0	17.0	0	36.5	40.6
Lamb and goat	31.9	15.2	12.6	29.5	24.5	22.4	17.3
Meat products	3.5	6.1	14.4	3.8	0	6.9	10.3
Legumes-vegetables							
Legumes	13.5	6.0	6.8	20.1		16.4	11.3
Fresh vegetable	70.5	66.4	69.9	56.3	44.2	50.3	68.7
Industrially processed vegetables		5.7	18.9			4.1	14.5
Expenditure on food away from home							
Restaurants	56.4	56.7	58.4	35.6	49.1	43.1	45.8
Cafes	43.6	43.3	41.6	64.4	50.9	56.9	54.2

* Smaller villages with up to 199 residents
Typical consumption in meat category: sheep and goats: 31.8%, pork: 17.8%, other types of meat (offal, game, etc.): 21.2%, frozen meat: 4.8%. In the vegetable category: potatoes 55.8%.

Source: [Household…1957/58, 1963/64, 2008].

The analysis of internal structure of the cereal category highlights differences in the evolution of consumption characteristics between urban and rural households. In urban households, the traditional 'industrial' products such as bread gradually disappear in favour of the most modern and western-origin new industrial products (e.g. corn flakes, pasta with meat, cheese, seafood or vegetable preserved, frozen or canned, precooked, etc.). On the

contrary, in rural households the traditional industrial product (bread) increases its share in the expenditure at the expense of home made bread and flour, while the consumption of newly industrialized products increases, though by lower percentage and growth rates compared with urban households. These differences in the evolution of cereal consumption patterns clearly demonstrate the industrialization and its characteristics of the modern Greek diet. While in the decade of 50s [Household… 1957/58], the percentage differences between urban and rural households were minimal (18.9 % and 17.5%), at the end of the period studied (2008) the differences were very important (26.2% and 17.1%).

In meat category, the main common feature in the food consumption of the two population groups (urban and rural households) is the increased consumption of veal. In rural households, the rates continue to rise, though with fluctuations, while in urban households the rates reached a maximum level in the early 70s and since then the fluctuations are small. Regarding the internal structure of this category, there is a clear dominance of beef and veal, approximately 50% of whole category, even though at the beginning of the investigated period (50s and 60s) the equivalent rates were very low; 34.8% in urban areas, 17% in rural areas and 0% in smaller villages. However, this evolution of meat consumption affirms the earlier evaluation and characterization [Karapostolis 1983]: 'time lag' of alimentary behaviour in the meat category of rural compared to urban households. The evolution of consumption of all meat types, traditional and industrial, can be described in the same way. The consumption of traditional lamb accounted for 1/3 of the whole category expenditure in the decade of 50s, but nowadays it accounts for only 1/10 and 1/6 in urban and rural households respectively. Conversely, the consumption of industrial (meat products) is sharply expanding, especially in smaller villages, where at the starting point it was zero.

The inversions of traditional behaviours are also intense to all other traditional categories. A typical example is vegetables; vegetables' consumption decline rapidly especially in rural areas, although during 60s they were among the predominant foodstuffs and were considered a staple food (1/5 of total food expenditure). In contrast, industrial vegetables from around zero rates in the early postwar years, nowadays account for over 10% of vegetables-legumes expenditure. During the 50s and 60s, until 1969, when the first industrial frozen vegetables appeared in the market, the only industrial product of this category was the tomato pulp. These inversions (in vegetables and legumes, meat, and especially in sheep and goats, cereal and bread) have symbolic dimensions with cultural extensions, especially to the Mediterranean diet and specifically in rural communities [Sotiropoulos 2011].

Severe reversals of behaviours are also observed in the consumption away from home. In urban households, the expenditure in restaurants prevailed, while in rural households the expenditure in cafes dominated, reflecting the lifestyle in the countryside. However, after the survey of 2004/05, the expenditure in restaurants in rural areas was higher than in cafes, even though this share is much smaller than in urban households.

Consequently, all the features of the world famous 'Mediterranean diet' are in decline, especially in Crete, where during the 50s the 'Mediterranean diet' dominated [Renaud 1996], maintaining an ages-old tradition from the Minoan era. Nowadays, the population of Crete consumes, to great extent, industrial foodstuffs and Western origin meat instead of the traditional Cretan products, and to much lesser extent olive oil and fruit (the lowest in Greece). The cereal consumption remains slightly above the average in the general

population of the whole country, while fish and vegetable consumption remains high (Tables 4 and 5).

Table 4. Regional dietary patterns (according to regional divisions), %

Consumption component	Region and survey of							
	Crete		Thessaly		Attica		Thessalonica	
	´81/82	´08	´81/82	´08	´81/82	´08	´81/82	´08
Food	100	100	100	100	100	100	100	100
Cereals, bread	9.4	9.5	8.1	7.9	7.6	8.3	8.6	7.4
Meat	28.0	15.9	27.6	14.6	27.7	13.5	22.5	10.5
Fish	7.9	5.5	4.2	4.4	4.2	4.7	3.7	3.8
Vegetable/olive oil	2.3	1.8	11.2	4.7	5.7	3.2	5.9	3.0
Dairy products & eggs	11.6	9.7	11.6	10.8	12.6	11.2	13.4	11.0
Vegetables	10.9	8.2	8.1	6.3	9.3	6.9	8.3	6.0
Fruit	6.6	3.7	6.5	4.4	8.4	4.6	8.6	5.4
Sugar & pastry making products	4.9	4.0	5.4	3.2	4.9	3.4	5.2	4.0
Expenditure on food away from home	15.5	36.5	14.7	40.2	16.6	39.9	20.8	43.7
Non alcoholic drinks *	0.8	4.2	0.7	2.5	1.1	3.4	1.1	3.9
Other food categories	2.2	0.9	1.9	0.9	1.9	1.0	1.9	1.2

Source: [Household… 1981/82, 2008].

Locality seems to influence the dietary patterns and this could be a topic for future research, namely whether each specific region displays local diet features and how this is interpreted. Are these features associated, for example, with the productive base of the region, its trade relations, the activities of residents, their economic capabilities (e.g. tourism provides the necessary income to people to consume the products they wish), etc?

It seems, therefore, that the phenomena of behaviour convergence have accelerated after the decade of 80s, with the decline of traditional behaviours and the domination, eventually, of the modern Western and internationalized patterns. This evolution is characterized by the increased consumption of Western origin meat (especially beef) and of industrial products of all categories which preceded the expansion of food services. There is a complete change of lifestyles, reflected by the food consumption away from home, in restaurants and cafes, although the share of the latter is shrinking in favour of the former.

This is an important cultural element because it is associated with lifestyle and communication, professional behaviour, social relationships, as well as with the role of both sexes in the family and social life. For example, the participation of women in frequenting traditional coffee shops was slightest; however, in modern fast food restaurants it is dominant. This raises other important issues, such as the characteristics and the structure of the respective expenditure, with significant extensions. One of these is the consumption of alcoholic (e.g. the traditional raki, ouzo, etc.) and non-alcoholic beverages (e.g. coca cola), types of coffee, and the choice of restaurant menus, with significant consequences for the production base and the international trade of the country.

11

Table 5. Structure of regional dietary patterns for cereals, meat, legumes, vegetables, and expenditure on food away from home (in %).

Consumption component	Region and survey of									
	Athens			Thessalonica			Crete		Thessaly	
	′57/58	′81/82	2008	′57/58	′81/82	2008	′81/82	2008	′81/82	2008
Bread, cereals										
Bread	68.6	57.6	62.0	75.5	66.4	64.2	48.0	66.8	51.5	70.6
Flour	3.0	3.2	3.6	3.8	3.0	3.2	9.5	3.7	9.3	3.6
Industrially processed cereals	20.8	32.7	27.6	13.6	24.4	26.8	31.6	22.8	29.4	20.6
Rice	7.4	6.6	6.8	7.2	6.2	5.8	10.9	6.7	9.8	5.2
Meat										
Beef	36.9	53.1	40.4	50.2	56.4	37.5	16.7	31.7	37.9	39.5
Lamb and goat	33.4	14.4	11.1	16.3	5.4	10.9	32.9	19.3	23.9	20.7
Meat products	3.3	5.1	15.1	6.7	10.1	17.1	3.8	11.0	5.3	11.9
Legumes-and vegetables										
Legumes	5.7	5.3	7.2	5.5	4.9	6.8	10.1	8.1	14.8	9.1
Fresh vegetables	40.1	66.3	68.4	40.6	69.9	69.6	47.1	73.5	59.0	67.7
Industrially processed vegetables		6.0	20.0		6.0	19.2	3.7	14.3	3.3	17.3
Expenditure on food away from home										
Restaurants	61.6	57.6	61.3	68.3	58.2	56.2	38.0	64.5	46.2	53.3
Cafes	38.4	42.4	38.7	31.7	41.8	43.8	62.0	35.5	53.8	46.7

Source: [Household…1957/58, 1963/64, 1974, 1981/82, 1987/88, 1993/94, 1998/99, 2004/05, 2008].

The analysis based on local criteria leads to broader conclusions about the traditional behaviours which often exceed the prevailing broader patterns (e.g. Mediterranean or industrial) and have stability and durability. For example, fish consumption has always been and still remains increased in the island of Crete and the islands of Aegean and Ionian Seas. The same applies to areas where vegetable production is high, such as in Crete (e.g. greenhouses), though fruit consumption in Crete over time constantly declines, as well as in Western Greece. Epirus, one of the poorest regions of Europe, but with a strong livestock and poultry production base, displays increased meat consumption, although overall meat consumption is strongly related to income level [Sotiropoulos 2006].

Conclusions

The Greek food consumption analysis based on regional criteria, given its world historical and cultural weight ('Mediterranean diet'), is an extremely interesting research topic. This research employed the 'formula of patterns classification' which enables a decomposition and reclassification of data. The data reclassification allows performing an in-depth analysis of product categories such as industrial or traditional, plant or animal,

etc., beyond the standard classification by general product category provided by the Statistical Service (NSSG-ELSTAT).

During the examined period (1957-2008) the traditional Mediterranean dietary patterns decline in Greece. Moreover, the consumption of industrialized and internationalized 'Western origin' goods and services has increased, but with significant fluctuations per region (locality) and type of area (urban or rural). The most important conclusion is that there is a convergence of rural to urban dietary patterns, particularly since the decade of 70s. However, this convergence of rural to urban dietary patterns presents some basic differences in terms of time ('lag'), manner ('asymmetrical convergence') and location (local particularities).

The time lag refers to fact that the industrial internationalized patterns appear one to two decades later in rural than in urban areas, and especially in the capital. Asymmetric convergence means that significant differences in convergence are observed, as well as particularities in the new dietary behaviours of farmers. The new industrial patterns in rural areas are different in many aspects from the corresponding in urban areas, mainly in the intensity of industrialization and internationalization. These particularities in many areas (islands, vegetables producers, semi-mountainous animal breeders) have specific characteristics which display small changes over time and where behaviours little change (e.g. preference to fish consumption in islands, vegetable consumption in vegetable producing Crete etc.). In conclusion, the industrial internationalized dietary patterns prevailed in modern Greece, but with significant differences and particularities in terms of time, manner and geographical areas.

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Sławomir Kalinowski[1]
Chair of Economics
Poznań University of Life Sciences
Barbara Kiełbasa[2]
Section of Rural Areas Development and Extension Service
Socio-Economic Institute
Hugo Kołłątaj Agricultural University in Cracow

Farm management in the light of the cross-compliance requirements

Abstract. The paper presents main issues in managing implementation of the cross-compliance requirements on the microeconomic level, i.e. in an agricultural holding. Important areas of requirements that were introduced within the cross-compliance mechanism in 2004 are discussed. Cross-compliance means the dependence of obtaining EU direct payments in their full extent on meeting by a farmer some standards and keeping to some rules. This mechanism initiates some processes in agricultural holdings which are called processes of adjustment and which can be repeatable. Management of adjustment processes combines functions of management such as planning, organizing, directing and controlling the obtained results. Adjustment of the agricultural holdings receiving direct payments is related to the management of these holdings in accordance with established rules (standards) that operate as cross-compliance requirements.

Key words: management, management functions, process of adaptation, agricultural holding, cross-compliance.

Introduction

The mechanism of cross-compliance is a result of the European Union's Common Agricultural Policy evolution. In 2004, within the Fischler reforms, four mechanisms were introduced [Oskam et al 2010]:

- progressive modulation, i.e. reduction of financial support for the largest agricultural holdings,
- financial discipline, i.e. no possibility of exceeding fixed financial limits,
- decoupling policy, i.e. separation of the direct payment amount from the size and structure of production,
- the cross-compliance mechanism, a linkage between the direct payment amount and meeting some requirements by a farmer.

Therefore, since 2004, receiving direct payments by holdings in the European Union has been linked with the management of holdings in accordance with requirements concerning good agricultural practice, environmental protection, food safety for consumers, animal health, plant protection and animal welfare conditions. These requirements were called cross-compliance and they consist of three so-called areas of compliance. Their satisfying conditions the possibility of obtaining direct payments in full extent [Oskam et al

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[1] PhD, e-mail: kalinowski@up.poznan.pl.
[2] MA, e-mail: bkielbasa@ar.krakow.pl.

2010].

In Poland, as a result of negotiated conditions, cross-compliance is implemented gradually, as follows [Dostosowanie… 2009]:

- area A which consists of environmental protection of rural areas, it has been in force since 2009
- area B which contains requirements of food safety, animal health and plant protection, it has been in force since 2011
- area C which deals with animal welfare conditions, it will be obligatory from 2013.

Cross-compliance requirements also include norms concerning animal identification and registration (animal traceability), soil maintenance according to the so-called Good Agricultural Practice, and also occupational safety and health requirements (OSH) for people who work in agricultural holdings [Minimalne… 2010].

These requirements have not been created for purpose of the Common Agricultural Policy reforms, but they are the standards which should have been met for several years by farmers who run agricultural holdings and receive direct payments. The newly introduced element concerns only the linkage between direct payments and compliance with a number of obligations and norms [Oskam et al. 2010]. The cross-compliance mechanism thus means that a farmer has to fulfill certain obligations included in the areas of cross-compliance in order to receive direct payments in full extent. The main condition is to follow the Good Agricultural and Environmental Conditions (GAEC) and above that the Statutory Management Requirements (SMRs). Another new element is the introduction of both the control system and charging sanctions.

Each Member State was also obliged to inform farmers about the requirements and the sanctions resulting from negligence. Additionally, due to the complexity of this mechanism, the European Commission made it mandatory for all member states to establish the so-called Farm Advisory System in order to help farmers in adaptation to the new rules. The Farm Advisory System in Poland has been based on existing agricultural advisory structures of agricultural extension service, mainly public advisory centers, but also private consulting firms. The implementation of cross-compliance in Poland has been introduced by [Kania i Kiełbasa 2011]:

- Ministry of Agriculture and Rural Development which is responsible for the implementation of the Farm Advisory System; it approves the legislative acts, delegates tasks and assigns functions
- Agency for Restructuring and Modernisation of Agriculture which performs informative, implementation and financial functions in the cross-compliance implementation process; additionally, it is involved in carrying out inspections (controls) and also examination of the complaints lodged about inspections reports
- Foundation of Assistance Programmes for Agriculture which organizes contests for management of some specific measures of Rural Development Programme or other aid programmes, verifies, evaluates and selects projects, and finally transfers the funds after the approval by the Ministry of Agriculture and Rural Development
- Agricultural Advisory Centre in Brwinów which along with three offices in Kraków, Poznań and Radom prepares advisers to farmers; it specifies the methodology of extension and documentation for all advisory bodies and it is also

appointed to carry out inspections of private extension bodies operating on the basis of an accreditation by the Ministry of Agriculture and Rural Development

- 16 agricultural extension service centers located in each voivodeship that provide to farmers services connected with the adjustment processes, organize training courses for farmers about the cross-compliance requirements and cooperate with the Agricultural Advisory Centre in Brwinów and the Agricultural Chambers
- 16 Agricultural Chambers located in each voivodeship which cooperate in organizing training courses for farmers about cross-compliance requirements
- 60 private consulting bodies (firms), accredited by the Ministry of Agriculture and Rural Development, which provide to farmers advisory services in adapting to cross-compliance.

Directing and managing of an agricultural holding

Management is a process of achieving objectives by using acquired knowledge and available resources [Michalski 2008]. Farm manager makes it by the use of management functions, but some of these functions change their character slightly, due to the nature of farm (e.g. classical motivation function) [Sokołowska 1998]. Farm management connects management functions with the effective use of resources, i.e. human resources (i.e. labour on the farm), financial ones (e.g. cash, savings), tangible resources (e.g. buildings, equipment, means of transport) [Kapusta 2008]. In the management process, an achievement of the objectives through a rational and optimal use of personal, financial, tangible and information resources is sought. Efficient and effective achieving the organization objectives means a way of management that uses resources wisely without wasting them [Roszkowski & Wiatrak 2005].

Due to the possibility of obtaining direct payments by Polish farmers, the farm management goal should be to meet the cross-compliance requirements. Organization and management of holdings apply to such areas as the plant and animal production, human resource management, choice of the specialization, applied technology, organization of the machinery park and finally investment activities undertaken in agricultural holdings. The plant production management and its organization are aimed at obtaining maximum income from one hectare of agricultural land [Fereniec 1999]. This is related, among others, to farmer's choices about plant variety, plant rotation, methods of plant protection and irrigation, and also to the organization of plant harvesting, transportation and storage of agricultural products. Furthermore, the animal production should be run in harmony with plant production, taking into account the use of forage area. The main purpose of livestock production should be to develop the highest income by breeding highly productive beef or dairy cattle, using appropriate amount of nutrients, proper management (distribution) of fodder, adequate adjustment and use of livestock buildings, proper organization and distribution of labour [Fereniec 1999]. Decisions associated with tangible means of productions (investment decisions) are also very important for the household's outcome. They are related to new buildings, modernization of old ones, as well as to supplying the farm with the necessary machinery and equipment. The right organization of human work and effective using of the labour resources also play a vital role. Large agricultural enterprises usually define their organizational structures (e.g. manager, administrator,

foreman, administration department, etc.). In agricultural holdings, however, one person usually performs several functions, and the manager (i.e. farmer) must specify goals, manage his resources, and also focus on achieving these goals in an appropriate way [Leśniak 2002].

Management functions in an agricultural holding

One of the basic duties of the farm manager, as well as the first step of organization, is setting goals and making decisions [Koźmiński &Piotrowski 1996]. Making decisions translates into achieving desirable results, and therefore it cannot be done in a random and unconsidered way.

The decision making involves at first noticing and defining the problem, then analyzing and gathering information about the problem and formulating some possible alternatives, next choosing the best solution and implementing it in practice, and finally controlling the obtained results [Kompedium… 2004]. In a farm management system, we can distinguish the following management functions which are performed by farm managers.

- Planning, which means setting goals and the best ways to achieve them. Decisions made in agricultural holdings must not be taken in a haphazard way and should be well thought over. Moreover, setting specific objectives should become a routine. An agricultural holding is an economic entity and therefore it is guided by the same rules as any other enterprise [Duczkowska-Piasecka 2001]. Farm management involves making such decisions that will allow to select and implement the optimal solutions. This in turn should lead to achieving the best results with the lowest input, if it is possible. The main goal of planning is to gain competitive advantage [Nowakowska-Grunt & Cubała 2007]. In holdings that are undergoing the adjustment processes, these activities should enable farmers to exist in agricultural markets and become competitive.
- Organizing, which means activities aiming to combine resources in order to achieve and accomplish the goals, set specific tasks and finally implement them [Griffin 2004]. One of the manager's tasks is to provide the necessary resources in order to carry out planned tasks. In very small and small holdings, organization is aimed at planning tasks for the members of the family.
- Leadership or managing, which means exerting a direct impact on workers, by using the technique of effective communication and motivation [Misztal 2008; Kożuch 2000]. In an agricultural holding, apart from delegating the tasks to other member of his family, the owner (or manager or tenant) often undertakes them by himself.
- Control, which is based on comparing the obtained results (outcomes) with objectives that were formulated earlier, so this is an evaluation of the degree of goal achievement. A control comprises four areas of organization: tangible components (products and production), personnel (staff), information (analyzing and forecasting) and also financial aspects (debts, financial ratios) [Drucker 2005].

As in any other enterprise, farmers must be able to anticipate in their agricultural holdings the market needs. They should produce in accordance with the demand and effectively adapt their farms to the standards and requirements established by national laws and regulations resulting from the membership in the European Union. Farmers decide not only on the production and investments, but they also make decisions that affect the members of their families. Therefore, their decisions contain emotional elements which result in various problems in management. The farm planning process can be affected by two types of barriers [Zarządzanie… 1998]:

- organizational problems arising at the moment of preparing the tasks
- the attitude of people (members of the family) working in the farm (i.e. the manager who is the farm owner and his family members).

The farmer is thus the manager whose job is to plan, organize, lead and control, and therefore we can say that every farmer is a planner, organizer, leader and controller [Sokołowska 1998].

Farm management leading to meeting the cross-compliance requirements

The farm management means making decisions by the farmer (manager). Their optimization requires knowledge, concerning not only processes taking place on the farm, but also outside it, e.g. the European Union requirements related to the farm management. In the decision making process, the checklists created by the Ministry of Agriculture and Rural Development are used. These checklists can be a tool of strategic management in agricultural holdings, because the results show the status of the farm, the degree of compliance, and therefore they are the basis for preparing the so called 'Plan of farm adaptation to the cross-compliance requirements'. Constructing the adaptation plan requires the introduction of additional decision supporting techniques, such as statistical and mathematical methods, agricultural accounting, heuristic methods, and all of them based on opinions of an expert (i.e. the agricultural adviser who works with the farmer). The checklists cover all areas of farm management in the context of adaptation to cross-compliance standards. The agricultural adviser, who assesses a farm, must indicate on the list if a requirement is met, not met, or not applicable in the farm [Minimalne… 2010].

The compliance analysis may be conducted by the farmer himself, but usually this is a result of cooperation between an agricultural adviser and the farmer. Agricultural counseling conducted in connection with the cross-compliance adaptation is the type of individual agricultural extension service. During the on-farm visits, an agricultural adviser at first examines the whole farm, then checks the documentation on the farm, inspects the fields and finally analyzes and assesses animal welfare conditions. An assessment of the degree of compliance with cross-compliance requirements is also the task of the agricultural adviser. The adviser is responsible for the quality of his service, particularly with regard to a correct identification of non-compliances and preparation of an effective reform plan. The adviser does not take responsibility in cases when irregularities had been identified and an adjustment plan was then prepared, but the farmer consciously did not introduce the prescribed changes.

Process of management is a structured series of actions. Therefore, in the process of adaptation to the cross-compliance requirements one can distinguish some stages and elements that interact and follow each other in a strict order. Organization of the management process must concern the creation of organizational structures, transfer of information, regulation systems, and must also cover the functions of management. Management is a process consisting of actions that are functions of planning, organizing, motivating and controlling and they cause changes in some empirical systems, which means that it has its own reference or translation into practice [Stabryła 1983]. Thus, management is an implementation of structured tasks that follow one another in a specified time and are in some way dependent on each other. Managing the process of cross-compliance rules implementation in agricultural holdings comprises several steps. These steps make up a process of adjusting the holding to the cross-compliance requirements and are shown in Figure 1. The first stage is preparing a farm analysis in the light of cross-compliance requirements, using a set of checklists [Centrum… 2012]. The checklists are very important, because they are the tool for implementing cross-compliance standards, as they are used to asses agricultural holdings.

In this way, the degree of adaptation to cross-compliance requirements is determined as well as areas where irregularities have occurred. The result of this analysis is 'Initial report on the agricultural holding condition' (Figure 1). In the case of detection of irregularities, (non-compliances) the agricultural adviser, together with the farmer, prepares 'Plan of farm adaptation to cross-compliance requirements' which contains a description of planned investment activities leading to the fulfillment of standards, of the possibility of obtaining external funds, of action stages and people responsible for them. The necessary actions should be prepared taking into account the resources available in the farm, such as labour, agricultural area, capital and their proper organization. In the implementation of adaptation processes, the aim is the optimal use of possessed resources. It means that at first the so called non-financial input is planned, which is for example the farmer's own work input, the preparation and filling in on-farm documentation, obtaining the required qualifications to run a farm and to apply plant protection products, and also cleaning farm buildings, warehouses and farmyard. An important stage is to prepare a plan of tasks and their implementation, as well as defining the impact of these tasks (or changes) on the whole farm operation (Figure 1). The next step is determined by the function of controlling the process of adaptation to the cross-compliance requirements, which manifests itself in determining the level of implementation of adjustment plan, calculating the measurable and non-measurable effects (benefit and cost analysis) and also preparing the final report of the farm adjustment processes (Figure 1).

The management functions on the microeconomic level, i.e. in agricultural holdings, are affected by many factors, both internal (owned resources and motivations) and external ones (the system of sanctions, the possibility of obtaining funds for investments). Therefore, it can be noted that management of the cross-compliance implementation is a process consisting of many components, including the traditional functions of management: planning, organizing, directing and controlling (Figure 1). The adjustment process, presented in Figure 1, may have repetitive character, namely in a situation, when despite the implementation of "Plan of farm adaptation to cross-compliance requirements" irregularities (non-compliances) still occur, or after some time (e.g. in the next year) other irregularities are detected. Then the farmer returns to the first stage, i.e. the analysis of the

farm situation in terms of the current cross-compliance requirements, and after that he should plan activities or investments leading to their fulfillment.
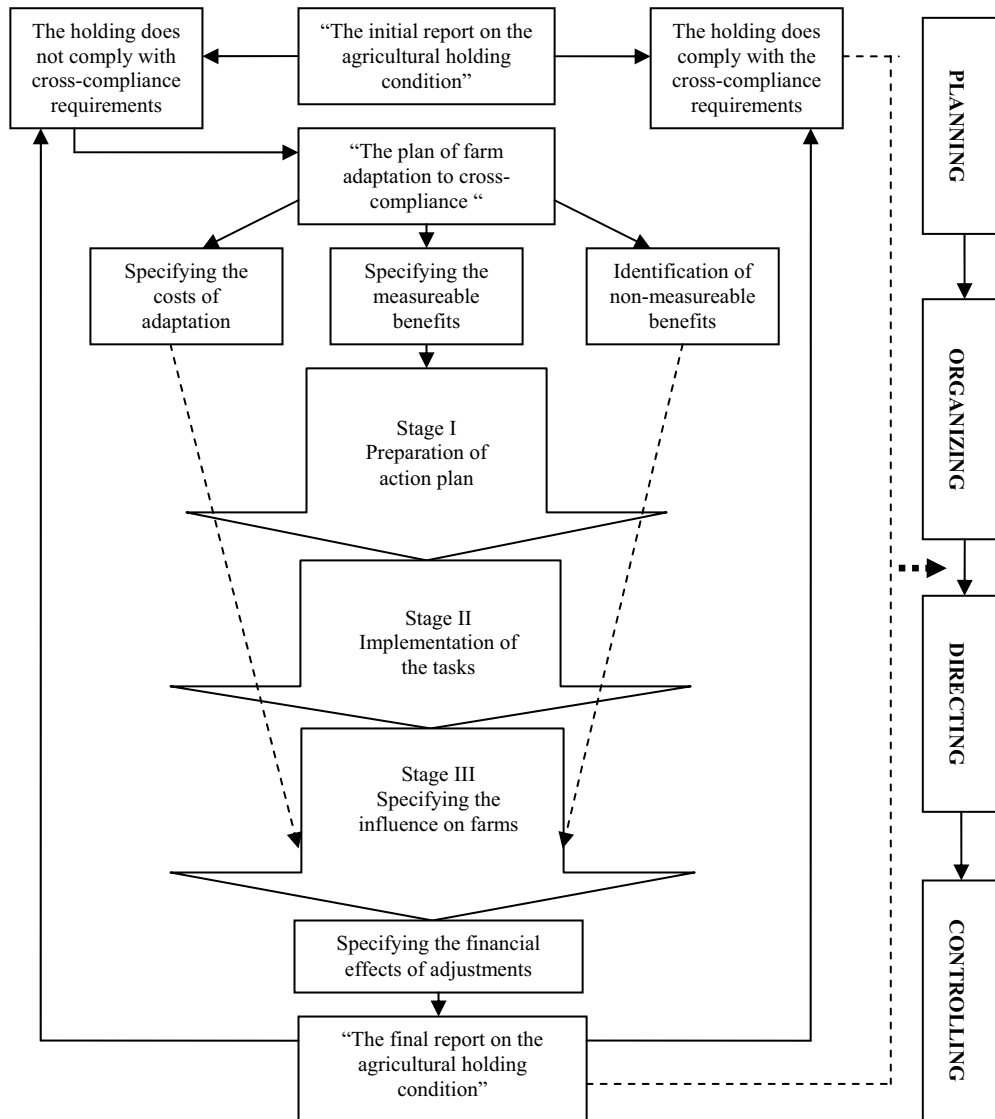

Fig. 1.The process of managing the cross-compliance implementation in an agricultural holding

Source: own elaboration based on data from the Agricultural Advisory Centre in Brwinów, branch in Radom.

Summary

The concept of farm adaptation process, as presented in the paper, refers to an effective management in the situation when farms are involved in the direct payment system. The requirements included in the range of cross-compliance standards are not new for the European Union farmers, because these norms have been gradually implemented beginning with the MacSharry reforms. The new element is the control system and the system of financial sanctions for farmers. As a result, these requirements have become obligatory for farmers, especially since they have been linked to direct payments which are received by the majority of farmers.

After analyzing the implementation process of cross-compliance in Poland at the microeconomic level, it can be concluded that it is and it will be a big challenge for farmers, especially in terms of meeting the standards of animal welfare (i.e. area C of cross-compliance). Poland has negotiated some transitional periods in order to give Polish farmers some extra time to adjust to these new standards. The implementation of cross-compliance requirements is based on performing the management functions by a farmer. It includes an analysis and evaluation of farm condition using specially prepared tools (i.e. checklists), then preparation of alternative solutions, selection of the best solution and finally realization of some "repair tasks" on the farm. Thus, the aim is a full compliance with the cross-compliance requirements.

Farm management in the context of adjustment processes is a case of strategic management, because it affects not only the present state (status quo) of the farm, but it also should apply to the future conditions. In some cases, this will require extra financial expenditure on investment activities. Thus, very small and small agricultural holdings should be excluded from the controls and sanctions. They usually produce for meeting their own consumption needs and the adjustment processes might be too expensive for the farmers to be fully implemented. This will result in their utter elimination from the agricultural market, but in general these farms use most of their products to meet the needs of the family. On the other hand, non-compliances will not occur in very small and small agricultural holdings, or will occur on a small scale, which does not endanger the health of consumer supplied from the market. Therefore, in those farms implementing cross-compliance standards will not require additional financial costs.

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Dostosowanie gospodarstwa rolnego do minimalnych wymogów wzajemnej zgodności. Poradnik metodyczny dla doradców rolnych wykonujących usługi doradcze w ramach działania „Korzystanie z usług doradczych przez rolników i posiadaczy lasów" objętego PROW 2007-2013. [2009]. Wydawnictwo Centrum Doradztwa Rolniczego. Radom.

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Magdalena Kapelko[1]
Wroclaw University of Economics
Alfons Oude Lansink[2]
Wageningen University
Spiro Stefanou[3]
Pennsylvania State University and Wageningen University

Analysis of static and dynamic productivity growth in the Spanish meat processing industry

Abstract. This paper estimates static Malmquist and dynamic Luenberger productivity growth measures and decomposes these to identify the contributions of technical change, technical efficiency change and scale efficiency change. The Malmquist and Luenberger productivity growth measures are estimated using Data Envelopment Analysis. The empirical application uses data on Spanish meat processing firms over the period 2000-2010. The dynamic Luenberger indicator and the static Malmquist index show, in the period under investigation, a productivity decrease of, on average, 0.3% and 1% respectively. In both measures, the technical regress is the main driver of change, despite the technical and scale efficiency growth.

Key words: Malmquist TFP, dynamics, Luenberger TFP, meat processing.

Introduction

The meat processing industry is the most important food sector in Spain, generating approximately 20% of total sales and employment within food industry and 2% of Spanish GDP in 2009 [National… 2012]. Its significance is emphasized by the fact that it is one of the main exporting sectors of Spain. The Spanish meat processing industry is characterized also by a low level of innovations and by the predominance of small and medium-sized enterprises [Study… 2011]. The period analyzed concerns the time of increasing regulation in the European Union (EU) with regard to food safety, consumer information, mandatory adoption of environmentally-sustainable practices and the functioning of internal market. In order to cope with the increasing regulation, European firms had to undertake additional investments and deal with more administrative burdens [The meat… 2004; Wijnands, van der Meulen & Poppe 2006]. Another impact factor is an increase in production costs of meat producers resulting from the increase in the costs of animal feed in 2007 and 2008. This increase in feed costs decreased the supply of slaughter cattle which serves as an input for the meat processing industry. Finally, from 2008 onwards the Spanish meat processing industry is being affected by the economic crisis as reflected by the decrease in the demand for meat. The impact of changes in the policy and the economic environment on the economic performance is an empirical question.

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[1] PhD, e-mail: mkapelko@ue.wroc.pl
[2] Professor, e-mail: alfons.oudelansink@wur.nl
[3] Professor, e-mail: spiros@psu.edu

The Total Factor Productivity (TFP) growth is a frequently used measure of a sector performance over time. The economics literature on efficiency has produced a wide range of productivity growth measures [Balk 2008] with the Malmquist index being prominent among these. The setting of decision environment plays a crucial role in the modelling framework and the characterization of results. The static models of production are based on the firm's ability to adjust instantaneously and ignore the dynamic linkages of production decisions. If the conditions for static models hold, then a static Malmquist index can give a correct representation of productivity growth. However, the business policy relevance for distinguishing between the contributions of variable and fixed capital factors to inefficiency or to productivity growth is clear. For example, when a variable factor use is not meeting its potential, remedies can include better monitoring of the resource use; when an asset use is not meeting its potential, remedies can include training programmes to enhance performance or even a review of the organization of assets in the production process to take advantage of asset utilization. The weakness, underlying the static theory of production in explaining how some inputs are gradually adjusted, has led to the development of dynamic models of production, where current production decisions constrain or enhance future production possibilities[4].

The characterization of dynamic efficiency can also build on the adjustment cost framework that implicitly measures inefficiency as a temporal concept which accounts for the sluggish adjustment of some factors. In a nonparametric setting, Silva and Stefanou [2007] develop a myriad of efficiency measures associated with a dynamic generalization of the dual-based revealed preference approach to production analysis found in Silva and Stefanou [2003]. In a parametric setting, Rungsuriyawiboon and Stefanou [2007] present and estimate a dynamic shadow price approach to the dynamic cost minimization.

An intriguing prospect is to incorporate the properties of the dynamic production technology presented in Silva and Stefanou [2003] into the directional distance function framework, which can exploit the Luenberger productivity growth measurement. The directional distance function offers a powerful advantage of focusing on changes in input and output bundles, in the inefficiency and the technology. Such a productivity measure based on the directional distance function has its origins in work by Chambers, Chung and Färe [1996] who defined a Luenberger indicator of productivity growth in the static context. A growing literature employing this approach has emerged more recently[5]. However, in the presence of adjustment costs in quasi-fixed factors of production, the static measures do not correctly reflect productivity growth. Recently, Oude Lansink, Stefanou and Serra [2012] proposed a dynamic Luenberger productivity growth measure based on an econometrically estimated dynamic directional distance function and decomposed this into the contribution of technical change and of technical inefficiency change. Kapelko, Oude Lansink and Stefanou [2012] extended this decomposition to identify the contribution of scale inefficiency change.

This paper nonparametrically estimates the dynamic Luenberger productivity growth measure of Kapelko, Oude Lansink and Stefanou [2012] and decomposes this to identify the contributions of scale efficiency, technical change and technical efficiency change. The results of the Luenberger estimation are then compared with the results of a traditional

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[4] The rationale behind the dynamic characterization of efficiency is described in detail in Stefanou [2009].
[5] See Chambers, Färe and Grosskopf [1996], Boussemart, et al. [2003], Färe and Primont [2003], Briec and Kerstens [2004], Färe and Grosskopf [2005], Balk [2008].

Malmquist index and its decomposition. The focus of the application is on panel data of Spanish meat processing firms over the period 2000-2010.

The next section presents the measures of static (Malmquist) and dynamic (Luenberger) productivity growth and its decomposition. This is followed by an empirical application to the panel of Spanish meat processing firms showing productivity change and its decomposition. The final section offers concluding comments.

Static and dynamic productivity growth

Malmquist index of static productivity growth

The Malmquist Index is defined through a radial distance functions originally developed by Shephard [1970; 1953]. Let $\mathbf{y}_t \in \mathfrak{R}_{++}^M$ represent a vector of outputs at time t, $\mathbf{x}_t \in \mathfrak{R}_+^N$ denote a vector of variable inputs, $\mathbf{K}_t \in \mathfrak{R}_{++}^F$ the capital stock vector, and $\mathbf{I}_t \in \mathfrak{R}_+^F$ the vector of gross investments. Computing a Malmquist index of TFP growth requires constant returns to scale (CRS) technology in order to assure feasible solutions to the programming problem. The Malmquist Input-Based TFP Index is defined as [Färe et al. 1994]:

$$M_i(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t|CRS) = \left[\frac{D_t^i(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t|CRS)}{D_t^i(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1}|CRS)} \times \frac{D_{t+1}^i(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t|CRS)}{D_{t+1}^i(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1}|CRS)} \right]^{1/2} \quad (1)$$

where $D_t^i(\cdot)$ is an input oriented distance function in period t which is defined as:

$$D_i(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t) = \max \gamma \in \mathfrak{R} : (\mathbf{x}_t/\gamma, \mathbf{K}_t/\gamma) \in P(\mathbf{y}_t) \quad (2)$$

and $P(y_t)$ is the input set. $D_t^i(\cdot)$ is the inverse of the Debreu-Farrell input oriented technical efficiency ($F_t^i(\cdot)$) measures [Färe et al. 1994]. The Malmquist input oriented productivity index in equation (1) is written as the product of technical efficiency change and technical change:

$$\frac{F_{t+1}^i(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1}|CRS)}{F_t^i(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t|CRS)} \times \left[\frac{F_{t+1}^i(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1}|CRS)}{F_t^i(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1}|CRS)} \times \frac{F_{t+1}^i(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t|CRS)}{F_t^i(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t|CRS)} \right]^{1/2} \quad (3)$$

The first term in equation (3) reflects the technical efficiency change, measuring the change in technical efficiency in period t+1 compared with period t. The second term (in brackets) reflects the technical change, which is measured as the geometric mean of shift of the frontier relative to the observations in period t+1 (first term) and t (second term). The denominator of the first ratio in the brackets and the numerator of the second ratio in the brackets are so-called mixed-period efficiency measures [Färe et al. 1994]. These efficiency measures are equal to the distance of an observation in a one time period relative to the technology of another time-period. The other efficiency measures equal the Debreu-Farrell efficiency for periods t and t+1.

The first term on the right hand side of equation (3) can be further decomposed into the contributions of technical efficiency change under variable returns to scale (VRS) and scale efficiency change (ΔSE):

$$\frac{F_t^i(\mathbf{y_t},\mathbf{K_t},\mathbf{x_t}|CRS)}{F_{t+1}^i(\mathbf{y_{t+1}},\mathbf{K_{t+1}},\mathbf{x_{t+1}}|CRS)} = \frac{SE_t^i(\mathbf{y_t},\mathbf{K_t},\mathbf{x_t})}{SE_t^i(\mathbf{y_{t+1}},\mathbf{K_{t+1}},\mathbf{x_{t+1}})} \times \frac{F_t^i(\mathbf{y_t},\mathbf{K_t},\mathbf{x_t}|VRS)}{F_{t+1}^i(\mathbf{y_{t+1}},\mathbf{K_{t+1}},\mathbf{x_{t+1}}|VRS)} \quad (4)$$

Hence, the Malmquist index is decomposed into the contributions of technical change (ΔT), technical efficiency change under variable returns to scale (ΔTE) and scale efficiency change:

$$M(\cdot) = \Delta T \times \Delta PTE \times \Delta SE \quad (5)$$

An illustration of the components of Malmquist index in case of one input and one output is shown in Figure 1.
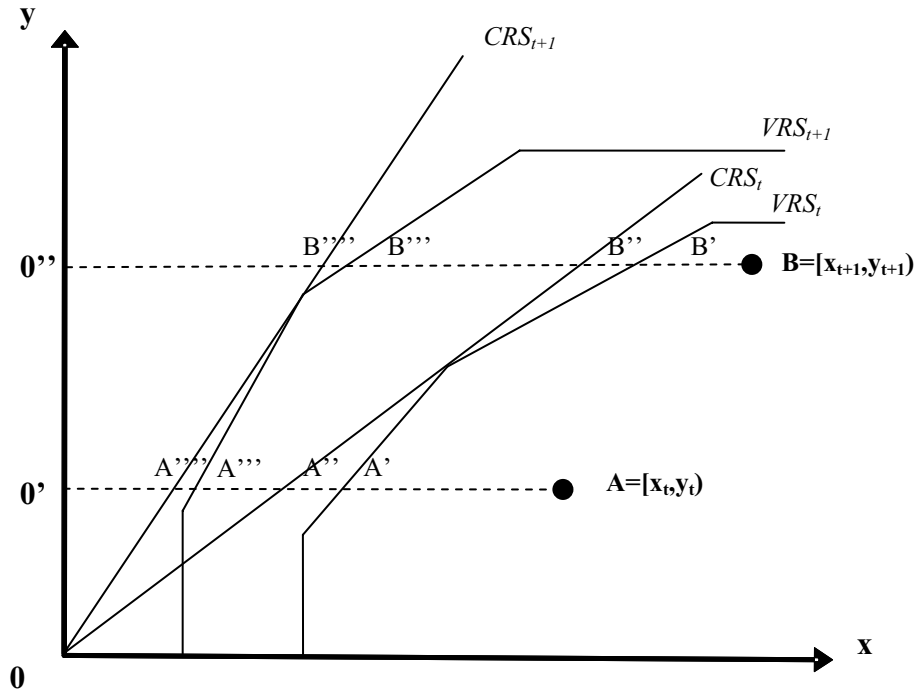
Fig. 1. Malmquist index of productivity change
Source: own elaboration.

The constant returns to scale frontier at the time period t is the line through the origin denoted by CRS_t, while the CRS frontier at t+1 is the line denoted by CRS_{t+1}. The VRS frontiers at t and t+1 are the lines VRS_t and VRS_{t+1}. Technical efficiency in period t relative to the VRS frontier is given by the ratio of the distances O'A'/O'A, whereas in period t+1 this is O''B'''/O''B. Hence, technical efficiency change is given by the ratio of the two

technical efficiency measures. Scale efficiency reflects the difference between the VRS and CRS frontier. Scale efficiency in period t is equal to the ratio O'A''/O'A' and in period t+1 this is O''B''''/O''B'''; the ratio of the two scale efficiency measures gives scale efficiency change. Technical change reflects the difference between the CRS_{t+1} frontier and the CRS_t frontier based on the observed values of input and output in period t and period t+1. It is measured as the geometric mean of two ratios of distances, i.e. 0'A''''/0'A'' and 0''B''''/0''B''.

Luenberger dynamic productivity growth

The Luenberger indicator of dynamic productivity growth is defined through a dynamic directional distance function. The production input requirement set can be represented as $V_t(\mathbf{y}_t : \mathbf{K}_t) = \{(\mathbf{x}_t, \mathbf{I}_t)$ can produce $\mathbf{y}_t$, given $\mathbf{K}_t\}$. The input requirement set is defined by Silva and Oude Lansink [2012] and assumed to have the following properties: $V_t(\mathbf{y}_t : \mathbf{K}_t)$ is a closed and nonempty set, has a lower bound, is positive monotonic in variable inputs $\mathbf{x}_t$, negative monotonic in gross investments $\mathbf{I}_t$, is a strictly convex set; output levels increase with the stock of capital and quasi-fixed inputs and are freely disposable.

The input-oriented dynamic directional distance function with directional vectors for inputs ($\mathbf{g}_x$) and investments ($\mathbf{g}_I$), $\vec{D}_t^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t, \mathbf{I}_t; \mathbf{g}_x, \mathbf{g}_I)$ is defined as follows:

$$\vec{D}_t^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t, \mathbf{I}_t; \mathbf{g}_x, \mathbf{g}_I) = \max\{\beta \in \Re : (\mathbf{x}_t - \beta\mathbf{g}_x, \mathbf{I}_t + \beta\mathbf{g}_I) \in V_t(\mathbf{y}_t : \mathbf{K}_t)\},$$

$$\mathbf{g}_x \in \Re_{++}^N, \mathbf{g}_I \in \Re_{++}^F, (\mathbf{g}_x, \mathbf{g}_I) \neq (\mathbf{0}^N, \mathbf{0}^F) \tag{6}$$

if $(\mathbf{x}_t - \beta\mathbf{g}_x, \mathbf{I} + \beta\mathbf{g}_I) \in V_t(\mathbf{y}_t : \mathbf{K}_t)$ for some β, then $\vec{D}_t^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t, \mathbf{I}_t; \mathbf{g}_x, \mathbf{g}_I) = -\infty$.

The directional distance function is a measure of the maximal translation of $(\mathbf{x}_t, \mathbf{I}_t)$ in the direction defined by the vector $(\mathbf{g}_x, \mathbf{g}_I)$ that keeps the translated input combination interior to the set $V_t(\mathbf{y}_t : \mathbf{k}_t)$. Since $\beta\mathbf{g}_x$ is subtracted from $\mathbf{x}_t$ and $\beta\mathbf{g}_I$ is added to $\mathbf{I}_t$, the directional distance function is defined by simultaneously contracting variable inputs and expanding gross investments. Hence, the directional distance function provides a measure of technical inefficiency rather than efficiency. For the case of the static input directional distance function with directional vector gx=x, Färe and Grosskopf [2005] show that $D_t^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t; \mathbf{g}_x) = 1 - 1/D_t^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t)$. Remind that efficiency is defined as $1/D_t^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t)$, so inefficiency is defined as one minus efficiency. As shown by Silva and Oude Lansink [2012], $D_t^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t, \mathbf{I}_t; \mathbf{g}_x, \mathbf{g}_I) \geq 0$ fully characterizes the input requirement set $V_t(\mathbf{y}_t : \mathbf{K}_t)$, being thus an alternative primal representation of the adjustment cost production technology.

Building in the Luenberger indicator of productivity growth defined by Chambers, Chung and Färe [1996] to the dynamic setting by using the dynamic directional distance function (assuming CRS) leads to:

$$L(\cdot) = \frac{1}{2}\left\{ \begin{array}{l} [\vec{D}_{t+1}^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t, \mathbf{I}_t; \mathbf{g}_x, \mathbf{g}_I) - \vec{D}_{t+1}^i(\mathbf{y}_{t+1}, \mathbf{K}_{t+1}, \mathbf{x}_{t+1}, \mathbf{I}_{t+1}; \mathbf{g}_x, \mathbf{g}_I)] \\ + [\vec{D}_t^i(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t, \mathbf{I}_t; \mathbf{g}_x, \mathbf{g}_I) - \vec{D}_t^i(\mathbf{y}_{t+1}, \mathbf{K}_{t+1}, \mathbf{x}_{t+1}, \mathbf{I}_{t+1}; \mathbf{g}_x, \mathbf{g}_I)] \end{array} \right\} \tag{7}$$

This indicator provides the arithmetic average of productivity change measured by the technology at time t+1 (i.e., the first two terms in equation (7)) and the productivity change measured by the technology at time t (i.e., the last two terms in equation (7)).
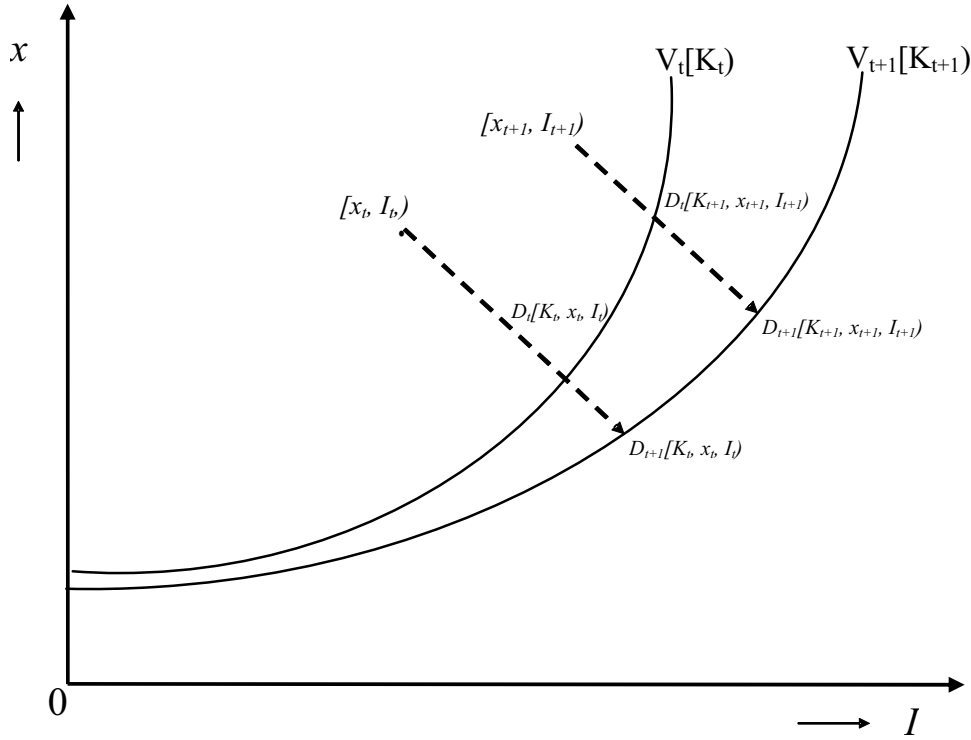
Fig. 2. Luenberger indicator of dynamic productivity growth

Source: own elaboration.

The Luenberger indicator of dynamic productivity growth is illustrated graphically in Figure 2. The quantities of inputs and investments at time t and time t+1 are denoted as $(\mathbf{x}_t, \mathbf{I}_t)$ and $(\mathbf{x}_{t+1}, \mathbf{I}_{t+1})$, respectively. The dynamic directional distance function measures the distance to the isoquants at time t and time t+1, which is denoted as $\vec{D}_{t+1}^{\,i}(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t, \mathbf{I}_t; \mathbf{g}_x, \mathbf{g}_I)$. The Luenberger indicator of dynamic productivity growth can be decomposed into the contributions of technical inefficiency change (ΔTEI) and technical change (ΔT):

$$L(\cdot) = \Delta T + \Delta TEI \qquad (8)$$

The decomposition of productivity growth is obtained from equation (7) by adding and subtracting the term $\vec{D}_{t+1}^{\,i}(\mathbf{y}_{t+1}, \mathbf{K}_{t+1}, \mathbf{x}_{t+1}, \mathbf{I}_{t+1}; \mathbf{g}_x, \mathbf{g}_I) - \vec{D}_t^{\,i}(\mathbf{y}_t, \mathbf{K}_t, \mathbf{x}_t, \mathbf{I}_t; \mathbf{g}_x, \mathbf{g}_I)$. Technical change is computed as the arithmetic average of the difference between the technology

(represented by the frontier) at time t and time t+1, evaluated using quantities at time t (first two terms in equation (9)) and time t+1 (last two terms in equation (9)):

$$\Delta T = \frac{1}{2}\left\{ \begin{array}{l} [\vec{D}_{t+1}^{j}(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t,\mathbf{I}_t;\mathbf{g}_x,\mathbf{g}_I) - \vec{D}_t^{j}(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t,\mathbf{I}_t;\mathbf{g}_x,\mathbf{g}_I)] \\ +[\vec{D}_t^{j}(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{I}_{t+1};\mathbf{g}_x,\mathbf{g}_I) - \vec{D}_t^{j}(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{I}_{t+1};\mathbf{g}_x,\mathbf{g}_I)] \end{array} \right\} \quad (9)$$

The technical change can be seen in Figure 2 as the average distance between the two isoquants. This involves evaluating the isoquants using quantities at time t, $\vec{D}_{t+1}^{i}(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t,\mathbf{I}_t;\mathbf{g}_x,\mathbf{g}_I) - \vec{D}_t^{i}(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t,\mathbf{I}_t;\mathbf{g}_x,\mathbf{g}_I)$ and quantities at time t+1, $\vec{D}_{t+1}^{i}(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{I}_{t+1};\mathbf{g}_x,\mathbf{g}_I) - \vec{D}_{t+1}^{i}(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{I}_{t+1};\mathbf{g}_x,\mathbf{g}_I)$. Dynamic technical inefficiency change is the difference between the value of the dynamic directional distance function at time t and time t+1:

$$\Delta TEI = \vec{D}_t^{i}(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t,\mathbf{I}_t;\mathbf{g}_x,\mathbf{g}_I) - \vec{D}_{t+1}^{i}(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{I}_{t+1};\mathbf{g}_x,\mathbf{g}_I) \quad (10)$$

The technical inefficiency change is easily seen from Figure 2 as the difference between the distance functions evaluated using quantities and technologies in period t and period t+1.

We can decompose the Luenberger measure further to allow for scale inefficiency change (ΔSEI). With the Luenberger measure historically being developed in the context of constant returns to scale, this further decomposition relaxes the technology assumptions of constant returns to scale to permit variable returns to scale.

From a primal perspective, the technical inefficiency change component in equation (10) can be decomposed as follows:

$$\Delta PEI = \vec{D}_t^{i}(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t,\mathbf{I}_t;\mathbf{g}_x,\mathbf{g}_I \mid VRS) - \vec{D}_{t+1}^{i}(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{I}_{t+1};\mathbf{g}_x,\mathbf{g}_I \mid VRS)$$

$$\Delta SEI = \vec{D}_t^{i}(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t,\mathbf{I}_t;\mathbf{g}_x,\mathbf{g}_I \mid CRS) - \vec{D}_t^{i}(\mathbf{y}_t,\mathbf{K}_t,\mathbf{x}_t,\mathbf{I}_t;\mathbf{g}_x,\mathbf{g}_I \mid VRS) \quad (11)$$

$$-\left[\vec{D}_{t+1}^{i}(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{I}_{t+1};\mathbf{g}_x,\mathbf{g}_I \mid CRS) - \vec{D}_{t+1}^{i}(\mathbf{y}_{t+1},\mathbf{K}_{t+1},\mathbf{x}_{t+1},\mathbf{I}_{t+1};\mathbf{g}_x,\mathbf{g}_I \mid VRS)\right]$$

Where ΔPEI is the technical inefficiency change under variable returns to scale and ΔSEI is the scale inefficiency change.

Data

The data used in this study come from the SABI (System for the Analysis of Iberian Balance Sheets or Iberian Balance Sheet Analysis System) database, managed by Bureau van Dijk, which contains the financial accounts of Spanish companies. The study sample includes the firms belonging to the category of firms involved in processing and preserving of meat and production of meat products (NACE Rev. 2 code 101). In what follows, we refer to our sample as the meat processing industry. Initially, 3000 firms were obtained from the database. After filtering out companies with missing information and after removing the outliers[6], the final data set consists of between 928 and 1527 firms that operated in Spain at least two consecutive years during the period from 2000 to 2010. The

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[6] Outliers were determined using ratios of output to input. An observation was defined as an outlier if the ratio of output over any of the three inputs was outside the interval of the median plus and minus two standard deviations.

dataset is unbalanced and it sums up to 13103 observations (in total 26206 observations if we consider that each observation is repeated two times in two consecutive years).

One output and three inputs (material costs, labour costs and fixed assets) are distinguished. Output (production) was defined as total sales plus the change in the value of stock at current prices and was deflated using the industrial price index (1999=100%) for output in the meat processing industry. Material costs and labour costs were directly taken from the SABI database and were deflated using the industrial price index for consumer non-durables and labour cost index in manufacturing, respectively. Fixed assets are measured at the beginning value of fixed assets from the balance sheet (i.e. the end value of the previous year) and are deflated using the industrial price index for capital goods. All price indices used to deflate output and inputs are obtained from the Spanish Statistical Office (various years). Additionally, to estimate the dynamic Luenberger indicator, gross investments were used. Gross investments in fixed assets in year t are computed as the deflated beginning value of fixed assets in year t+1 minus the deflated value of fixed assets in year t plus the deflated value of depreciation in year t. Table 1 provides the descriptive statistics of the data used in this study, for the whole period 2000/2001-2009/2010.

Table 1. Descriptive statistics of input-output data of the Spanish meat processing industry, 2000/2001-2009/2010, constant 1999 prices, EUR thousand

Variable	Mean	Standard deviation	Minimum	Maximum
Fixed assets	2066.131	15233.260	0.134	896472.800
Employee cost	671.038	3465.618	1.420	87188.160
Material cost	5064.267	23834.010	0.333	737417.900
Investments	375.900	4609.822	-41366.180	400870.600
Production	6465.920	30897.880	0.490	859756.100

Source: SABI database.

The data in Table 1 shows that the average meat processing company in our sample is relatively small in terms of the EU size classification, with a mean turnover of approximately 6 EUR million. On the other hand, the standard deviations relative to their respective means are relatively high showing that the firms in our sample differ considerably in size.

Results and discussion

Table 2 summarizes the geometric means of static Malmquist productivity index and its decomposition for the pairs of consecutive years and Table 3 summarizes the arithmetic means of dynamic Luenberger productivity indicator and its decomposition for the pairs of consecutive years. Some of the mixed directional distance functions used to compute Malmquist and dynamic Luenberger indicators do not have a feasible solution. Literature mentions two possible solutions to this problem: (1) to omit the infeasible observations in the computation of averages or (2) to assign to the indices the value equal to no change in indicator, which is the strategy we have followed. In general, Briec and Kerstens [2009] recommend reporting the infeasibilities that occurred in the empirical application as shown

in Tables 2 and 3. Out of 13103 observations, 19 observations are found to be infeasible for the static Malmquist estimations and 204 observations are found to be infeasible in case of the dynamic Luenberger estimations.

The results of the Malmquist index in Table 2 show that productivity growth was, on average -1% per year in the period 2000-2010, with technical change making, on average, a negative contribution to TFP growth. Technical efficiency change slightly increases in the period under investigation, to make a positive contribution to TFP growth; scale efficiency changes also contributed positively. Results of individual years show that TFP growth is negative in all years, except the period 2001/2002 and 2009/2010. The technical change shows very large fluctuations, from a 34.2% decrease in 2005/2006 to a 3.5% increase in 2001/2002.

Table 2. Evolution of static Malmquist productivity change (growth rate)

Period	Number of firms	Malmquist productivity change	Technical change	Technical efficiency change	Scale efficiency change
2000/2001	1000	-0.070	0.027	-0.151	0.044
2001/2002	1157	0.045	0.035	0.043	-0.033
2002/2003	1340	-0.010	-0.054	0.037	0.004
2003/2004	1418	-0.018	-0.018	0.037	-0.038
2004/2005	1465	-0.004	-0.184	0.112	0.046
2005/2006	1499	-0.013	-0.342	0.120	0.142
2006/2007	1527	-0.003	0.005	-0.010	0.002
2007/2008	1412	-0.032	-0.228	0.126	0.039
2008/2009	1357	-0.008	-0.088	0.074	0.001
2009/2010	928	0.006	-0.061	0.048	0.015
Total or geometric mean 2000/2001-2009/2010	13103	-0.010	-0.093	0.052	0.025

Note: out of 13103 observations, 19 (0.15%) were found to be infeasible.

Source: own calculations.

The results of the dynamic Luenberger indicator in Table 3 also show a decline in dynamic productivity in the Spanish meat processing industry. However, there is a productivity growth from 2001 to 2002 and an upward trend of productivity growth from 2009 to 2010. From 2007 to 2008 the dynamic productivity decline has a mean value of -0.012, from 2008 to 2009 of only -0.003, but from 2009 to 2010 there is a productivity growth with a mean value of 0.004. From the three components of dynamic Luenberger productivity change we can observe that the negative productivity growth is mainly due to technological regress in most years. Especially the period from 2005 to 2009 is characterized by a technological regress (with an exception of 2008/2009 when technical stagnation is observed).

Comparing the results of the Malmquist and the Luenberger analyses shows that the Malmquist estimation reports a higher productivity decline than the Luenberger (-1% versus -0.3%). Also, technological change is lower for the Malmquist than for the Luenberger estimations. Technical efficiency and scale efficiency make a larger

contribution to productivity growth in case of the Malmquist than in case of the Luenberger analysis.

Table 3. Evolution of dynamic Luenberger productivity change (growth rate)

Period	Number of firms	Luenberger productivity change	Technical change	Technical inefficiency change	Scale inefficiency change
2000/2001	1000	-0.018	0.043	-0.083	0.023
2001/2002	1157	0.009	0.083	-0.006	-0.069
2002/2003	1340	-0.003	-0.099	0.093	0.002
2003/2004	1418	-0.001	0.014	-0.008	-0.008
2004/2005	1465	-0.001	0.021	0.009	-0.031
2005/2006	1499	-0.003	-0.070	0.012	0.054
2006/2007	1527	-0.002	-0.078	0.040	0.037
2007/2008	1412	-0.012	-0.131	0.090	0.029
2008/2009	1357	-0.003	0.000	0.036	-0.039
2009/2010	928	0.004	-0.057	0.002	0.059
Total or arithmetic mean 2000/2001-2009/2010	13103	-0.003	-0.031	0.022	0.005

Note: Out of 13103 observations, 204 (1.6%) were found to be infeasible.

Source: own calculations.
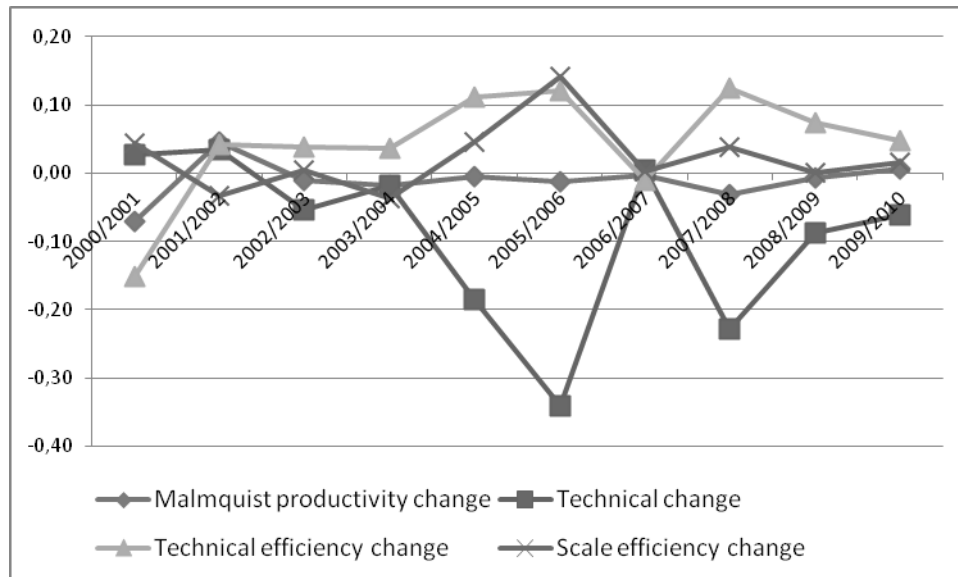
Fig. 3. Evolution of the Malmquist productivity change and its components

Source: own elaboration.

The finding of technological regress from the results of the estimation of the Malmquist and the Luenberger suggests that in these periods the technology eliminates some productive options that were previously available for the firms in the Spanish meat processing industry. Under the regulatory environment of EU with regard to food safety, the firms are forced to adapt to new standards by undertaking additional investments and absorbing additional costs without a productive impact. As a result some production practices could not be undertaken anymore after the new regulation and consequently the situations of technical regress are produced. The highest technical regresses occur in the period from 2005 to 2006, 2006 to 2007 and 2007 to 2008. In these years, an increase in animal feed costs occurred and also the financial crisis added its negative effects to the Spanish meat processing sector. On the other hand, most years of the period under investigation are characterized by efficiency improvement. The improvement of technical efficiency shows that the firms in the sample moved towards the frontier.

Figures 3 and 4 show the evolution of the static Malmquist and dynamic Luenberger productivity growth and their decomposition into technical change, technical (in)efficiency and scale (in)efficiency change.
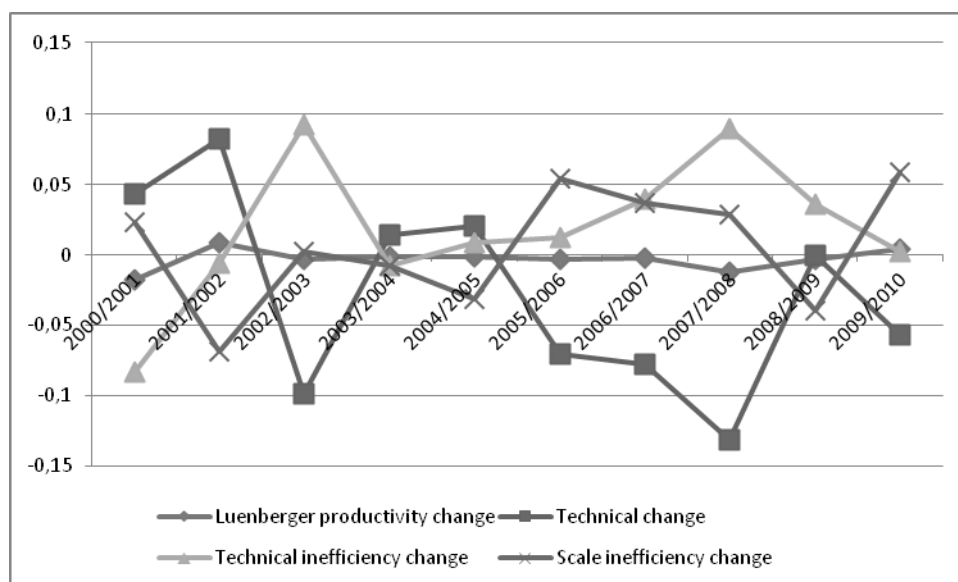
Fig. 4. Evolution of the Luenberger productivity change and its components

Source: own elaboration.

Figures 3 and 4 indicate that fluctuations of TFP growth are slightly higher for the static Malmquist index than for the dynamic Luenberger productivity. The biggest changes are associated with technical change and technical efficiency change for both productivity measures. The technical efficiency growth clearly dominates the analyzed period with high increases observed between 2007 and 2008 in both TFP measures. On the other hand, a technical regress is observed in most periods with highest decline in 2007/2008.

Confronting our results with these reported in other studies, first of all we should notice that the literature on productivity change in the European meat processing sector (or

food industry in general) is rather limited. Bontemps et al. [2012] studied the impact of regulations on productivity in French food processing industry (poultry and cheese) from 1996 to 2006. They show that these industries experienced a period of technical progress, followed by a period of technical regress, which might be a consequence of constraints imposed by stricter sanitary regulations. Therefore, our conclusions are similar to those reported in their study.

Conclusion

This paper uses DEA to estimate a static Malmquist index and a dynamic Luenberger productivity growth indicator. Both productivity measures are decomposed to identify the contributions of technical (in)efficiency change, scale (in)efficiency change and technical change. The empirical application focuses on panel data of firms in the Spanish meat processing industry over the period 2000-2010.

The results show that the static and dynamic productivity measures report, on average, a negative productivity growth over the period under investigation. The Malmquist index results suggest a higher productivity decline than the dynamic Luenberger productivity growth indicator. In both productivity measures, technical change made a large (on average 9% for the Malmquist and 3% for the Luenberger indicator) negative contribution to TFP growth, particularly in the years after the beginning of financial crisis. For both productivity measures, technical efficiency and scale efficiency improved on average in the period under investigation, to make a positive contribution to TFP growth.

The results suggest that the introduction of hygiene regulations in the slaughter industry have caused a negative technical change in the period under investigation. Hence, policy makers should be aware of the negative impacts on competitiveness of the on-going regulation. The results also suggest that the financial crisis had a large negative impact on the productivity of the meat processing sector.

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Gábor Kemény[1]
Tibor Varga[2]
József Fogarasi[3]
Kristóf Tóth[4]
Research Institute of Agricultural Economics (AKI)
Budapest

The development of Hungarian agricultural insurance system

Abstract. Agricultural insurance is one of the financial tools that agricultural producers can potentially use to cope with increasing risks in their activity. Experiences accumulated on insurance markets demonstrate that the development of a proper agricultural insurance product can not be reached without a governmental intervention mainly due to the systemic risk and information asymmetries. The aim of this paper is to present the Hungarian agricultural insurance system and its possible development. Using the farm level economic and meteorological data we assess the costs of introducing drought and soil submersion insurance products and the possible insurance premiums for these agricultural products.

Key words: Hungarian agricultural insurance system, insurance premium, drought and soil submersion risks insurance.

Introduction

Agriculture is particularly exposed to adverse natural events, such as floods or droughts and the economic costs of natural risks may even increase further in the future because of climate change. Agricultural insurance is one of the financial tools that agricultural producers can potentially use to cope with increasing risks in their activity. Experiences accumulated on insurance markets demonstrate that the development of a proper agricultural insurance product can not be reached without a governmental intervention, mainly due to systemic risk and information asymmetries. The systemic risk is taking place when a risk affects a large number of farmers simultaneously. Therefore the systemic component of agricultural risks can generate major losses for agricultural insurers [Mahul & Stutley 2010]. The information asymmetries in case of agricultural insurances are derived from an adverse selection and moral hazard. Both are connected to the difficulties associated with measuring risk and monitoring farmer behaviour. Adverse selection arises due to the lack of information which in turn results in inaccurate premium rates that make high risk farmers more likely to purchase an insurance. This can lead any insurance plan to be unprofitable and eventually to its failure.

A moral hazard occurs when insured farmers alter their production practices in some way that changes their underlying risk, which is not easily observable by the insurers.

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[1] Director of Economic Analysis, address: IX. Zsil utca 3-5, 1093 Budapest, Hungary, e-mail: kemeny.gabor@aki.gov.hu.
[2] Senior Research Fellow, address: IX. Zsil utca 3-5, 1093 Budapest, Hungary, e-mail: tibor.varga@aki.gov.hu.
[3] Senior Research Fellow, address: IX. Zsil utca 3-5, 1093 Budapest, Hungary, e-mail: fogarasi.jozsef@aki.gov.hu.
[4] Junior Research Fellow, address: IX. Zsil utca 3-5, 1093 Budapest, Hungary, e-mail: toth.kristof@aki.gov.hu.

Typically, this involves a failure to use good farming practices, to care for the crop, or to supply adequate fertilizer or water.

A governmental support for agricultural insurances is a common practice helping farmers better access the risk management tools. Especially under certain conditions, the support of insurance can be regarded as a Green Box measure within the WTO agreements [Managing… 2009]. The World Bank conducted a survey on agricultural insurance programs in 65 countries and found that almost two-thirds of the surveyed countries provide agricultural insurance premium subsidies, with subsidies usually in the order of 50% of the original gross premium. Governments also provide public reinsurance (32% of surveyed countries), subsidies on administrative and operational expenses (16%) and loss adjustment subsidies (6%). At the same time, governments can also provide support with legislation and research, development and training [Mahul & Stutley 2010].

The aim of this paper is to present the Hungarian agricultural insurance system and its possible development. Using farm level economic and meteorological data, we assess the costs of introducing drought and soil submersion insurance products as well as the possible insurance premiums for these agricultural products. The paper is organized as follows: Section 2 presents the development of Hungarian agricultural insurance system in the last two decades and the main characteristics of the agricultural insurance market. In section 3 the conceptual framework of calculations is explained and the data used for calculations are described. The results of calculations are presented in section 4. Section 5 offers some concluding remarks.

Empirical background

The Hungarian agricultural insurance system experienced major transformations since the beginning of the post-communist transformations in the 1990s [Bielza et al. 2008; Felkai & Varga 2010; Kockázatok… 2009; Varga et al. 2011]. The production cooperatives that were the dominating organizational form in agriculture before 1990 contracted at least hail risk insurance at one of the two existing state owned insurer firms every year. At the beginning of transformation period, most of these cooperatives got bankrupt and obviously were replaced by small individual farms without any experience and proper knowledge of risk management. Therefore the hail risk coverage in Hungarian crop production has decreased from almost 100% to 40%. Consequently, the supply of agricultural insurance has not become popular during the transition and after the EU accession among Hungarian insurance companies. More than 40 insurance companies have been operating in the Hungarian economy in the last two decades and in the first part of the transition period only five insurance companies developed their agricultural insurance product portfolio. Due to poor financial performance of agricultural insurance products, the number of insurance companies providing agricultural insurances was reduced to four companies and only three insurance companies supplying agricultural insurance remain in 2012.

The main reason of poor financial performance in the Hungarian agricultural insurance market is the high premium/damage ratio which has led to a lower profitability of agricultural insurances as compared to other insurance products.

The Hungarian agricultural insurance supply was characterised by covering only a limited number of risk types like hail risks, fire risks, storm and winter frost risks, while the largest damages of crop production are caused by drought and spring frost.

The government introduced an agricultural insurance premium subsidy for the farmers contracting agricultural insurances up to 30% of insurance premium in 1997 for solving the above presented problems, for extending the risk avoiding community in case of agricultural insurance and for facilitating the introduction of new insurance products in case of risks which previously could not be insured. This intervention programme has failed to provide the expected results and the insurance premium subsidy programme was stopped in 2003. Increasing natural risks in agricultural production determined the government to establish the National Crop Damage Compensation System [Nemzeti Kárenyhítési Rendszer, NAR] in 2006. By collecting financial means from farmers, the government supported the NAR up to 50% of the received payments from the farmers. In case of higher claims than the funds collected from farmers the compensations decreased proportionally.

However, the NAR and the low penetration of agricultural insurances proved to be ineffective in dealing with the increasing risks in the Hungarian agricultural production and a new agricultural insurance system based on two pillars started to operate in 2012. The first pillar is the continuation of the National Crop Damage Compensation System with two important changes: the participation of farmers is compulsory above a certain farm size and there is a more severe control of the damage compensations. The second pillar is focusing on the development of agricultural insurance market by introducing an insurance fee support for farmers contracting insurance policies of hail, fire, storm and winter frost damages as well as for drought, cloudburst and spring frost which previously were not insurable risks.

The new insurance scheme entered into force on 1 January 2012 with an aim of increasing the efficiency of farmers' protection against environmental damages. Natural disasters and extreme weather events caused significant damages to the producers and, as it was mentioned previously, those damages were not covered sufficiently by the National Crop Damage Compensation System. After serious weather events, it often happened that the government provided compensation from ad hoc funds even to those farmers who had had no insurance and had not participated in the national compensation fund. Obviously, in those circumstances farmers had no real interest to pay any extra money for risk management policies. This situation is often referred as the lack of self-provision and it characterises the Hungarian society in general.

The first pillar is very similar to the above mentioned damage mitigation system (NAR). The most important change is that the participation of farmers is compulsory above 10 hectares of farm land in case of crop production, 5 hectares in case of vegetable production and 1 hectare in case of permanent plantations. The deposit paid by farmers varies between different land uses. The sum thus accumulated from farmers' deposits is supplemented by the government in an equal amount from budgetary sources. However, only those producers will receive full damage compensation under the new system, which provides motivation for farmers to become self-providers, who have acquired insurance from an insurance company with regard to at least 50% of their activities, while those with no insurance may receive only 50% of the maximum possible damage mitigation allowance.

The second pillar comprises a supported, private agricultural insurance construct for those producers who wish to decrease their production risks to a higher level than the protection provided by the NAR damage mitigation fund. Farmers can take out insurance policy on a voluntary basis, however, as it was said earlier, without a private insurance the

level of compensation that they can get from the national fund (NAR) is significantly lower.

The distribution of elemental damages in Hungarian agriculture in the last two decades is almost constant (Figure 1). The highest compensation for Hungarian agricultural production was paid for drought damages (42 %) following by hail damages (21 %). Varga [2010] estimated in average a yearly 70 Hungarian forint (HUF) billion damage in the Hungarian cereal production basing on the yield drops in the period between 2000 and 2008.
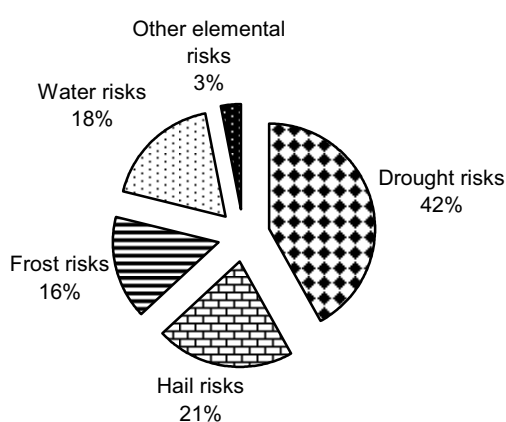
Fig. 1 The distribution of elemental damages in Hungarian agriculture in 2009, %

Source: authors' own elaboration based on data from the Association of Hungarian Insurance Companies (MABISZ) in 2010.

The insurance premium paid for hail and fire insurance represented about 85% of the total agricultural insurance fees since 2002 (Figure 2) while the most important natural risk in Hungarian agriculture is drought. There is a discrepancy between existing insurance products and the actual farm exposure to risks. For the main risks as drought and spring frost, no insurance products were supplied before 2012.
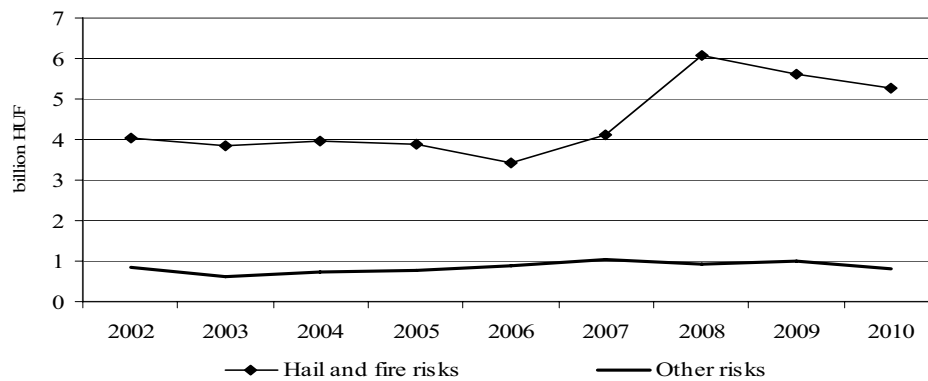
Fig. 2 Annual insurance fees collected by insurance companies from crop production, HUF billion

Source: authors' own elaboration based on data from the Association of Hungarian Insurance Companies (MABISZ) in 2010.

Crop insurance demand is particularly low in Hungary as only 40% of arable land was covered by hail and frost insurance contracts before 2012. The main reason for that is the poor income situation of many farmers which implies that the insurance products supplied in the market were not affordable. Moreover, the farm managers' willingness to pay is additionally reduced by the lack of trust in the insurance system, the lack of experience with "true" insurance systems and the wrong signals imposed by the governmental ad hoc payments.

Table 1. Incentives for increasing insurance demand in Hungarian crop production, %

Importance ranking*	Cheaper insurance premium	Deductible	Drought	Soil submersions	Inundation	Spring frost	Other
				Protection against			
1	58.8	1.8	8.8	4.7	0.6	5.3	20.0
2	11.7	25.9	30.2	14.8	6.2	7.4	3.7
3	11.8	14.6	21.5	34.7	6.9	8.3	2.1
4	5.3	23.3	13.5	15.8	15.8	24.8	1.5
5	9.8	22.3	8.0	13.4	23.2	20.5	2.7
6	6.1	18.2	15.2	12.1	21.2	23.2	4.0
7	18.7	6.7	10.7	8.0	34.7	8.0	13.3

* 1 - most important, 7- least important.

Source: Prepared at the Financial Policy Department in AKI basing on data collected from a survey of Hungarian farmers.

Spörri et al [2012] analysing the experiences of Hungarian agricultural insurances concluded that 'premium subsidies alone might not be a conclusive strategy to support the insurance use and improve its impact on economic performance of farms. Strategies to

enhance the knowledge and trust are needed to ensure that farm managers are able to utilize insurance products for readjusting their production decisions and improving their performance'.

A survey conducted by the Hungarian Research Institute of Agricultural Economics (AKI) in 2011 found evidences that the insurance penetration in Hungarian crop production can be increased by reducing insurance premiums and supplying better adapted insurance products (Table 1). The majority of crop producing farmers (58.8%) considered the most important requirement for a business insurance product to be provided at low insurance premium. Other important requirements for an agricultural insurance product are to cover risks caused by drought (30.2%) and soil submersion (34.7%).

Conceptual framework and data

Increasing demand for agricultural insurance can be achieved, as we presented in the previous section, by extending the available agricultural insurance products in the market to other risks. In this section we analyse the introduction of insurance contracts for drought and soil submersion. As there are no collected empirical data of the damages caused by drought and soil submersion in Hungarian agriculture, we apply a model based on estimation using the Hungarian FADN meteorological and special survey data.

We consider a crop damage when the yield drops below the average yield of previous nine years. The farm level yield data are confronted with the farm level meteorological data in order to assess the influence of drought and soil submersion. A special survey was applied for collecting data on the farmers willingness to pay for drought and soil submersion insurance products.

Farm level monthly meteorological data were obtained by interpolation of precipitation, insolation, average temperature, minimum temperature and maximum temperature between neighbouring meteorological stations. These meteorological data were collected by 100 automatic stations.

We considered a farm injured by a drought when the yield was below the damage ceiling and the monthly rainfall in one month between March and September was lower than 10 mm. In case of soil submersion damage, farms with yield lower than the damage ceiling and with monthly rainfall higher than 80 mm between March and September were taken into account. The damage ceiling in case of wheat and barley is 4 tonne per hectare, in case of maize is 6 tonne per hectare and in case if sunflower and rapeseed 2 tonne per hectare.

Results

Extending risk management tools for Hungarian agricultural producers by introducing insurance products for drought and soil submersion risks accompanied by the subsidised insurance premiums needs an assessment of the costs and the level of insurance premiums. Average and high damage costs and insurance premiums are presented in case of different damage ceilings as a share of the average production value in Table 2. The insurance premiums of crop products for drought and soil submersion risks in case of average damage years in the period between 2001 and 2009 are ranging between 10% and 14%, and in case

of high damage years between 20% and 40% of production value. We considered 2003 as a high damage year for wheat, barley and sunflower seed in the analysed period; and 2007 for maize and rapeseed, because farmers recorded the highest damages in case of these crops in these years.

Table 2. Total damages and insurance premiums for different damage ceilings and crops

Crop	Damage ceiling, tonne/hectare	Average damage covering costs as a share of average production value, %	Insurance premium for an average damage year, %	High damage covering costs as a share of average production value, %	Insurance premium for a high damage year, %
Wheat	4	9.3	12.5	28.8	38.3
	3.5	5.5	7.3	19.9	26.6
	3	2.9	3.8	12.5	16.6
	2.5	1.3	1.8	6.9	9.2
	2	0.5	0.7	3.1	4.1
	1.5	0.2	0.2	1.1	1.4
Barley	4	9.0	12.0	17.4	23.1
	3.5	5.7	7.7	12.5	16.7
	3	3.4	4.5	8.2	11.0
	2.5	1.8	2.4	4.9	6.6
	2	0.9	1.1	2.4	3.2
	1.5	0.3	0.4	1.0	1.3
Maize	6	10.3	13.8	31.9	42.5
	5	5.8	7.8	19.6	26.2
	4	2.8	3.7	10.0	13.3
	3	1.1	1.4	3.9	5.2
	2	0.3	0.4	1.0	1.4
Rapeseed	2	7.7	10.2	20.2	27.0
	1.5	3.3	4.3	9.5	12.7
	1	0.9	1.2	2.3	3.0
	0.5	0.1	0.1	0.1	0.2
Sunflower	2	7.7	10.3	16.9	22.6
	1.5	2.6	3.4	6.1	8.1
	1	0.5	0.7	1.4	1.9
	0.5	0.0	0.1	0.1	0.2

Source: calculations carried out at Financial Policy Department of AKI.

A successful introduction of drought and soil submersion risk insurance required an assessment of the farmers willingness to pay for this insurance product. We have collected data about farmers' willingness to pay for insurance products by a special survey of the farms included in the Hungarian FADN System.

The calculations based on the survey and the FADN data reveal a very low level of farmers' willingness to pay as compared to the production value. The willingness to pay for drought and soil submersion insurance is below 2% even in the case of a complete damage compensation. In case of wheat, for example, only 1.8% of farmers declared that they would agree to pay 9% insurance premium in the case of 90% damage ceiling, while 17% of farmers opted for a 0.5% insurance premium. This low willingness to pay further decreases in case of lower damage ceiling, for example in case of 70% damage ceiling 36% of farmers have chosen the 0.5% insurance premium. If our aim is to attain a risk community of 50% in case of drought and soil submersion insurance, the insurance premium should be between 1 and 2%.

The costs of introducing drought and soil submersion insurance products for Hungarian farmers are higher than the farmers' willingness to pay for these insurance products (see Table 2 and Table 3). However, the increasing risks caused by drought and soil submersion in Hungarian agriculture require a development of Hungarian agricultural insurance system by extending the risks management tools and introducing drought and soil submersion insurance policies. Reducing costs of these insurance products or increasing farmers willingness to pay can be achieved by subsidising insurance premiums.

Table 3. The distribution of farmers' willingness to pay for drought and soil submersion insurance in case of different damage ceilings

Crop	Damage ceiling, %	Insurance premium as a share of production value, %								Total, %
		0.5	1.0	2.0	3.0	5.0	7.0	9.0	above	
Wheat	90	17.0	35.7	22.3	12.5	10.3	0.0	1.8	0.4	100
	70	36.1	29.3	12.0	11.5	9.6	0.0	1.4	0.0	100
	50	52.7	22.3	12.5	10.3	2.2	0.0	0.0	0.0	100
Barley	90	22.7	33.5	18.4	11.9	10.8	0.0	1.6	1.1	100
	70	38.3	29.4	12.8	9.4	8.3	0.0	1.7	0.0	100
	50	56.2	18.4	11.9	10.8	2.7	0.0	0.0	0.0	100
Maize	90	18.2	34.6	20.6	12.6	11.7	0.0	1.4	0.9	100
	70	37.9	29.3	12.6	10.6	8.1	0.0	1.5	0.0	100
	50	52.8	20.6	12.6	11.7	2.3	0.0	0.0	0.0	100
Sunflower	90	17.4	29.2	21.5	16.7	12.5	0.7	1.4	0.7	100
	70	36.8	25.7	11.8	10.3	11.0	1.5	2.9	0.0	100
	50	46.9	21.5	16.2	13.4	2.1	0.0	0.0	0.0	100
Rapeseed	90	15.4	22.0	19.8	20.9	14.3	3.3	2.2	2.2	100
	70	30.4	29.1	16.5	7.6	8.9	5.1	2.5	0.0	100
	50	47.9	19.8	15.8	12.1	4.4	0.0	0.0	0.0	100

Source: calculations carried out at Financial Policy Department of AKI.

Conclusions

More frequent adverse natural events have been increasing the risks exposition of Hungarian agriculture, which necessitates the development of an agricultural insurance system. This paper analyses, after presenting the development of Hungarian agricultural insurance system in the last two decades, the possibilities of drought and soil submersion risks insurance products introduction.

The up to now experience suggests that the reason behind the poor development of agricultural insurance system is related to both the supply and demand side of the market. Referring back to the mitigation potential of agricultural lands is also necessary here. It should not be forgotten that farmlands can play a significant role in mitigating the risk from the potentially vulnerable urban areas where costs could be significantly higher.

The new two-pillar risk management system has just entered into force in Hungary. The aim here is more to develop an efficient compensation system with a fair contribution from all stakeholders. The previous system failed in that context, the new has had no time to demonstrate its ability yet. However, due to the special characteristics of agricultural sector, it can be assumed that the public sector has a significant role in the compensation of extreme weather related agricultural damages and the state involvement is often necessary to provide a suitable environment to companies to develop agricultural insurance products that cover damages caused by extreme weather events.

A survey of Hungarian crop producers carried out in the Research Institute of Agricultural Economics (AKI) has revealed the farmers' low willingness to pay for drought and soil submersion risks insurance, while high damages caused by drought and soil submersion are characteristic for the Hungarian agriculture. The introduction of drought and soil submersion risks insurance has higher costs than the farmers' willingness to pay for these insurance products. The introduction of this new risk management product can be achieved with a government intervention by subsidising agricultural insurance premiums.

Extending risk management tools for agricultural producers by introducing new insurance products and subsidising the insurance premiums for farmers is going to increase the risk avoiding community which reduces the costs of operation for insurance companies and increases the income stability of the farmers.

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Szilvia Erdeiné Késmárki-Gally[1]
László Fenyvesi[2]
Hungarian Institute of Agricultural Engineering
Gödöllő

Tendencies and challenges in global agriculture

Abstract. The development of global agricultural market has been at the forefront of professional studies. Expert opinions have quite differing views as to whether the world's food production will be able to supply (and under what circumstances) the huge demand of growing population. Our paper provides a general overview of global agricultural trends, including alternative views on whether agricultural productivity increases will be able to keep up with food demand increases, price trends, and which regions of the world may undergo the largest food demand changes in the future. Our research has focused on the present state of the agricultural market and on the analysis of the key factors defining the tasks the agricultural sector faces in the near future, with a special attention to the case of Hungary.

Key words: globalization, market, technology.

Introduction

At the end of the 20th century, extremely significant changes occurred in the global agriculture, the accelerating technical development modified the economic processes. At the moment, the world's population is more than seven billion people and their daily food supply must be provided. Moreover, it is a widely accepted view that according to the UN estimates this figure will reach nine billion by the year 2050. Consequently compared with the present figure, by 2050 there will be three billion more of human beings and this number equals the total number of population of the globe in the 1950s. In the forthcoming decades the boost of population growth will be triggered by the underdeveloped regions. However, the centre of this situation will be shifted from China and India to Africa. The African continent in itself will contribute to half of the total population growth according to the calculations [Sippel et al. 2011].

Another reason for the problem is that not only the population will grow in the following forty years but the standards of living and the people's income as well and these result in a modification of consumption habits. In addition, there is a continuous growth of domestic consumption in the world; there is a growing demand for agricultural produce and food (this effect is significant in certain developing countries) and simultaneously there is more and more demand for producing industrial raw materials and developing 'non-food' agricultural crops. On the basis of the above mentioned facts, it is clear that the global demand for food products will double in the following decades and it also means challenges for the agriculture (along with mechanization).

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[1] PhD, head of department, address: H-2100 Gödöllő, Tessedik S. u. 4, e-mail: galli.szilvia@gmgi.hu.
[2] PhD, director general, professor, address: H-2100 Gödöllő, Tessedik S. u. 4, e-mail: fenyvesi.laszlo@gmgi.hu.

Research results

The world

There is a significant disagreement in opinions regarding the possibilities of supplying the growing demands. Even specialists do not agree on the question whether the global agricultural production is able to satisfy the rapidly growing new demands and under what conditions. There is a wide range of specialist literature dealing with the analysis of the changes in supply. On the basis of this, there is an optimistic approach, a traditional view, a pessimistic opinion and an approach focusing on the food production opportunities of the developed countries [Csáki 1999].

According to the optimistic view, there is no need to be worried about the global food supply perspectives regarding the near future. The food shortage after the Second World War lasted only for a few years in Europe. The quantity of harvested cereals doubled between 1950 and 1973; as a result it is believed that the food production will keep up with the new demands without having any problems in the following decades These quantitative forecasts compare these supply forecasts with forecasts of population growth, changes in income and the following changes in demand; on the other hand the trends defining the growth of agricultural production [Agcaoli & Rosegrant 1995]. As they see it, the pace of population growth is slower than the output growth of agricultural production. The situation of the global food market will still be defined by a surplus and not by an unsatisfied demand. The deterioration of the natural resources and the ecological dangers are not treated as a significant limitation in the near future, but it is emphasized that there is a continuous need to invest in the agricultural research, mainly in order to improve the conditions of agricultural production and its infrastructural conditions.

The traditional view believes in the food supply and food safety as a national problem[3]. According to this view, there might occur problems in the food supply especially in the developing countries where the ecological reserves are getting to be depleted[4] [Population... 1995].

According to the pessimistic view[5] the ecological reserves of the Earth are turning to be depleted and the global food production has to face new ecological, environment-related burdens [Brown & Kane 1994]. They believe that there might be more serious food-supply problems and a significant increase in the price level of food products as well as a possible unbalanced situation in the supply and demand. Their view is justified by the changes in the global cereal production; the biological limits that have been reached by the sea fishing; the deterioration of quality of pastures; the continuous shrinking of agricultural production area; the limited quantity of irrigation water. Also, the amount of money spent on agricultural research has been decreasing in many countries. For example in the most populous country, China, there is a threatening danger that desertification and a decrease of crop producing areas will jeopardise the agricultural production and water supply.

According to the attitude focusing on the developed countries' food production opportunities, the developed countries will export processed industrial products and technologies to the developing countries in exchange for raw materials and commodities

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[3] Self-sufficient system

[4] For example the size of arable lands is decreasing, the water reserves are needed as drinking water reserves.

[5] That is typical of environment protectionists ("the green") and those specialists who deal with the natural-ecological conditions of the agricultural production.

[Carruthers 1993]. At the same time the developed countries are exporting more and more food products to the developing countries[6] in exchange for manual-labour-intensive, processed products, consequently this is the solution to provide food supply[7].

After comparing the four major attitudes, it is not easy to state that any of these concepts is absolutely correct as the problem in itself is many-folded and complex. What is sure, each of these attitudes is focusing on a particular group of factors that defines the future. In reality, these factors most possibly occur in close interaction with each other.

What is a fact, the prices are a significant factor. For many decades, the main agricultural products have had decreasing relative price levels, but in the recent period (since 2002) the global agricultural price levels have been increasing (Table 1).

Table 1. Annual real food price indices (2002-2004=100)

Year	Food price index	Meat price index	Dairy price Index	Cereals price index	Oils price index	Sugar price index
2000	93.1	98.7	98.3	87.7	69.9	119.5
2001	99.1	102.4	113.6	91.8	71.7	130.1
2002	96.6	96.2	88.4	101.5	93.5	105.1
2003	97.7	96.7	95.1	98.1	100.8	100.5
2004	105.1	106.3	114.7	100.5	104.9	95.1
2005	109.7	112.4	126.6	96.8	96.9	131.2
2006	116.6	109.1	117.8	112.0	103.5	192.9
2007	139.6	110.0	186.7	146.7	149.5	125.7
2008	164.6	126.3	180.9	195.9	187.2	149.6
2009	135.0	114.3	121.7	149.4	129.8	221.3
2010	158.3	130.0	171.2	156.0	165.9	258.0
2011	200.2	155.3	194.0	217.1	221.9	324.5
2012	194.8	162.1	179.4	204.2	219.5	304.4

Source: [FAO... 2012].

After a relatively steady trend, there were drastic price increases in 2008 and 2010, something that was not typical of agricultural markets earlier. The decades long trend reversed what had been previously suggested that the relative food prices showed a decreasing tendency and that consequently the global prices followed the global changes in trends with regional specialities. According to experts the food prices started to go up because there was a boost in demand for food products that contained a higher level of added value and for more processed food products as well as because of a significant increase in the population of the Earth.

According to the latest published figures by the United Nation's Food and Agriculture Organisation [Agricultural Outlook... 2011], the global food prices showed a slight decrease in April 2011. The reason for the previous price increase was higher prices of

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[6] The agricultural production in the developed countries mainly takes place in the temperate zone that is more favourable for production.
[7] Tropical climate is typical of the agricultural areas in underdeveloped countries, which are especially sensitive ecologically and the opportunities to increase production capacity is limited.

vegetable oils and cereals and the global price drop was due to the decline in cereal and sugar prices. The food price index[8] by FAO was 215.9 points in March 2012. In February the price increase was even higher than that, at that time the index was 2.6 points higher than in January. At the same time in 2012 the global food prices were lower than in February 2011, which was the peak period as the index was at the level of 238 points, a result of an increase in cereal prices. Despite the continuous decline of the prices in the second half of the last year, the average of the index was at 228, the highest since FAO started to record this index in 1990. The previous peak was in 2008, when the average value of the index was at 200 points and there were some hunger strikes in certain developing countries.

As for the near future, the price levels of crops seem to stay at a higher level and also we can expect an increase in agricultural production in the short term. The consumer food prices are expected to go up in most countries, therefore it will result in a higher aggregated value of consumer prices inflation. These might cause anxiety about the economic stability and instability of food supply in certain developing countries as well, because the spending power of low income population is decreasing.

The market of the European Union is significantly protected. The so called PSE[9] level in agriculture is 25-28% on average; while at the same time it is around 10% in the USA, and it is lower than 10% in Brazil and New Zealand. In Hungary, the population spends 22% of its income on food, the same figure is 50% in India but it reaches only 10% in the USA [Producer... 2012]. Therefore the increase in food prices hits the poor more than the rich.

According to the OECD-FAO study [Agricultural Outlook... 2011], the per capita food consumption is most likely to increase the fastest in Eastern Europe, Asia and Latin America, in those areas where the incomes are increasing and the population is decreasing (Figure 1 and 2).
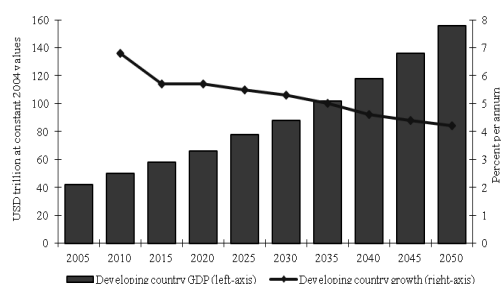
Fig. 1. Income growth in developing countries

Source: Simulation with World Bank's Envisage model from Baffes & Mensbrugghe [2009]
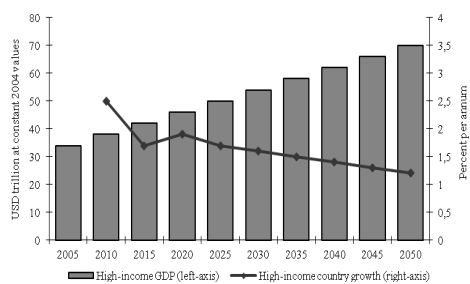
Fig. 2. Income growth in high-income countries

Source: Simulation with World Bank's Envisage model from Baffes & Mensbrugghe [2009]

In numerous supply fields, the available land for agricultural activities is more and more limited and the production must be expanded on less and less developed areas which can be described as having lower productivity and a higher risk of unfavourable weather

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[8] It is calculated on the basis of cereals, oilseeds, meat, dairy produces and sugar prices every month.
[9] Producer Support Estimate is the proportion of public support for agricultural producers.

conditions. This means that significant investments are needed in order to boost productivity, so that the agriculture will be able to meet the growing demand in the future.

In the future, the environmental problems are more likely to happen more and more often and in a more and more severe way. A decrease of environmentally damaging effects of intensive production methods must be achieved with increasing efforts. Providing a sustainable agricultural production is a major challenge. Consequently, there is a higher demand for the development of environmentally friendly agricultural technologies all over the world as well as for the more emphasised vindication of the requirements of sustainable agriculture.

Beside the human consumption, the competition for fodder for livestock and for raw materials for the bioenergy production is getting to be more and more significant. The incentive to grow non-food crops has become in the forefront in agriculture [Agricultural Commodity... 2011]. The raw materials for energy production are not only biomass but also oilseeds and cereals. The fast growing prices and decreasing reserves of fossil fuels are making the opportunities of energy production in agriculture more precious.

In relation to the agricultural production in the future and the possible tendencies in the agricultural markets, important factors are the biotechnological opportunities, the development of bioenergetics, the increase in arable and cultivated lands, the growth of irrigated areas and the level of environmental damages caused by agricultural production capacities.

Hungary

The accelerated development of the world economy and globalization has had a significant influence on the agriculture. The global trends have reached Hungary, irrespective of whether these influences are positive or negative. The Hungarian agricultural development cannot be separated from these tendencies. One of the challenges of our times is to understand these changes and to phrase answers.

Hungary has good ecological qualities, its competitive advantages in agricultural production are well known, the favourable natural characteristics and historical traditions of the country are better than the European and global average. At the same time, Hungary is able to make use of its ecological advantages if its technical and technological development makes it possible[10]. If the country's agricultural development falls behind, then the otherwise available ecological advantage will not happen. If there is a proper level of technical and technological development, in that case the opportunities can be taken advantage of.

The most important factors are the enhancement of the competitiveness of the agricultural and food industry and the application of supportive measures. All these must be evaluated in environmental, production quality and sociological dimensions. One of the most crucial problems of Hungarian agriculture is the adaptation to the modified market circumstances. The implementation of market economy has not been finished, this process is still happening. Another important task is the creation of an efficiently operating institutional system, the foundation of legal frames, setting up the protection of quality. The future of Hungarian agriculture calls for a significant enhancement of efficiency, productivity and competitiveness.

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[10] For example: technological funds, production technologies, methods of storage and conservation, etc.

Before the change of political regime, there were clearly defined production systems in operation in Hungary, integrating the research and development and the production. Parallel with this structure, the innovation was provided by the self-learning attitude of the system. The structure, as 'system administrators', practically fell apart after 1990. On the production side, the problem is that there is no production system that operates in the whole spectrum of agriculture. A significant priority is a fast technological development based on scientific results. There is a demand for creating such production methods which are able to enhance specific yields without damaging the environment and shrinking natural resources. These are enormous challenges for the sciences of agriculture, biology and ecology with respect to fulfilling needs of the future not only by an increase in each product's growth potential but also in the general food production's productivity and quality. It is such a complex task that it must incorporate not only the enhancement of knowledge and information but also investments and development processes. In the present situation, the creation of production system based on research and development can be promising.

Conclusions

There has been an increasing attention to the safety of global food supply and providing the safety of environment and energy supply has also been in focus.

It can be concluded that the majority of countries still have a huge, untapped production potential. The necessary resources are available in the world to meet the growing demands; the globally needed food supplies can be produced, there are sufficient land and water reserves; at the same time the productivity and agricultural investments are decreasing whereas the production size is increasing. There is a need for more investments and research in the future. There is a need for financial resources; the institutional structure and the economic environment are defining the expected development in all countries. There is a need for higher level of international cooperation in order to make the agricultural markets stable and to provide the sustainable development. The food supply of the 21st century depends on positive answers to the following questions.

- Will the world be able to develop such complex agricultural production systems that can increase the specific yields without damaging the environment?
- Will the world be able to develop the agricultural policies and institutions in such a way that they provide more favourable economic and incentive methods for the agricultural producers?
- The more developed a country is, the more money it spends on subsidizing, supporting research and development. Will the world be willing to increase spending on the research and development in agriculture?

On top of the above mentioned facts, the real growth rate of GDP is another important factor and a special attention is needed to the quality and safety of food and the ecological constraints.

Research in agriculture should have an increasing attention as it plays a significant role in the increase of production. Consequently one way to reach an increase in economy might lie in the special governmental subsidies to research and development. Tendencies are long-run, therefore long-term economic development programs must be built on these. There is a need for integrated area and country development strategies and preparations for the

climate change are inevitable. Those enterprises which can introduce the results of research and development achievements can enhance their competitive advantages. A fierce competition is typical for the global markets but it is absolutely sure that efficiently grown food products will find their buyers and there is a demand for a competitive produce (including Hungarian products) in the world.

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Julian T. Krzyżanowski[1]
Chair of Agricultural Economics and International Economic Relations
Warsaw University of Life Sciences

The future of direct payments system in the EU agriculture; European Commission scenarios

Abstract. The paper deals with the future of direct payments system in the EU agriculture. Different scenarios of the current system adjustments, as proposed by the European Commission, are presented. Four possible scenarios are being discussed: An 'EU flat rate', a pragmatic approach, the use of objective criteria and a combination of a pragmatic approach and objective criteria. It seems that the best option for the New Member States are the flat rate or the pragmatic approach criteria.

Key words: agriculture, Common Agricultural Policy, direct payments, EU Commission scenarios.

The system of direct payments in the EU has a long history, but their nature has changed significantly over the years. With the 1992 reform, they were introduced as coupled payments, linked to production based on farm acreage or number of animal heads and compensating farmers for cuts in price support. From 2003, direct payments were gradually decoupled from farmers' production decisions. For the rate of payment each farmer was eligible for, previous support receipts (linked to either the individual farmers' or the regions' production history) were used as reference.

Today, considerations have to be made with respect to a more equitable distribution of support between Member States and between farmers as well as to a strengthened role of the income support and public goods provision.

Distributional concerns stem from the current uneven distribution of support between individual farms and Member States. The latter issue is especially emphasized in the inter-institutional and public debate and by many of the new Member States (EU-12) that feel disadvantaged compared to the EU-15 countries, because their average levels of direct payments per hectare are lower.

Today, as adjustments in all agricultural sectors have taken place and as twelve more Member States have joined the European Union with a substantially different production and support history, differences in support levels based on historical references cannot be justified. Even more so because farm structures and production patterns have of course changed since the reference periods. Moreover, direct payments based on historical production patterns do not reflect the fact that important environmental public goods tend to be provided by farms with lower yields. Those farms also tend to be more economically vulnerable and so in need of greater support.

Present discussion is especially vital because of the preparation for the new Financial Perspective 2014-20. That is why decisions about the level of future direct payments across EU should be taken soon.

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[1] PhD, associated professor in WULS.

Redistribution of direct payments

The future distribution of direct payments (DP) should better reflect the dual role of direct payments for income support and provision of public goods by ensuring a better fit between these policy objectives and the budgetary means available. At the same time, the current distribution will need to be taken into account to avoid major disruptions. Several options for redistribution of direct payments envelopes between Member States can be foreseen:

- an 'EU flat rate': direct payments are distributed evenly on the total of potentially eligible hectares across Member States
- a pragmatic approach: limited adjustment of the existing distribution in order to avoid major disruptions to current DP levels, while setting an EU-wide minimum level of per hectare payment based on a share in the EU average
- an application of objective criteria: the EU flat rate is adjusted by objective criteria based on economic, physical and/or environmental indicators
- a combination of a pragmatic approach and objective criteria.

It should be noted that the simulations do not address the issue of the length and the modalities of a possible transition to the new distribution which will also depend on the final level of redistribution involved. The calibration of the transition period would not only be of importance for the Member States which would see their national direct payments envelope decreasing but also for the Member States which will benefit from an increase. Indeed, the sometimes important gains in direct payments per hectare in the following options could not only drive up land prices but also prove to be an impediment to structural changes, as they could prevent farmers from restructuring, growing and improving the profitability of their farms.

The starting point of simulations is the current level of direct payments per hectare, which is calculated by dividing the total direct payment envelope for each Member State (with 'phasing in' completed for the EU-12 and modulation taken into account at the level of 2013) with the total potentially eligible area for SPS/SAPS as declared by farmers and communicated by Member States to the Commission in the frame of the IACS (Integrated Administration and Control System; claim year 2008).

All simulations of the direct payments redistribution assume the budget for direct payments set out in the proposal for the Multi-Annual Financial Framework (MFF). Results of the different options are presented in comparison to the existing national envelopes based on the current distribution of direct payments.

EU flat rate

One option arising from the public debate would be to move away from historical references towards an EU wide 'flat rate' (or 'EU average') with the same level of aid per hectare to all farmers in the EU (option called 'EU flat rate' in the Commission documents). For the EU-27 the average level of direct payments, i.e. the EU flat rate would be EUR 267/ha of potentially eligible area (PEA).

This option would produce significant losses for Malta, Belgium, the Netherlands, Italy, Cyprus and Denmark while substantial gains for Latvia, Estonia, Lithuania, Poland

and Romania. In absolute terms, the biggest winners would be Romania, Poland and Estonia, while the biggest losers would be Italy, Denmark and France. The total amount redistributed would reach EUR 4,394 million.

However, as explained in the Communication on the CAP towards 2020, a flat rate payment across the EU may fail to reflect differences in the economic and environmental situation in the Member States, since a given level of payment does not have the same effect on income and each hectare does not equally contribute to the provision of environmental public goods [Communication… 2010]. Moreover, the change from current levels of support to the flat rate could be disruptive in certain cases as indicated above.

Finally, it has to be kept in mind that land is distributed unevenly between farms: in the EU-25 almost 90% of land is concentrated in 20% of holdings. Therefore, a move to an EU flat rate with an even rate of direct payments per hectare would not solve the problem of an uneven distribution of direct payments between farms as this is based on the structural reality of farming in the EU.

Pragmatic approach

Another option mentioned in the Communication is to adopt a pragmatic approach, by providing for instance that all Member States get at least 80% of the EU average per hectare.

In the status quo distribution, eight Member States are below the 80 % threshold, while eleven Member States are above the EU average. The cost of lifting the per hectare payments in the poorer Member States to 80% of the EU average (i.e. to EUR 213/hectare) would be covered on a proportional basis by the eleven Member States that are situated above the EU average. This would require a reduction of their envelopes, while the envelopes of those Member States who fall between 80% and 100% of the EU average would remain unchanged.

This option would allow addressing the situation of Member States which are significantly below the EU average while mitigating the impact of redistribution on those above the EU average. In absolute terms, the biggest winners would be Romania, Latvia and Lithuania, and the biggest losers France, Denmark and Italy. The total amount redistributed would come to EUR 847 million.

It could also be envisaged that Member States that currently have direct payments below the level of 80% of the average will by 2014 close 1/3 of the gap between their current level and the 80% level.

This option would provide less convergence for the Member States below 80% of the EU average. Consequently, the cost of convergence to be borne by Member States above the EU average would also be more limited. In absolute terms, the biggest winners would be again Romania, Poland and Estonia, while the biggest losers would be Italy, Denmark and France. The total amount redistributed would come to EUR 738 million.

Alternatively, it may be envisaged that all Member States get at least 80% and that no Member State gets more than 120% of the flat rate (option called 'Tunnel 80').

This option would provide a more substantial convergence around the flat rate. However, the cost of convergence would be borne by a more limited number of Member States that would face significant reductions in their envelopes. In absolute terms, the biggest winners would be again Romania, Latvia and Lithuania, while the biggest losers

would be Italy and the Netherlands. The total amount redistributed would come to EUR 847 million.

Use of objective criteria

Another option would be to base the distribution on objective criteria that reflect the dual role of direct payments in providing income support and public goods and would thus ensure a more equitable and efficient use of budgetary resources.

Possible objective criteria are very diverse in nature and may provide a very different outcome in terms of redistribution of direct payments on account of the specific economic and environmental situation of each country. The difficulties with reaching agreement on such objective criteria should not be underestimated. A selection of the criteria which have been most discussed in the institutional and public debate is given below.

For general economic criteria, PPS (purchasing power standard) and GDP/cap: an index is used for the adjustment in relation to the EU average, with the Member States with higher GDP/capita (expressed in PPS) receiving higher direct payments/hectare. These criteria would reflect disparities in the costs of living between Member States.

For economic criteria related to agriculture, AWU (annual working unit) and GVA/AWU (gross value added per AWU): a comparison to the EU average, with the Member States with higher GVA/AWU receiving higher direct payments/hectare. These criteria would reflect differences in productivity in the agricultural sectors of Member States.

For the environmental criteria, acreage of less favoured areas (LFA), Natura 2000 zones and permanent pasture: The index compares the share of the relevant area in the Member State's total utilised agricultural area (UAA) to the EU average. Thus Member States with a higher share of these types of areas get higher direct payments/hectare. These criteria would reflect disadvantages in particular areas or areas that are particularly important for the provision of public goods.

Another approach would be a combination of economic and environmental objective criteria to adjust the EU flat rate, based on the following formula (using a weight of 2/3 for economic and 1/3 for environmental criteria).
Flat rate x [2/3 x [(2/3 GDP/cap + 1/3 GVA/AWU)] + 1/3 (1/3 LFA + 1/3 permanent grassland + 1/3 Natura 2000 area)], where the components are relations to the EU average.

The use of objective criteria giving more weight to economic criteria would accentuate the gap between the EU-12 and the EU-15 Member States (United Kingdom, Spain and France) and it would most improve the situation of the last in absolute terms. With environmental criteria Spain, United Kingdom and Portugal would profit most. With a combination of economic and environmental criteria Spain, United Kingdom and Ireland would be the greatest winners while in addition to Italy and Belgium also Poland would be among the biggest losers. For the smaller Member States (Malta and Luxemburg) an ad hoc solution would be most likely in any case when using objective criteria, given the extremity of the impact for these Member States.

The main problem with this option is the fact that it would entail <u>massive redistributions</u> (e.g. with the latter formula combining economic and environmental objectives the total amount redistributed comes to EUR 4,516 million which could, however, vary depending on the exact weighting of the different objective criteria taken

into account) which is likely to make it politically unacceptable for many Member States to agree to such a redistribution.

Combination of a pragmatic approach with objective criteria

Obviously, there are different ways to combine objective criteria. There are also different ways of combining objective criteria while taking into account the convergence objective and the current distribution, such as:

- to ensure a minimum level of convergence (e.g. that all Member States get at least 90% of the EU average) while using objective criteria to define the level of payments in Member States currently above the EU average (option called 'Min90% with objective criteria' in the Commission document [Communication… 2010]); the total amount redistributed would be EUR 2,164 million
- to apply the objective criteria to the difference between the current distribution and the EU average so as to ensure that all Member States that are above the flat rate will be reducing their direct payments but still remain above the flat rate and those that are below the flat rate will be increasing their direct payments but still remain below the flat rate; the total amount redistributed would be EUR 2,534 million.

The discussion is still going on and will most probably be this way till the end of 2012. However, the best option for the New Member States are the flat rate or pragmatic approach criteria.

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Annet Lászlók[1]
PhD School in Business and Management Sciences
Szent István University
Gödöllő, Hungary

The impact of energy crop production on land use in Hungary

Abstract. Use of land, as a limited resource is gaining importance due to the rapid growth of Earth's population, the subsequently increasing demand for energy and the presumed impact of climate changes. Despite of the land being a specific resource, as lots of experiences confirm, in most of the countries, as in Hungary, it is not managed optimally. It is a question whether the optimum balance can be reached between different land utilization and production methods and not harming food supply safety but improving the competitiveness of agriculture, decreasing the energy dependence and avoiding an excessive use of soils. The paper analyses the impact of energy crop production on land utilization in Hungary. The current production and technology on the available land cannot satisfy the total energy need by bioenergy. But if land is used which is not cultivated at present due to economic reasons and the possibilities of by-products available in great quantities are exploited, the Hungary's EU commitment can be fulfilled by 2020. and the country will not risk food production losses or modify the land use considerably.

Key words: arable land, land utilization, energy crop production, biofuel, energy dependence, food safety.

Introduction

The concept of land use can have two meanings. The beginning and expansion of land cultivation, when the land is drawn into cultivation, and the development of cultivation methods is land utilization in the classical sense. In current sense, land utilization means the state in connection with the full exploitation and protection of land, in correspondence with the records of users [Dömsödi 2006].

Land has an outstanding role among the means of production as the basis and source of agricultural activities. Arable land belongs to the group of renewable resources. It is available in limited quantity in all countries.

The wasteful consumption, the low-performance technologies and the accelerated growth of the world's population numbers confronts the people on the Earth with the limits of natural resources and the urging need to manage these resources rationally.

According to the forecasts, the population of Earth will be more than 9 billion by 2050 and the agricultural production should therefore be increased by 70% compared to the current level due to the growth of specific needs. It means that land and land utilization will be of significantly higher value [Bozsik & Magda 2010].

In the Hungarian and international references, a lot of studies discuss the changes of land use [Rabbinge & Diepen 2000], introduces the altering land use in Europe and tries to determine the degree of optimal land use. Fekete-Farkas-et al. [2008] used scenario analysis to explore how the climate changes, agricultural policies, social and economic changes affected land use in Europe. Ben Frajd et al. [2012] set up an agricultural supply side model

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[1] PhD student, address: Gödöllő, Károly Róbert street 1, e-mail: laszlok.anett@gmail.com.

to examine the impact of European miscanthus yield changes on land use. The Global Biosphere Management model helped to analyse the impact of world climate changes on yield fluctuations and land use, as well as, through these, on food safety [Fuss et al. 2011].

Garay et al. [2012] examined the impact of energy crop production on land use. Their paper analyses the potential quantity and utilization of biomass-based energy sources in Hungary. They have concluded that sufficient biomass, waste and by-products are available in Hungary in order to reach the targets defined in the energy strategy, therefore it is not necessary to involve more land in energy crop production.

Ciaian et al. [2012] explored how the changes of fuel and biofuel prices affect the land use. They have concluded that land use changes if the fuel prices change and this impact is strenghtened by biofuels. The impact can be direct or indirect. The direct impact regarding land use changes refers to a situation when the land is already in use and crops for biofuel production are planted. In case of indirect impact, plots of land that were not used previously are involved in agricultural production. Empirical results have confirmed that energy prices affect the land use. The authors say that all agricultural products have an impact on energy prices, even those which are not used directly for bioenergy production.

The greatest problem regarding land use is that there are more competing needs on behalf of users. The production of renewable energy sources actually competes with the aims of food production and nature preservation, in addition to other land-use purposes. The different biomass production technologies for energetics purposes are also rivals of each other because the production of bio-fuel raw materials needs land as much as energy forests or herbaceous energy crop plantations [Gyulai 2010].

The price of land in Hungary, in spite of the fact that it is constantly increasing, is much lower at present than in the member states of the European Union [Takacs-Gyorgy et al. 2007], [Takacs-Gyorgy et al. 2011] which significantly affects the competitiveness of agriculture [Biro 2007.]. The land market in the EU countries, as well as almost the whole world, is in shortage of land supply. The demand is increasing but the supply grows only at a smaller pace. If farmers expect greater profits, the price of land will continue to grow.

Another risk factor is the climate change [Fekete-Farkas et al. 2008]. The forecasted climate change will affect crop yield, animal husbandry and the locations of agricultural production, considerably endangering the incomes from agriculture and increasing the risk of withdrawing land from production. The risks connected with food production may cause problems in some parts of Europe because the heat waves, drought and insects will probably result in more yield losses. The higher is the changeability of yield, the greater is the risk of global food supply [Szabó-Barótfi 2009].

In 2009, in the frames of directive 2009/28/EC about the promotion of use of energy from renewable sources, the EU determined, as a mandatory target to be reached by 2020, that 20% of the total energy use should come from renewable sources within the EU (Hungary targeted at 13%). The transport sector's target is 10% as a share of biofuels in trasportation fuels as a whole. At the same time, the 2009/30/EC directive, as regards the quality of fuels, approved as a mandatory target for the EU as a whole to reduce the greenhouse gas emission intensity of fuels used in transport by 6% by 2020. These international expectations stimulate a growing competition in the changes of land use.

Material and method

The database of the Central Statistical Office (KSH) of Hungary was used the for the analysis of land use. When examining the raw material price changes, the calculations were made with the average wheat prices and the annual median EUR rate of the Hungarian National Bank (BÉT) was used for changing from HUF (Hungarian forint) to EUR. Then model calculations were carried out to determine the size of land required in Hungary to achieve the European Union target.

Analysis of the situation

The human society consumes or uses different resources in order to maintain life activities. Two big groups of resources can be distinguished: social and natural resources. The definition of social resources is very far-reaching but essentially it means labour force which is one of the main factors of production. In modern economic sense, it also involves the qualification, competency and other features of human capital. Natural resources include those natural qualities which are exploited by the society for fulfilling its needs at the given development level of society [Bora & Korompai 2001].

The basic resources of agricultural production (labour, means, land) still offer an exploitable comparative advantage in international comparison for the national economy as a whole. The land, as a natural treasure is the most important and most complex, multifunctional resource.

Due to the special features of land, the characteristics of competitive market do not prevail in pure form in case of land market. The specific features of land, as a factor of production, can be summarized according to the following.

- It is fixed, it cannot be moved from one point of Earth to the other. Its geographical position usually depends on the changes of environment. Therefore land is often purchased with speculation purposes [Mizseiné Nyiri 2010].
- Its supply is given and unflexible. The land available for the agricultural sector of a country is usually given, although there are some countries which engage new areas in production in order to provide food for the increasing population (e.g. South America). The situation is different in Europe, because here the quality improvement of existing land or investments (e.g. irrigation) are implemented to produce enough foodstuff on a given area of land.
- Its demand is a derivative demand, so the price is determined by the marginal income of products produced on it. It depends on the quality of land, thus the price of different quality land changes according to the range of products that can be produced on the given area and the quantity connections of marginal returns, average and marginal efficiency of individual products.
- Its alternative utilization is limited, not all the land plots are suitable for any kind of agricultural activities.
- Its fertility can be improved by amelioration, so it is possible to produce a number of products there.

- If it is used properly, it does not go down in value, it is not amortized. Moreover, its value can even be increased by rational use, so it has capital accumulation and asset increasing role.
- The land value or land price as a cost is also specific, because, unlike other means of production, it is returned not in the value or price of the produced output, but it is used without being used up. Thus the money spent on land purchase is always available and can be withdrawn from production by land sale.

Agriculture and related land use is closely connected with the livestock breeding sector, too.
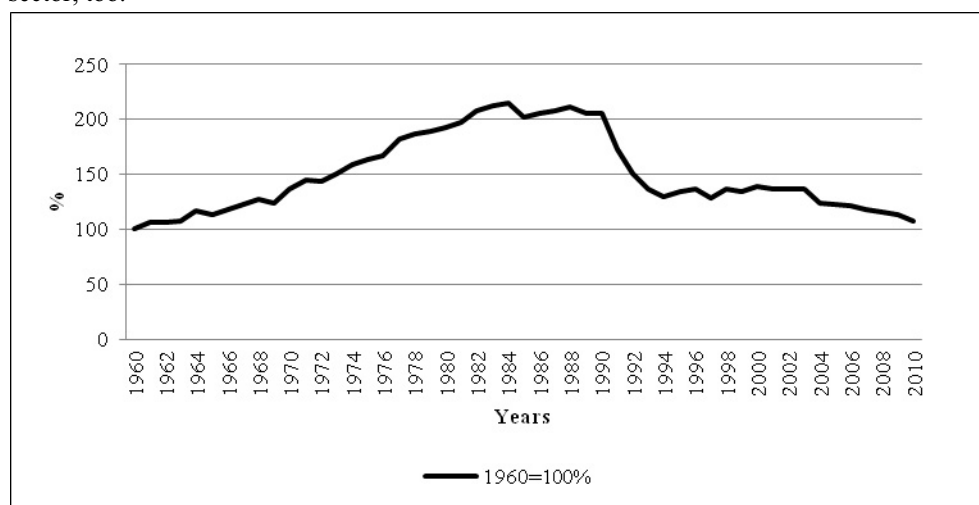
Fig. 1: Gross production index of livestock breeding between 1960. and 2010.

Source: own work on the basis of KSh publication [Mezőgazdaság,,, 2012].

The structure of land utilization significantly affects the performance of agricultural production. In Hungary, the livestock number has dramatically decreased from 1990, following the social transition, and it has resulted in considerable changes in land use. Subsequently, new possibilities should be explored in order to improve the stability and profitability of agricultural sector. In addition to the well-known ways of use like food production, industrial raw material production, fodder production, herbs production, nature protection, recreation services, environmental maintenance, a new alternative has emerged: the energy raw material production, which offers new ways of utilizing the redundant stocks thus improving the situation of agricultural sector and reducing our energy dependence.

It is obvious from Table 1 that Hungary needs significant volumes of imports with regard to crude oil and natural gas consumption. The import of natural gas is 2.9 times higher than the domestic production, while the crude oil import is almost 6,9 times higher. Our energy dependence is around 70% at present, due to the scarce stocks and because the marginal cost of their exploitation is higher than the market price. Hungary can ease this dependence by growing energy crops and producing bioenergy from them. In order to implement this, however, the questions of land use should be discussed because the security of food supply cannot be harmed.

Table 1: Energy production and imports of Hungary in 2009

Type of energy resource	Production		Imports	
	Tj	%	Tj	%
Coal	65 104	14.20	47 117	6.43
Oil	33 055	7.21	226 747	30.93
Natural gas	113 760	24.81	331 059	45.16
Firewood and other biomass	76 404	16.66	1 294	0.18
Electric energy	170 155	37.12	126 923	17.30
Total energy consumption	458 478	100.00	733 140	100.00

Source: Own work on the basis of reports [Energiamérleg... 2012].

Branch of cultivation means the method of utilizing the soil. In the recent decades the territory of the country was as follows in terms of different ways of land use and cultivation branches:

Table 2: Branches of cultivation in Hungary, thousand hectare

Type of land	Year						
	1950	1960	1970	1980	1990	2000	2011
Arable land	5518.1	5309.8	5046.2	4734.7	4712.0	4499.8	4322.3
Vegetable garden	94.4	107.5	146.3	291.4	341.2	101.6	81.5
Orchard	58.1	82.3	171.6	138.4	95.1	95.4	92.4
Vineyard	230.2	203.6	229.7	167.8	138.4	105.9	82.1
Grassland	1474.7	1437.9	1281.3	1294.2	1185.0	1051.2	758.9
Agricultural areas	7375.5	7141.1	6875.1	6626.5	6473.0	5853.9	5337.2
Forests	1165.9	1306.2	1470.7	1610.3	1695.0	1769.6	1921.7
Reeds	29.4	26.1	32.3	37.7	40.4	60.0	65.5
Fish ponds	..	..	..	25.3	26.8	32.0	35.4
Cropland	8570.8	8473.4	8378.1	8299.8	8235.0	7715.5	7359.9
Area withdrawn from cultivation	728.2	829.7	925.1	1003.8	1067.0	1587.5	1943.5

Source: own work on the basis of KSH reports [Magyarország… 2012].

Table 3: Share of agricultural land of Hungary in the total area, %

Type of land	Year						
	1950	1960	1970	1980	1990	2000	2011
Arable land	59.34	57.08	54.24	50.89	50.66	48.37	46.46
Agricultural area	79.31	76.76	73.90	71.23	69.59	62.92	57.37
Cropland	92.17	91.08	90.06	89.21	88.53	82.94	79.11
Area withdrawn from cultivation	7.83	8.92	9.94	10.79	11.47	17.06	20.89

Source: own work on the basis of KSH reports [Magyarország… 2012].

The division of the country according to branches of cultivation is the result of a long historical development [Magda 2001]. In 2011, the cropland occupied 79.11% of the total

9,303.4 hectare area of Hungary. The cropland includes agricultural areas, forests, reeds and fish ponds, the ratio of which has been growing in the recent years. A major part of the agricultural area is the arable land.

The ratio of agricultural area to the total territory of Hungary has decreased by almost 22% in the last 60 years. The most obvious is the reduction of arable land by 13%. The size of land withdrawn from cultivation, however, has doubled since 1950. Industrial development, water settlement, urbanization and modernization of transport networks take away considerable areas from agriculture year by year. Some land is withdrawn from cultivation due to economic reasons. Foodstuff raw material cannot be produced profitably on these areas but they could be utilized for growing energy crops.

The size of territory with unfavourable conditions is 883,558 ha, which is 14% of the total cultivated area. These fields are not competitive in the market due to environmental drawbacks (climate, height above the sea level, soil features, etc.) but farmers on these areas should perform farming activities aimed at the environmental protection or improvement, protection of landscape as well as maintenance of touristic attractiveness of the region. The fertility of soil is worse on these areas, therefore the yield is much smaller than on better land [Kukovics 1972]. State subsidies can be requested for the cultivation of these areas, but it is stipulated in regulations that no subsidy can be given for the production of wheat, rice, maize, sugar beet, potato, vegetables and industrial crops.

Land utilization is measured on the basis of the value of land area expressed in arable land units. The different branches of cultivation and the arable land used in different ways are transfered into arable units. The changes of land utilization index is introduced in Table 4.

Table 4: Land utilization index in Hungary between 1990 and 2011, %

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Land utilization index	79.56	79.42	82.35	81.68	81.70	81.18	81.07	80.94	80.88	80.72	79.32
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Land utilization index	78.70	78.54	78.49	78.53	77.99	78.01	77.97	77.30	77.21	77.35	77.19

Source: own calculation on the basis of data from Central Statistical Office (KSH).

The land utilization index helps to analyse how the land use changed during the examined period. In Hungary, the land use has decreased by 2.37% compared to 1990, which cannot be regarded as a significant change. The land exploitation was 77.19% in 2011.

If the pressure to use biofuels increases, the demand for raw materials will be greater. The prices will grow together with the demand and more people will consider a purchase profitable. It will lead to an increase of cropland at the expense of nature. It is obvious that the land use competition will first damage the natural ecosystems, then the production of raw materials. In this regard, as in case of other European intents of environmental improvement, the environmental load will be shifted to the third world, too [Gyulai 2010].

The raw materials for biofuels can be produced on land transformed directly from other category of land into agricultural field. If, however, these crops are grown on existing agricultural plots, it can oust the production of other crops which ends in the conversion of the land into agricultural area. This indirect impact manifests itself in the changing demand

in the world market for agricultural raw materials and substituting products. The price change can alter the behaviour of market actors, it may lead to increased land use, which often results in modifications in land use. The higher prices can also stimulate the market actors to increase the volume of yield on the existing agricultural areas [Report... 2010]

Results

Hereinafter the eleven-year changes of yield averages, sowing area and sales price of two crops, wheat and rape, are analyzed. These crops serve not only as foodstuffs but also as raw materials for alternative energy sources.

Table 5: Wheat production output in Hungary during the last eleven years

Calculation item	Year										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Median yield, t/ha	4.31	3.52	2.64	5.12	4.50	4.07	3.59	4.98	3.85	3.71	4.21
2001=100%	100.00	81.69	61.26	118.72	104.40	94.47	83.22	115.58	89.42	85.96	97.71
Sowing area, thousand ha	1208.7	1112.2	1116.7	1176.4	1136.5	1091.4	1115.1	1125.6	1156.1	1065.6	986.9
2001=100%	100.00	92.02	92.39	97.33	94.03	90.30	92.26	93.13	95.65	88.16	81.65
Sales price, EUR/t	113.53	96.62	126.74	123.81	90.99	105.80	174.97	165.71	97.44	136.23	191.70
2001=100%	100.00	85.10	111.64	109.05	80.15	93.19	154.12	145.97	85.83	119.99	168.86

Source: own work on the basis of KSH (Central Statistical Office) and BÉT (Budapest Stock Exchange) databases.

Table 6: Rape production output in Hungary during the last eleven years

Calculation item	Year										
	2001.	2002.	2003.	2004.	2005.	2006.	2007.	2008.	2009.	2010.	2011.
Median yield, t/ha	1.87	1.60	1.52	2.78	2.31	2.38	2.20	2.65	2.22	2.16	2.23
2001=100%	100.00	85.77	81.43	148.45	123.53	127.22	117.67	141.89	118.92	115.63	119.54
Sowing area thousand ha	110.94	128.30	81.73	103.78	122.72	144.72	223.58	251.91	267.22	265.16	240.02
2001=100%	100.00	115.65	73.68	93.55	110.63	130.46	201.54	227.08	240.88	239.02	216.36
Sales price, EUR/t	206.55	209.90	228.66	194.97	..	235.68	293.69	371.18	250.00	320.48	433.98
2001=100%	100.00	101.62	110.70	94.39	..	114.10	142.19	179.70	121.03	155.16	210.11

Source: own work on the basis of KSH (Central Statistical Office) and BÉT (Budapest Stock Exchange) databases.

One of the most important cereals in Hungary is wheat. Its sowing area has been about 1.1 million hectare on average in the last 10 years, but it is decreasing. The yield average is

4 t/ha, which is also affected by the weather. In drought-stricken years the median yield is below 4 t/ha. The sales price depends on the quality of wheat and the quantity of crop, too. The sales price of wheat had a peak in 2007, which was a very dry year. The sales price was the best in 2011.

The median yield of rape was 2.12 t/ha in the last ten years. The importance of rape is constantly increasing, its sowing area has doubled as compared to 2001. Rape is grown on bigger areas mostly for eating purposes but also because the rape production can be well mechanized and the by-products of oil making are valuable fodder. The sales price of rape has also more than doubled in the recent years.

The territorial limits of substituting our full energy consumption are demonstrated by the case of rape. The rape would give 1.45 tonne of rape oil in case of 3 t/ha/year yield. The heating value of this oil is 40MJ/kg. (Table 6. shows that there is no such median yield in Hungary.) It is 58 GJ/ha/year, and 539.4 PJ on 9.3 million hectare. So about half of the total average energy demand could be met with rape. According to the literature, in case of rape half energy should be reinvested for the production of this amount of pure energy [Gyulai 2010].

1293 million liters of petrol and 1587 million liters of diesel oil were consumed in 2011. Since we do not know how much our fuel consumption will be in 2020, we presume on the basis of data of 2011 that 10% of this consumption should be replaced by biomass in the transport sector. If in case of etanol, we calculate with 1200 l/ha annual production, in case of biodiesel with 1400 l/ha [Gyulai 2010, p. 63] we need about 221 thousand hectare of land for this. It could be satisfied by involving the non-utilized areas (the size of not-utilized agricultural areas was 240 thousand hectare in 2007 [Bai 2008]) but we still do not include the biomass energy used not for transport purposes which would significantly increase the land size required for this.

Moreover, as the by-product of food production, there is about 8-10 million ton maize stalk and straw available as well as other by-products like e.g. vine-shoots and sunflower stems, and only part of these should be returned to the soil as nutrient. The remaining quantity could be used for energy production, so it would not be necessary to involve further land plots into energy crop production.

Conclusions

Although it seems to be a good idea to grow less soil-intensive, ligneous energy crops because they reduce the fertility of land only slightly, in author's opinion those energy crops should be farmed in Hungary which can also be utilized for human consumption after a year of weaker yield. Following a year of better yield, however, the remaining part, above the fodder and foodstuff needs, can be utilized for energy purposes. The areas which are not cultivated for economic purposes can be involved and thus the soil decay can also be decreased.

If, however, the farmers regard energy crop production more profitable than traditional crop production, it can happen that the changing demand increases the prices of agricultural food products which might lead to the expansion of cropland and the modification of land use. It would also endanger the safety of food supply.

Considering the safety of food supply, it seems to be necessary to develop a background industry which undertakes the profitable processing of agricultural by-products, which are available in great quantities, for the purposes of energetics.

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Wiesława Lizińska[1],
Renata Marks-Bielska[2]
Department of Economic and Regional Policy
Varmia & Mazury University
Olsztyn

Acquisition of land property by foreigners in Poland in 2000-2010

Abstract. The objective of the present study has been to evaluate changes in the number of sales and in the area of land real estate, including agricultural and forest land, bought by foreigners in 2000-2010, and also in the land real estate acquired via transactions such as acquisition or taking hold of stocks and shares in companies which had been owners or perpetual users of real estate. The authors have used secondary data from the Ministry of Interior and Administration[3], the Institute of Agricultural Economics and Food Economy, the Agricultural Property Agency (APA) and the Ministry for Agriculture and Rural Development. Most agricultural and forest land and other types of real estate sale transactions were concluded in 2007. In 2000-2010, foreigners bought land real property with total acreage of 37,588.57 hectare. Since 2008, a dynamic increase has been observable in the area of land property purchased through transactions of acquisition or taking hold of stocks and shares by foreigners in companies which had been owners or perpetual users of real estate (in 2006-2010, foreigners bought 75.4% of the total area of land bought in this way). In 2000-2010 foreigners acquired in total 65,731.79 hectare of land real estate in Poland, while the total area of land sold from the resources of APA during the same time period was 1,228,000 hectare.

Key words: land property, foreigners.

Introduction

Land property is a particularly important component of the real estate resources available in the Polish market. Despite new and frequently changing conditions governing our economy, land remains a fundamental production resource in farming [Johnson 2002; Swinnen & Vranken 2009; Marks-Bielska 2009; 2010; 2013]. Land buying and selling is affected by a number of factors, rooted in the historical, economic and social or cultural context, but in Poland, the European Union's enlargement remains one of the most essential aspects [Lizińska 2005].

Agricultural real property is, according to the article 2 section 2 of the Act of the 11th of April 2003 on management of the agricultural system [Act… 2003] effective as of the 16th of July 2003, the agricultural land as defined by the civil code (that is land that is or can be used for conducting production activities in agriculture in the areas of crop or animal production, not excluding horticultural, orchard and fishery production), excluding real property situated in the areas allocated in physical development plans for purposes other than agriculture [Marks-Bielska 2009].

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[1] DrSc, e-mail: wieslawa.lizinska@uwm.edu.pl.
[2] PhD habilitated, professor in V&MU, e-mail: renatam@uwm.edu.pl.
[3] In November 2011 name changed to Ministry of Interior.

The question of regulating the land property purchase by foreigners provokes many discussions, not just in Poland. It should be mentioned, however, that unrestricted acquisition of real property by foreigners is an element of freedom in economic activity and in flow of production means. Since 2004, citizens and entrepreneurs from the EEA states have been allowed to purchase shares and stocks in companies which owned real estate, including the agricultural one, without a requirement to obtain permission [Kisiel et al. 2007; Pałasz 2005].

Foreigners can become users of the State Treasury's agricultural real estate either by buying or renting some real property from the Resources of the Agricultural Property Agency, or through buying stocks or shares in companies which hold ownership or perpetual usufruct rights to agricultural real property, and by doing so they support the scale and structure of the private sector in Poland [Szewc-Rogalska 2004]. As mentioned above, it should be borne in mind that since 2004 citizens and entrepreneurs from the EEA states have been allowed to purchase shares and stocks in companies which owned real estate, including agricultural one, without the requirement to obtain permission [Oleszko 2009, Rynek… 2011].

Selling real property is the most permanent and desirable way of taking advantage of the state's land resources. For the buyer, the land purchase favours long-term investment into the purchased property. For the Agency, selling some land is advantageous for two reasons. First, all the revenue from the transaction is earned in a short time; secondly, the Agency is released from the obligation to supervise the property [Kozłowska-Burdziak 2005]. Foreigners can also participate in auctions, provided they have been granted a permission to purchase real estate by the Minister of Foreign Affairs, pursuant to the regulations governing the acquisition of real estate by foreigners. For several years now, German, Dutch, Finnish and Danish investors have invariably been the major buyers of land from the Resources of the State Treasury [Marks-Bielska & Woźniak 2009, Marks-Bielska 2010].

Renting land, too, plays an important role in the land turnover involving foreign citizens. Leasing requires less financial outlay than buying for many farmers, including foreigners, and it is a convenient and relatively easily accessible way to get hold of land property from the Resources of the State Treasury. However, for the land renting system to function properly, stable conditions need to be ensured [Ziętara 2001; 2009].

Aim of the study and data sources

The objective of the present study has been to evaluate changes in the number of sales and in the area of land real estate, including agricultural and forest land, bought (with a permission and without the obligation to obtain one) by foreigners in 2000-2010, and in the land real estate (including agricultural and forest land) acquired via transactions such as acquisition or taking hold of stocks and shares in companies which were owners or perpetual users of real estate. Another purpose of our analysis has been to evaluate the relations between particular types of purchased land and between ways in which it was bought over the last ten years.

In this study, the authors have used secondary data originating from reports by the Ministry of Interior on the execution in the years 2000-2010 of the Act of 24 March 1920 on land acquisition by foreign citizens [Sprawozdanie… 2012], and the data provided by

the Institute of Agricultural Economics and Food Economy, the Agricultural Property Agency and the Ministry for Agriculture and Rural Development. These data contained such information as number of land property acquisition transactions (including agricultural and forest land), either with required permission or without such an obligation, as well as the purchase of land real estate (including agricultural and forest land) acquired via the acquisition of stocks or shares in companies which were owners or perpetual users of real estate.

Changes in the number of transactions and in the surface of land acquired by foreigners

In most countries, buying land by foreigners raises heated debates, because it means relinquishing some of the national treasury. In all of the EU countries, there are restrictions imposed on the real estate sale. In Poland, the transitional period regarding the acquisition of agricultural and forest land by foreigners is the longest among all other countries which accessed the EU at the same time as Poland. The number of transactions of real estate sale to foreigners in Poland in 2000-2010 is presented in table 1.

Table 1. Number of transactions concluded by foreigners to acquire real estate in Poland, with a permission or without the obligation to obtain one, in 2000-2010

Year	Agricultural and forest land		Other types of real estate	
	without permission	with permission	without permission	with permission
2010	241	175	3713	133
2009	218	188	3063	140
2008	190	250	3248	115
2007	195	294	4410	136
2006	106	283	3190	123
2005	119	128	2338	348
2004	96	75	1341	1042
2003	73	107	321	1602
2002	56	100	313	1601
2001	47	74	348	1198
2000	95	27	515	929
Total	1436	1701	22800	7367
Total transactions in groups	3137		30167	
Number of all transactions	33304			

Source: authors' calculation based on the report by Minister of Interior [Sprawozdanie… 2012].

At present, a considerable number of land sale transactions by foreigner buyers can be concluded without permission. However, prior to Poland's access to the European Union, the proportions were opposite. This is attributable to the change in the regulations on land

purchase by citizens of the EU countries. This change has led to a considerable increase in the total number of land purchase transactions by foreigners since Poland joined the European Union.

The share of agricultural and forest land in the total number of transactions was 11%, being much smaller than that of other types of real property. Most agricultural and forest land sale transactions were concluded in 2007 (489) and the smallest number of such transactions occurred in 2001 (121). The highest number of transactions of other types of real estate sale (4,546) was recorded in 2007 and the smallest one in 2000 (1,444).

According to the information contained in the reports by the Minister of Interior, foreigners bought, in 2000-2010, the land real property that in total encompassed 37,588.57 hectare, including 3,400.14 hectare of farm and forest land (with or without the obligation to obtain permission). However, since 2008 a dynamic increase has been observable in the area of land property (including agricultural and forest land) purchased through transactions of acquisition or taking hold of stocks and shares by foreigners in companies which were owners or perpetual users of real estate (Fig. 1).
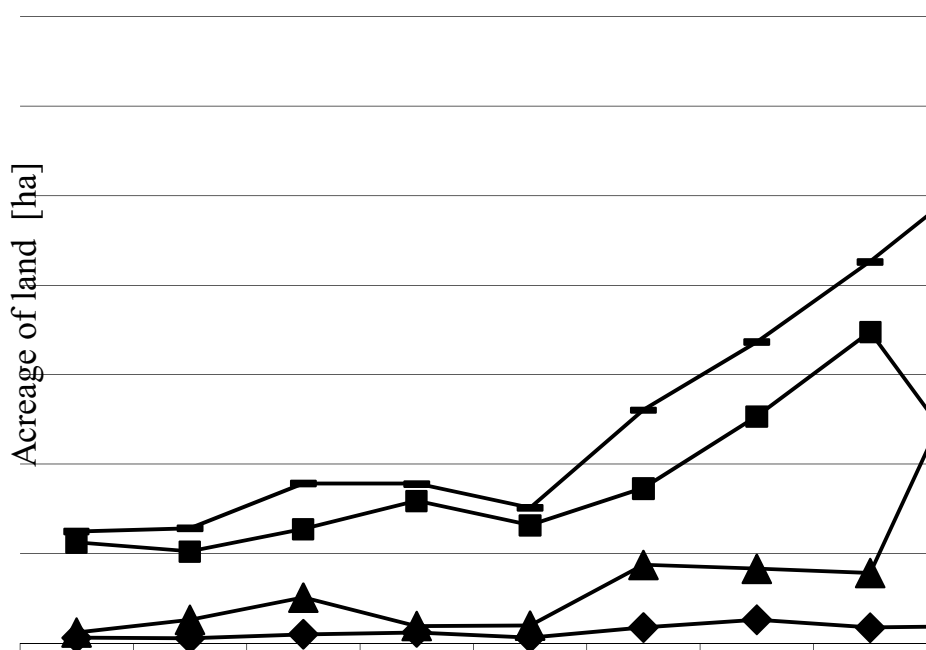
Fig. 1. Acreage of land real estate (including agricultural and forest land) purchased by foreigners in 2000-2010

Source: authors' calculation based on reports by the Minister of Interior [Sprawozdanie… 2012] and other institutions [Rynek… 2011].

In 2000-2010, foreigners acquired in this way the land real estate covering in total 28,143.22 hectare. Noteworthy is the fact that in just 2006-2010 foreigners bought 21,239.14 hectare of agricultural or forest land by acquiring or taking hold of stocks or shares in companies which had an ownership right or a perpetual usufruct to this land,

which corresponds to 75.4% of the total area of the land bought in this way. At the same time, this is six-fold more than the total acreage of agricultural and forest land bought, with a permission or without an obligation to obtain permission, in 2000-2010. With respect to the land for which a purchase permission had been issued to foreigners who bought or took up stocks or shares in companies owning land, it should be noticed that from 2000 to 2004 the issued permits covered a total area of 35,359 hectare, whereas the area which was actually acquired in this way during this period reached just 2569.84 hectare, corresponding to 7.3% of the area stipulated in the permits. Although in 2004, citizens and entrepreneurs from the EEA (European Economic Area) countries were allowed to acquire stocks and shares in companies that possess real estate without an obligation to obtain permission, considering the scale of acquired agricultural real estate it does not seem that the year 2004 was a turning point in this respect. In 2000-2010, foreigners acquired in total 65,731 hectare of land real estate in Poland, while the total area of land sold from the Resources of the Agricultural Property Agency during the same time period was 1,228,000 hectare.

Summary

Most agricultural and forest land and other types of real estate sale transactions were concluded in 2007. In 2000-2010, foreigners bought land real property with total acreage of 37,588.57 hectare. Since 2008, a dynamic increase has been observable in the area of land property purchased through transactions of acquisition or taking hold of stocks and shares by foreigners in companies which were owners or perpetual users of real estate. The beginning of the economic crisis period did not discourage foreigners to invest in Poland in this way. In 2006-2010, foreigners bought 75.4% of the total area of land bought through transactions of acquisition or taking hold of stocks and shares in companies which were owners or perpetual users of real estate. In 2000-2010, foreigners acquired in total 65,731.79 hectare of land real estate in Poland, while the total area of land sold from the Resources of APA during the same time period was 1,228,000 hectare. Thus, in comparison to the area which was distributed by the APA, the area of land that foreigners have purchased is only 5.3%

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Szilvia Majóczki-Katona[1]
Szent István University
Gödöllő, Hungary

Characteristics of human capital among people employed in Hungarian agriculture after the EU accession

Abstract. A high decline in employment was one of the negative consequences of economic transformation in Hungary in the past few decades. The activity of rural population continues to decrease in the EU. Agriculture has a very special role in forming the employment. The aim of the research is to examine chararcteristics, trends, changes of qualification and skills of employees working in Hungarian agriculture in the period from accessing to the EU till nowadays. The education of employees in agriculture despite of distinct improvement is still low. The majority of producers manage their company with only practical experience or even without it. The lack of sufficient expertise makes farmers be less receptive to innovative solutions, insist more on production methods based on their previous experience, thereby inhibiting popularisation of the modern, competitive technologies. For the competitive and efficient agricultural production, the human capital, appropriate skills and educational attainments are essential, they can help the agricultural sector to catch up with the more developed West.

Key words: agriculture, grain sector, employement, qualification, vocational training, human capital, social determinants.

Introduction

In the 1990's during the economic transformation, fundamental changes were taking place in the job market as well. After the democratic transformation the number of employed people decreased dramatically. On the one hand the proportion of unemployed people increased, on the other hand the number of inactive people in rural regions grew extraordinarily [Czagány & Fenyővári 2008].

The employment and activeness reached its lowest degree in 1996-97 and then, as an effect of economic stabilization and because the investments went up, until 2000 there was a reasonably fast increase in them. From then until the middle of 2007, except one or two temporary periods, they were at a nearly stagnation level and they turned into a deterioration from the autumn of 2007 [Pólya 2009].

According to a workforce survey by the Hungarian Central Statistical Office (HCSO), we can say that from 1998 to 2010 the unemployment rate went up from 7.8% to 11.2%.

The decline of employment was over the average level in agriculture. In the 1990's, the biggest dropout among the sectors of national economy was from agriculture, the number of those in employment reduced by nearly 700 000 [Czagány 2008]. The proportion of empleyees in agriculture was 7.4% out of the total number of employees in 1989, however by 2010 it was only 4.5%.

The employment proportion of the main groups of agricultural and forestry jobs decreased from 3.6% to 2.6% in one and a half decade.

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[1] Address: H-4030 Debrecen, Mikepércsi út 69. I/7, e-mail: majoczki.katona@gmail.com.

The number of those who were employed in agriculture, forestry-, hunting and fishing industry declined from 275 000 in 1998 to 174 000 in 2008, by 2010 this number was 172 000.

Meanwhile, in 1998 the proportion of unemployed who were working in the main groups of agricultural and forestry jobs was 3.4% of the total number of unemployed, by 2010 this number was 2.2%. The same proportion referring to the sectors of forestry, hunting and fishing industry within agriculture decreased from 8.7% to 5%.

The activeness of rural population has also declined in other countries of the European Union in the past few decades. This phenomenon has turned an attention to the fact that agriculture, apart from food producing has an important function in employment as well, by means of forming the social and public environment of the rural areas [Czagány 2008].

In the interests of increasing employment, the improvement of competitiveness is also essential. In order to make it come true, it is necessary not to put on the Hungarian citizens' shoulders heavier loads by legal rules than those put on their competitors [Gőgös 2009].

The present ruling government [Fazekas 2011] considers it as a particularly important task to increase the employment and it deals with agriculture as one of its stressed tool. In the National Country Strategical Plan, that looks out into the future until 2020, among the goals and aims the first ones are preserving jobs in the country, if possible improving them, right after that preserving rural population and resetting the demographical balance. So the main goal of the changes in the next few years is to increase the number of those in employment in agriculture.

The main difficulty in rural economic restructuring is the discrepancy between real demands of economy and the structure of vocational training. The number of workforce that has the needed expertise and qualification for prospering economic sectors is low, mainly beacuse of migration in the 15 rural areas. The knowledge of self-employed farmers is incomplete, mainly the knowledge about the EU is missing (market and output regulation, sponsoring system, quality protocols of products, rules of animal husbandry, protocols of environment protection) and they are in a great lack of expertise and capability in farm management and marketing. This situation is getting more difficult because of the advisory system and the adult education in non regular school system faults wich need a concern [Új… 2007].

Characteristics of companies in grain sector

One of the negative consequences of the economic changes in the past decades was the great decline in employment that affected each of economic sectors quite differently. As it was also mentioned in the introduction, the fall of labour-demand came up in agriculture in the most drastic way.

According to the results of the population workforce survey of 2010, 3.7 million employees were in employment, the same as the previous year. Within agriculture, forestry, hunting and fishing industry altogether 172 000 people were employed, 4.5% of the total number of those in employment.

After a slight increase in 2009, the volume of labour-outgoings in agriculture, in compliance with the long-term trend, decreased more. The importance of agriculture in employment, not as a consequence of basically the crop falling out by unfavourable weather, fell in 2010. The use of unpaid labour was lower than in 2009 by 2.3%, the paid

labour by 2.8%. The volume of agricultural labour-outgoings declined by 18% in 5 years, the unpaid labour fell most significantly, by 20%, the paid labour by 9% as compared with the data from 2006. The significant reduction of labour with the unpaid agricultural labour outgoings together can be traced back to the decrease of private farms at a rapid pace. The scheme of labour-outgoings did not change significantly as compared with the year of 2009, the paid labour amounts to one quarter of the total in 2010 as well [Fazekas 2011].

In 2010, according to the data of institutional labour statistics, a number of 76 000 permanent employees worked full-time in agriculture nationwide, 14 000 employees worked in vegetable farms, 62 000 employees in farms with mixed activities. The number of temporarily employed workers was 27 000 altogether in 2010.

The number of family labour is approximately 1 million in the private farms, half a million work in vegetable farms.

The professional formation of those in employment in agriculture is widely different from the one of all the employees. Among them, the proportion of brain-workers is significantly smaller.

There was remarkable owner and structure changing in the Hungarian agriculture during the democratic transformation. Owner and work structure of agriculture has changed. Big firms were changed to micro- and middle size companies and individual farms. Farms also got in new situation, lost previous integrating connections, basicly given by a collective farm. This way a new group of contractors started up, that was out of market experience, connections and funds [Varga 2001; Molnár & Farkasné 2003]. The changing procedure of agrarian sector appreciably affected employment, wich later also affected structure of education [Szabó 2011].

One of difficulties in changing the economic structure was that a disharmony came up between needs of economy, the structure of education and the structure of vocational training. It is ordinary in rural areas that only few highly qualified professionals with modern knowledge want to settle down. Most of them migrate to other regions and only few employees stay that have the needed qualification to revive the sector. Flare and enriching of education and training are basic and important in modernising agriculture. Beside practical experience, developing knowledge of employees in agriculture and sylviculture, mainly managers, are particularly important on those topics that were dropped out in the previous studies. For example: the sustainable treatment of natural resources, correspondence requirements in landscape protection and developing, environmentally sound production methods, market and management skills, implementation of new, innovative production technologies. It is very important to work up and develop the ability of self-learning, furthermore to raise the awareness in learning methods (consulting, using electronic sources in learning).

In food processing sector the primary task is to raise extant qualification level, develop acceptance for the new, modern and innovative knowledge [Új… 2007].

In Hungary, the education level of those in employment in agriculture, as in grain sector, is still low, despite the fact that it has improved a lot in the past one and a half decade [A mezőgazdaság… 2008]. In the agricultural sector, the proportion of employees with primary education is quite high as compared with other national economic sectors, the proportion of the ones with secondary school education is the same, the proportion of the ones with a university degree or college education is much lower.

Among the population of private farms, farmers who produce for sale are the most educated. The HCSO 2008 study says it is a consequence of their age composition, because

they are much younger than the ones who produce mostly for their own consumption and sell only the spare products.

The proportions of the agricultural education of private farmers have hardly changed in the past years. Even during the times of FSS of 2007, only near 2% of them had a higher education in agriculture, 6% of them had an agricultural education at an intermediate level and another 6% of them had it only at a basic level. It says that a critical majority of them, near 87%, possesses only a practical experience or manages their businesses even without any experience.

The HCSO 2010 data referring to private businesses tell that only 15 031 out of 567 446 men have a higher education, most of them, 445 340 men use only a practical experience.

In general, men have a higher agricultural education. This is not surprising, because agriculture is one the subjects, which traditionally belong to 'manly' education.

Changes in higher education affected specialties in different rate. The position of agrarian higher education is depending on the crisis in agriculture. The lack of general capitalization and lack of ability to produce sufficient income in this sector has a negative effect on innovative processes. After democratic transformation there was a very loud opinion that the number of students applying for agrarian school would dramatically decrease, as well as the interest in this profession [Horn 2002].

In the first decade of the democratic transformation there was a dynamic rising both in the whole number of students and students in agrarian education. From 2000, the growing rate of higher education seemed to moderate, but the number of students in agrarian higher education has been dramatically decreased and it still stays so nowadays.

The interest in agricultural education decreased nationwide between 2002-2007 both at the secondary and higher levels of the schooling system, and in the adult education as well, outside the schooling system.

Agriculture is a traditional activity in Hungary, thanks to the excellent natural capabilities of the country. But the sector's function and importance is changing and that affects the number and consistence of students starting in agrarian education, so as the requirements they desire to meet. Those who finished their studies before democratic transformation could be sure of having job in a big firm, nowadays it is a possibility only for few. In the agrarian sector, the number of new investors is low, the labour market seems to show a prevalence of supply over demand [Szabó et al. 2008].

The agricultural production means a special kind of lifestyle that passed through generations. Universities and colleges in Western-Europe have the power of giving kowledge through generations, most of the students start with family connections and vocational experience. Hungarian people working in the agrarian sector will send their children to the same line much more rarely, so this family and vocational connection is getting weak [Hajdu et al. 2002].

Due to the characteristics of agriculture, the education that can be gained within the frames of higher education is quite diverse and branching out. The interest in the traditional subjects of agricultural universities (engineer in vegetable farming, engineer in animal breeding etc.) has fallen in the past few years. At the same time, professions such as food engineer, landscape building engineer, economist and agricultural engineer, environmental engineer, countryside developing engineer, mechanical engineer have been attracting more and more attention.

Meanwhile, the total number of students participating in higher education fell from

424 161 to 361 347 students between 2005 and 2010, in agricultural education these numbers fell from 12 725 to 9 059 students by 2010. The number of those gaining a diploma or a scientific degree also decreased during these five years.

In agricultural education, at higher levels 463 students participated in college education, 389 students in university education, 4 913 students in BSc and 802 students in MSc programmes, 369 students particpated in PhD education.

There was a change in job market for employees with an agricultural degree. Previously, agricultural professionals with specialized knowledge were wanted, today these employees need to have skills to execute special tasks and need to have a top level economic and financial knowledge in order to have a success in job market. The speciality of agricultural education realized in emergence in job market. Jobs that can be undertaken with agricultural qualifications typically bring a moderate income with a relatively big lot of working time. An agricultural career has remarkably lost it's fascination in last decades, so employees with agricultural qualifications got weaker position in job market bargains. While previously, an entrant with an agricultural degree had a chance to choose, nowadays the employer has it [Szabó 2011].

Apart from the agricultural education of the youth in the schooling system, the adult education and further training of farmers in the grain sector is an overriding important task, as their level of education is reasonably low.

During the past few years, the number of people enrolling to out of school further trainings in agriculture, forestry and fishing industry heavily fluctuated.

In public education, 162 030 students participated in professional trainings in 2005, by 2010 this number went up to 181 082. Looking at the agricultural education, the number of 6 058 students in 2005 fell down to 5 758 by 2010.

A government's report summarized in 2011 that in the agricultural education, within the schooling system by the term of 2009/2010, the competence based module system of professional education fulfilled its purpose. In the current module scheme of the National Training Register there are 47 agricultural qualifications, but the total number of agricultural qualifications, due to the part-qualifications, branches and further trainings, is 215.

The publication of professional and exam demands of two new higher educational qualifications are in progress.

The appraisal notes of the professional course books, module learning material parts fitting to the new type trainings are publishing continuously. At the moment, approximately 330 different agricultural professional course books, notes, processed learning material that is available in electronic form, are at the students' disposal.

Practically there are 160 venues where agricultural education take place, but in many cases we can speak about courses of only a couple of students. Organising of institutions that are prepared to provide sectoral trainings into regional integrated educational centres from the point of view of schools where agricultural training takes place seems to mean a disadvantage.

Summary, conclusions, proposals

Even today lots of people think, that agriculture, opposite to the other sectors of economy, is the area where you can manage without a proper professional knowledge. This is only partly true, as a part of manual jobs in agriculture is like that, and you can get by without education.

Agriculture, like other sectors, needs more and more qualified employees [Németi 2003]. The decrease of demand for unqualified workforce can result in serious employment tensions in the future, which can be solved only by educational programmes [Abayné et al. 2004].

The proper education and qualifications of human resources are the essential conditions of a competitive and efficient agriculture, as for a qualified labour the acquisition of modern enterpreneurial, market, marketing and technological knowledge, that are necessary in modern farming, is easier and simplier.

Patay [2007] says that it can not be a disadvantage for the economy to have lots of qualified people, as long as it means usable knowledge, since the basis of a well-being society can only be the highly qualified human capital.

The professional training is one of the key factors of agricultural development, as its essential task is to provide the youth with modern theoretical and practical knowledge that is competitive even at international level. If necessary, it should give to workers in agricultural sector an opportunity to learn new technological methods, legal rules and acquire market information.

Acoording to the above mentioned HCSO study, the biggest problem of professional education these days is that it is less practice focused, the schools still put a stress on the theoretical knowledge. Students should learn more about manual jobs, however, creating places where practice could be done is quite difficult and expensive.

The government report about agriculture in 2011 said: one of the most important tasks of agricultural education is to promote the development of the countryside and the villages. Its strategic questions must be dealt with at every level. In areas, where the circumstances are favourable for agricultural production, making of quality goods must be conducive to developing of professional education, improving the efficiency and building up the scheme of processing and sale.

Higher education has an outstanding importance in supplying the grain sector with experts. The transformation of the institutional network in the higher education continued in 2010, the variety of courses at master level was completed. The radical reduction of state subsidized number of students has stopped, as it was a characteristic of the past few years, the government has confirmed the position of the agricultural faculties, besides the scientific and technological faculties. However, the valuation and re-examination of results of Bologna Process has become necessary.

To develop the human workforce it is indispensable to improve the level and accessibility of human infrastructure in rural areas. This needs an aligned and practical use of Hungarian and the EU co-financed programmes and subsidies. To improve the human potential and talents in rural areas, training programmes and advisory service can help. It is particularly important to enrich human conditions by supporting selected areas in acquisition of the missing qualifications in non-school adult education system [Új… 2007].

As the HCSO drafted in its publication about the state of development of agriculture in 2008, without a proper knowledge farmers are not sensitive enough to innovative solutions.

They insist on using production methods based on their former experiences, impeding the spread of modern, environment- friendly and at the same time competitive technologies and are holding back the joining up of the grain sector of the country to the developed western economies.

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Serhiy Moroz[1]
Department of Logistics and Production Management
Sumy National Agrarian University
Sumy, Ukraine

Structural changes in agriculture of Ukraine: results and perspectives

Abstract. The paper examines structural changes in the Ukrainian agriculture during the reform period. The tendencies in the agricultural sector and directions of its transformations are considered. It has been concluded that the multifunctional model of agriculture should be implemented in Ukraine, because it can create good opportunities for an increase in the competitiveness of the agricultural sector, a solution of socio-economic issues of the rural areas and a provision of an integrated development of rural areas in the long-term perspective.

Key words: agriculture, agricultural reforms, Ukraine.

Introduction

The transition from a command and control to a market economy led to significant structural changes in the agriculture of Ukraine. The agricultural reforms were aimed at the creation of new organizational and legal forms which could operate effectively under the existing economic system. The reforms had an impact on both agricultural production and the economic efficiency of the sector. For a long time, agriculture has operated under the socialist economic model. Accordingly, the majority of decisions regarding the production activities of agricultural enterprises were taken centrally. In contrast, in a market economy, they have to make decisions by themselves. So, the main task for agricultural producers is to adapt to these economic conditions. It is a well known fact that Ukraine has a high agricultural potential. Though, it is not fully used. In this context, it is important to review reform processes and to identify perspectives of the agricultural sector in the country.

The aim of this paper is to describe the main tendencies in agriculture of Ukraine, to analyze structural changes in the agricultural sector, and to define directions for its long-term development. The paper is based on data from the State Committee of Ukraine for Statistics. The descriptive analysis is used to identify main tendencies and perspectives of agriculture in Ukraine.

Main tendencies in agricultural production

Agriculture remains one of the major branches in the economy of Ukraine, although it has undergone the most significant reduction as compared with other economic branches. While in 1990 the portion of agriculture in the country's gross value added was 25.5%, in 2010, it went down to 8.2% [Statistical… 2011].

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[1] Assistant professor, address: 160, Kirov St., Sumy, 40021, Ukraine, e-mail: smorozmail@gmail.com

In 1990-2010, the gross agricultural output (in fixed prices of 2005) was reduced from 145.9 billion hryvnya (UAH) to 100.5 billion hryvnya. This fall in output was caused by a significant decrease of the share of livestock production: from 54.4% in 1990 to 41.6% in 2010. That is why crop production became predominant in the structure of gross agricultural output and its portion amounted to 58.4% in 2010. In 2008-2010, as compared with 1990-1992, the largest growth in the volumes of production took place for sunflower seeds and vegetables. They rose by 180.6% and 36.4% respectively (Table 1). To a lesser extent, the production volumes went up for potatoes (by 12.3%) and grain and leguminous crops (by 8.1%). Actually, the above mentioned increase was caused by the growing demand for these crops. The opposite tendency was observed for sugar beet production which decreased drastically for the same period: from 36.4 million tonne to 12.4 million tonne. This was due to the decline in the domestic demand for sugar, high cost nature of sugar beet production, inefficient processing facilities, as well as increased competition from imports [Achieving… 2003].

Table 1. The gross yield of main agricultural crops (all types of farms), thousand tonne

Crop	Period							2008-2010 as % of 1990-1992
	1990-1992	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	
Grain and leguminous crops	42740	38872	28838	29582	33616	33856	46196	108.1
Sugar beet (factory gate)	36405	30502	18732	14279	14815	18289	12418	34.1
Sunflower seeds	2336	2168	2232	2834	3525	4735	6554	280.6
Potatoes	17186	17280	16839	16635	18609	19344	19305	112.3
Vegetables	5969	5692	5243	5684	6443	7396	8143	136.4

Source: [Agriculture… 2011].

These tendencies in crop production were linked with changes in the structure of sown area of agricultural crops. Between 1990 and 2010, the total sown area shrank from 32.4 million ha to 27.0 million ha. The highest share in the planted area was occupied by grain and leguminous crops (45.0% in 1990, 56.0% in 2010). For 1990-2010, the largest growth of crop land was observed for soya (from 93 thousand ha to 1076 thousand ha) and rapeseed (from 90 thousand ha to 907 thousand ha). Also, the planted area increased significantly for winter barley (by 180.5%), sunflower (by 179.5%), and corn for grain (by 119.5%). At the same time, the greatest decline occurred in the sown area of fodder crops, sugar beet, and winter wheat: by 78.3%, 68.8% and 18.9% correspondingly.

It should be noted that tendencies in yields were almost identical for agricultural crops (Figure 1). Between 1990-1992 and 1996-1998 (or 1999-2001), all crop yields dropped essentially. Later, yields gradually increased and, in 2008-2010, exceeded those in 1990-1992. During the period, the biggest growth occurred for sugar beet, from 23.5 tonne per hectare to 31.7 tonne per hectare and vegetables, from 12.9 tonne per hectare to 17.7 tonne per hectare.

tons/hectare
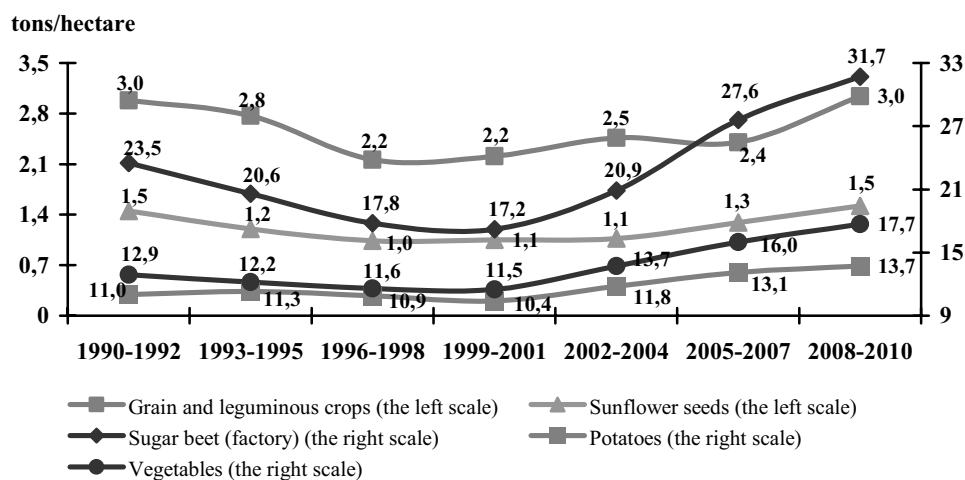
Fig. 1. Yield of main agricultural crops (all types of farms), tonne per hectare of the harvested area

Source: [Agriculture… 2011].

In 1990-2010, the production of livestock products went down significantly: for beef and veal by 80.0%, for pork by 62.5% and milk by 54.3% (Table 2). The main reason for this change was the sharp decline in demand for animal products precipitated by a significant drop in real per capita income in Ukraine [Achieving… 2003]. The only exception was poultry, for which an increase in the volume of production was observed for the period 1990-2010: for poultry meat from 0.7 million tonne to 1.0 million tonne (or by 42.9%) and for eggs from 16.3 billion pieces to 17.1 billion pieces (or by 4.9%). This is because poultry is characterized by faster capital turnover. Also, the demand for poultry meat grew essentially due to its lower price as compared to other types of meat.

Table 2. Production of main livestock products (all types of farms)

Product	Year									2010 as % of 1990
	1990	1995	2000	2005	2006	2007	2008	2009	2010	
Meat - total (in slaughter weight), mil. tonne	4.4	2.3	1.7	1.6	1.7	1.9	1.9	1.9	2.1	47.7
including:										
- beef and veal	2.0	1.2	0.8	0.6	0.6	0.5	0.5	0.5	0.4	20.0
- pork	1.6	0.8	0.7	0.5	0.6	0.6	0.6	0.5	0.6	37.5
- poultry meat	0.7	0.2	0.2	0.5	0.6	0.7	0.8	0.9	1.0	142.9
Milk, mil. tonne	24.5	17.3	12.7	13.7	13.3	12.3	11.8	11.6	11.2	45.7
Eggs, billion pieces	16.3	9.4	8.8	13.0	14.2	14.1	15.0	15.9	17.1	104.9

Source: [Agriculture… 2011].

Between 1990 and 2010, the number of cattle was reduced from 24.6 million heads to 4.5 million heads and pigs from 19.4 million heads to 8.0 million heads. So, in 2010, number of cattle and pigs contracted to 18.3% and 41.2% in comparison with 1990. For 1990-2000, the number of poultry decreased from 246.1 million heads to 123.7 million heads. Though, since 2005, it has had a clear upward tendency and reached 203.8 million heads in 2010 (or 82.8% of its level in 1990).

Considering the level of productivity of livestock and poultry, it should be noted that in 1990-1995 there was a significant drop in the relevant indicators, including the average daily weight gains of growing and fattening cattle (from 431 grams to 259 grams) and pigs (from 229 grams to 117 grams), the average annual milk yield per cow (from 28.6 centners to 22.0 centners) and the average annual eggs laying per hen (from 214 pieces to 171 pieces). Later, the situation has improved. In 2010, all above mentioned indicators exceeded their levels in 1990: average daily weight gains of growing and fattening cattle and pigs by 7.0% and 63.8% and the average annual milk yield per cow and the average annual eggs laying per hen by 42.7% and 31.3% respectively. Despite these positive changes, in absolute terms, however, the level of these indicators was quite low. This could be confirmed, for example, by comparing Ukraine and countries of the European Union [Bański 2008].

It is worth to note that an opposite processes took place in agricultural enterprises and household plots with respect to agricultural output production (Figure 2). In agricultural enterprises, it declined sharply: from 101.3 billion UAH in 1990 to 45.1 billion UAH in 2010 (or by 55%).
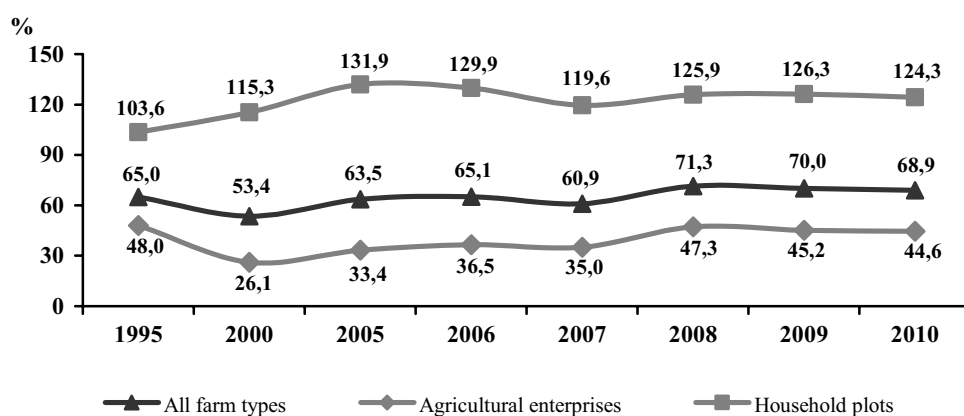
Fig. 2. Dynamics of gross agricultural output, by farm type, 2005 fixed prices, 1990 = 100%

Source: [Agriculture… 2011].

In contrast to agricultural enterprises, this indicator for household agricultural plots increased substantially. Its maximum rate was in 2005 (by 31.9% more than in 1990). After that, there was a slight decrease in agricultural output production in the household plots sector. Though, in 2006-2010, the indicator continued to surpass its level in 1990. As a result, the shares of agricultural enterprises and household plots in gross agricultural output changed significantly: from 69.4% and 30.6% in 1990 to 44.9% and 55.1% in 2010.

From our point of view, two approaches to development of Ukrainian agriculture could be identified. The first approach is related to agricultural enterprises. In general, compared with 1990, their share in production of main agricultural products decreased (Figure 3). Actually, they switched mainly to agricultural products which are in steady demand, are the most profitable and require relatively low capital costs (grain and leguminous crops, sunflower, etc.). The second approach is observed in household plots. They are chiefly focused on agricultural products which are characterized by a significantly lower level of profitability and high manual labor costs. The low level of production efficiency of such products in farm enterprises is connected with the use of old production technologies, the lack of modern storage facilities and the underdeveloped market infrastructure. Thus, for instance in 2010, the share of household plots in production of potatoes, vegetables, fruit and berries amounted to 97.4%, 88.1% and 83.6% respectively. Households also produced a large proportion of livestock products, especially milk (80.3%) and meat (44.9%). This approach should be considered as a means of survival of rural residents that have limited employment and income earning opportunities. It allows households to meet their basic needs in food products and get some cash income through the partial sale of own agricultural products on the market. This redistribution of agricultural production toward the household plots is not efficient because they are primarily based on manual labor. Consequently, it does not provide possibilities for the full use of the existing agricultural potential of Ukraine.
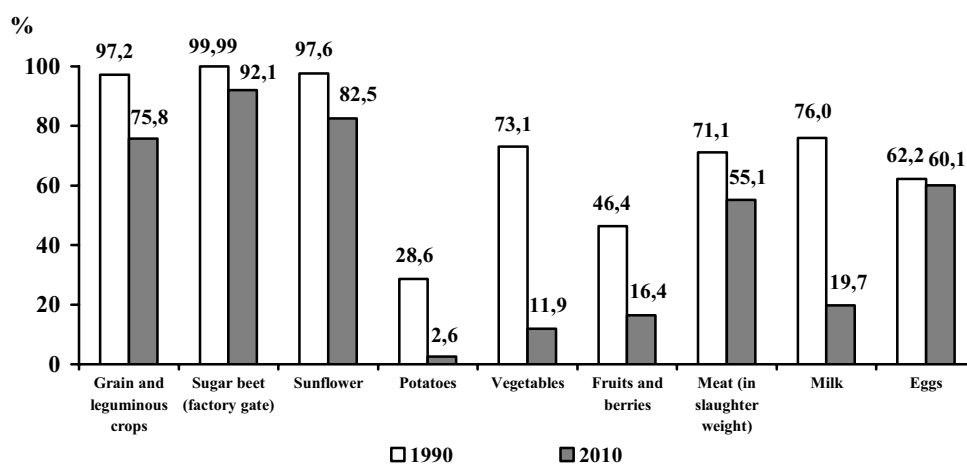
Fig. 3. Share of agricultural enterprises in production of main agricultural products, %

Source: [Agriculture… 2011].

The peculiarities of reform processes in the agricultural enterprises

The main goal of agricultural reforms is creation of a competitive agricultural sector, capable of operating effectively in a market economy. The reform processes have had different impacts on the agricultural sector. First, they led to a large diversity in organizational and legal forms of agricultural enterprises and to a substantial growth in their

number. According to the State Committee of Ukraine for Statistics [Agriculture… 2011], 73.8% of agricultural producers were in 2010 individual farmers, 13.8% partnerships, 7.5% private enterprises and 1.7% cooperatives.

Second, the land ownership structure has changed significantly as well (Table 3). In 1990-2010, the area of agricultural lands owned by agricultural enterprises decreased by 46.8%. As a result, the share of these enterprises in the total agricultural land area dropped from 92.1% in 1990 to 49.5% in 2010. In 1990, the portion of state agricultural enterprises in the area of agricultural lands was 23.6%, while in 2010 it went down to 2.4%. During the same period, agricultural lands owned by individuals increased from 2.7 million hectares to 15.9 million hectares (5.9 times).

Table 3. Structure of agricultural lands, by farm type (at the end of year)

Land property	Year										2010 as % of 1990
	1990		1995		2000		2005		2010		
	mil. ha	%	mil. ha	%	mil. ha	%	mil. ha	%	mil. ha	%	
Agricultural lands - total	42.0	100,0	41.9	100,0	41.9	100,0	41.8	100,0	41.6	100,0	99.0
Agricultural enterprises	38.7	92.1	35.2	84.0	29.9	71.4	22.1	52.9	20.6	49.5	53.2
in that:											
- state	9.9	23.6	7.1	16.9	1.8	4.3	1.2	2.9	1.0	2.4	10.1
- non-state	28.8	68.6	28.1	67.1	28.0	66.8	20.9	50.0	19.6	47.1	68.1
Individuals	2.7	6.4	5.6	13.4	8.5	20.3	14.9	35.6	15.9	38.2	590
in that: household plots	2.5	6.0	3.9	9.3	4.3	10.3	4.7	11.2	4.9	11.8	196.0

Source: [Agriculture… 2011].

Third, after the completion of land sharing, a significant number of small agricultural enterprises was created (Figure 4). In 2010, the largest shares in agricultural lands had enterprises with the following agricultural land areas: 24.3% of land belongs to farms of acreage between 20.1 and 50.0 ha, 12.7% to those between 100.1-500.0 ha and 10.2% to having less than 5.0 ha. In total, the portion of land belonging to agricultural enterprises with the land area below 100.0 ha was 58.9%, while for enterprises with the land area more than 1000 ha it was only 10.1%. Of course, the existence of a large number of small land plots limits the possibilities for an effective use of agricultural lands.

Fourth, as it has been mentioned before, the volume of agricultural production decreased substantially, and its redistribution toward the household plots sector occurred during the reform period in Ukraine. What does it mean? It means that only the formal reorganization occurred in a substantial portion of agricultural enterprises. Farm restructuring was not fully implemented in these enterprises. Their organizational structures remained mostly at the same level, as they were in collective and state agricultural enterprises. Actually, the result of this process was only 'changing the sign on the door'.

Because these agricultural enterprises did not operate profitably, the above-mentioned redistribution in agricultural production occurred. So, these tendencies could be regarded as an insufficient adaptation of a significant share of agricultural enterprises to conditions of the market economy.
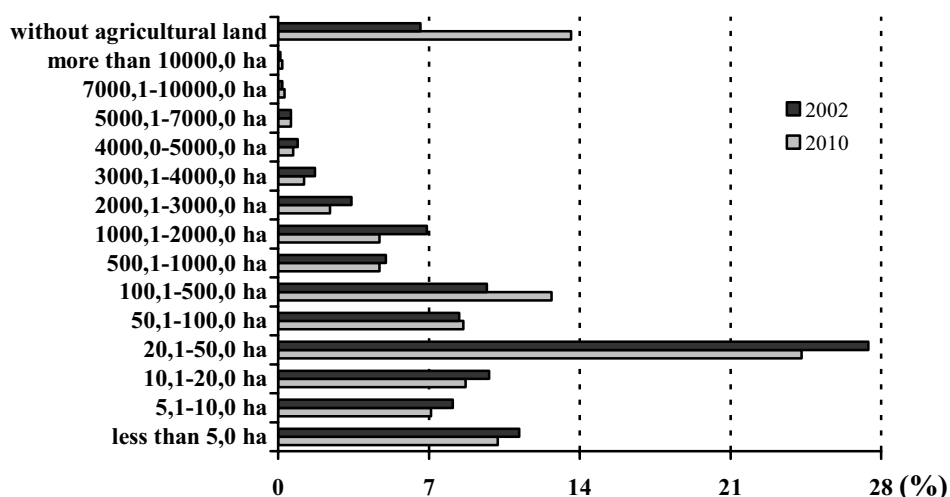
Fig. 4. Distribution of agricultural enterprises, by agricultural land's size

Source: [Agriculture… 2011].

A large part of farm enterprises had not only a small land area, but also other indicators which confirm limited opportunities for an effective farming. In 2010, an average statistical agricultural enterprise had 80 heads of cattle (including 47 heads of cows) and 141 heads of pigs (or 27.4, 15.9 and 12.3 times less than in 1990). A substantial decline happened with respect to the provision of farm enterprises with agricultural machinery and equipment. While in 1990 an average statistical agricultural enterprise had 44 tractors, 10 combine harvesters and 26 trucks, in 2010, it had only 3 tractors, 1 combine harvester and 2 trucks. The situation with the technical resources is also complicated by the fact that the level of their deterioration in the agricultural enterprises is between 55% and 90% [Betliy et al. 2006].

In 1990, the profitability rate of crop production was 98.3% (Figure 5). Later, this indicator decreased substantially, reaching its lowest level (7.9%) in 2005. After that, it has grown again, but its rate has not been stable. The economic situation in the livestock sector was more complicated. During 1990-1995, its profitability rate dropped from 22.2% to -16.5%. For a long time, livestock production has been unprofitable. Only since 2008, it has become profitable again. In 2010, this indicator was equal to 7.8%.

The profitability rate of agricultural production went down from 42.6% in 1990 to -1.0% in 2000. After that, it increased substantially and reached 21.1% in 2010. On the whole, this was a positive sign. At the same time, during 1995-2010, there was a significant share of unprofitable agricultural enterprises. For instance, it was 30.7% in 2010. In our opinion, this confirms that the restructuring program has not been completed in the substantial part of farm enterprises, for which it was only a change of the legal form. It also

shows that, with respect to economic indicators, there was a large gap between fully and partially reformed agricultural enterprises.
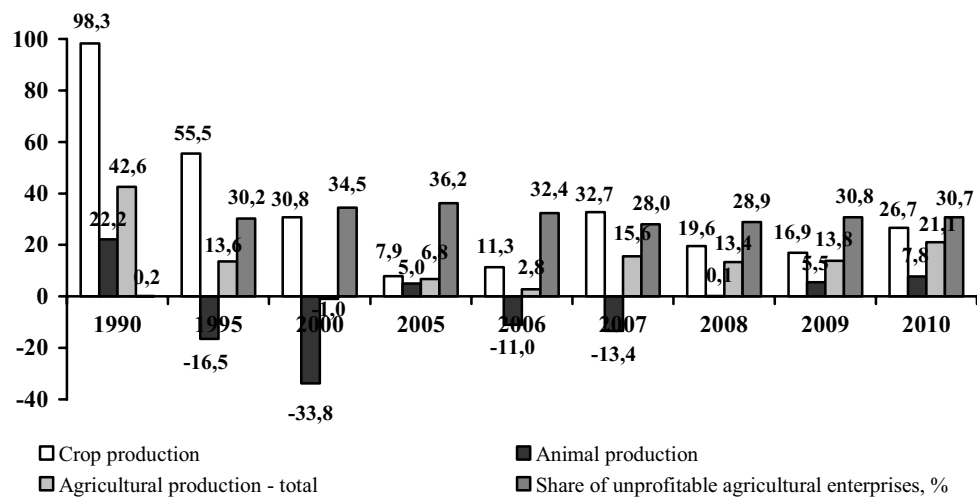
Fig. 5. Profitability rate of agricultural production in agricultural enterprises, %

Source: [Agriculture… 2011].
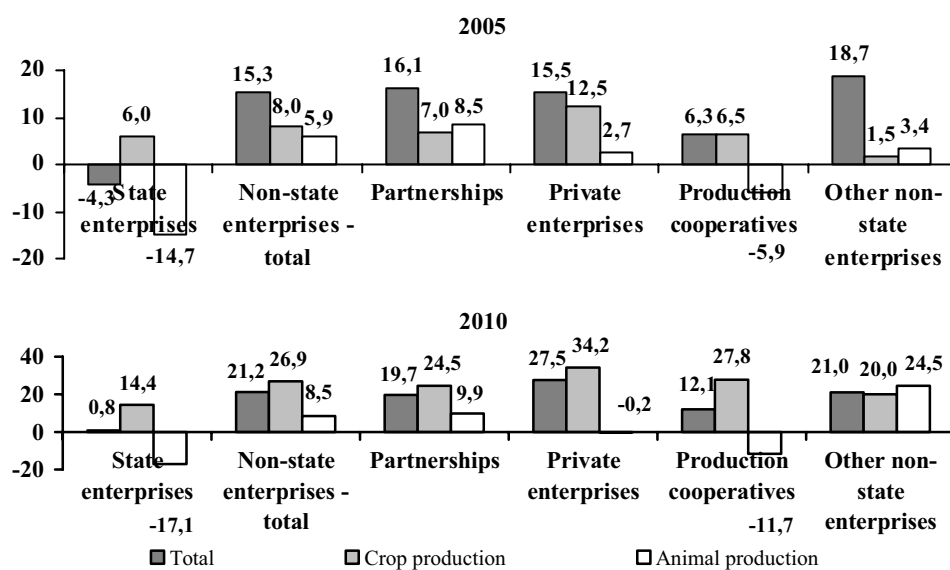
Fig. 6. Profitability rate of agricultural enterprises, by organizational and legal form, %

Source: [Agriculture… 2011].

It is also important to compare state and non-state agricultural enterprises with regard to the level of profitability. In 2010, this indicator for crop and livestock production in state

agricultural enterprises amounted to 14.4% and -17.1% respectively, while the corresponding figures in non-state agricultural enterprises were 26.9% and 8.5% (Figure 6).

In 2010, the profitability rate of agricultural production in state and non-state farms was 0.8% and 21.2% respectively. On the ground of these data, it can be concluded that the orientation of reform processes towards private ownership had a positive impact on the agricultural sector. However, the objectives of the agrarian reform were not fully achieved.

The role of agriculture in employment and incomes of the population

The number of people employed in agriculture declined essentially during the reform period: from 5.0 million workers in 1990 to 3.1 million workers in 2010. This tendency occurred because of a significant reduction in number of farm enterprises, as well as of number of people working in restructured enterprises as compared with the pre-reform period. An attention should be paid to the fact that in Ukraine the employed population also includes people who are engaged in cultivation of household plots. The share of persons who have formal employment positions in the total number of employed in the agricultural sector is much smaller. For instance, it was only 25.8% in 2010.

Also, it is worth to note that the average wage in agriculture is one of the lowest among the branches of economy of Ukraine. Between 1990 and 2000, the ratio of salary in agriculture to salary in all economic sectors decreased on average from 104.5% to 49.6%. While in 2005-2010 this index gradually increased, it remained at a quite low level. In 2010, the ratio amounted to 65.5%.

Agricultural production is still one of the most important income sources for the rural households. In 2010, income from sales of agricultural products accounted for 10.9% of their total incomes. The share of consumed own products, which were produced on the household plots, was 12.9%. At the same time, the role of agriculture in this context has been gradually reduced (for example, in 2000, the above-mentioned indicators were 13.4% and 34.9% correspondingly).

It is a well-known fact that the role of agriculture in the rural economy and the rural employment declined significantly not only in Ukraine, but also in other countries [The new… 2006]. Though, in Ukraine in contrast to developed countries, employment and income-earning opportunities are very limited in rural regions. For the vast majority of former agricultural workers who lost their jobs due to farm restructuring, the only employment possibility is to work on household plots.

To a significant extent, these factors resulted in the growth of employment of rural residents in the informal sector. This sector includes all people employed in unregistered individual enterprises, which correspond to the following criteria:
• market orientation of economic activity
• limited number of workers
• absence of state registration of entrepreneurial activity.

Taking into account peculiarities concerning the spreading of informal labor relations in Ukraine, the criteria for determination of the number of inhabitants engaged in this sector were extended due to the inclusion of people working in the official sector under a verbal agreement with an employer, namely without a conclusion of the labour contract. At present, agricultural production is the predominant type of activity in the informal sector. The share of people engaged in the informal sector is 65.2% (or 74.1% of dwellers

employed in agriculture) [Statistical… 2011]. The concentration of employment in this sector testifies to a low level of labour productivity, an ineffective use of the rural labour potential and an exclusion from the sphere of action of labour legislation (in particular, with regard to the duration of working hours and leisure) and the almost complete social vulnerability of the majority of rural workers [Population… 2007].

In 2010, a large proportion of rural inhabitants (28.6%) had an average per capita monthly income below the minimum subsistence income. The low income level of rural households is also confirmed by the ratio of the actual consumption of basic foodstuffs to the recommended rate (Figure 7). In 1990-2010, this ratio decreased drastically on meat and meat products (by 22.4%), milk and milk products (by 36.9%), eggs (by 20.8%), and fruit, berries, and nuts (by 18.6%). This shows that the rural inhabitants are mainly oriented to the consumption of cheap food products (for example, bread and bread products, potatoes, vegetable oil, etc.). So, the significant portion of foodstuffs is not available for the rural population due to the high prices. Consequently, this tendency has a negative impact on the health of rural people and the employment potential of rural territories.
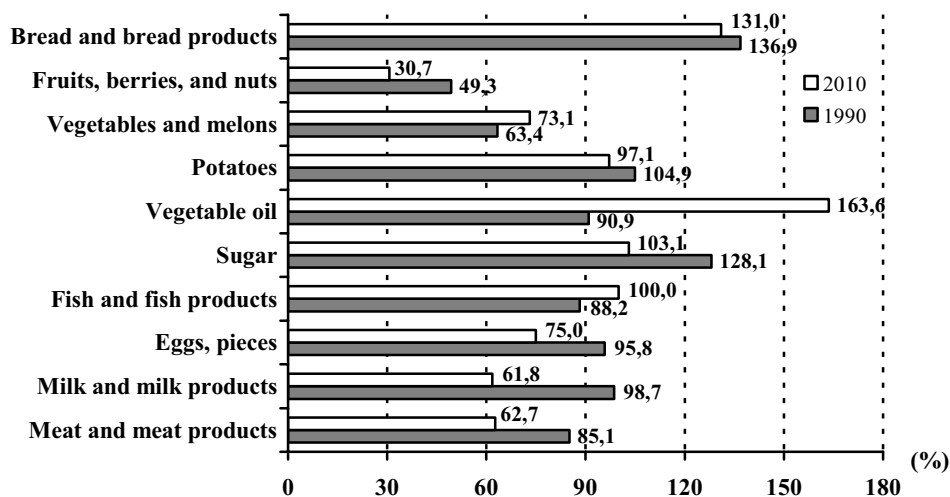
Fig. 7. Consumption of foodstuffs in rural households, % of recommended rate[2]*

Source: [Statistical… 2011].

Directions of the Ukrainian agricultural sector development in the long-term perspective

The above-mentioned production and economic indicators confirm that the Ukrainian agriculture has a significant potential that is not fully used. The current model of agriculture is focused primarily on agricultural production. In author's opinion, this model has limited opportunities to promote a stable growth of the agricultural sector in the long-term

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[2] According to the Ukrainian Scientific Research Institute of Nutrition.

perspective, if we take into account the needs of rural population and the unfavourable social, economic and other tendencies in the country. In order to improve the existing situation in the agricultural sector, its new long-term goals should be identified.

First, it is necessary to move to the model of multifunctional agriculture which has been implemented in the EU countries [Romstad et al. 2000, van Huylenbroeck et al. 2007]. Under this new model, the traditional direction of agricultural development which is linked to production of agricultural products should be supplemented by the following directions:

• increase of the viability of the rural areas
• improvement of employment and income opportunities for rural residents based on the development of both traditional production activities (e.g. the processing of agricultural products) and relatively new activities related to agriculture (agro-tourism, organic farming, bioenergy, etc.)
• preservation of cultural heritage
• protection of environment and maintenance of natural landscapes.

From author's point of view, one of the first steps which should be taken to implement the model of multifunctional agriculture, is to provide rural regions with qualified specialists who have necessary skills to create new businesses. Though, these people should have interest to reside in the countryside. This will be possible only if these specialists will have attractive living conditions, which are particularly related to housing and a developed social infrastructure. Besides, to promote the creation of new businesses, it is important to build a good rural physical infrastructure, especially roads.

Second, appropriate measures should be introduced to enhance the competitiveness of Ukrainian agriculture and to increase the quality level of agricultural products. In this context, an urgent problem is the agricultural modernization. The problem could be solved basing on the use of advanced production technologies and the renovation of material and technical base of agricultural enterprises. However, to do that, significant investments are needed. Thus, a particular attention should be paid to the integration and cooperation between agricultural enterprises, as well as to the creation of new business entities with a participation of enterprises from other economic branches. In addition, it is important to elaborate economic mechanisms which would stimulate agricultural enterprises to spend money on modernization of production.

Third, it is necessary to work out an agricultural policy which would establish well-defined and transparent 'rules of the game' for all participants of the agricultural market. Also, measures regarding agriculture and rural areas should be grouped around objectives ('axes'), as it takes place in the EU countries [The EU... 2008].

Conclusions

So, one can guess that the existing potential of Ukrainian agriculture could be used in full under the model of multifunctional agriculture. Based on this model, it is possible not only to increase the efficiency of agricultural production, but also to solve important socio-economic issues in rural areas, including the increase of the viability of rural regions, the improvement of employment and income opportunities for rural dwellers, and the promotion of development of the countryside in the long-term perspective.

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AldonaMrówczyńska-Kamińska[1]
Poznań University of Life Sciences

The significance of imports in the supply of material for food economy in Poland and Germany[2]

Abstract. The main aim of the article was an analysis of the significance of imports in the supply of material for the Polish and German agri-food sectors. The results of the analysis point to the fact that foreign trade is an important factor stabilising the development of the food sector in Poland and in Germany. However, in Germany imports are a much stronger stimulator of the development of agriculture and food industry than in Poland. A comparison reveals the desirable direction of changes in Poland, where the role of imports in the supply of materials to agriculture and the food industry should increase. Thanks to this, the imported products and global processes will have a significant influence on further development and modernisation of the Polish agribusiness.

Key words: input-output analysis, agriculture, food industry, supply of materials, imports.

Introduction

One of the methods of formulating visions of transformations in agribusiness in Poland is the analysis and interpretation of global experience. The understanding and making use of the experience of other countries, which occupy higher positions in the socioeconomic development than Poland, is related with the development pathways of contemporary world and may be an important signpost for the development of the Polish agribusiness. The regularities present in the complex of food economy of West European countries are of particular importance. One of the reasons for this is the conviction that the experience of those countries may be of a direct practical importance for solving problems occurring in the Polish food economy [Tomczak 1994a & b]. The experience of strongly developed countries determines the general model of agribusiness development and the directions of changes. Studies of development of rural areas, agriculture and food economy pay particular attention to the world experience and to international comparisons and analyses. A need to make use of the world experience is forced by the debate on the management strategy and basic problems of the agricultural and food policy, which has been going on for many years [Tomczak 1997]. The conclusions resulting from this analysis give a possibility to make a definite statement that the development pathways of the agribusiness of individual countries are and will be more and more visibly identical with the pathways of contemporary world. This conclusion gives a possibility not only to learn about the development tendencies and forces in the food economy of other countries, but it also gives an answer to the question how to establish and execute the development strategy of this sector of national economy. Poland may learn many new things from the experience of western market economies [Tracy 1997].

The main aim of the article is an analysis of the supply of imported material to the food economy in Poland and in Germany. The period of time under study comprises the years 1995, 2000 and the latest available data concerning the input-output tables. In Poland, the latest data are available for 2005, whereas in Germany for 2007. The analysis comprised the volume and the share of imported products in the supply of material to agriculture and the food industry from sector I (industries manufacturing means of production and services for agriculture and the food industry), sector II (agriculture) and sector III (food industry)[3].

The main research method was the input-output analysis. The basis for this methodology is the statistics of inter-branch flows. It consists in summing those components of inputs, products and potentials, which altogether form the agribusiness. In other words, it is a model of quantitative relations between different branches of production, leading to a general economic equilibrium [Czyżewski 2008; Leontief 1936 & 1949]. The model is a useful instrument of the economic functioning [Tomaszewicz 1994]. On the basis of the general equilibrium theory assumptions, it is possible to analyse the creation and distribution of the produced macroeconomic effects, the connections between agribusiness and environment, the influence of global processes on this sector through exports and imports [Czyżewski 2001 & 2008, Leontief 1936 & 1949]. The input-output tables are the only available statistical material, on the basis of which it is possible to make analyses of these volumes in the agri-food sector.

The evaluation of the streams of means volume flowing to the agri-food sector from non-agricultural branches is subjective. It is possible to try making it objective by international comparisons. Although international analogies are not a warranty and usually they cause numerous and justified reservations, they undoubtedly have the advantage of certain points of reference, which enable a relative assessment of processes and phenomena [Woś 1979]. For this reason, the article uses the method of analogies (similarities) and comparisons, which gives a possibility to obtain a prognostic information by transferring the regularities from one phenomenon to another. The German economy was chosen for the comparison, because Germany is Poland's most important trade partner (the share of exports to Germany in the total exports of agri-food products from Poland was about 23.0% in 2011[4]). This fact is caused by the geographical closeness, the demographic and economic potential and the traditions of Polish socio-economic connections [Cziomer 2001]. In Germany, there are similar soil and climate conditions to the Polish ones; there is also a similar volume of agricultural land, structure of production and consumption. Because of the much higher level of economic development in Germany, this comparison may be a premise enabling the formulation of conclusions concerning the direction of development of this branch in Poland.

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[3]A fundamental work on the theory of agribusiness, its internal structure and relations with the national economy is the work by Davis and Goldberg [1957], traslated also to Polish. in 1967. According to the authors of the book, the agribusiness as a branch of the national economy consists of three main economic aggregates (groups), which are used in this analysis. Sector I is the industries manufacturing means of production and services for agriculture and for the food industry, sector II is agriculture and sector III is the food industry.
[4]www.epp.eurostat.ec.europa.eu

The supply of imported materials in the Polish and German agriculture

Agriculture is one of the aggregates in agribusiness and, together with the food industry, it directly participates in the production and distribution of food. Determining the importance of foreign countries, especially imports therefrom, in indirect consumption is an important element in researching the development of agricultural sector in a given country. This analysis is possible thanks to the data from the input-output tables, concerning the supply of materials to agriculture from the domestic production and imports. Table 1 shows the volume of imported materials supply to the Polish and German agriculture. In 2005, the imported products for intermediate consumption in agricultural production in Poland were worth about 8.0% (0.9 EUR billion), which was about 2% more than in 2000. In Germany, this share was two times higher and amounted to about 17.0% in 2007 (4.5 EUR billion). Those results point to the much higher import intensity of intermediate consumption in Germany than in Poland. In a detailed analysis of the share of imported products in each component of the intermediate consumption in agriculture, it is possible to notice the fact that both in Poland and in Germany the highest significance of imports could be observed for products from the chemical industry. In Poland in the years under investigation, their share was about 40.0%, whereas in Germany in 2007 more than 60.0% of all fertilisers and crop protection products used by agriculture were imported. In the German agriculture, there was an equally high (about 60.0%) share of imported products, classified in the 'other industries' section (more than 216 EUR million was spent in 2007 on products purchased abroad). It is chiefly related with a higher inflow of imported products made out of rubber and plastics. On the other hand, a significant importance of imports for the intermediate consumption was observed in Poland for products of electrical machinery and means of transport industries (about 30.0% of the total supply from those sectors came from imports in the years under investigation).

As far as the imports of products classified as sectors II and III of agribusiness is concerned, their share in the total value of intermediate consumption in those sectors reached about 5.0% in Poland. On the other hand, in the internal turnover in agriculture in Germany as much as 28.0% of agricultural products were imported in 2007. Also, as far as the products flowing to agriculture from the food industry are concerned, 17.0% of them were imported.

On the basis of the volume of supply of imported materials to agriculture, it is possible to calculate import intensity ratios (the value of imported products used directly by agriculture in relation to the global production of this sector). In the years under investigation, the ratio for Poland was 0.04-0.05[5]. In comparison with the German economy, the share is half as high; in 2007 in Germany it was 0.1. The low import intensity ratio in Poland also points to the smaller importance of imports in the stimulation of agricultural development. It also means that the inflow of progress (new technologies decisive for the modernisation of agriculture) is limited in Poland.

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[5] The import intensity ratio comprises only the supply of materials and does not allow for imports of fixed production assets.

The supply of imported materials in the Polish and German food industry

In many aspects the processing of agri-food products is a special sector in each country's economy, which chiefly results from its function of supplying ready food products to people [Rejman & Halicka 2001; Urban 1997]. Apart from agriculture and the branches providing agriculture and the food industry with means of production and services, the agri-food industry is one of the components of agribusiness [Davis & Goldberg 1957; Czyżewski & Helak 1991; Czyżewski 1995; Czyżewski 2001; Woś 1979; Woś 1996a; Woś 1998; Woś 1996b]. It is regarded as one of its main elements and a part of close surroundings of agriculture [Poczta & Mrówczyńska 2002]. The agri-food industry is critical for the effective functioning of food economy as a whole. It is decisive for the effectiveness of connections between its individual sectors [Nieżurawski 1993] and it is regarded as a locomotive for the development of integration processes in the agri-food sector [Grabowski 1995]. In modern food economy, the importance of food industry is constantly growing and assigning it the role of an organiser and integrator of this economy. Obviously, the equivalence of all components in the food economy is unquestionable, but the modern and developed agri-food industry should play the leading and integrating role. The highly industrialised agri-food processing fulfils a stimulating function in agriculture and accelerates its modernisation, which means that agriculture is more and more dependent on this industry. On the other hand, the agri-food industry is also agriculture dependent [Zegar 1973].

The supply of materials to the food industry and agriculture comes from the domestic production and from imports [Table 2]. Both in Poland and in Germany, the importance of imported products in the supply of materials to the food industry is relatively significant. In the years under investigation in Poland, the imports share increased from about 11.0% in 2000 to 12.4% in 2005. On the other hand, in Germany as early as in 1995 the share of imported products in the overall intermediate consumption in food industry was 16.2%, whereas in 2007 it reached almost 20.0%. Similarly to agriculture, these results show that the import intensity of this intermediate consumption in Germany was much higher than in Poland.

In a detailed analysis of the share of imported products in each component of indirect consumption in the food industry, we can notice the fact that in Poland in 2005 the highest significance of imports could be observed in other industries, i.e. fish and fish products (as much as 76.2% of products from this sector of the national economy, which were used in the food industry, were imported[6]). In Germany, this share was also relatively high. In 1995, it reached 43.4%, but since 2000 it was relatively stable and amounted to about 24.0%. There were relatively significant differences in the supply of imported materials to the Polish and German food industries as far as products of the energy industry and metallurgic industry are concerned. In the last year under investigation in Germany, this

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[6] The development of fish industry in the first decade of the 21st century is a typical example of the development of those sectors of food industry which do not have their own raw material base. Connections with the EU market in the form of exports of food industry products and imports of raw materials and semi-finished products enabled a very rapid development of this sector of food industry. A similar situation can be observed for the tobacco industry, manufacturing of chocolate products or tea and coffee processing.

share amounted to 20.3% and 35.5% respectively, whereas in Poland the values were 10.7% and 7.3% respectively.

Both in Poland and in Germany, about 40.0% of the total intermediate consumption of products of the chemical industry used in the food industry comes from imports. This value amounts to 30,0% for paper products, paper package and plastics. Additionally, in Poland in 2000 nearly 40.0% of the total consumption within a given branch came from the electrical machinery industry and means of transport (in 2005 this share decreased to about 25.0%). This may prove the fact that in 2000, before Poland's integration with the European Union, there was a higher demand of the food industry for modern electrical machinery or modern imported means of transport.

As far as the imports of agricultural products used in the Polish and German food industry is concerned, their share in the total value of intermediate consumption in the sector III of agribusiness reached about 9.0% in Poland, whereas in 2007 in Germany it was 20% higher and amounted to 29.0%. As far as the internal turnover in food industry is concerned, both in Poland and in Germany imports are relatively significant (about 23.0% of products used in the food industry in Poland and about 30.0% in Germany were purchased abroad).

Table 1. The material supply to agriculture from imports and the share of imports in the intermediate consumption in agriculture in Poland and Germany

Imports by branch	Poland, in				Germany, in					
	2000		2005		1995		2000		2007	
	EUR million	%	EUR million	%	EUR million	%	EUR million	%	EUR million	%
From sector I	395	8.7	571	12.2	2 209	14.3	2 590	15.6	3414	16.4
Fuel and energetic industry	8	1.0	17	2.2	188	13.4	577	29.0	572	25.1
Metal industry	12	10.3	11	6.6	82	22.6	109	30.2	150	31.8
Electromechanical industry	17	30.9	19	32.2	13	19.1	18	31.0	17	31.5
Industry of means of transport	78	26.9	129	28.7	182	20.0	185	25.1	273	22.3
Chemical industry	256	40.1	371	39.3	1 402	54.9	1408	55.1	2 001	61.6
Industry of construction material	3	2.7	5	5.1	75	11.8	66	12.8	102	19.6
Other industry	3	8.6	6	17.1	145	43.8	165	51.7	216	59.2
Services	14	4.2	8	1.5	4	0.1	19	0.3	14	0.2
Trade	-	x	-	x	41	1.4	-	x	-	x
Construction	-	x	-	x	2	0.5	1	0.4	1	0.4
Transport and telecommunication	4	1.8	4	2.2	71	11.7	36	14.9	56	22.5
Forestry	-	x	-	x	4	7.3	6	9.8	12	14.5
Other branches	-	x	-	x	-	x	-	x	-	x
From sector II	192	5.0	195	4.8	107	9.8	261	15.5	336	27.7
From sector III	50	4.1	91	5.2	433	11.8	785	19.4	742	16.7
Total	637	6.7	857	8.2	2 749	13.6	3 636	16.3	4 492	16.9

Source: own calculations on the base of input-output tables for Poland in 2000 and 2005 [Bilans… 2004 & 2009] and for Germany in 1995, 2000 and 2007 [European… 2012].

On the basis of the supply volume of imported material to the food industry, it is possible to calculate import intensity ratios (the value of imported products used directly by sector III of agribusiness in relation to the global production of this sector). In Poland this ratio increased from 0.08 in 2000 to 0.10 in 2005, whereas in Germany it rose from 0.12 in 1995 to 0.15 in 2007. These results point to the fact that foreign trade is an important factor stabilising development of the food sector.

Table 2. The material supply of food industry from imports and the share of imports in the intermediate consumption in food industry in Poland and Germany

Imports by branch	Poland, in				Germany, in					
	2000		2005		1995		2000		2007	
	EUR million	%	EUR million	%	EUR million	%	EUR million	%	EUR million	%
From sector I	490	6.3	920	8.1	2 542	6.7	3 635	8.4	4 686	8.8
Fuel and energetic industry	2	0.4	7	0.7	268	10.9	584	21.3	811	20.3
Metal industry	24	14.0	24	7.3	192	12.0	337	22.1	412	35.4
Electromechanical industry	9	36.0	11	26.2	5	11.4	18	32.1	12	20.0
Industry of means of transport	63	39.1	79	25.1	76	10.0	74	8.9	210	17.2
Chemical industry	84	38.4	177	41.3	305	48.0	467	39.1	595	41.2
Industry of construction material	9	7.1	13	5.6	143	14.8	135	17.5	142	14.9
Other industry	174	22.1	343	27.4	918	18.4	1 206	26.4	1 579	30.0
Services	32	4.6	117	5.9	83	0.6	267	1.5	318	1.5
Trade	-	x	-	x	-	x	68	0.7	-	x
Construction	-	x	-	x	4	0.6	2	0.5	-	x
Transport and telecommunication	60	7.2	49	4.7	261	7.8	345	8.6	436	7.5
Forestry	-	x	3	14.3	-	x	-	x	-	x
Other branches	33	24.6	96	76.2	287	43.4	132	24.9	171	24.1
From sector II	564	9.1	750	9.3	7 518	23.9	8 427	25.9	9 480	29.1
From sector III	1 028	18.8	1 632	22.9	4 524	22.0	5 234	30.0	8 133	30.4
Total	2 082	10.7	3 302	12.4	14584	16.2	17296	18.6	22299	19.8

Source: own calculations on the base of input-output tables for Poland in 2000 and 2005 [Bilans… 2004 & 2009] and for Germany in 1995, 2000 and 2007 [European… 2012].

Conclusions

After a comparison of the significance of imports in the supply of material to the Polish and German agri-food sector, it is possible to state that in the Polish food economy the situation is at an early stage of transformations towards modernity. The internal turnover which chiefly comes from domestic production continues to play in Poland a significant role in the supply of material to agriculture and the food industry. On the other hand, in spite of the low share of internal turnover in agriculture, the share of imports in the supply of material to this sector is much higher in Germany than in Poland. The situation in the food industry looks similar, but the differences are not as significant as in agriculture.

Those results point to the much higher import intensity of intermediate consumption in Germany than in Poland The low import intensity ratio in Poland also points to the smaller importance of imports in the stimulation of agri-food sector development. It also means that the inflow of progress (new technologies decisive for the modernisation of agri-food sector) is limited in Poland. The results of the analysis point to the fact that foreign trade is an important factor stabilising the development of the food sector.

The comparison with the agri-food sector shows the desirable direction of changes in Poland. In Germany, the foreign trade is a much stronger stimulator of the agriculture and food industry development than in Poland. It suggests that the role of imports in the supply of material to the Polish agriculture and food industry should increase. However, it is important that the significance of foreign trade in the Polish agri-food sector is constantly growing and there is a chance that imported products and global processes will have significant influence on further development and modernisation of the Polish agriculture and food industry.

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Karolina Pawlak[1]
Department of Economics and Economic Management in Agribusiness,
Poznań University of Life Sciences

Importance and competitive advantage of the European Union countries in trade in agri-food products

Abstract. The aim of the paper was to show the importance and competitive advantage of the EU countries in trade in agri-food products. It was proved that old member states of the EU, especially Holland, Germany and France, play a dominant role in the agri-food trade. Although agri-food products occupy an important position in the total trade structure of the Central and East European countries, their significance in the exchange of agri-food products in the Community is incomparably smaller.

Key words: agri-food products, exports, imports, export specialisation, intensity of exports and imports, intra-EU trade, extra-EU trade.

Introduction

In the conditions of market economy, competing with other entities is understood as mutual rivalry aimed at gaining advantage related with functioning on the domestic and international market [Misala 2007]. It is an inseparable element of functioning of each business entity and at the same time it is one of the most essential economic mechanisms. Economic sciences usually define competition as a process of rivalry between business entities in the market, which pursue their goals by presentation of a more favourable offer than other market participants in terms of price, quality or other traits affecting one's decision about the transaction [Kamerschen, McKenzie & Nardinelli 1991]. The range of competition may be diversified. It is possible to talk about competing on a regional, national or international scale [IMD… 1997]. Due to the fact that competitiveness is by nature a relative, valuating notion which defines a certain desirable state, it is usually referred to the international market and evaluated on it. In this context, a high significance in creating competitive advantage and increasing the level of employment and people's income[2] is attributed to the results achieved in foreign trade. As Ezeala-Harrison [1999] notes, 'the export of uncompetitive products, which are not accepted by consumers on an international scale, makes achievement of a large share in the global market impossible and in consequence, it makes an increase in income and employment impossible'. These two determinants of competitiveness are also stressed in the definition at the mezoeconomic level. According to Singh [1977] and Devine [1996], an efficient sector which is simultaneously competitive, is the one that is able not only to satisfy the demand on the domestic market, but also on international markets. At the same time, it can obtain funds to

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[1] PhD, e-mail: pawlak@up.poznan.pl
[2] In the research on competitiveness based on the economic growth theory, the international competitiveness of a country is defined as 'the potential to achieve the economic policy goals, especially the income and employment increase, simultaneously maintaining balance of payment transactions' [Fagerberg 1988].

cover necessary import expenses and to maintain a socially acceptable level of production, employment and exchange rate.

Definitions of competitiveness deriving from the international trade theory also provide a clear reference to the position of a country in the global economy or in the economy of a particular region and to the results achieved in foreign trade. They define competitiveness as the ability to maintain or increase market shares [van Duren, Martin & Westgren 1991; Lubiński 1995; Kennedy et al. 1997; Pitts & Lagnevik 1998]. They list such measures of assessment of competitiveness level as the balance of trade, terms of trade, relative prices or shares in the world trade or regional trade. In the light of the abovementioned theories, it is possible to decide that the international competitive position of an agri-food sector can be assessed on the basis of the home country under analysis significance in the regional or world trade in agri-food products. Hence, the aim of the paper is to show the importance and competitive advantage of the EU countries in trade in agri-food products.

Material and research method

This study uses the most recent available statistics from the resources of the Statistical Office of the European Communities (Eurostat). The analysis compares the shares of individual countries in trade in the EU agri-food products, the intensity of exports and imports of agri-food products assessed on the basis of their trade value per hectare of utilised agricultural area (UAA) and export specialisation measured by means of the specialisation index value (SI). The export specialisation index (SI) compares the share of product i in the k country's exports with the share of this product in the world (w) or regional export:

$$SI_k = \frac{X_{ik}}{X_k} : \frac{X_{iw}}{X_w}$$

(1)

High values of the index are considered to be desirable. Otherwise, it is possible to draw a conclusion about an unsatisfactory competitiveness of a given economy or its sector [Jagiełło 2003].

Importance of the EU countries in the intra- and extra-EU trade in agri-food products

The old member states of the Community play a dominant role in the EU foreign trade in agri-food products. In 2011 they represented about 90% of the total turnover in this group of products (Table 2). Holland, Germany and France were the biggest exporters and importers of agri-food products both in the intra-EU exchange and in the trade with third countries. In 2011, Holland exported more than 73.5 EUR billion worth of agri-food products, Germany gained a revenue 60.4 EUR billion on their exports and France attained 57.2 EUR billion (Table 1). These values corresponded to about 18%, 15% and 14% of the

total agri-food exports in the Community (Table 2). In that year, Germany had the highest import expenses, as it paid 74.1 EUR billion to purchase foreign food which was nearly 18% of the total unionist imports of the kind. Holland and France spent 48.4 EUR billion and 45.1 EUR billion on these imports respectively. This corresponded to nearly 12% and 11% shares in the total value of agri-food products imported to the EU.

Italy, Spain and Belgium also noted intensive trade exchange in the agri-food sector. Its turnover ranged in these countries between 29 and 39 EUR billion, which amounted to about 7-9% of the exports and imports value of this group of products from/to the EU. Apart from them, the United Kingdom was also a significant importer of agri-food products, as it spent more than 46 EUR billion to purchase agri-food products abroad. It is necessary to note that Holland was the largest net exporter of agri-food products in the Community and generated a surplus of 25.2 EUR billion in the balance of trade. France, Spain and Denmark were the most significant countries among the other largest net exporters. On the other hand, the United Kingdom was the largest net importer, as it generated a deficit of 23.8 EUR billion in the agricultural foreign trade in 2011. The UK was followed by Germany (13.7 EUR billion deficit), Italy (8.5 EUR billion) and Sweden (5.5 EUR billion).

Of the new member states, Poland was the most significant in the structure of exports and imports of agri-food products from/to the EU. However, its share in the total turnover of the Community reached only 3.7% of exports and 3% of imports. The role of the other countries from the region of Central and Eastern Europe as well as Cyprus and Malta was marginal and except for the Czech Republic and Hungary their share in the trade did not exceed 1%.

It is worth noting that intra-EU turnover prevails in the agri-food trade in the EU member states. It is also noteworthy that a particular significance is ascribed to the intra-EU exchange in the countries of Central and Eastern Europe. Except for Lithuania, Latvia and Estonia, the share of intra-EU exports in the total exports value was higher than 70% in this region. Apart from Slovenia and Romania, the share of intra-EU food imports in the total imports value reached more than 80%. It is necessary to remember that reaching higher stages in the process of European integration contributes to the growth of mutual exchange between the Community member states, but simultaneously it may have influence on decreased dynamics of external trade. In view of those facts it is possible to state that the of the countries with high economic potential, which are characterised by competitive advantage in regional global markets. Holland, Germany, France, the United Kingdom, Italy, Spain and Belgium can be included in this group, because in 2011 they generated more than 75% of the total value of agri-food trade in the Community.

Table 1. Intra- and extra-EU trade in agri-food products in 2011, EUR million

Country	Intra-EU trade					Extra-EU trade					Total trade		
	exports		imports		balance	exports		imports		balance	exports	imports	balance
	EUR million	share in total exports	EUR million	share in total imports	EUR million	EUR million	share in total exports	EUR million	share in total imports	EUR million	EUR milion		
Austria	7 739	78.7	8 858	85.7	-1 119	2 099	21.3	1 483	14.3	616	9 838	10 341	-503
Belgium	27 060	86.3	21 952	74.9	5 108	4 301	13.7	7 362	25.1	-3 061	31 361	29 314	2 047
Bulgaria	2 444	74.0	1 819	80.5	625	857	26.0	441	19.5	416	3 301	2 260	1 041
Cyprus	152	62.0	776	79.6	-624	93	38.0	199	20.4	-106	245	975	-730
Czech Republic	4 510	91.8	5 883	92.8	-1 373	403	8.2	458	7.2	-55	4 913	6 341	-1 428
Denmark	11 477	70.5	7 390	68.5	4 087	4 792	29.5	3 397	31.5	1 395	16 269	10 787	5 482
Estonia	720	69.4	1 146	92.6	-426	317	30.6	91	7.4	226	1 037	1 237	-200
Finland	898	55.2	3 463	79.2	-2 565	728	44.8	909	20.8	-181	1 626	4 372	-2 746
France	38 144	66.7	35 472	78.6	2 672	19 038	33.3	9 669	21.4	9 369	57 182	45 141	12 041
Germany	47 101	78.0	55 783	75.3	-8 682	13 299	22.0	18 281	24.7	-4 982	60 400	74 064	-13 664
Greece	3 123	73.3	4 886	78.2	-1 763	1 140	26.7	1 365	21.8	-225	4 263	6 251	-1 988
Holland	59 149	80.4	27 819	57.5	31 330	14 385	19.6	20 554	42.5	-6 169	73 534	48 373	25 161
Hungary	5 720	82.5	3 855	90.9	1 865	1 215	17.5	386	9.1	829	6 935	4 241	2 694
Ireland	7 033	78.5	5 473	87.3	1 560	1 928	21.5	794	12.7	1 134	8 961	6 267	2 694
Italy	20 631	68.5	28 017	72.5	-7 386	9 499	31.5	10 634	27.5	-1 135	30 130	38 651	-8 521
Latvia	898	59.0	1 551	89.3	-653	625	41.0	185	10.7	440	1 523	1 736	-213
Lithuania	1 960	58.4	2 315	83.5	-355	1 394	41.6	456	16.5	938	3 354	2 771	583
Luxem-bourg	929	97.1	1 809	95.4	-880	28	2.9	88	4.6	-60	957	1 897	-940
Malta	37	25.2	441	88.4	-404	110	74.8	58	11.6	52	147	499	-352
Poland	11 680	78.0	10 041	81.1	1 639	3 294	22.0	2 338	18.9	956	14 974	12 379	2 595
Portugal	3 310	68.9	6 571	75.5	-3 261	1 491	31.1	2 138	24.5	-647	4 801	8 709	-3 908
Romania	2 897	72.6	3 524	79.6	-627	1 095	27.4	903	20.4	192	3 992	4 427	-435
Slovakia	2 753	96.3	3 554	97.1	-801	106	3.7	107	2.9	-1	2 859	3 661	-802
Slovenia	948	71.2	1 445	63.4	-497	384	28.8	835	36.6	-451	1 332	2 280	-948
Spain	25 364	76.8	17 442	60.2	7 922	7 672	23.2	11 521	39.8	-3 849	33 036	28 963	4 073
Sweden	4 565	74.1	7 714	66.4	-3 149	1 597	25.9	3 903	33.6	-2 306	6 162	11 617	-5 455
United Kingdom	14 321	64.3	32 231	70.0	-17 910	7 952	35.7	13 822	30.0	-5 870	22 273	46 053	-23 780
EU-15	270844	75.1	264880	71.4	5 964	89 949	24.9	105920	28.6	-15 971	360 793	370 800	-10 007
EU-12	34 719	77.8	36 350	84.9	-1 631	9 893	22.2	6 457	15.1	3 436	44 612	42 807	1 805
EU-27	305563	75.4	301230	72.8	4333	99842	24.6	112377	27.2	-12535	405405	413607	-8202

Source: [ComExt-Eurostat… .2012].

Table 2. Shares in intra- and extra-EU trade in agri-food products in 2011, %

Country	Intra-EU trade		Extra-EU trade		Total trade	
	exports	imports	exports	imports	exports	imports
Austria	2.5	2.9	2.1	1.3	2.4	2.5
Belgium	8.9	7.3	4.3	6.6	7.7	7.1
Bulgaria	0.8	0.6	0.9	0.4	0.8	0.5
Cyprus	0.0	0.3	0.1	0.2	0.1	0.2
Czech Republic	1.5	2.0	0.4	0.4	1.2	1.5
Denmark	3.8	2.5	4.8	3.0	4.0	2.6
Estonia	0.2	0.4	0.3	0.1	0.3	0.3
Finland	0.3	1.1	0.7	0.8	0.4	1.1
France	12.5	11.8	19.1	8.6	14.1	10.9
Germany	15.4	18.5	13.3	16.3	14.9	17.9
Greece	1.0	1.6	1.1	1.2	1.1	1.5
Holland	19.4	9.2	14.4	18.3	18.1	11.7
Hungary	1.9	1.3	1.2	0.3	1.7	1.0
Ireland	2.3	1.8	1.9	0.7	2.2	1.5
Italy	6.8	9.3	9.5	9.5	7.4	9.3
Latvia	0.3	0.5	0.6	0.2	0.4	0.4
Lithuania	0.6	0.8	1.4	0.4	0.8	0.7
Luxembourg	0.3	0.6	0.0	0.1	0.2	0.5
Malta	0.0	0.1	0.1	0.1	0.0	0.1
Poland	3.8	3.3	3.3	2.1	3.7	3.0
Portugal	1.1	2.2	1.5	1.9	1.2	2.1
Romania	0.9	1.2	1.1	0.8	1.0	1.1
Slovakia	0.9	1.2	0.1	0.1	0.7	0.9
Slovenia	0.3	0.5	0.4	0.7	0.3	0.6
Spain	8.3	5.8	7.7	10.3	8.1	7.0
Sweden	1.5	2.6	1.6	3.5	1.5	2.8
United Kingdom	4.7	10.7	8.0	12.3	5.5	11.1
EU-15	88.6	87.9	90.1	94.3	89.0	89.7
EU-12	11.4	12.1	9.9	5.7	11.0	10.3
EU-27	100.0	100.0	100.0	100.0	100.0	100.0

Source: own calculations on the basis of data from Table 1.

Agri-food foreign trade intensity and export specialisation in the EU countries

In 2011, Holland and Belgium were characterised by the highest intensity of agri-food trade per hectare of UAA (Table 3). The value of exports of agri-food products in these

countries reached 38.4 EUR thousand per hectare of UAA and 22.8 EUR thousand per hectare of UAA respectively, i.e. about 16 and 10 times more than the average value in the EU countries. On the basis of the SI values, it is possible to conclude that Holland realised export specialisation in agri-food products and the significance of its exports volume in the overall commodity trade was 70% higher than the average value in the Community countries (SI=1.7; Table 3). The imports value of agri-food products reached in Holland 25.3 EUR thousand per hectare of UAA and in Belgium it was 21.3 EUR thousand per hectare of UAA, so it was more than 10 times and nearly 9 times higher than the average value in the EU countries respectively.

Only Malta had more intensive imports of agri-food products due to its small area of UAA. In 2011, the expenses on agri-food products purchased abroad reached there as much as 48.9 EUR thousand per hectare of UAA and it was 20 times more than the average value in the EU countries. It is necessary to note that imports of agri-food products to this country was a necessity and it resulted from the absence of possibility to satisfy the internal demand with domestic production. International tourism is a significant sector of Malta's national economy, whereas agricultural production can chiefly be found on terraced slopes and irrigated lowland, where cereals, vegetables and citrus fruit are grown and cattle and goats are bred. Due to the poor quality of soil and a fresh water shortage, most agri-food products are imported from continental Europe. In consequence, this country did not undertake export specialisation in agri-food products and the share of its exports in the total commodity trade was 50% lower than the Community average (SI=0.5).

Denmark, Cyprus and Greece were distinguished for their highest level of export specialisation in the EU (SI=2 or SI=2.1). These countries play a minor role in the Community agri-food trade, but this group of products was an important source of their revenue from exports. At the same time, Denmark was characterised by a relatively high intensity of agri-food turnover. In 2011, the value of exports per hectare of UAA was in Denmark 2.5 times higher than the average value in the Community, whereas the imports value was 1.5 times higher than the Community average. Also Cyprus noted a nearly 3 times higher value of import expenses per unit of UAA than the EU average.

Luxembourg, Germany, Austria and Slovenia were also characterised by higher of exports intensity of agri-food products than the average value in the Community. In these countries in 2011, the revenue from exports ranged from 2.7 to 7.3 EUR thousand per hectare of UAA and it was from 16% to more than 3 times higher than the EU average, though none of those countries realised export specialisation in agri-food products. The share of agri-food products in the total trade volume was in those countries 20-40% lower than the average value in the Community (SI). Sweden, Austria, Italy and the United Kingdom together with Luxembourg and Slovenia were characterised by significant values of imports of agri-food products per hectare of UAA. The imports of agri-food products per unit of UAA ranged in these countries from 2.9 to 4.7 EUR thousand, i.e. 19-95% more than the average value in the EU countries.

The values of exports and imports of agri-food products per hectare of UAA ranged in the EU countries of Central and Eastern Europe from 0.3 EUR thousand in Romania to 1.9 EUR thousand in Slovakia. In most of these countries, it was from 40% to 60% lower than the average value in the countries of the Community. However, agri-food products occupied a significant position in the total trade structure of those countries. Export specialisation in this sector could be seen in Lithuania, Latvia, Bulgaria and Poland (1.2≤SI≤1.8).

Table 3. Agri-food trade intensity and export specialisation in the EU countries in 2011

Country	Export intensity		Import intensity		SI
	EUR thousand per hectare of UAA	EU-27=100%	EUR thousand per hectare of UAA	EU-27=100%	
Austria	3.1	131.3	3.2	135.3	0.8
Belgium	22.8	971.2	21.3	889.8	1.0
Bulgaria	1.1	46.1	0.7	30.9	1.7
Cyprus	1.7	71.4	6.7	278.6	2.0
Czech Republic	1.4	59.4	1.8	75.2	0.5
Denmark	6.1	260.1	4.1	169.0	2.1
Estonia	1.1	48.7	1.4	56.9	0.9
Finland	0.7	30.2	1.9	79.6	0.3
France	2.1	88.6	1.6	68.5	1.4
Germany	3.6	151.8	4.4	182.5	0.6
Greece	1.0	44.5	1.5	64.0	2.0
Holland	38.4	1 634.9	25.3	1 054.1	1.7
Hungary	1.6	69.8	1.0	41.8	0.9
Ireland	2.2	92.1	1.5	63.2	1.1
Italy	2.4	100.6	3.0	126.5	0.9
Latvia	0.9	36.5	1.0	40.8	1.7
Lithuania	1.3	53.9	1.0	43.6	1.8
Luxembourg	7.3	311.7	14.5	605.5	0.7
Malta	14.4	613.4	48.9	2 041.0	0.5
Poland	1.0	41.2	0.8	33.4	1.2
Portugal	1.4	58.8	2.5	104.6	1.2
Romania	0.3	12.4	0.3	13.4	0.9
Slovakia	1.5	62.8	1.9	78.9	0.5
Slovenia	2.7	116.0	4.7	194.6	0.6
Spain	1.3	56.5	1.2	48.5	1.6
Sweden	1.9	82.2	3.6	151.8	0.5
United Kingdom	1.4	58.8	2.9	119.1	0.7
EU-27	2.3	100.0	2.4	100.0	x

Source: [ComExt-Eurostat… 2012; Eurostat…, 2011], own calculations.

Concluding remarks

The aim of the paper was to show the importance and competitive advantage of the EU countries in the foreign trade in agri-food products. It is possible to observe that the old EU member states, especially Holland, Germany, France, the United Kingdom, Italy, Spain and Belgium play a dominant role in the agri-food trade due to their competitive potential, its

quality and effectiveness of its use. However, agri-food products are not a significant source of export revenue in all of those countries. The countries with a high level of economic development are more often characterised by specialisation in industrial products exports, diversified products with higher value added. Their production requires more advanced manufacturing technologies. It is necessary to note that the higher technological potential of farms gives the countries of the EU-15 a comparative advantage mainly in capital-consuming directions of production which depend on technological progress. However, due to usually large resources of cheap labour force in Central and Eastern Europe, the agriculture gains there an advantage in labour consuming branches of production, which stands in agreement with the Heckscher-Ohlin-Samuelson theorem on resource abundance. Although agri-food products occupy an important position in the total foreign trade structure in the Central and East European countries, their significance in the exchange of agri-food products within the Community is incomparably smaller. In comparison with other countries of the Community, Malta is distinguished for its very high import intensity, which is necessary to satisfy the demand of the home market, although the share of this country in the EU agri-food trade is marginal.

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Daniela Popa[1]
Elena Timofti[2]
The State Agricultural University of Molavia
Chisinau, Republic of Moldavia

Perspectives of Moldavia's agricultural sector after potential accession to the EU

Abstract. Development of intensive agriculture is a perspective direction in the world, but also in Moldavia. The natural factors, as well as knowledge and technology developed on this basis, ensuring a high yield, quality, competitiveness and specialization of production, will be both contributing to the development of agriculture as a branch, as well as the social efficiency of production. European integration and scientific progress offers new opportunities for raising agricultural output. The goal of the paper was to characterize perspectives of Moldavia's agricultural sector following country's potential accession to the European Union. As a conclusion we can say that the main factors in ensuring the competitiveness of agricultural products are quality, which manifests itself through price differentiation and diversity of sales channels.

Key words: competitiveness, integration, specialization, productivity, effectiveness.

Introduction

Economic and social changes have been undergoing in Moldavian agriculture and food economy that involve issues of regional development, the main tasks of which are the following [Timofti & Popa 2009]:

- creation of conditions for stable economic development of economic agricultural entities in the region
- maintenance of the necessary standard of living and the social security of the region's population
- resolving of the ecological problems.

Accession to the European Union mechanisms includes:

- further harmonization of legislation and institutions in agriculture with the acquis communautaire in the European Union, practical application of country's economic and social activities
- increasing premises of advantageous integration of Moldavia into the European Union
- development and implementing a quality standards aligned with those in the European Union countries;
- creating channels of product support.

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[1] DSc,-e-mail: d.popa@uasm.md.
[2] DSc habilited, e-mail: e.timofti@uasm.md.

Discussion

Macroeconomic conditions

Progress offers new opportunities for boosting the agricultural output of many industries. This task can be achieved by targeting priority to production and export of food products of high competitiveness. Economic efficiency and social economic effects are beneficial both for producers, by saving inputs, their rational use, reducing costs while increasing quality and, consequently, a better positioning in the competitive environment and for consumers, by increasing the nominal and real wage and thus increasing the purchasing power of income, saving working time, recovery time, etc.

The competitiveness of production is a complex notion, which reflects, on the one hand, the producer's interests, and on the other hand the consumer's interests. In the first case the product is considered competitive if it assures efficiency of the producer's activity. In the second case, it is a product which assures a maximally useful effect per unit of consumption. Through these assertions we stipulate that in the assessment of competitiveness of production it is necessary to take into consideration so much producers interests as well as those of consumers.

We are convinced that an improvement of production quality in the agricultural sector, raising of sale price as a result of differentiation in production quality as well as an improvement of distribution ways constitute a set of levers which determine the main direction of increasing the economic efficiency of production and the competitiveness of enterprises.

Increasing agricultural production quality can not be rationally considered separately from economic categories such as labour productivity, unit cost, selling price, profit, profitability, etc. A close and direct connection exists, however, between the quality of agricultural products and their selling price [Timofti 2009].

An economy can not be considered efficient if it is not sufficiently receptive to the technological and scientific progress and is using irrationally the economical resources. For an efficient economy, a high level of using its economical and production possibilities is characteristic. The efficiency is a production result and this result can be of a low, high or negative level. That is why in certain cases favourable conditions for the effectuation of the large production process can be created, but in other cases the created situation is leading to a diminution of production.

A system of indicators is used for the economic efficiency characterization of all production branches. These indicators reflect the level of utilisation of the production factors, also the selling conditions, the demand, the offer, the competition between the producers, etc.

The system of the appraisal indicators offers to us a possibility to analyze in a complex mode and to obtain certain results concerning a new direction of development and of refining the production economic efficiency.

The results of efficiency estimation demonstrate in a concrete mode to the merchandise producers how to organize the production structure in order to correspond to the competitive market demands.

By the notion of 'system of indicators' a set of multiple reciprocally interconnected indicators is understood, which have basically a unique conception concerning the consumer, the calculation methodology and the aggregation means, which are coordinated

and have hierarchic structure of multiple levels, respect the comparability, characterize the main aspects of the economic process, oriented to unravelling of some concrete objectives [Timofti 2009].

Investment

In accordance with data from agricultural enterprises in the Republic of Moldavia, which farm more than 60% of the agricultural land area in the country, researches were effectuated in the field of economic production efficiency.

Fixed capital investments play a major role for the agricultural development. Fixed capital investments for agricultural development, by forms of ownership, are presented in Table 1.

Table 1. Fixed capital investments in agricultural development, by forms of ownership, current prices, leu million

Capital source	Year							
	2003	2004	2005	2006	2007	2008	2009	2010
Fixed capital investments with production purpose	92.3	317.9	455.9	489.2	731.6	1020.2	923.3	992.2
of which:								
public	25.4	28.2	41.5	37.5	37.8	41.2	23.7	29.2
private	154.7	258.7	369.6	382.5	558.8	861.9	795.8	818.8
Mixed (public and private). without foreign participation	6.7	5.7	6.9	5.4	20.1	14.9	2.6	0.9
Joint ventures	3.6	25.2	32.9	61.8	10.2	98.1	87.2	16.8
Foreign investors	1.9	–	5.0	2.0	5.2	4.0	14.0	26.6

Source: National Bureau of Statistics, Republic of Moldavia

Table 1 data indicate that capital investments with purpose of production rose in 2010 by 7.5% as compared to 2009, while mixed capital investments (public and private) and joint ventures were significantly reduced without foreign participation in the last year of analysis.

The way of approach, the criteria of efficiency hierarchy and their contents are changing when passing to the new economic relations of competitive economy. Obtaining of a profit, being the main objective of activities in agriculture in conditions of competitive economy, as a criterion of economic efficiency will be the maximisation of profit per unit of resources consumption, in conditions of a high level of quality and assurance of production competitiveness. In the case of implementing new modern technologies, the criterion of efficiency will become the minimisation of resources consumption per unit of final result.

SWOT analysis

As a tabulation of research results of the economic efficiency of agricultural production through the SWOT analysis, a series of conclusions that assess the strengths, weaknesses and opportunities can be shown in order to improve the estimation

111

methodology of increases in economic efficiency of production branch agriculture, which is a priority of the economy.

Table 2. SWOT analysis of the agricultural sector in Moldavia

Strengths	Weaknesses
• Agro-science based on de-monopolization of agriculture developed a concept of its functioning under various forms of joint ownership and activity. • Total agricultural area is relatively high and arable land has a considerable weight. • Producers of goods of highly valuable agricultural products (fruit, vegetables, etc.) are employed in private enterprises and large corporations. • In the prevailing cases some products can not be produced in large enterprises (beans, peas, buckwheat, melons, berries, herbs, quail eggs, goat milk, rabbit meat, honey, and fish). • The Republic of Moldavia agricultural market has access to markets in the East and West. It offers great opportunities for sales in the domestic and export agricultural markets. • Reforms have provided opportunities to a large part of farmers to show entrepreneurship and strive to achieve high results, profits and other successes. • Producers of goods are given the right to independently solve problems and develop production operations. • An opportunity was created to develop agriculture in many forms of ownership and production meeting the need of cooperation on different principles. • Implementation of strategies, programs and mechanisms to support agricultural sector. The legislative basis for development of agricultural sector has been created and continuously improved. • The country's favourable geographical location, situated between the EU and CIS countries. • The labour force with skills in foreign languages. • Well developed telecommunications system including the internet access. • New and transferable skills acquired by returning migrants.	•Lack of investment in agriculture, existence of a large number of unprofitable farms. • Increasing dependence of agriculture on industrial processing enterprises. This makes a disparity between agricultural and industrial production prices. • The manufacturers of agricultural products still do not feel confidence in their powers. • Natural factors influence risk (hail, frost, fire, landslides and floods). • The disparity between prices of food and industrial products. • Lack of personal experience in agriculture and economic studies. • Lack of counselling centres. • Difficulties with selling products. • Economic efficiency of agricultural production at a lower level. • Crop and animal productivity is low as compared to other countries. • The low level of labour remuneration. • Ageing workforce, the youth migration to cities and other countries. • Lack of state subsidies. • The high interest rate on loans. • The low quality of products. • Reduced work discipline and technological discipline. • Increasing costs of agricultural products. • Technical and material destruction. • Low skilled workers. • Not sufficient changes taking place in the necessary structural systems (financial and organizational) which are not adequate to ensure effective development of agriculture. • Low productivity reasons: • reducing rates of mineral and organic fertilization • reducing crop area cultivated with intensive technology • reducing the irrigated areas due to failure of irrigation systems. • Worsening labour and technological discipline; • Conditions conductive to extensive reproduction. Crisis in agriculture has generated agricultural market distortions, mainly caused by: • problems in the orientation of production structures in relation to the domestic and external demand • lack of recovery in the processing and storage of food products • poor promotion of foreign investments in processing of agricultural products • poor protection of domestic production • lack of services to promote sales channel performance • inefficient allocation of resources • reduced efficiency of legislative base implementation • political instability • limited financial capacity of the state for support to agriculture • underdeveloped business support infrastructure and capital market • lack of financial support instruments for innovation projects • low level of competitiveness of agricultural sector • low level of development and absorption of innovations • low level of entrepreneurial culture and training • poor knowledge of techniques of access to foreign export markets and reduced rate of exports of agricultural sector.

Table 2. continued

Opportunities	Threats
• Initiation of competitive business in agriculture and demand for the agricultural land based on increasing returns. • Increases in crop yields and product quality. • Diversification of crops in line with other emerging markets and their development. • Encouraging foreign investment. • Modernization of processing procedures in the way of investment. • Greater access to the EU markets and the EU financial funds. • Improving the producers, processors and traders activity in the supply chain. • Cooperation between agricultural units in the storage of products and increasing their market influence. • Introduction of exchange transactions and a growing use of modern sales instruments. Increase in the state attention to the problems and needs of the agricultural sector. • Development of public-private partnership. • Pro-European vector in national development. • Development and continuous improvement of observation of intellectual property rights. • Extension of international cooperation, development of cooperation in agriculture and regional infrastructure to strengthen the contact points. • Further development of the internationalization of agricultural sector. • Further development of technologies and innovations and their absorption capacity.	• Use of inappropriate agricultural policies to improve production and/or sale of agricultural products. • Increase in international competitiveness not ensuring increased competitiveness of the Moldavian agricultural products. • Processing capacity and technical and technological equipment possibly damaged. • Difficulties in adjusting to and integration with the European agricultural production requirements. • Low production volume, disparity with industrial prices, naturalization of agriculture, risk of financial dependence, poor social infrastructure development. • Expensive loans, high interest rates, farmers' problems with getting loans when taking into account the specific natural conditions in agriculture. • Existence of territorial conflict. • Instability of the legislative framework. • Significant migration of the active population. • Lack of inflow of young professionals specialized in agricultural activities. • Increasing shadow economy. • International competitive pressure. • The energy dependence. • Adaptation of the education system too slow to meet the labour market demand. • Low participation of entrepreneurs in entrepreneurship education programs. • The tendency to increase the tax burden.

Source: [Decision… 2006].

The impact of potential EU accession on the agro-food sector in the Republic of Moldavia (opportunities, threats) can be analyzed through a methodology like the SWOT analysis. By identifying strengths, it was intended to highlight the capabilities, resources, abilities and skills characteristic of the agriculture in Moldavia that can be sources for a successful development. In fact, the strengths in SWOT analysis are defined also in amounts and both internal and external factors created are valued. In contrast, gaps in legislation governing the sector, poor resource areas and internal conditions that are otherwise actual values, are the points of weakness. Opportunities are the virtues that can be advanced skills, ways that can be exploited to the limits of their force and faults that can be removed at least vulnerability and that prevent the agricultural sector in the country to attain the most developed level of economy in which the contribution by this sector to creating the value added and the GDP are very important. Threats are some negative aspects arising from the limits imposed by the external unstable environment of the sector, external relations of the state, the pressure exerted by state bodies through regulations and taxation. The main objective pursued through the SWOT analysis is to view items separately and to recommend strategies that would create optimal alignment of the agricultural sector to international standards.

The SWOT analysis indicates the existence of advantages and opportunities for development of agricultural sector, but the weaknesses and threats in relation to agriculture

113

remain substantial. In this context, there is a need to support agricultural sector, creating stable legal and economic conditions.

In such a context, the reconstruction of agriculture concerns a series of important segments of this industry. Vital, urgent and interdependent processes and attention are taken by the present government through its governmental programme. It includes many directions and actions to drive a significant turnabout in this subsystem of the national economy, including the following:

- quantitative and qualitative growth of crop and animal production, by building national productive potential and promotion of organic farming systems, stimulating a growth of farmers' performance and competitiveness of Moldavian food products in domestic and international markets and expanding organic farming [Law… 2001, p. 9]
- consolidation and private sector development by promoting specific investment programmes, effective and profitable for farmers;
- technical equipment of agriculture, primarily by supporting farmers in the purchase of tractors, agricultural machinery, equipment, plants, fertilizers, pesticides (within the limits of ecological balance) and petroleum products, agricultural products including payments for industrialization and export
- competitive, reliable and stable development, ensuring adequate income to farmers, including tax policies directed primarily at products such as wheat, sugar beet, sunflower, soy, cow's milk, poultry, pork etc.
- promotion of a comprehensive rural development programme in all developing regions in a complex concept of rural development, economic and social integration of Moldavian villages
- ensuring an enabling environment to attract, on favourable terms, the foreign capital investment to support programmes and agricultural production in Moldavia. [Law… 2007].

For Moldavia, an integration into the European Single Market is an economic necessity, social and political. The EU accession strategy is based on the major objectives to be met by our country which has to meet the requirements of integrataion into the EU economic structures and creation of a food system and market performance, competitive internally and externally. Food requirements in the Moldavian market are very tough.

Price regulation in the EU has necessitated the creation of a complicated mechanism that manages the land market price movements. The basic element of this is guaranteeing prices. The guaranteed prices usually include three types of prices: prices for special intervention, prices of involvement, limit prices (import prices).

The intervention prices are always below the price for special purposes (usually 10% to 15%) [Timofti & Popa 2009]. They function as the minimum price guarantee. The intervention price is the price that the purchasing agencies in each EU country are required in November until May to purchase products from farmers at (only standardized products are purchased). If market prices fall below intervention prices or the demand for agricultural products is not sufficient, the EU procurement organizations buy from producers any quantity at the intervention price. A limit price is the minimum import price. Import duties are custom duties by which import prices are set at the limit price. Import duties are paid by importers of EU products and should not exceed the intervention price by 55%. Export subsidies (refunds) are payments by which export prices are set in the export

114

market. Export subsidies are designed to eliminate the divergence between EU prices and world prices. Their total volume is not mounted automatically but depends on the internal market price and the price obtainable in the third countries markets. Subsidies are usually established by decision of the Committee for Administration based on daily auction price bidding. Fixed volumes of product export certificates are issued that allow receiving export subsidies. Products from intervention stocks may also be sold in export markets at world prices. If the intervention prices for grains stay below limit prices over a part of the year, monthly pay increases for goods' manufacturer and trading firms as a stimulus to store products instead of selling them at early intervention prices [Decision… 2006].

Much of the intervention payments structure is occupied by payments to farmers growing grain crops (57%). Most state subsidies were distributed in Italy (28.3%) and France (14.4 %). Small subsidies have received Belgium, Sweden, Denmark, Portugal and Great Britain. In the structure of the trade subsidies to producers dominate grain crops payments (64.7%). Among the EU countries, greater support receive commercial producers in France and Germany (35% and 23.3% respectively) and the smallest get manufacturers in the Netherlands, Luxemburg, Portugal, Greece, Belgium and Denmark.

An important factor of the EU agricultural policy is also a permanent control over markets and prices. As one of the EU market regulation measures it serves for seizure practice of a large proportion of agricultural products and for keeping the so-called 'state reserves'. Consequently in most cases the product comes as a result of exports support. An European Union permanent deposit keeps agricultural products worth 1 ÷ 1.5 EUR billion [Decision… 2006].

Commodity interventions are a constituent of the mechanism of price regulation in the EU. When prices fall below the intervention level, the purchase and storage takes place and when the world prices fall below the EU prices (which is a common situation) the exporters receive compensation payments. Maintaining domestic EU production at reproductive balance is achieved at the expense of export subsidies compensating the exporters when the EU goods are more expensive than the world market price. Thus, the EU market is operating in an enclosed space determined by actions appropriate for maintaining an adequate stability of the internal market independent of world prices.

Social development programs have been established and the support for agricultural products is explained by the cohesion framework. First of all, these programs are conducted on a regional scale. The cohesion policy pertains to numerous agricultural districts. These are all territories of Greece, Portugal and Ireland and much of Spain, Southern Italy, Sardinia, Corsica and France's foreign departments. Besides, the reason for inclusion of the regions mentioned above into the economic programme are also three other criteria: a high level of employment in agriculture, low living standards of population and/or a well-marked tendency of diminishing number of population. In these regional programmes are included many other traditional actions financed on the EU account. Investments in industrialised farms, social programmes (early retirement, helping young farmers, professional training), help for districts with unfavourable conditions for agriculture and with regional environmental tensions, support for farm forestry, development programmes for processing and marketing of agricultural products, financing environmental safeguards can be highlighted. In districts with ecological tensions, entrepreneurs can receive subsidies as compensation for possible losses of income from taking measures of environmental protection, recommended by the EU.

Payment shall be made per hectare of agricultural land and may be from EUR 25 to 200 per hectare. Territory size of ecological tension must not exceed 10% of the EU territory [Decision… 2006].

The grant is paid annually; the amount depends on the size of the lost income and expenses. The maximum grant is EUR 600 per hectare of annual crops, EUR 900 per hectare of permanent crops and 450 hectare of agricultural land under crops per year.

Even in the current crisis of the condition of agriculture, approximately 15% in the state budget revenue is formed at the expense of agriculture, while rural areas get in return only one tenth of that rate. Price divergence has become a legitimate form of extracting money from agriculture. In the EU, agricultural producers receive from 65% to 75% of sales worth. In Moldavia, this indicator is 10 ÷ 30%. [Decision… 2006].

Food imports in Moldavia whose supply from the world market is directly and indirectly subsidized by governments, mean for Moldavia a double danger. On the one hand, it is an evident threat of liquidation of national manufacturers, especially as it relates to animal husbandry. On the other hand, it is threatening with the national consumer price rises as a result of possible import trend towards achieving possible weakening export subsidies requirements by the World Trade Organization. In these circumstances, we need a new foreign trade regulatory approach that would help out of the crisis in Moldavian agriculture. The question of regulatory tools is not as simple. Quotation can be made in connection with the preparation for Moldavian accession to the World Trade Organization and a decrease in customs duties on imports of large volumes of food may have inflationary effect.

The state regulation of adapting the agricultural sector to the EU requirements encompasses a central mechanism of regulating prices that simultaneously help to stabilize farmers' income, protects domestic agricultural products against those imported from the EU at lower prices than domestic, helps to regulate the structure of agricultural market. The EU is actively involved in setting prices, their regulation and in the redistribution of incomes. Namely, the need to defend the national producer and the purchaser was the root cause for the formation of a unified EU Common Agricultural Policy. There, as the main instruments of domestic origin, are used defensive duties and compensation payments called upon to balance the difference between high domestic prices and the world ones.

Resulting from the EU experience, it is necessary in Moldavia to introduce systematic payments which have demonstrated high efficacy for the protection of domestic producers and are able to operate in an automatic mode, need not repeated political decisions and, what is most important, can be accommodated with the international trade. At this level of protection they should be essentially higher than those in the existing tariff system in Moldavia. It is important that the compensation payments system is situated outside the budget but in a common fund which serves to maintain the market price. Another possible way is a system of state involvement in agricultural markets, as the agricultural product purchases guarantee minimum prices established under applicable EU mechanisms models. This would allow for solving the task while supporting rural producers as a result of their production activity, and address both product development and adjustment in marketing. Maintaining the price level should be indicated with the customs defence. Moreover it is necessary to establish a direct channel of distribution network for assets acquired at the expense of import tariffs on agricultural products with guaranteed co-financing of their acquisition by domestic producers. Such a combination will not only regulate the problem cheaper but will have more 'transparent' meaning for the society. Not just talking about

spending additional money from the state budget but about imposing customs duties on imports for development of national production. The EU member states' compelling development experience shows that market conditions, vitality of farmer households, agribusiness full effectiveness, enhancement of economic sphere level and significant improvement of ecological protection are subject to state regulation of agricultural products. A dominant role in the complex and valid measures for state regulation of agricultural holdings in the EU belongs to the price regulation system. Agrarian production efficiency improvement is impossible without a state regulation and support for agricultural production under which the price system is necessary to pledge guarantee payments of compensation, export subsidies and purchases by the state. It is also necessary to take comprehensive approach to state regulation system of agricultural products, to fortify the support of agriculture basing on the experience of developed countries in order to protect national agriculture and to raise its efficiency. To improve the situation in the agrarian sector of economy and achieve an efficiency gain, the state regulation of agricultural industry is necessary.

Conclusions

The main findings from the study are summarized as follows. In order to enhance competitiveness of Moldavian products the following actions are needed:

- improving the competence of farmers and people who will ensure a more efficient farm management (need for improved training, consulting and information services)
- improving competitiveness of farms in terms of achieving the promotion of investment as well as the technological and scientific progress, reducing production costs, achieving a compliance with the EU standards
- modernisation and changes in the processing and sales of agricultural products (requires a system of small and medium processing, storage and packaging of food products.

As a recommendation, in order to enhance perspectives of Moldavia's agricultural sector, it would be good to improve the living standards of rural population and to develop competition in agricultural production. In the EU market regulations of production are based on following principles: abolishment of any restrictions on trade between the EU countries, mechanisms that contribute to stabilization of producer unit prices of agricultural products, domestic market defence from competition of third countries products, financing of agricultural holdings from a unique fund consisting of contributions from participants.

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117

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Zanna Svarinska[1]
University of Latvia

The situation in Latvian agriculture in the context of European and global agricultural trends

Abstract. This scientific paper presents a consequent research of actual problems, trends and challenges in agricultural sector worldwide, in Europe and Latvia starting from global outlook and ending up with Latvian nationwide scale. The analysis of global and EU agricultural trends and problems has revealed that they all to a greater or lesser extent refer to Latvia as well. Thus, it can be stated that an analysis and application of worldwide experience in solution of Latvian agricultural problems would be utmost precious and useful, while taking into account not only mature economies as Scandinavian countries, but also experience of developing countries to which Latvian agriculture is more related. Novelty of this research consists of a consequent analysis of the situation in Latvian agricultural sector in the context of European and global agricultural trends. Practical effect of this research is based on the conclusion that the Common Agricultural Policy of the EU does not have any sufficient economic feasibility, as the EU Member States are not uniform in their vision of common agricultural policy, but separated in country groups with different agricultural problems and trends.

Key words: Latvian agriculture, Common Agricultural Policy, European Union, global agricultural trends.

Introduction

The Gross Domestic Product (GDP) of Latvian agricultural sector over the 2000-2009 period increased at current prices from 110884 Latvian lat (LVL) thousand up to 171245 thous. LVL or by 54.4%. according to the Central Statistical Bureau of the Latvian Republic (hereinafter LR CSB) [Table IKG061… 2012]. Meanwhile, the real GDP increased by 16.3% over the 2000-2009 period[2]. However, the crisis of 2007-2009 resulted for the Latvian agricultural sector in a sharp decline. The branch GDP as a key growth indicator dramatically dropped from 239209 thous. LVL to 171245 thous. LVL or by 28.4% [Table IKG061… 2012]. Despite the fact that the GDP decline was observed over the crisis period in all branches of Latvian economy, the agricultural sector experienced the heaviest fall. The average decrease of GDP in other sectors of the national economy was almost 3 times smaller than in agriculture (total GDP decrease at current prices was 9.3%) [Table IKG061… 2012]. In this regard, the situation in Latvian agriculture requires a special attention of researchers and practitioners. This is one of the economic sectors which experienced the worst impact of the crisis. In its turn, ramifications of the crisis might lead to irreversible changes which address new challenges for Latvian farmers. Another significant factor that defines a relevance of this research is the fact

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[1] MA, PhD candidate.
[2] Author`s own calculations based on data from the Latvian Ministry of Agriculture [Latvijas… 2004, p. 11; Latvijas… 2006, p. 14; Latvijas… 2009A, p. 14; Latvijas… 2009B, p. 22; Latvijas… 2011, p. 20] and the World Bank [Agriculture... 2010].

that the Latvian agriculture is incorporated in the context of European and global agricultural trends. Consequently, the study of the situation in Latvian agriculture is impossible without relevant analysis of European and global agricultural trends.

There are extensive discussions in Latvian media on 'the greatest paradox' of the Latvian countryside which is a situation, when 'farmers have no work, when thousands of hectares are overgrown with hogweed and creeping thistle, while the customers at supermarkets buy Polish potatoes, Dutch tomatoes, cucumbers, cabbages..." [Seleckis 2011]. Agricultural problems are widely discussed also in scientific community of Latvia, with attempts to find a scientifically substantiated explanation for the 'greatest paradox' of Latvian agriculture. Besides, there is another problem, namely 'the majority of the rural population does not wish to apply new and innovative ways of earning money in their economic practice' [Liscova 2011, p. 8].

Thus, the objective of this paper is to analyze the most actual development problems, trends and challenges of the agricultural sector in Europe and worldwide, which form the basis for development of Latvian agriculture. As it has already been mentioned, it functions not separately, but in connection with global trends in agriculture, so far it produces agricultural commodities. In order to achieve the objective of this research, the author has carried out an analysis of statistics which describes the developmental tendencies of global, European and Latvian agriculture, as well as an analysis of the global, European and Latvian analytical reviews. In her research the author is basing also on the actual scientific works by Latvian researchers on economic and social problems of agriculture [Jirgena 2009; Siliņa 2009; Baraškina 2010; Šūmane 2010; Liscova 2011].

The paper is structured into three sections. The first focuses on the global trends of agriculture and food security in relation to the agriculture of Latvia. The second section presents an analysis of trends and challenges in the development of European agriculture, while the third section focuses directly on the situation in Latvian agriculture.

The global agriculture and food security trends and the challenges related to Latvian agriculture

International organizations consider an increase in the prices of agricultural products as one of the main global problems, which has its direct impact on agricultural sector and food safety in various regions of the world. Nevertheless, in the early 2000s, a decrease of the worldwide food prices diminished or was at least interrupted with an increase of food prices in real terms, reaching its culmination in 2007-2008. Although the worldwide prices of food decreased a little in 2009, they still remain higher than in previous years. The statistics as on October 2010 show that the Food Price Index increased again within the time period from 2009 to 2010 [The State… 2011, p. 15].

It seems at first sight that an increase of agricultural products prices is a serious problem for the population, not for the farmers. Nevertheless, when analyzing this subject from the standpoint of economic theory, it is to be noted that an increase of prices (due to low productivity of agricultural sector) leads to a deterioration of the competitiveness of agricultural

production. It hinders the integration of local farmers to the global market of agricultural products. For example, a large amount of local potatoes, carrots and other vegetables was left in the fields in Latvia in autumn of 2011 and Latvians were buying in stores cheaper imported agricultural products.

The second significant global problem of agriculture, to which one must pay particular attention, is the price instability in the global markets of agricultural products. Although the instability of prices has always been typical for the markets of agricultural products, there are tendencies nowadays, due to which this phenomenon should be particularly emphasized. The climate changes can lead to more frequent extreme events, eventually to shocks at the agricultural markets. The expansion of biofuels production, which is based on agricultural products, will make agricultural markets more dependent on the global markets of energy resources.

Latvia also has its own practice of establishing food security networks and mechanisms. Ffor instance, the Food Bank, which is a food program of the www.ziedot.lv charity portal. The Food Bank, in cooperation with local charity organizations, renders assistance to needy inhabitants by distributing food packages to inhabitants throughout Latvia.

The food security issue which is actual on a worldwide scale, and which refers to Latvia as well, is closely related to the agricultural sector, where there is often a surplus of manufactured products (as, for instance, in Latvia in 2011). This surplus remains in the field, without being used for the implementation of social programs in the sphere of food safety.

Another global problem, which is very important, and which is closely related to the sphere of agriculture, is the condition of worldwide land and water resources for food production and agricultural activities. The research on this topic was carried out in 2011 by the UN Food and Agriculture Organization, and the review was issued in the same year [The State… 2011, p.26]. This review describes the condition of the worldwide land and water resources, which are necessary for food production. It analyzes corresponding threats to food security and to sustainable development. The UN Food and Agriculture Organization emphasizes that these threats have not come into existence only due to the relative shortage of land and water, but also due to its inefficient utilization.

Nowadays, latest global agricultural trends are characterised by climate changes, population growth worldwide and changes in nutrition habits. They all predispose to transformation of current agricultural production methods. According to the assumptions of the UN Food and Agriculture Organization, population and income growth by 2050 will result in an increase of demand for global food production by 70%, whereas demand in developing countries will rise by 100% as compared to 2009. Nevertheless, allocation of land and water resources in the countries with a low developed agricultural sector is not favourable. Availability of farm lands in the countries with a low income level is per capita more than twice lower than in countries with a high income. Some countries which are characterised by a rapidly rising demand for food, meanwhile experience severe shortage of land and water resources. Obviously, future growth of agricultural productivity might be achieved mainly by means of business intensification on existing agricultural lands. In its turn, this will require both a large scale implementation of a long-term land management and an efficient water

management of land irrigation by improving the flexibility, safety and simultaneity of water supply. In addition to the problem of availability and sufficiency of land and water resources, it is worth to mention the problem of agricultural land productivity. According to the global research, this productivity 'varies dramatically worldwide' [Todaro & Smith 2011 116].

Table 1. Comparative table of agricultural productivity worldwide

Country	Comparison of agricultural productivity (added value per 1 worker in 2005-2007, constant dollars of 2000), USD/worker/year	Average grain crop in 2006-2008, kg per hectare
Average worldwide	1 016	3 397
USA	45 015	6 578
Japan	39 368	5 977
United Kingdom	28 065	7 110
Latvia	3 260	2 770
Russia	2 914	2 092
Sudan	844	600
India	460	2 574

Source: [Implementing... 2009, p. 44].

The data summarized in Table 1 shows that Latvia with its agricultural productivity belongs to developing countries, and the author believes that herein is embodied one of the key challenges that is addressed to Latvian agricultural sector.

Based on the analysis of actual problems in the agricultural sector worldwide, the author has come to the conclusion that the Latvian agricultural sector will have in the future better climatic conditions, favourable for agricultural activity, but at the same time these conditions will deteriorate in developing countries with a relatively high population density. In a logical consequence, it follows that Latvia will be forced to 'share' its physical agricultural resources in order to make its contribution to the alleviation of global food crisis.

Having studied further growth prospects for the global agricultural sector, the author discovered the factor, which is currently known as a retarding growth factor, i.e. a disproportional distribution of agrarian property in many countries worldwide [Otsuka et al. 1992, p. 1973]. According to the statistical data of 2010 from the Central Statistical Bureau of the Latvian Republic, the ratio of small farms (less than 5 ha of utilised agricultural lands) to the total number of farms stood at 34.0%, whereas the ratio of large farms (more than 50 ha of utilised agricultural lands) stood at 6.5%[3]. In its turn, small farms cover 4.0% out of the total utilised agricultural lands and large farms 57.5%, which is more similar to the developing Latin American countries. The average area of utilised agricultural lands in Latvian farms is more similar to Latin America than to Asia and amounts to 21.5 ha[4].

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[3] Author`s calculations based on LR CSB publication [Table LSK10-I11... 2012].
[4] Author`s calculations based on LR CSB publication [Table LSK10-I11... 2012].

So, the analysis of experience and the current situation in agricultural sector of developing countries would be highly useful for Latvia, as results of the author`s research have revealed that Latvian agricultural sector often faces the same problems as developing countries.

Agricultural problems in Europe

The main problems of the EU agriculture are: competitiveness, farmer's income level, shape of agricultural policy (relationship between 1 and 2 pillar) [How… 2012]. An analysis of the European agricultural sector reveals that in recent years the EU and its Member States have experienced a real growth in the agricultural sector; this growth is backed by two structural growth indicators which are the sector's growth and labour productivity. Thus, it can be inferred that the EU agricultural sector has no reasons for worries. Nevertheless, the problem still exists and it lies in the third structural growth indicator which is the extent to which the EU agricultural sector has provided a growth in the living standards of the EU residents. It is measured by the real GDP produced by the sector or by the agricultural output per capita. It turned out that the total 'contribution' of the EU agricultural sector to the growth of EU population living standards over the 2004-2011 period was negative. It points to the fact that the EU agricultural sector is able to a lesser degree to provide the EU residents with growth of the living standards. That is, most likely, a typical agricultural problem of the 'old' Europe (with its steady population growth and rather slow growth of both the GDP [Prospects… 2011, p. 23] and the agricultural output [Economic… 2011] as compared to the EU-12). This brings up the question, if all Member States have common interests in the agricultural sector as it is declared by the EU Common Agricultural Policy.

To answer this question, the author has carried out a cluster analysis based on three indicators, i.e. demographic dynamics, cereal production (as the main product of European agriculture, from the point of view of Eurostat) dynamics, agricultural income dynamics (in percent, over last three years) [Europe… 2012; Economic…values… 2012; Population… 2012; Economic… agricultural… 2012]. As a result, the EU Member States have been divided into three different groups:

- states with the highest population growth, an average increase in cereal production and the slowest income growth in the agricultural sector (Belgium, the Netherlands, France, Germany, United Kingdom etc.)
- states with a decrease in population and cereal production, but at the same time an income growth in the agricultural sector which is twice more than in the first group of countries (Latvia, Lithuania, Bulgaria, Hungary, Romania)
- states with the most rapid income growth in the agricultural sector and the most significant decrease in cereal production along with a slow rise in population (Denmark, Estonia, Poland).

In the author`s opinion, the first and the largest group of countries initiates and moderates the EU Common Agricultural Policy. The author believes that in the context of 'one of the goals set by the EU Common Agricultural Policy is to provide sufficient living standards for

farmers' this by chance did not appear because the slowest growth of income in the agricultural sector is observed exactly in such group of countries which are the key donors to the EU structural funds.

By the definition of the UN Food and Agriculture Organisation, Europe mainly consists of regions with moderate climate and with intensive agricultural production, to which key threats are soil and water pollution, loss of biodiversity and ecosystem degradation around fresh water sources [The State… 2011]. The UN Food and Agriculture Organization and European scientists are at one in their conclusion that one of the key socioeconomic and environmental problems in Europe is soil erosion as a kind of physical degradation of agricultural lands, though noting that this problem is more actual for Southern Europe due to its disastrous effect than for Northern Europe, where soil is less destructed by erosion [Montanarella 2011, p. 5]. Soil erosion leads to a decrease of agricultural productivity and ecosystem degradation. More than half of European utilised agricultural areas are endangered by erosion which is caused by water and in one-fifth by wind [Europe's… 2011, p. 17].

On the other hand, the EU farmers are familiar with and widely use in their practice such preventive agricultural measures as control of soil erosion, crop rotation, organic production etc. In opinion of scientists, the significance of the aforesaid measures in farming is of a vital importance in the context of EU Common Agricultural Policy [Franzke et al. 2003, p. 4].

Situation analysis in the Latvian agricultural sector

The situation in the Latvian agricultural sector is quite well explored. Advanced research facilities of the Latvian University of Agriculture, economists and sociologists have contributed to studies of current situation in Latvian agriculture and its historical background.

Two key factors have had their strong impact on the contemporary rural reality in Latvia [Šūmane 2010]. Firstly, period of Soviet collectivism and subsequent structural socioeconomic and political changes after 1990. They were driven by two crucial factors, namely transition to the market economy and restoration of democratic form of government. For rural areas it meant restructuring of rural economy (de-collectivisation and privatisation) and formation and development of civil society. The impact of Latvian accession to international organizations, in particular the European Union and the World Trade Organization, is also not to be underestimated, as it played a crucial role in setting up priorities and defining standards, achievement of which was backed by a financial support. Accession to the WTO enabled Latvia to introduce and implement proven practices and knowledge, standards and tactical models which are widely applied in the Western Europe, thus offering some innovative solutions to local problems (for instance, the EU LEADER program enabled Latvia to implement the principle of partnership aimed at local development). However, following external standards without regard to local specificity can also be a constraint for the development.

As a result of the structural changes in economics and society dating from 1990, rural communities faced an escalation of such social and economic problems as the unemployment, poverty, social detachment, relative deterioration of social and economic infrastructure, limited

access to some services etc. In recent years, rural socioeconomic and demographic situation has been worsened due to short-term departures of rural inhabitants or their moving abroad. These deep-rooted problems significantly reduced the rural human and social capital, thereby limiting the rural development potential [Šūmane 2010, p. 53].

Agricultural development is still strongly affected by economic transformations of the early 1990 which are de-collectivisation and restoration of private property [Šūmane 2010, p. 27]. In the agricultural sector, they resulted in liquidation of collective and state farms or their re-organization into other collective activity forms (companys and cooperatives), restitution of former pre-war property, privatisation, setting-up of private farms. Over the short-term period 800 large farms were replaced by 200000 private farms [Tisenkopfs 1999, p. 78], which were small or medium size. Although in recent years the agricultural sector tends to consolidation of agricultural production, at least five years ago 84% of the total number of farms were small holdings which produced agricultural products mainly for their own consumption [Latvijas… 2006, p. 37].

Nowadays, Latvian authorities provide farms and rural businesses with a wide range of support measures. Thus, the 'arsenal of measures' of the Ministry of Agriculture of Latvian Republic contains such support tools as national subsidies, support for biofuels production, direct support for production of bioethanol and biodiesel, indirect state support (alleviation of the excise tax), loans aimed at purchase of working assets, loan guarantees for rural business etc. [Latvijas… 2011, p. 48].

To conclude, it can be stated that almost all Latvian relevant institutions have been deeply involved in the analysis of situation in the Latvian agricultural sector in general, and in rural communities in particular. From the author`s point of view, the specialists of Latvian State Institute of Agrarian Economics (LVAEI) have shown the main agricultural trends in the Latvian agricultural sector related to its growth in the penultimate year, i.e. negative growth in crop output (-7.3%) and positive growth in cattle breeding (+3.2%), labour productivity growth (+60.1%) (one of the most significant sectoral indicators), growth of living standards provided by the sector (+38.8%). Other actual challenges are rising prices of agricultural commodities (+14.8%) along with decreasing prices of purchased resources (-0.6%), deterioration in sectoral employment (-9.0%). Nevertheless, the aforesaid indicators suggest that the Latvian agricultural sector has some potential for its further growth and development. While disputing about further implementation of the EU Common Agricultural Policy, the most important issue for Latvia, from the point of view of politicians, is the revision of direct payments system [Latvijas… 2011, p. 25]. However, based on the statistical analysis, the author assumes that from an economical point of view, Latvia with its rapid decline in population and 16% of uncultivated lands out of all utilised agricultural areas [LIZ… 2012], can hardly justify its claim for largest amount of direct payments to its agricultural sector, unless it offers its uncultivated lands to migrants who deem to be a heavy burden for the 'old' Europe.

In her analysis of the situation in Latvian agricultural sector, the author brings to the forefront mainly four sectoral growth inducers, i.e. investments, labour force, export of commodities/services and economically active market entities which are included in the economic growth model elaborated by the author [Svarinska 2011, p. 101].

The results of the author`s research reveal that investments in agriculture (including forestry and fishery) form 3-5% of all non-financial investments to Latvia and approximately 2.5% of foreign investments in equity of Latvian enterprises. As for the workers engaged in the agricultural sector, about 90% of all workers are employed in farms with the total number of workers up to 5, including herein approximately 55% of the farms with 1-2 workers, i.e. family farms. Overall, human potential in Latvian agricultural sector is quite low in terms of education and age (including farm managers). The analysis of agricultural export capacities points that Latvian agriculture has quite low export potential. Nevertheless, combined with food industries, which produce the highest added value in agricultural commodities, agricultural exports stand for approximately one fifth of the total Latvian exports. The analysis of agricultural enterprises reveals that for the period 2005-2010 the share of agricultural enterprises in the total number of Latvian enterprises dropped by 6.7%. Notwithstanding this trend, the author does not consider it unfavourable, because, as it was mentioned before, it is followed by an extension of agricultural areas, i.e. an increase of capacity; although insufficiency of farm size for most holdings is a significant matter of concern for the Latvian agricultural sector.

Taking into account that global/EU agricultural challenges and problems also refer to Latvia, the author can conclude that using worldwide experience in solution of Latvian agricultural problems would be much precious and useful. Attention is to be paid not only to mature economies as Scandinavian countries, but also to experience of underdeveloped countries to which Latvian agriculture is more similar. For example, some common indicators are agricultural labour productivity, land capacity, disproportional land distribution.

Conclusions

- The key agricultural problems worldwide are price volatility in agricultural markets, food insecurity, undernourishment, shortage of land and water resources used in agricultural activities. Latvian agriculture faces all these problems too, including the problem of undernourishment.
- The analysis of growth in European agricultural sector showed that the EU total agricultural production increased in 2010 by 1/4 (24.7%) as compared to 2005, despite the slowdowns in 2006 and 2009. However, in most EU countries the agricultural sectoral growth was accompanied by a progressive reduction in the total working force employed in agriculture during the 2004-2011 period.
- Referring to the analysis of growth in agricultural sector of the EU and its Member States based on two structural growth indicators, i.e. the sectoral growth and labour productivity, it can be stated that in recent years the EU agricultural sector has experienced a real growth.
- However, the analysis of growth in the living standards provided by the agricultural sector across the EU allowed the author to reveal many marking worthy processes in different EU Member States. They prove the fact that agricultural sectors of those countries have different problems in contemporary circumstances.

126

- The author reckons that today Europe has no economic justification for the Common Agricultural Policy, because the agricultural sector in different EU Member States has different challenges and, hence, different development mechanisms and directions.
- One of the key socioeconomic and environmental problems in Europe is soil erosion as a kind of physical degradation of agricultural lands which leads to a decrease of agricultural productivity and ecosystem degradation. More than half of European utilised agricultural areas are endangered by erosion which is caused mainly by water and only in one-fifth by wind.
- Making an outline of the situation in Latvian agricultural sector in the context of global and European challenges, the author brings to the forefront four Latvian agricultural growth inducers, which were defined basing on an analysis of economic growth theory, i.e. investments, labour force, exports of commodities/services and number of economically active market entities.
- As a result of various historical reasons, system transformations, as well as of the impact of economic crisis and global agricultural development trends, the growth potential of the Latvian agricultural sector is considered to be low. It is determined by a low level of investments in agriculture, low quality of human resources and low economic capacity of farms. Notwithstanding this fact, there are still some positive tendencies, for example exports growth based on inclusion of farms into the value added chain, which might be achieved in co-operation of farms with food processing industrial enterprises within common supply chains or food clusters.

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Cecília Szigeti[1]
Anita Borzán[2]
Szent István University
Gödöllő, Hungary

Extreme outliers in the database for calculation of ecological footprint; the problems of grazing land footprint as well as the fishing ground footprint calculation

Abstract. The appreciation of ecological footprint has been increasing since the study by Stiglitz, Sen and Fitoussi' [Stiglitz et al. 2009]. At the same time, owing to the methodological and standardization problems as well as the shortcomings of data collection, its accuracy can be questioned. In our study, we were looking for countries with a significantly differing from the world average composition of the ecological footprint, with the help of cluster analyses and data from the database used for calculating the ecological footprint index by the Global Footprint Network. Comparing data from two years, we were trying to find answer to the question if the outlier data can trace back to professional errors or data collection problems. Basing on our studies, we can determine a two members group with an outstanding grazing land footprint (Mongolia, Uruguay), which can be considered as outliers according to every examination method. The formation of a stable group characterized by a big fishing ground footprint in 2010 can trace back to an inconsistency in the database, which is proved by the example of Gambia and Norway. In our opinion, a control of outliers is necessary for proper calculation of the EF index every year.

Key words: ecological footprint, grazing land footprint, fishing ground footprint, hierarchical cluster, Gambia.

Introduction

The Global Footprint Network (GFN)[3] calculates the ecological footprint (EF) for countries and the whole world. The national results as well as the global trends can be downloaded by land use categories from the website of the institution. The GFN prepares guidelines and information for the calculation [Kitzes et al. 2008; Ewing et al. 2010].

One of the most significant criticisms of the EF index territorial application is that the borders of countries have been established basing on geopolitical and cultural aspects. For this reason these by no means have any environmental meaning because they usually divide connected ecosystems. In this aspect, the EF calculation for territories within their natural borders is applicable for straighter conclusion. At the same time, nations are the largest decision-making bodies, so an environmental intervention can be made in the first place in this frame. For this reason, one of the suggestions by the spatial calculation critics is that the index should not be used in spatial instead of temporal analyses: 'The per capita EF is

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[1] PhD, e-mail: szigetic@sze.hu, address: H-9026, Győr , Egyetem str. 1.
[2] PhD, e-mail: borzan.anita@gk.szie.hu, address: H-5600, Békéscsaba, Bajza str. 33.
[3] You can find detailed information about the institution and co-operation possibilities as well as the publications related to GFN in the web [Global…2010, 2011].

neither very informative about the spatial distribution of the impacts nor the causes of environmental pressure' [van den Bergh & Verbruggen 1999].

We are examining in our study the extreme outlier data included in the GFN database for 2010 and 2011. We are looking for those countries whose ecological footprint structure differs significantly from the average one. Comparing the data of the two years, we are trying to find answer for the question if the outlier data can trace back to professional errors or data collecting problems.

Material and method

The GFN database gives the ecological footprint for certain countries between 1961 and 2008 (Table 1). The increase of EF went together with the transformation of its structure, which means that the carbon footprint increased fivefold and the carbon dioxide emission is now responsible for more than half of the EF. Behind the seemingly unambiguous global tendency, significant individual national differences can be realized.

Table 1. Structure and size of global ecological footprint for between 1961 and 2008, global hectare (gha) / person

Ecological footprint and components	Year										
	1961	1965	1970	1975	1980	1985	1990	1995	2000	2005	2008
EF	2.4	2.5	2.8	2.8	2.8	2.6	2.7	2.6	2.5	2.6	2.7
cropland footprint (cr)	1.1	1.1	1.0	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6
grazing land footprint (gr)	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
forest footprint (fo)	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
fishing ground footprint (fi)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
carbon footprint (ca)	0.3	0.5	0.9	1.0	1.1	1.1	1.2	1.2	1.2	1.4	1.5
built-up land footprint (bu)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Source: GFN database of 2011 [Global... 2011].

We conducted our analyses with the application of IBM SPSS20 programme package and we relied on the database analyses manual by Sajtos and Mitev [2007] for selecting the methods and assessment of the results. A ranking was performed with the help of cluster analysis.

We applied GFN database for 2010 and 2011 for our research [Global... 2010 & 2011]. We used a graphic method, a boxplot diagram for mapping the outliers. Then in the second part of our research we investigated if a linear relationship was realized between pairs from among six components of the EF. We indicated values of Pearson's correlation coefficients in form of a correlation matrix (Table 2). Since the cluster analysis is very

sensitive to the appearance of outliers, we checked the outstanding data with the nearest neighbour method before every examination and excluded these values from the examination. From the perspective of assessment of results, it is important that we did not exclude the outstanding values of certain data, but only those which would have created a single group. The data used in the study are measured on the same metrical scale, for this reason we used not standardized data. In co-operation with two independent variables, trio as well as five variables we excluded the cropland footprint because of the strong multi-collinear method. We conducted hierarchical cluster analyses with analyses of variance: with 'Nearest neighbour' and Ward's methods. Clustering was performed, in case it was necessary, with K-means cluster , and not with hierarchical method, which was followed by summarising the results with analysis of contingency tables.

The aim of the cluster analyses in the first place was not to limit the country sets to countries with similar characteristics, but to identify the outstanding values as well as the outliers.

Findings

Based on the statistical data of 150 countries, Table 2 shows the linear correlation coefficients between the ecological footprint components. Pearson's correlation coefficients marked by bold typing show significant relationship between certain components of ecological footprint, while others are independent. Since strong relationship can not be noticed anywhere, in principle there is nothing to prevent us from withdrawing all of the variables from the cluster analyses. Table 2 shows results for the 2010 database, however, an investigation of the 2011 one revealed similar results.

Table 2. Matrix of Pearson correlation coefficients

EF component[4]	cr	gr	fo	fi	ca	bu
cropland footprint (cr)	x	x	X	x	x	x
grazing land footprint (gr)	-0.23	x	X	x	x	x
forest footprint (fo)	**0.334**	0.023	X	x	x	x
fishing ground footprint (fi)	**0.273**	-0.101	0.214	x	x	x
carbon footprint (ca)	**0.641**	0.008	**0.277**	**0.231**	x	x
built-up land footprint (bu)	**0.601**	-0.008	**0.293**	0.114	**0.352**	x

Source: own calculation based on GFN 2010 database [Global... 2010].

We conducted the first cluster analysis in our research with five variables, however we did it with three variables in our second study.

In our first examination, owing to stronger than mid-range relationship between cr and ca as well as cr and bu variables, we conducted the examination with 5 variables excluding cr. The outliers revealed with the nearest neighbour method, with regard to the data from 2010, Mongolia; Uruguay; Australia; Qatar and United Arab Emirates. We received similar

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[4] Table 1 consists of the meanings of the abbreviations in the chart.

results with the use of database for 2011. Results obtained with similar methods are also similar, however, Kuwait appeared among the outliers instead of Australia. We repeated the cluster analyses with three, four and five cluster solutions without outlier values, nevertheless none of them provided appropriate results, the grouping of countries can not be performed clearly based on the examined variables.

Based on independent variables, trios (gr, fi, fo and fi, gr, bu) in pairs can be separated. Continuing our examination in order to eliminate the deviations because of correlation (Table 2), we repeated the analyses with two variables groups as well.

In our second study, we performed cluster analyses with the use of gr, fi, and fo variables and we excluded Mongolia and Uruguay outliers discovered by the nearest neighbour method. Regarding the method of Ward, used in the first case (the examination was done with 3 up to 7 clusters), we did not receive any appreciable results. Neither the nearest neighbour method analyses nor the K-means hierarchical cluster analyses did not result in satisfying solution.

We continued the examination with the other trio of independent variables (fi, gr, bu). After excluding the outliers (Mongolia, Uruguay), we came, basing on the database of 2010, to similar conclusion as when using the hierarchical cluster analysis as well as Ward's method. The best solution seemed to be dividing the countries into five clusters. According to two methods, three clusters were completely the same, in which a three members group was established, including Gambia, Mauritius and Norway. This group, which is considered to be stable, has not been established in 2011.

Results

Among the outliers revealed during the analyses, in all three cases Mongolia and Uruguay can be found in both examined years. We were looking for the reasons for this, while examining the composition of the ecological footprint in these two countries.
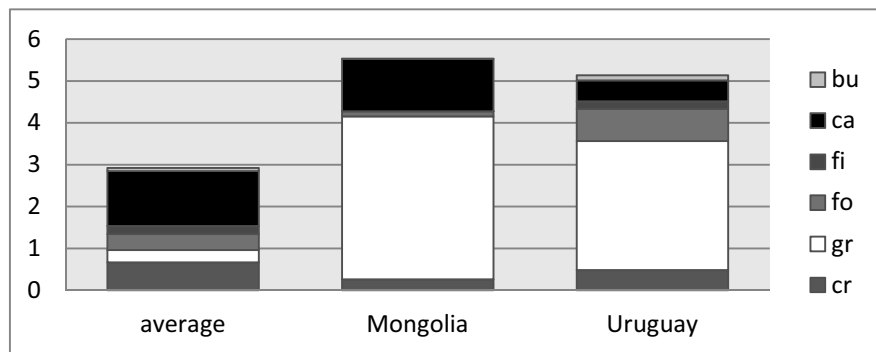

Fig. 1. Composition of the ecological footprint in selected countries, gha/person
Source: [Global... 2010].

As displayed in Figure 1, the most significant component of the average ecological footprint[5] is the carbon footprint (marked in black colour in the figure) and the grazing land footprint (marked in white in the figure) reaches 10% of the whole footprint. On the contrary, the grazing land footprint represents 70% in the ecological footprint of Mongolia and 60% in that of Uruguay, which are considered to be extreme outliers. Their grazing land footprint means 10 times more than the world average and this also means to be an extreme outlier (Figure 1).

In the boxplot diagram (Figure 2) the rectangle shows the distance between the top and the bottom quartile; the middle horizontal line is the median. The length of the vertical line is one and a half bigger than the extent of quartile. The outliers are the data that are out of the space between the extreme quartiles. If the data can be found outside of three times the extent between these quartiles, we call it extreme outliers and we sign it with *symbol. Figure 2 demonstrates excellently that the extreme outliers and the average values can be different from each other so significantly.

Figure 2 and Figure 4 in our study were created by the SPSS20 program. The result is the same when using the database of 201, which confirms that the two countries with their well-defined ecological footprint structure create a well distinguished separate group.
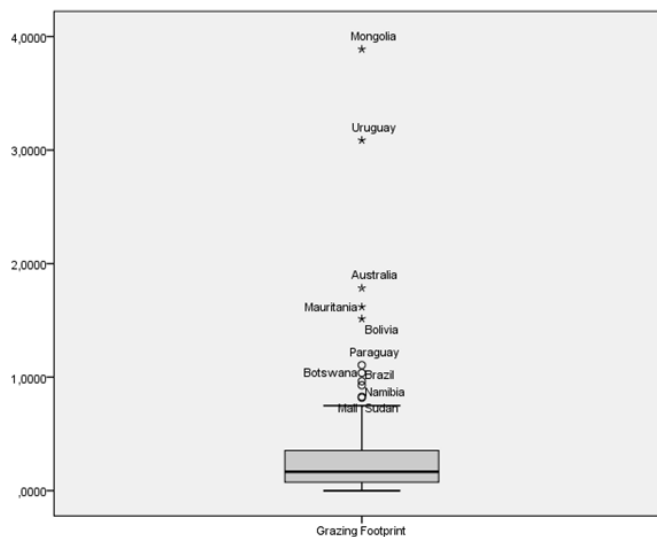
Fig. 2: Boxplot diagram of grazing-land footprint

Source: GFN 2010 database [Global... 2010].

Among the results of the cluster analyses conducted using data of 2010, the group with invariant and homogenous characteristics is interesting because of the differences between its members. The reason for this lies in the composition of their ecological footprint since

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[5] There are some small differences between the arithmetic average of the national data shown here, in other words the 'average ecological footprint', and the composition and size of the global ecological footprint outlined in Table 1 due to methodological reasons.

we can realize that Gambia, Mauritius and Norway, with remarkably different geographical, cultural and economic characteristics, have one common feature, which is that their fishing ground footprint represents 38% up to 58% of their total footprint (Figure 3).
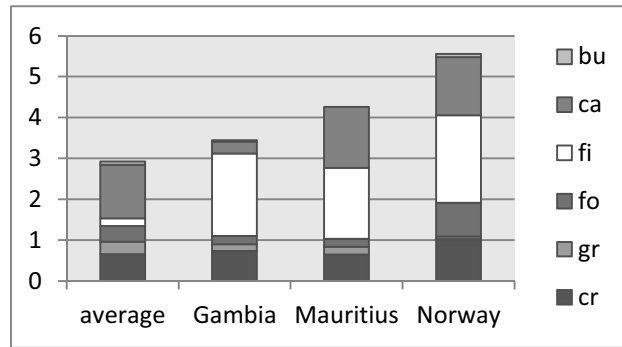
Fig. 3. Composition of the ecological footprint in selected countries, gha/person
Source: GFN database of 2010 [Global... 2010].
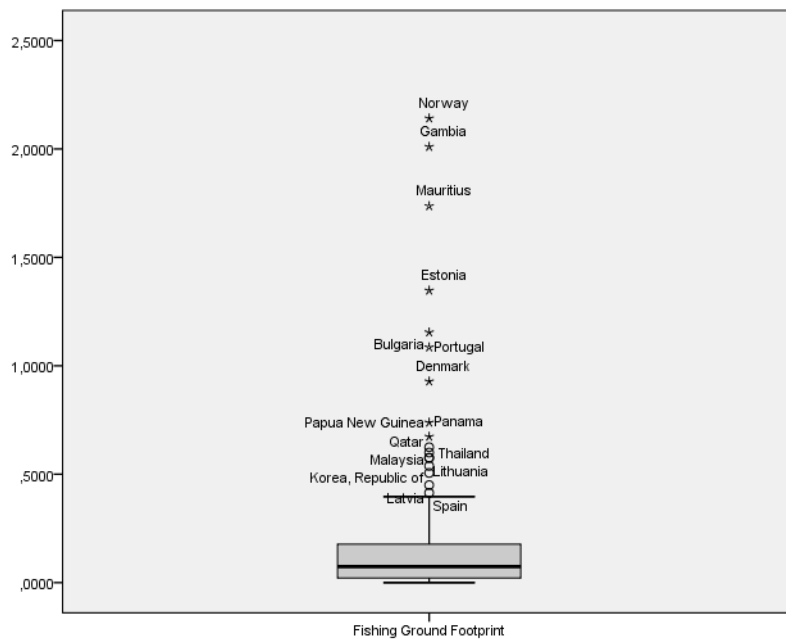
Fig. 4: Boxplot diagram of fishing-ground footprint
Source: own calculation based on the GFN database of 2010 [Global... 2010], SPSS20 output.

Figure 4 and Figure 2 can be interpreted similarly: they demonstrate the differences between the extreme outliers and the average data.

This prominently high fishing ground footprint values are 9 to 11 times more than the world average (Figure 4). When examining the database of 2011, Gambia can not be discovered among the extreme outliers, even its fishing ground footprint is the same as the world average of 0.1 gha/person, according to this database.

Conclusions

The appreciation of the ecological footprint indicator considerably varies in different application areas. While it is said to be the best indicator of 'unsustainability' on global level [Stiglitz et al. 2009], its spatial application is criticized from many angles [van den Bergh & Verbruggen 1999; McDonald & Patterson 2004]. However, the mentioned studies have not examined the whole database of the developing Global Footprint Network indicator, so the critical statements as well as the reservations have been conducted without screening the outliers. According to our study, the majority of the countries in the world (112 out of 150) can be described by an average EF structure. In other words, we can come to the conclusion about the ecological footprint composition of certain countries basing on the average ecological footprint composition. However, there are some well distinguished small groups, which have an EF composition that significantly differs from the average. Since the consumption system of a given country is reflected in the ecological footprint, according to our anticipation, the structure of the ecological footprint of countries, which are close to each other geographically and culturally, will also resemble each other. Mongolia and Uruguay form a stable and separated group because of their essential grazing land footprint, the year of study or the method notwithstanding. For this reason, we consider it reasonable to examine their consumption structure and characteristics in detail later. In case of the other three members group, the outstanding values can trace back to other reasons. Presumably, the consumption structures of Mauritius, African Gambia and North European Norway differ from each other considerably. The common feature means the fishing ground ecological footprint of 2010, which exceeds remarkably the average in all three countries. However, when examining the database of 2011, the fishing ground ecological footprint of Gambia is found corresponding to the world average. The reason for establishing cluster in 2010 can be attributed to the deviations in calculation methods of the fishing ground ecological footprint, which can strongly query the commensurability and reliability of the database. Our suggestion is that the statistical examination of the database (filtering the extreme outliers) should be followed by a professional control and the final data chart should be composed as a result of this. The consequences and the political decisions based on faulty and unreliable data can not lead to the expected results; it can make the situation even worse. The most essential result of our study can be a correction of failures in the database and we can establish a statistical background for more reliable consequences.

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[6] SPSS research and data analysis manual.

Anna Törő-Dunay[1]
Csaba Bálint Illés[2]
Sergey Vinogradov[3]
Györgyi Gábriel-Tőzsér
Faculty of Economics and Social Sciences
Szent István University
Gödöllő, Hungary

Lessons from the EU accession for agricultural enterprises in the Visegrad group countries in the light of CAP 2014

Abstract. The importance of evaluating different impacts of the EU accession has not decreased in the last decade. Some of the problems, such as the problems of competitiveness and effectiveness of the agricultural sector, or the delay in transformation of the payment scheme are still unsolved. The continuous learning process has not ended by the accession; not only institutions but also individuals shall observe and learn the changes of the agricultural policy, which of course means a heavy task for farmers, besides the management of their farming activities. This paper wishes to examine how the agricultural enterprises in Visegrad countries could utilize advantages of the EU accession and what kind of problems has arisen during the accession process. These questions became more actual in present days, as a draft of the new CAP reform was announced in October 2011. Thus, the readiness of farmers will have a great importance in the future. Without knowing the new system, the opportunities cannot be utilized, and without taking these advantages we cannot speak about a competitive and effective agricultural sector.

Keywords: CAP reform, agricultural enterprises, Visegrad countries.

Introduction

Eight years after the EU accession by the Visegrad countries, the impacts may be evaluated by either general observations and experiences or literary sources, and, furthermore they can be confirmed by statistical data. This paper examines the impacts of the EU accession at farm level: how the agricultural enterprises of these four countries (Czech Republic, Hungary, Poland and Slovakia) could manage themselves, how their financial situation developed and how could they finish their closing-up to the EU-15 member states.

The new reform of the Common Agricultural Policy means a new challenge for all stakeholders of the agricultural sector. The proposal of new CAP reform was announced on October 2011, and it forms a quite new situation for all the member states. The two payment systems, i.e. the Single Payment Scheme (SPS) and the Single Area Payment Scheme (SAPS) which was created for the new member states, will be changed for a

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[1] PhD, associate professor, Szent István University, 2100 Gödöllő, Páter Károly utca 1, e-mail: dunay.anna@gtk.szie.hu.

[2] MSc.

[3] PhD.

uniform scheme, the so-called Basic Payment Scheme. It will be used all over Europe, and all the farmers and agricultural enterprises should learn the new regulations and supporting opportunities. Our paper wishes to make a short introduction to the draft of the new CAP reform. It is very important for all the European farmers and agricultural enterprises to get enough information about the new system, but it is more important for the V4 (Visehrad group) countries to take its advantages and to try to finish their convergence process.

Materials and methods

The main purpose of this paper is to summarize the development of the agricultural enterprises of Visegrad countries compared to hose in the EU-15 member states. In our research we have made an international comparative analysis which included the assessment of the financial and economic status of the examined agricultural enterprises. The analysis was performed basing on secondary sources of the international Farm Accountancy Data Network database. The examined period is between 2004 and 2008, because only these data were given by the FADN database for the V4 countries in the modelling stage of the research.

For our calculations, we used the same typology for all the four V4 countries as well as for the average of the EU-15 member states. In our assessment, a detailed financial analysis of the examined enterprises was completed and the results were controlled by statistical methods. The statistical analyses were done by the SPSS 18 (PASW Statistics 18) for Windows programme; the differences were verified by one-way ANOVA (carried out by Games-Howell and or LSD post-hoc tests).

The evaluation of the EU accession of the V4 countries can not to be finished yet, as a brand new situation may be formed by the new CAP reform. The 50 years old CAP has always been adapted to respond to the challenges of its time and now, as a result of the actual political and economic changes, a new reform was proposed by the Commission for the years between 2014 and 2020. It was announced in October 2011. In our paper, we also summarize the main objectives and the proposed measures of the CAP reform 2014-2020 based on international literature and the original EU documents.

Examination of the impacts of EU accession on agricultural enterprises in Visegrad group countries

In our research, a detailed financial analysis of agricultural enterprises was carried out based on the data of FADN public database for the Visegrad group countries and the average of EU-15 member states. The methodology and typology used in the assessment process were in accordance with the FADN principles [Definitions... 2007]. As FADN methods do not differentiate agricultural enterprises according to their ownership, this database covers different kinds of properties (e.g. family farms, corporate farms, cooperatives etc.). The farms were classified by their ESU (European Size Unit) values into three groups: large farms (with more than 100 ESU), medium size farms (between 40 and 100 ESU) and small farms (less than 40 ESU). It should be underlined that the research was connected only with the financial processes and not with the results of real processes.

For the analysis of financial situation of agricultural enterprises, 20 indicators were determined (M1-M20), classified into five groups: indicators of capital structure, profitability, efficiency, liquidity and special indicators for the EU support. Because of the limited length of this paper, we would like to introduce the results for the five most typical indicators: M1 which is capital intensity (own equity/total capital); M4 which is long-term liabilities/total liabilities; M10 which is profitability ratio on equity; M18 which is total subsidies (direct payments plus subsidies on investment) per hectare of total UAA; M20 which is liquidity indicator (total current assets/short term liabilities). The values of indicators were calculated using the data from the FADN public database [FADN... 2004-2008].

In the selection of examined farm types, the most determinant factors were the domestic significance of the given farm type and the possibility of comparability. Only field crops producing, dairy and mixed farm types could be inserted into the comparative analysis, because of missing data for some member states. The main objective of the research was to explore how these indicators changed after the EU accession, what were the countable results of the accession at farm level and how could the Visegrad group countries take the advantages of the accession.

According to the assessment of the database, the capital intensity of farms may be well distinguished by their size. In small farms, the share of own capital is rather high, between 90-95%, except for Hungary, where it is near 80%. Large farms use more borrowed capital (total liabilities), except in Slovakia. Hungarian large farms have less own capital, only about 55-60% of the total capital. The trends of leverage (i.e. the ratio of total liabilities and own equity) of differently sized agricultural farms are illustrated in Figure 1. It may be observed that Hungarian farms are the most dependent on liabilities among all farm size categories in the V4 countries. Thus, it may be stated that the capital intensity of Hungarian farms is lower than the EU-15 average and the level of all other Visegrad group countries in all farm size categories.
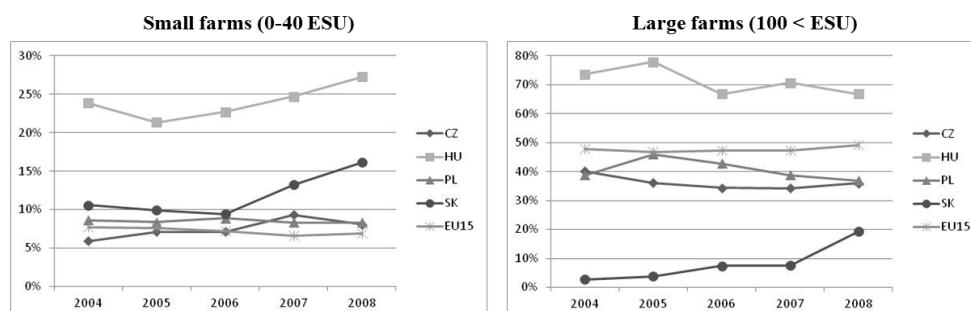
Fig. 1. The total liabilities and equity ratio in small and large farms

Source: own calculations based on FADN public database [FADN... 2004-2008].

Some financial categories are not registered in the public FADN database, thus the widely used ROA, ROE and ROS ratios should be substituted by similar indicators. For the calculations of profitability, a new indicator was introduced in our research, called 'Financial outcome of farm production', whose calculation method was: total output – total input + interest paid.

According to the results of our examinations, the farm level profitability indicators of the V4 countries has not been improved substantially.

In Hungary, a slight improvement may be observed in large farms which may be resulting from the very high leverage. In the other Visegrad group countries a stagnation or a small decrease of this indicator prevailed. In case of Slovakia and the Czech Republic, the values of the profitability ratio are rather variable. As a result of the low profitability level, the self-financing capability of the agricultural enterprises could not improve substantially after the EU accession.
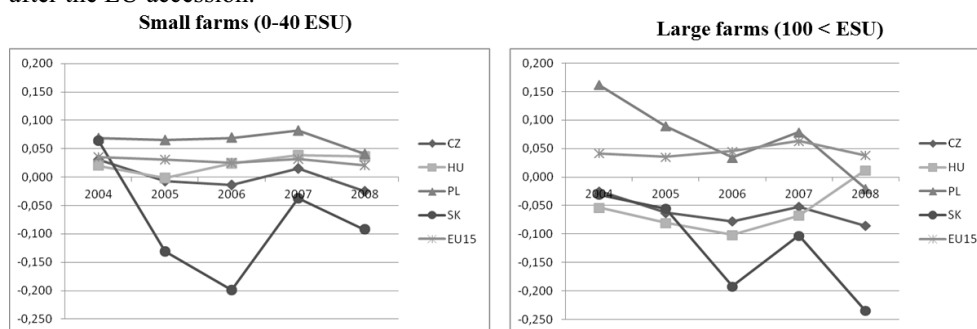
Fig. 2. Values of the M10 indicator, profitability ratio on equity*
*Calculation method: (total output – total input + interest paid)/equity

Source: own calculations based on FADN public database [FADN... 2004-2008].

The values of liquidity indicator in every farm size category were generally high, both in the EU-15 and in the Visegrad group countries. The average liquidity in the EU-15 member states was higher than in the V4 countries except Slovakia, where extremely high values could be observed in every farm size category and all farm types. The values of net working capital were positive and showed an increasing tendency in all countries; this indicates the spreading of conservative financing strategy. A conservative financing strategy is stable; it uses long-term funds to finance all of firm's projected needs and it uses short-term funds only in emergencies, which will not make the capital structure more expensive. Nevertheless, in case of the V4 countries, most of the agricultural enterprises are not creditworthy and the liabilities are more expensive than own sources. Thus, the spreading of conservative financing strategy is not absolutely resulting from an awareness, but rather from compelling reasons.

The results of calculations of total support (i.e. the total sum of direct payments and subsidies on investment) per hectare showed nearly the same values in all farm sizes in the EU-15 member states, while in the V4 countries different farm size categories enjoyed different levels of support. In the Visegrad group countries (except for Poland), large farms had significantly higher values of total support, which suggests that large agricultural enterprises could apply more successfully for different types of support. It may have several reasons. The level of direct payments per hectare is determined by the EU regulations for each member state, so the differences between farm sizes are probably caused by a different level of subsidies on investments. The unequal distribution of these, mostly Second Pillar, subsidies was examined by a former survey of Hungarian farms [Törőné Dunay 2012A, pp. 130-132]. Findings of this survey suggested that large farms apply for subsidies more

successfully than small farms. The information level of large farms is higher; they can pay services of consultants in different applications, they have more own resources and they are more creditworthy. In addition, small farms have fewer employees and their workforce should be used in production, instead of administrative tasks connected with applications for subsidies.

According to the results of our international comparison, V4 countries were not able to catch up with the former (EU-15) member states between 2004 and 2008, in contrast with the probably too optimistic expectations. The analysis of support and the values of the calculated indicators of financial situation revealed that the increased support and payments level could not make a solution for the farms, as neither the profitability nor the efficiency indicators improved despite of the significantly, because of the EU support, increased income. The share of support in the total income could not decrease. In practice, the sum of the EU payments means an optional tool for the agricultural enterprises in the V4 countries, by which credits may be substituted. The volume of income, particularly in smaller farm categories, is determined by the sum of payments and other support; this situation worsened after the accession due to the increased support level. The present form of the EU payments may conserve the unfavourable farm structure; their volume is not enough for modernization and development, but it is enough for survival, which may preclude an improvement of competitiveness. In Hungary, this situation is worse, as the Hungarian farm data presented the poorest results. Thus, it may be stated that Hungary is lagging behind in comparison with other Visegrad group countries.

Table 1. Significant differences between Hungary and the other examined countries (V4 and EU-15) according to the chosen indicators, by farm size categories (average results for 2004-2008)*

Farm size	Country	Indicator				
		M1	M4	M10	M18	M20
0-40 ESU Small farms	CZ	(–)	(+)	(0)	(0)	(0)
	PL	(–)	(0)	(–)	(0)	(–)
	SK	(–)	(0)	(0)	(0)	(0)
	EU-15	(–)	(0)	(0)	(–)	(–)
40-100 ESU Medium farms	CZ	(–)	(+)	(0)	(0)	(0)
	PL	(–)	(–)	(–)	(0)	(–)
	SK	(–)	(0)	(+)	(0)	(0)
	EU-15	(–)	(0)	(0)	(–)	(–)
> 100 ESU Large farms	CZ	(–)	(–)	(0)	(0)	(–)
	PL	(–)	(–)	(0)	(+)	(–)
	SK	(–)	(0)	(0)	(0)	(0)
	EU-15	(–)	(–)	(–)	(–)	(0)

* (+) and (-) signs means statistically significant values (0) means no significance.

Source: own calculations.

The results of the financial analysis were confirmed also by statistical methods. For these calculations, depending on the results of the former financial analyses, only five indicators were chosen (see Tables 1 and 2.). The calculations were carried out by average

data for the years between 2004 and 2008, in order to exclude the distorting effect of different years. Calculations were made both for the different farm sizes and for the different types of farming.

Table 2. Significant differences between Hungary and the other examined countries (V4 and EU-15) according to the chosen indicators, by types of farming*

Type of farming	Country	Indicator				
		M1	M4	M10	M18	M20
Field crops	CZ	(–)	(0)	(0)	(0)	(0)
	PL	(–)	(0)	(–)	(0)	(–)
	SK	(–)	(0)	(0)	(0)	(0)
	EU-15	(–)	(–)	(0)	(–)	(–)
Milk	CZ	(0)	(–)	(+)	(0)	(0)
	PL	(–)	(–)	(–)	(+)	(–)
	SK	(–)	(0)	(0)	(0)	(–)
	EU-15	(0)	(–)	(0)	(–)	(–)
Other grazing livestock	CZ	(0)	(+)	(+)	(0)	(0)
	PL	(–)	(0)	(–)	(0)	(–)
	SK	(–)	(0)	(0)	(0)	(0)
	EU-15	(–)	(0)	(0)	(–)	(–)
Granivores	CZ	(–)	(0)	(0)	(+)	(0)
	PL	(–)	(–)	(0)	(+)	(–)
	SK	n.d.a.	n.d.a.	n.d.a.	n.d.a.	n.d.a.
	EU-15	(–)	(–)	(0)	(+)	(–)
Mixed	CZ	(0)	(–)	(0)	(0)	(0)
	PL	(–)	(–)	(–)	(0)	(–)
	SK	(–)	(0)	(0)	(0)	(0)
	EU-15	(0)	(–)	(–)	(–)	(–)

* (+) and (-) signs mean statistically significant values, (0) means no significance, n.d.a. no data available.

Source: own calculations

Table 1 shows the direction of significant differences between Hungary and the other V4 countries (CZ, PL, SK) and the EU-15 average, according to the three farm size categories (small, medium and large farms). The (–) signs mean a negative a positive value of mean differences (i.e. their advantages compared to the farms in other countries), and (0) sign means that differences are not statistically significant. According to these results, the Hungarian farms are lagging behind the farms in other examined countries in the case of most indicators (there are only few exceptions, with positive values). Capital intensity (M1) is lower than in the other countries which, with the poor creditability, means a barrier for any development or modernization process for the Hungarian farms. Liquidity (M20) means another problem for the Hungarian agricultural enterprises. The indicator of the total subsidies (M18) shows that subsidies in Hungary are lower than in the EU-15 (in

accordance with the Copenhagen Agreement of 2003). The only one positive sign, in case of large farms and in comparison with Poland, is a result of a different farm structure.

The second step of our calculations was to examine these indicators according to different types of farming (in accordance with TF8 grouping of FADN methodology). Horticulture and permanent crop production were excluded from this process, because of non-available data from Slovakia. Table 2 shows the direction of significant mean differences between Hungary and the other V4 countries and the EU-15 average, according to the examined types of farming.

According to the results of these models, it can be observed that in most cases there is no significant difference between the average values of indicators, which is mainly a result of a correlation between them. The adverse situation of Hungarian farms is also clearly shown in these tables by the dominance of negative signs (–). Although there are few positive differences (in M4, M10 and M18 in grazing livestock and milking farms), the clear dominance of (+) signs can be observed in M18 indicator (total subsidies) in granivores producing farms (pig and poultry). The positive differences are probably caused by the high level of EU support for modernization and animal welfare measures in the Hungarian pig and poultry production sector.

Summarizing our results, it can be stated that the subsidies financed by the CAP could slightly improve the financial situation of the agricultural enterprises, but it was not enough to increase competitiveness and efficiency of the farms. In the case of small farms, this help was enough to maintain their operation and production, but it was not enough to improve their production. This situation will probably conserve the present, disadvantageous farm structure. The results of this international comparison are more adverse for Hungary, as we lost our former advantages in comparison with the other Visegrad group countries.

The new CAP reform proposal may possibly bring a new situation for all the V4 countries, so the research should be continued in the future. The most important objective is to give detailed information to all stakeholders of the agricultural sector about the new CAP reform.

Evolution of the Common Agricultural Policy

The actuality of summarizing the evolution of the CAP is given by the 50th anniversary of the policy which was implemented in 1962. The different preferences of different stages of the CAP may be well distinguished in Table 3.

In the 'original CAP', from 1960s until late 1980s, different market supports were dominant. The McSharry reform (CAP 1992) introduced the direct payments in 1992, whose share became the largest in the CAP budget. Agenda 2000 established the Second Pillar, by which the sources for rural development measures were totally separated from other subsidies. The decrease of direct payments was started by the 2003 reform, in which the decoupled support was introduced [Jambor-Harvey 2010].

The different types of CAP subsidies and payments, of course, are overlapping, as in the early years most of the subsidies have not been differentiated according to types. At present, these types of support are rearranged because of modulation.

The development process of the CAP has been accelerated since Millennium. If compared with the early decades; the changes appear within the financial perspectives. The

payment system of the CAP had to undergo several changes and adjustments in the past decade for different external causes, such as the global demographic and food crisis, the changing requirements of the world market or the increasing threat of the climatic change. Of course, several internal causes derived also from the increasing burden of the Community budget, the eastern enlargement of the EU and the economic crisis [The CAP... 2010].

Table 3. The evolution of CAP payment system from 1960 until 2012

| Period | Type of support | | | | |
	Market support	Direct support	Rural development	Other rural development	Environmental
Original CAP	▪ Price subsidies ▪ Intervention ▪ Export subsidies ▪ External protection	Less favoured areas (since 1975)			
CAP 1992	▪ Price cuts ▪ Quantitative restrictions ▪ Intervention ▪ Export subsidies	▪ Compensatory payments ▪ Standard payment system	Small farmers subsidies		▪ Extensification premium ▪ Set aside
Agenda 2000	First Pillar		Second Pillar		Cross compliance
	▪ Price cuts ▪ Quotas and set aside ▪ Intervention ▪ Export subsidies	Cuts of compensatory payments	Formation of Second Pillar	Agri-environmental programmes	
CAP 2003	▪ Intervention ▪ Cuts in export subsidies	Decoupling ▪ SPS ▪ SAPS	Modulation ⇨	Second Pillar ▪ Competitiveness ▪ Environmentally friendly farming ▪ Rural economy development ▪ Development of rural communities	
Health Check	Cuts in intervention				
CAP 2014	▪ Intervention as a safety net ▪ Cut of quantitative restrictions	▪ SPS, with payment ceiling ▪ LFA subsidies in selected regions ▪ Small farmers' scheme	▪ Improving competitiveness ▪ Supporting sustainable farming ▪ Balanced regional development		

Source: own compilation [Törőné Dunay 2012A]

Common Agricultural Policy after 2014

After an excessive public debate [The Common... 2010] on 12nd October 2011, the European Commission presented a set of legal proposals to make the CAP more effective, by which European agriculture may be more competitive and sustainable in the period between 2014 and 2020. It should be underlined that this was just a proposal which should be verified by the Council and the European Parliament, and that the EU budget may be modified, too. The proposals are in accordance with the previously published communication, namely, the two strong pillars remain, and the basic structure of the CAP is not radically altered, although the formal objectives now reflect the priorities of Europe 2020 much more explicitly. The First Pillar covers direct payments and market measures

providing a basic annual income support to the EU farmers and a support in case of specific market disturbances [Proposal... 2011B], while the Second Pillar covers the rural development [Proposal... 2011C]. Therein the member states draw up and co-finance multiannual programmes under a common framework, which should be harmonized at Community, national, regional and local levels.

According to the proposal, the First Pillar will contain the direct payments and market measures, where the most significant changes will concern direct payments. According to the proposal, the SPS and SAPS will be replaced by a new supporting system, the Basic Payment Scheme. The main objective of the policymakers was to discontinue the compensatory character of direct payments and to bind these payments to the production of public goods.

CAP 2014: changes in direct payments, market measures and rural development

With regard to the direct payments, some aspects were strongly emphasized by the proposal. One of these aspects is to decrease administrative burden, the second is to dissolve differences in direct payments which are neither evenly distributed by farm sizes nor by geographical location. In the proposal, three support levels were determined according to the support level of a given member state. An EU wide 'flat rate' (or 'EU average') has been determined with the same level of aid per hectare to all farmers in the EU (approximately 270 EUR/hectare); those member states with lower direct payments level will be compensated by the surplus redistributed from those members states with higher support than the EU average.

The direct payments would consist of two schemes: the Basic Payment Scheme and the simplified scheme for small farmers, therefore only a unified scheme would be in use for all the member states, in which compulsory and voluntary measures are distinguished [Proposal... 2011B]. The main elements of the scheme for direct payments are illustrated by Figure 3.

The Basic Payment Scheme may be distinguished into two parts: compulsory and voluntary measures. Compulsory measures shall be applied for all member states in the same way, while the decision of voluntary measures implementation shall be made at a member state level.

The second option will support small sized farms. All member states shall set the amount of annual payment for the small farmers as an amount not exceeding 10% of the national average payment per beneficiary. The amount of the payments shall be between EUR 500 and 1000. Those farmers who participate in this scheme shall not be beneficiaries of other schemes. The simplified small farmers' scheme will have less administrative burden than the basic scheme and the farmers shall not be obliged to conform to cross compliance requirements.

According to the new schemes of direct payments, the payments will have not only national ceiling but also they are capped per beneficiaries, the support shall be provided only for active farmers [Proposal... 2011B]. Market measures will also be simplified, their importance is decreasing, they will serve as a 'safety net' for the farmers. Intervention, private storage and export refunds will remain, but they will not be financed by the First

Pillar. In case of unexpected events (e.g. market disturbances, animal health problems, or other unexpected events) additional measures shall also be introduced [Proposal... 2011A].

Basic Payment Scheme		
Compulsory measures for all Member States	**(+)**	**Voluntary measures** (options chosen at MS level)
▪ *Basic Payment Scheme*: for all farmers (Not less than 40 % of the national or regional ceiling) ▪ *Greening component*: (30% of annual national ceiling) for farmers following agricultural practices beneficial for the climate and the environment: crop diversification, maintenance of permanent pastures and ecological focus areas) ▪ *Young farmers payment* ▪ *National reserve*		▪ *In areas with natural constraints 5% of the national ceiling may be redistributed* ▪ Member States may grant *coupled support to farmers*. This support may only be granted to sectors or to regions of a Member State where *specific types of farming or specific agricultural sectors undergo certain difficulties* and are particularly important for economic and/or social and/or environmental reasons.

Cross compliance

OR

Simplified scheme for small farmers
without cross compliance, less administration

Fig. 3. Payment schemes proposed by the CAP 2014

Source: own compilation based on EC proposal [Proposal... 2011B].

The rural development policy retains the long-term strategic objectives of contributing to the competitiveness of agriculture, the sustainable management of natural resources and climate action as well as to the balanced territorial development of rural areas. In line with the Europe 2020 strategy, these broad objectives of rural development support for 2014-2020 are given more detailed expression through six EU-wide priorities. They may improve the competitiveness of agricultural enterprises, the living standards of rural population, as well as preserve environmental, traditional and landscape values of the rural areas [Proposal... 2011C].

Conclusions

The results of our research draw attention to the specific problems of agricultural enterprises in the V4 countries. The convergence process has not been finished yet, some development may be observed, but there are many problems at both farm and sectoral level. The most significant problems at farm level are the low level of own capital, credit disability and liquidity problems which characterize all the V4 countries. These issues, of course, are rooted in the general problems of the agricultural sector, such as low technical level, the problems of land ownership and food-processing industry and the general financial problems. Thus, they can be solved by comprehensive measures at governmental level and the better use of the EU support.

The new CAP reform will bring a new payment system and the proposed national ceilings will not radically reduce the payment level in these countries [Az... 2012]. Greening and capping (i.e. the maximum payment level for individuals) may cause problems mainly for the large farms. Nevertheless, it should be stated that this is just a proposal, and all the V4 countries have formulated their own proposals, which are under a very intensive consultation process at present.

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Joanna Wiśniewska[1]
Department of Economics
Poznań University of Life Sciences

The international involvement of SMEs in rural areas

Abstract. The volume of international trade and the share of foreign capital in companies as well as their dynamics in 2005 and 2010 have been analysed. It enabled a verification of the hypotheses on changes, forms and levels of internationalisation. The process of internationalisation depends on the size of the company as well as on its location. There are two important determinants of internationalisation: potential and agglomeration effect. They are responsible for the differentiation of internationalisation of companies in rural and urban areas.

Key words: internationalisation, competitiveness, location, small and medium-sized enterprises, rural areas, urbanized areas, import, export, foreign capital.

Introduction

International competitiveness is one of essential research problems of contemporary economics. It is the ability to gain and maintain advantage over foreign competitors or, in other words, the ability to survive and to develop in the future. It is a condition for success and existence in the international market [Gorynia & Łaźniewska 2009; Markowski 2004]. The international competition and competitiveness are an essential feature in all economic aspects and their level is determined by the processes of international involvement of enterprises [Gorynia, Stępień & Sulimowska 2000; Gorynia 2007A; Witek-Hajduk 2010]. All the concepts comprising international actions are the concepts of enterprise internationalisation [Gorynia 2007B]. The internationalisation may be an active process which is related with the sales of products and with involvement of foreign resources of the enterprise, or a passive one which consists in gaining products abroad and receiving foreign capital. A traditional method of foreign expansion of an enterprise is exports, which requires that the company should adjust to foreign competition and markets. However, for different reasons it is more and more often replaced by capital expansion of the enterprise in a foreign market [Gorynia 2007A; Witek-Hajduk 2010]. Thus, the internationalisation of enterprises is a process of increasing involvement in the international activity, which takes place in two ways: an increased international trade and a domestic and foreign capital integration [Gorynia 2007A].

In the globalised economy, the processes of spatial polarisation of enterprises become intensified and the local environment does not always favour their development [Andrzejczyk 2010]. Small enterprises located outside urban areas encounter in the process of internationalisation important barriers to their development. The location of an enterprise in a rural area affects the volume and form of international involvement of the enterprise. Rural areas have at present various social and economic functions, starting with those of recreational areas, through typically agricultural areas, up to urbanised suburbs which are a socio-economic base for urban agglomerations [Bański 2009]. They are characterised by a

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[1] PhD, e-mail: wisniewska@up.poznan.pl.

considerable diversification of internal structures and development level. Their recognition is related with numerous research objectives [Wysocki 2010]. In the context of economic integration and globalisation, the following problems become important: the low international competitiveness of enterprises in rural areas, the poor participation of rural areas in the processes of internationalisation, the socio-economic polarisation of rural areas [Kłodziński 2003; Kulawczuk 1995; Ratajczak 2010; Stawasz 2000; Wysocki 2010; Zawisza & Dończyk 2010].

The aim of this research is to compare the international involvement of domestic enterprises, including their size and location. The subject of research was the volume of international trade, the share of foreign capital in enterprises and the dynamics of changes between 2005 and 2010. The analysis enabled a verification of hypotheses concerning the changes, forms and the level of internationalisation of enterprises.

Research method

The aim of the research is to compare the forms and the level of international involvement of enterprises. The enterprise internationalisation was evaluated by means of the available indices of foreign trade and investments. The research population is composed of enterprises, which according to the definition specifying the number of employees, are small (10-49 employees) and medium-sized (50-249 employees). The population of enterprises under investigation corresponds to the number of enterprises which submitted statistical reports in selected rural communes and rural areas of urban and rural communes in Poland in 2005 and 2010[2].

The communes selected for the research were classified according to standardised functional types as the following areas: urbanised, multifunctional, with prevailing agricultural functions, strictly agricultural.

The basis of standardisation of functional types was the degree of socio-economic structures concentration. Thus, urbanised areas are characterised by a considerable concentration of intensive structures, especially housing, services, production and recreation, and they meet the following criteria: location beyond the administrative boundaries of urban communes, population density of more than 100 residents per 1 km^2, more than 140 registered business entities per 1000 inhabitants of working age and a positive migration balance [Bański 2009].

Next, the multifunctional areas are a transitional form between urbanised areas and traditional rural areas. They meet the following criteria: location beyond the boundaries of urban areas, more than 100 registered business entities per 1000 inhabitants of working age and a positive migration balance [Bański 2009].

The areas with prevailing agricultural functions are these where agriculture has a definite advantage over other economic functions. They are characterised by a high diversification, ranging from strict commercial farming to extensive farming. These areas meet the following criteria: they are located outside urbanised and multifunctional areas,

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[2] The research does not include the entities working in the following branches: agriculture, forestry, hunting and fishing, public administration and national defence, mandatory social insurance, households employing workers, households making products and providing services for their own needs, exterritorial organisations and teams (according to the Polish Classification of Activities 2007).

the share of farmland in the total area is more than 70% and the number of farms running but an agricultural activity exceeds 70% of the total number of farms [Bański, 2009].

Table 1. The distribution of the researched population of enterprises by the employment size and area type in 2005 and 2010.

Area type	Number of communes	Number of small enterprises in		Number of medium-sized enterprises in		Number of small and medium-sized enterprises in		Share in overall population in, %	
		2005	2010	2005	2010	2005	2010	2005	2010
Urbanised	18	213	334	141	209	354	543	29.9	35.2
Multifunctional	53	242	308	117	159	359	467	30.3	30.3
With prevailing agricultural functions	82	215	225	108	132	323	357	27.3	23.2
Strictly agricultural	32	103	121	44	54	147	175	12.4	11.3
Total	185	773	988	410	554	1183	1542	100	100

Source: author's compilation based on the Main Statistical Office data.

On the other hand, in strictly agricultural areas which are characterised by a dominance of the agricultural function, a concentration of farmland, natural conditions favourable to agricultural production and a high share of commercial farms other economic functions are of small importance. Those areas are located outside the aforementioned types of areas; the share of farmland exceeds 80% of the total area or the share of farms with chiefly market-oriented production amounts to more than 70% [Bański 2009].

The researched population comprised 1,183 enterprises in 2005 and 1,542 in 2010, including 773 and 988 small as well as 410 and 554 medium-sized enterprises respectively. The entities were located in 185 communes, including 18 urbanised communes, 53 multifunctional communes, 82 communes with prevailing agricultural functions and 32 strictly agricultural communes (Table 1).

The research used a quantitative analysis of mean values from statistical reports of enterprises on income, costs, financial result and expenditure on fixed assets. The analysis enabled a conclusion about the degree of internationalisation of enterprises measured with the volume of export sales, import purchases and the share of foreign capital. The international potential of enterprises was compared, including their location, employment size and the forms and dynamics of internationalisation process.

Exports volume in small and medium-sized enterprises

The basic form of foreign involvement of an enterprise is export and import. Export is an active form of international involvement related with supplying the products of the enterprise to foreign markets [Gorynia 2007A; Witek-Hajduk 2010]. Entrepreneurs execute direct and indirect exports. The former is the sale of the producer's own products abroad without an intermediary. It refers to products marked with the producer's trademark which is well known. The latter refers to the agency which resales products purchased from

producers or other agents. It may take place under the agent's trademark [Rymarczyk, 2004].

Table 2. The average volume of exports from enterprises by the employment size and area type in 2005 and 2010, PLN thousand

Area type	Mean value of net revenue from sales of exported products and services in		Dynamics, %	Mean value of net revenue from sales of exported commodities and materials in		Dynamics, %
	2005	2010	2010/2005	2005	2010	2010/2005
			small and medium-sized			
Urbanised	2225.8	3073.9	138	716.9	501.2	70
Multifunctional	1974.5	2889.7	146	274.7	599.8	218
With prevailing agricultural functions	2204.7	2820.8	128	129.4	1027.3	794
Strictly agricultural	743.9	1124.4	151	132.2	82.5	62
Total	1959.6	2738.2	140	349.7	605.4	173
			small			
Urbanised	281.4	433.2	154	231.3	262.1	113
Multifunctional	563.3	964.5	171	231.5	562.9	243
With prevailing agricultural functions	515.0	526.8	102	37.0	125.1	338
Strictly agricultural	285.0	920.2	323	52.2	59.4	114
Total	435.1	679.8	156	153.5	299.9	195
			medium-sized			
Urbanised	5163.1	7293.9	141	1450.5	883.4	61
Multifunctional	4893.3	6618.9	135	364.0	671.2	184
With prevailing agricultural functions	5568.6	6730.8	121	313.5	2565.3	818
Strictly agricultural	1818.1	1582.1	87	319.6	134.3	42
Total	4833.9	6409.3	133	719.6	1150.2	160

Source: author's compilation based on statistical reports of enterprises on income, costs, financial result and expenditure on fixed assets.

In order to analyse the export volume two measures were used: the net revenue from sales of products and from the sales of exported commodities and materials. The revenue from sales of commodities and materials includes the sales of components acquired to be resold in an unprocessed form. This is net revenue from the sales of commodities and materials without the value added tax, i.e. the amounts due for the sold commodities and materials, regardless of whether they were paid or not, resulting from a multiplication of the amount sold by the net sales unit price, corrected by the surcharges due and discounts, rebates etc. or agreed amounts due to be paid for sales.

In the researched group of enterprises, the mean value of product exports was higher than the value of commodities and materials exports. It was 2,738.2 PLN thousand as opposed to 605.4 PLN thousand in 2010. The highest value of product exports (3,073.9 PLN thousand) had the enterprises located in urbanised areas and the lowest (1,124.4 PLN

thousand) those in strictly agricultural areas. On the other hand, the enterprises in the areas with prevailing agricultural functions reached the highest mean value of the commodities and materials exports (1,027.3 PLN thousand), whereas the lowest value was reached in strictly agricultural areas (82.5 PLN thousand). The value of direct and indirect exports increased in 2010 by 40% and 73% on average, as compared with 2005. However, in urbanised and strictly agricultural areas the value of the commodities and materials exports decreased, whereas in the areas with prevailing agricultural functions it increased nearly seven times. The mean value of product exports increased by more than 50% in strictly agricultural areas (Table 2).

The mean value of product exports in the group of small enterprises in 2010 was 679.8 PLN thousand, whereas the mean value of commodities and materials exports was 299.9 PLN thousand. Small enterprises in multifunctional and strictly agricultural areas had the highest values of product exports. The average value of direct exports (562.9 PLN thousand) was the highest in small enterprises located in multifunctional areas and the lowest (59.4 PLN thousand) in strictly agricultural areas. The exports of commodities grew in small enterprises in 2010 more rapidly. It was higher by 95%, whereas the exports of products were higher by 56%, as compared with 2005. The growth of commodities exports was the most rapid in the areas with prevailing agricultural functions, whereas the export of products grew most rapidly in strictly agricultural areas.

Similarly to small enterprises, medium-sized enterprises reached in 2010 a high average value of product exports (6,409.3 PLN thousand) and a low value of commodities and materials exports (1,150.2 PLN thousand). Medium-sized enterprises reached the highest value (7,293.9 PLN thousand) of direct exports in urbanised areas and the lowest (1,582.1 PLN thousand) in strictly agricultural areas. On the other hand, the enterprises reached in indirect exports the highest mean value (2,565.3 PLN thousand) in the areas with prevailing agricultural functions and the lowest (134.3 PLN thousand) in strictly agricultural areas. The indirect exports in medium-sized enterprises grew in 2010 by comparison with 2005 more rapidly (60%) than direct export (33%). The highest growth in value of commodities and materials exports was observed in the areas with prevailing agricultural functions. It grew more than 8 times. In strictly agricultural areas, the value of both types of exports decreased, the exports of commodities and materials to a greater extent, whereas in urbanised areas the value of indirect exports decreased.

The average value of the exports of products and commodities in small enterprises was nearly half of the value achieved by medium-sized enterprises in strictly agricultural areas. The value of exports in small enterprises in multifunctional areas achieved similar values. In small enterprises in rural areas there was a more rapid growth of exports than in medium-sized enterprises. There was a similar trend in urbanised and multifunctional areas. In strictly agricultural areas the rate of products and commodities exports growth in small enterprises was nearly two and three times higher than in medium-sized enterprises. On the other hand, small enterprises in the areas with prevailing agricultural functions achieved a lower rate of exports growth than the medium-sized enterprises.

Imports volume in small and medium-sized enterprises

Import is a form of passive involvement abroad, related with purchasing commodities or services in foreign markets [Witek-Hajduk 2010]. Imports satisfy current productive

needs, like imports of raw materials, materials or semi-manufactured products and services, development needs, like imports of capital goods as well as consumption needs, like imports of consumer goods [Rymarczyk 2004]. Enterprises arrange imports directly or indirectly, which satisfies their current productive and investment needs. It is the imports of raw materials, materials and prefabricates for production purposes and the imports of machines, appliances and know-how. Another form of trade is the imports of trade commodities, i.e. the imports of commodities to be resold, which replace domestic production, substitutive imports or competitive to domestic products.

Table 3. The average volume of imports in enterprises by the employment size and area type in 2005 and 2010, PLN thousand

Area Type	Mean total value of imports purchase in		Mean value of raw materials, materials, semi-manufactured products and services imports for production purposes in		Mean value of commodities and services imports to be resold in		Dynamics		
	2005	2010	2005	2010	2005	2010	2010/2005		
	1		2		3		1	2	3
small and medium-sized									
Urbanised	5865.9	8233.4	2398.9	2286.0	3135.8	5641.5	140	95	180
Multifunctional	1430.9	2434.3	985.7	1038.1	399.3	1255.9	170	105	315
With Prevailing Agricultural Functions	1426.2	1747.0	1111.2	800.8	157.3	590.9	122	72	376
Strictly Agricultural	801.1	1165.3	355.6	480.9	428.5	563.3	145	135	131
Total	2678.5	4173.3	1364.5	1359.4	1155.7	2567.7	156	100	222
small									
Urbanised	3528.3	6179.2	216.1	386.5	3025.2	5661.3	175	179	187
Multifunctional	495.1	996.6	176.5	266.8	293.3	708.5	201	151	242
With Prevailing Agricultural Functions	236.6	284.3	126.5	122.1	68.1	121.2	120	97	178
Strictly Agricultural	212.5	659.3	22.4	238.1	186.7	276.4	310	1063	148
Total	1221.4	2545.1	153.0	270.8	969.2	2196.2	208	177	227
medium-sized									
Urbanised	9397.1	11516.2	5696.4	5321.6	3303.0	5609.8	123	93	170
Multifunctional	3366.5	5219.3	2659.2	2532.1	618.8	2316.3	155	95	374
With Prevailing Agricultural Functions	3794.5	4240.4	3071.5	1957.6	334.7	1391.6	112	64	416
Strictly Agricultural	2179.0	2298.9	1135.6	1025.0	994.5	1206.2	106	90	121
Total	5425.8	7076.9	3648.8	3300.7	1507.4	3230.3	130	90	214

Source: author's compilation based on statistical reports of enterprises on income, costs, financial result and expenditure on fixed assets.

Three values were applied for analysis of the volume of imports: the total imports purchase, the imports of raw materials, materials and prefabricates for production purposes

and the imports of commodities to be resold. Total imports purchase is the net value of purchased imported commodities and services, i.e. without the VAT and handling costs, including the purchase of imported fixed assets and services.

The researched enterprises based their activity on imported products to a different extent. The greatest volume of imported purchase could be observed in the enterprises located in urbanised rural areas. Its average value reached 8,233.4 PLN thousand in 2010, whereas the lowest volume was noted in the enterprises located in strictly agricultural areas, with the value of 1,165.3 PLN thousand. The average value of imported commodities for trade was 2,567.7 PLN thousand in 2010 and it was higher than the value of commodities for production purposes which was 1,359.4 PLN thousand. The areas with prevailing agricultural functions were an exception, whereas in strictly agricultural areas the value of materials, raw materials or semi-manufactured products, services and trade commodities imports did not differ much (Table 3).

An average value of import purchases increased in the researched group of enterprises in 2010 by 56%, as compared with 2005. The value of materials, raw materials or semi-manufactured products and services imports did not change and the imports of commodities for trade increased by 122%. In the enterprises located in urbanised areas, multifunctional areas and those with prevailing agricultural functions, the imports of commodities for increased more rapidly, whereas in strictly agricultural areas a higher growth rate was observed in the imports of commodities for production purposes. There was a more important role of the imports for commercial purposes in urbanised areas, whereas in strictly agricultural areas materials, raw materials or semi-manufactured products and services imports were more important.

Among small enterprises, the highest on average volume of import purchases could be observed in the enterprises located in urbanised rural areas. It amounted to 6,179.2 PLN thousand in 2010. The lowest volume was noted in the enterprises located in the areas with prevailing agricultural functions, i.e. 284.3 PLN thousand. In 2010, the average value of imports of commodities for trade was 2,196.2 PLN thousand and it was much higher than the value of commodities imported for production purposes, i.e. 270.8 PLN thousand. The enterprises located in the areas with prevailing agricultural functions and in strictly agricultural areas were an exception. Their values of materials, raw materials or semi-manufactured products and services imports as well as the imports of commodities for trade were very low and did not differ much. The highest rate of changes took place in the volume of the above mentioned imports in strictly agricultural areas, where they rose more than ten times in 2010, as compared with 2005. A considerable increase could be seen in the enterprises located in multifunctional and urbanised areas; it was more rapid in the commodities imports than in imports of materials, raw materials or semi-manufactured products and services.

The highest on average volume of import purchases in medium-sized enterprises could be observed in the enterprises located in urbanised rural areas. It amounted in 2010 to 11,516.2 PLN thousand. The lowest volume was noted in the enterprises located in areas with prevailing agricultural functions, i.e. 2,298.9 PLN thousand. The average value of commodities imported for trade in medium-sized enterprises in 2010 was 3,230.3 PLN thousand and it was slightly lower than the value of commodities imported for production purposes, i.e. 3,300.7 PLN thousand. The enterprises located in urbanised areas and in strictly agricultural areas were an exception, where the value of materials, raw materials or semi-manufactured products and services imports was slightly lower than the imports of

commodities for trade. There was a growth in the imports of commodities for trade. It was the highest in the areas with prevailing agricultural functions and in multifunctional areas, where the value of imports of commodities for trade increased in 2010 more than 4 times and nearly 4 times respectively, as compared with 2005. During the period under analysis the researched group of enterprises noted a fall in the imports of materials, raw materials or semi-manufactured products and services, which was the highest in the areas with prevailing agricultural functions.

Enterprises with foreign capital input

Apart from traditional trade relations, the capital connections are at present an essential form of international involvement of enterprises. The sale of shares of an enterprise in the domestic market to a foreign entity is a passive, non-cooperative and capital form of internationalisation [Gorynia 2007A; Witek-Hajduk 2010]. The investment involvement of Polish enterprises abroad is not high, but it has been increasing in recent years. On the other hand, the location of foreign investments in domestic enterprises is a significant economic process and so far it has been the dominant form of internationalisation of Polish enterprises [Rymarczyk 2004].

In the researched group of enterprises, their number with foreign capital input changed depending on the size of the enterprise and the functional type of the area. On average, the share of entities with foreign capital input in the total number of enterprises was 12.9% in 2005 and it increased to 15.2% in 2010. This share was the highest in urbanised areas, i.e. 23.9% in 2010, and it was the lowest in strictly agricultural areas, i.e. 6.3%. There were similar changes between 2005 and 2010, this share rose by more than 4% in urbanised areas and only by 0.2% in strictly agricultural areas, whereas in the areas with prevailing agricultural functions it dropped by 1% (Table 4).

Among small enterprises the share of foreign capital was nearly 9.7% in 2005 and it increased to 12.2% in 2010. The share of small enterprises with foreign capital input was diversified according to the area type. The largest number of enterprises (18.6%) was located in urbanised areas in 2010, whereas the smallest number (i.e. 6.6%) was in strictly agricultural areas. The dynamics of enterprises with foreign capital input in urbanised and in strictly agricultural areas was in 2010 similar; their share increased by 4% and 3.7% as compared with 2005. On the other hand, the increase in areas with prevailing agricultural functions and in multifunctional areas reached barely 0.5%.

On the other hand, the share of foreign capital input in medium-sized enterprises was higher than in small enterprises. It was 19% in 2005, but it rose to 20.6% in 2010. The number of enterprises with foreign capital input differed depending on the area type. The largest number (nearly 32.5%) of medium-sized enterprises was in 2010 located in urbanised areas, whereas the smallest number (5.6%) was in strictly agricultural areas. There was a different dynamics of the number of enterprises between 2005 and 2010. Their number increased in urbanised and multifunctional areas by 5.5% and 3.3% respectively, whereas in the areas with prevailing agricultural functions and in strictly agricultural areas it decreased by 4.6% and 8% respectively.

Table 4. The share of enterprises with foreign capital input by the employment size and area type in 2005 and 2010

Area type	Total number of enterprises in		Enterprises with foreign capital input in		Share of enterprises with foreign capital inputs in, %		Change
	2005	2010	2005	2010	2005	2010	2010/2005
small and medium-sized							
Urbanised	354	543	69	130	19.5	23.9	4.4
Multifunctional	359	467	40	59	11.1	12.6	1.5
With prevailing agricultural functions	323	357	35	35	10.8	9.8	-1.0
Strictly agricultural	147	175	9	11	6.1	6.3	0.2
Total	1183	1542	153	235	12.9	15.2	2.3
small							
Urbanised	213	334	31	62	14.6	18.6	4.0
Multifunctional	242	308	24	32	9.9	10.4	0.5
With prevailing agricultural functions	215	225	17	19	7.9	8.4	0.5
Strictly agricultural	103	121	3	8	2.9	6.6	3.7
Total	773	988	75	121	9.7	12.2	2.5
medium-sized							
Urbanised	141	209	38	68	27.0	32.5	5.5
Multifunctional	117	159	16	27	13.7	17.0	3.3
With prevailing agricultural functions	108	132	18	16	16.7	12.1	-4.6
Strictly agricultural	44	54	6	3	13.6	5.6	-8.0
Total	410	554	78	114	19.0	20.6	1.6

Source: author's compilation based on statistical reports of enterprises on income, costs, financial result and expenditure on fixed assets.

Conclusions and recommendations

There is a considerable diversification in the process of internationalisation of enterprises in Poland, which may influence the balanced development of economy. The analysis confirmed the presence of two important effects in the process of enterprise internationalisation: potential effect and agglomeration effect.

The presence of those effects is indicated by the international involvement of larger enterprises located in the areas near urban agglomerations. Enterprises in urbanised areas gain agglomeration advantages resulting from the advantages of scale, location and urbanisation. In the researched group of enterprises the agglomeration effect clearly determines the forms of their internationalisation. The presence of these effects in the process of enterprise internationalisation may mean that the aim of enterprises may be to gain and a maintain permanent advantage in the local market rather than to realize global strategies.

The analysis positively verified the hypotheses. The internationalisation potential of enterprises depends on the possibility of gaining foreign capital and thus, of gaining advantage over domestic competitors. On the other hand, the location of direct investments in the largest enterprises which are located in big agglomerations confirms the assumptions of Dunning's [1980] eclectic theory of direct investments. It assumes that the internationalisation of production takes place where there are specific advantages resulting from the property, internalisation and location [Gorynia 2005]. The research took into consideration a diversification of structure, size and location of enterprises. This enabled the author to draw a conclusion about the heterogeneity of the processes of enterprise internationalisation and their concentration in urbanised areas. In consequence, there are even bigger differences in the development of urban outskirts, including strictly agricultural areas and the areas with prevailing agricultural functions whose competitiveness decreases.

To sum up the research results, the share of enterprises with foreign capital in the total number of enterprises changed between 2005 and 2010 along with the size of enterprises and the type of the area where they were located. There was a higher number of enterprises with foreign capital input among medium-sized rather than small companies. The highest number of these was located in urbanised areas and the lowest in strictly agricultural areas. The share of enterprises with foreign capital input among small and medium-sized enterprises in urbanised areas was about 20% and 30% respectively, whereas in strictly agricultural areas it was about 7% and 6% respectively. However, as far as medium-sized enterprises are concerned, there was a slightly slower rate of growth of enterprises with foreign capital input in 2010, as compared with 2005. There was a similar increase in the number of small enterprises with foreign capital input in urbanised and strictly agricultural areas. However, as far as medium-sized enterprises with foreign capital input are concerned, in 2010 their number decreased by 8% in strictly agricultural areas and by 4.6% in the areas with prevailing agricultural functions, as compared with 2005.

Small and medium-sized enterprises achieved a higher value of imports when they were located in urbanised areas. The imports of commodities for resale were also more significant in those areas. In the other areas the enterprises had a higher value of imports for production purposes. The imports of commodities for trade were an essential form of imports in small enterprises, whereas medium-sized enterprises turned the majority of imports for their own production purposes. In the researched period there was an increase in imports in small enterprises in strictly agricultural areas, which indicates their growing share in the processes of internationalisation.

The direct exports of products made in the enterprise were in the researched group of enterprises located in rural areas more significant than indirect exports of commodities and materials. During the period under analysis, small and medium-sized enterprises achieved a higher value of exports when they were located in urbanised areas. In the researched period there was a considerable increase in the exports in small enterprises located in strictly agricultural areas, which indicates their growing share in the processes of internationalisation.

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Anna Woźniak-Andrzejuk[1]
Chair of Agricultural Economics and International Economic Relations
Warsaw University of Life Sciences

Analysis of the regional occurrence of fruit and vegetable producer groups and organizations in Poland

Abstract. The paper discusses issues concerning the fruit and vegetable producer groups and organizations and their regional aspects in Poland. It focuses on the concentration of these organizations in the Polish provinces, taking into account the membership and the legal form they adopt. In the paper, a statement is made that without further consolidation on the Polish fruit and vegetable market, which despite major improvements is still highly fragmented, a deterioration of efficiency will set in. The share of producer organizations in the fruit and vegetables market in Poland must improve in order to reinforce their position in the changing market environment.

Key words: producer organizations, producer groups, fruit and vegetables, European Union,, regional analysis, Poland, agricultural markets.

Introduction

The market of fruit and vegetables belongs to the most advanced sectors of agribusiness in Poland, on the other hand it is characterized as highly fragmented. The vast majority of Polish fruit and vegetables producers are family based enterprises. The family provides most of the labour and capital required to operate the farm and all the management decisions are made within the family. This puts the fruit and vegetable producers at a high disadvantage in the harsh market environment dominated by the market intermediaries and modern distribution channels, which due to their scale remain highly adaptive and flexible to changing consumer preferences. To strengthen the fruit and vegetable sector, the European Commission decided to introduce regulations aimed at consolidation of the fruit and vegetable market. The regulations, which have also been introduced into the Polish law, encourage individual farmers to form organizations in order to collaborate in groups. Collaboration allows for a concentration of supply, common production planning, concentration of demand for the means of production, common negotiation of contracts, entry into new markets, quality improvements, promotion of privately owned brands [Chlebicka 2008].

The process of consolidation of family farms into groups is unavoidable if producers are to remain competitive in the common European market and in general. In some instances the process can even culminate in forming an entity which controls the whole distribution chain. As was the case with the West Australian farmers, who started as a co-operative and came a long way to control the major supermarket chains in the country, giving its stockholders control over a substantial portion of the market. Another example is the United Farmers Co-operative Company (UFCC), formed in the early 1990s. It has evolved as the most significant agricultural cooperative success story in Western Australia since the conversion of the Westralian Farmers Co-operative into a publicly listed

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[1] MSc, e-mail: anna_andrzejuk@sggw.pl

corporation. The UFCC's success and rapid membership growth to over 3000 members is also a significant factor contributing to the subsequent mini-boom of co-operative registrations identified in the late 1990s in Western Australia. [Cheong 2006]. In the European Union, a very successful co-operative among others is Veiling Haspengouw from Belgium, Koninklijke Fruitmasters Groep from the Netherlands, or Württembergische Obstgenossenschaft Raiffeisen e.G. from Germany. Together, those three organizations have joined forces to create the European Fruit Cooperation. The process of mergers and joint ventures among western produces organizations illustrates not only the scale of cooperation but also the way of thinking of the management.

Despite some progress in the efforts designed to encourage integration among Polish fruit and vegetable producers, Poland is still a long way from duplicating such success stories as the one from Australia or Western EU countries. Individual Polish producers remain at a high disadvantage when faced with low prices, excessive price volatility and high quality demands from retailers, just to name a few.

Methodology

The purpose of this paper is to show the characteristics, legal forms and regional diversity of fruit and vegetable producer groups in Poland. The time period of the analysis is a snapshot picture on the date of 13.07.2012. The choice of time period was dictated by the data availability and its limitations.

The scope of the paper includes an analysis of the concentration of fruit and vegetable producer groups in each province and in cross-section of category to which they belong.

The study encompasses the entire Polish territory, including the division into 16 provinces which are the basic unit of administration adopted for the analysis. The methodology of this paper employs quantitative research. The data has been developed using a comparative analysis. Basic statistical measures have been applied for the data analysis as well as the classical methods of inference. A deduction method was used for the assessment of events. Presentation of the results was made in a tabular form.

Definition of fruit and vegetable producer groups

The law governing the establishment and conduct of producer groups in Poland is titled Law of the 15th of September 2000 on agri-producer groups and their unions [Ustawa… 2000].

Fruit and vegetable producer organizations are defined as any legal entity which is formed on the own initiative of growers in the categories of products such as fruit, vegetables, products intended for processing, citrus fruit, nuts, mushrooms and culinary herbs. Those organizations must have in particular the aim of ensuring that production is planned and adjusted to demand, particularly in terms of quality and quantity, promoting concentration of supply and placing on the market of products produced by its members, reducing production costs and stabilizing producer prices, promoting the use of cultivation practices, production techniques and environmentally sound waste-management practices.

According to the Council Regulation ((EC) No 2200/96) [Council Regulation…1996], the preliminary recognized fruit and vegetable producer groups are new producer

organizations which have not been recognized yet, have been established with the aim for full recognition, and are allowed a transitional period of no more than five years in which they have to meet the conditions for recognition. During this period an aid can be granted by the state to a producer group to encourage their formation and development. In order to qualify for full recognition, preliminary recognized fruit and vegetable producer groups must present a recognition plan, and after its fulfilment become recognized producer organizations.

Financial aid to producers

There are several ways for the groups to benefit from the state aid for the preliminary recognized fruit and vegetable producer groups. One of those forms of financial assistance is for the costs associated with the creation of producer groups and their administrative activity. The aid for producer groups is also granted to assist in the transition of fruit and vegetable growers to the status of a recognized producer organization. Investment aid is granted in the form of financial assistance to cover a part of the eligible investment costs included in the approved recognition plan.

Financial aid can also be granted to existing recognized producer organizations. This can take the form of financing the operational fund established for specific purposes by a producer organization. The fund is financed by: (a) financial contributions of members or of the producer organisation itself; (b) Community financial assistance which may be granted to producer organisations. Operational funds must be used only to finance operational programmes approved by Member States [European Commission…2011].

The EU member states implement the national strategy for sustainable operational programmes of producer organizations of fruit and vegetables. In Poland the strategy was drafted for the years 2010-2013. It assumes that producer organizations will prepare operational programmes acting as specific business plans with several goals, such as production planning, improvement of product quality, improvement of marketing, R&D, advisory and educational services, prevention of crises, environment protection and other.

Analysis of fruit and vegetable producer groups

In this chapter, fruit and vegetable producer organizations are analyzed first, followed by fruit and vegetable producer groups.

A total of 68 fruit and vegetable producer organizations have been registered in Poland in the analyzed period. The highest concentration of organizations occurred in the voivodeship of Kujawy-Pomerania (16), followed by the voivodeship of Mazovia (14) and the voivodeships of Lublin (12) and Greater Poland (11). Those four provinces aggregate 77,9% of the total number of fruit and vegetable producer organizations in Poland. The lowest number of organizations occurred in 3 provinces, namely the voivodeships Lubuskie, Lower Silesia and Pomerania, with each of those regions having a single organization. The highest number of organizations deal with production of both fruit and vegetables (51). Production of fruit alone have been declared by 10 organizations. Five organizations produce vegetables and just two organizations sell mushrooms. It's

interesting to note that out of 16 Polish provinces, only 10 are represented in the fruit and vegetable producer organizations summary list [Table 1].

Table 1. Categories of fruit and vegetable producer organizations in Poland

Voivodeship	mushrooms	fruit	fruit, vegetables	vegetables	Total
Łódź	1		4		5
Mazovia	1	5	8		14
Greater Poland		2	5	4	11
Lublin		2	10		12
Lubuskie		1			1
Kujawy-Pomerania			15	1	16
Małopolska			2		2
Świętokrzyskie			5		5
Lower Silesia			1		1
Pomerania			1		1
Total	2	10	51	5	68

Source: own research based on data from the Ministry of Agriculture and Rural Development for the European Commission report on fruit and vegetable producer groups and organizations.

Fruit and vegetable producer organizations fall into four categories with regard to the adopted legal form: limited liability company, co-operative, association and union. The highest number of organizations are organized as a limited liability companies (29). The second most popular form is the union , with 19 organizations, followed by co-operatives (13). It is a surprise to discover that the union is the second most popular entity, especially that no shares are sold under this form, and the voting rights are equally distributed among members. Which also assumes that each member contributes equally to the organization's value [Ejsmont & Milewski 2005]. It is also worth noticing that 7 organizations are registered under the association form. It must be added that associations are organizations with social objectives. Economic activity in the case of associations cannot be an end in itself. An association cannot be formed with an aim to conduct business.

Fruit and vegetable producer organizations consist of a group of members. According to the Law of the 15th of September 2000 on agri-producer groups and their unions [Ustawa… 2000] the number of members cannot be lower than 5. The fruit and vegetable producer organizations in Poland aggregate 3533 members in 68 groups. This averages to 51.96 members per group. The highest average number of members (261.5) takes place in the voivodeship of Małopolska with 523 members concentrated in two organizations. The lowest average number of members takes place in the voivodeship of Lubuskie, with 16 members gathered in a single organization. It is worth noticing that the two provinces with the largest number of fruit and vegetable producer organizations, the voivodeship of Kujawy-Pomerania and the voivodeship of Mazovia have below average numbers of members (29 and 37).

239 fruit and vegetable producer groups have been registered in the analyzed period. The highest concentration of groups occurred in the voivodeship of Mazovia which currently holds 75 groups and which constitutes 31.4% of all the groups. The second most

active region is the voivodeship of Greater Poland, holding 33 groups, which constitutes 13,8% of the total number of groups. And the third most active region is the v oivodeship of Kujawy-Pomerania with 28 groups making up for 11,7% of the total. Those three regions already stand for 56,9% of the total number of groups. The relatively high number of groups in these provinces can be connected with such factors as tradition of cooperation between farmers, structure of farms and natural conditions in these regions. It is worth noting that out of 16 voivodeships in Poland 9 hold less than ten fruit and vegetable producer groups, with the lowest number of groups occurring in voivodeship of Podlasie (2), voivodeship of West Pomerania (2), voivodeship of Warmia-Masuria (3) and voivodeship of Silesia (3).

Table 2. Legal forms of fruit and vegetable producer organizations in Poland

Legal form	Voivodeship	Total
Ltd. company	Łódź	2
	Mazovia	9
	Greater Poland	4
	Lublin	3
	Kujawy-Pomerania	8
	Małopolska	1
	Świętokrzyskie	1
	Lower Silesia	1
Total Ltds.		29
Co-operative	Łódź	1
	Mazovia	4
	Greater Poland	3
	Kujawy-Pomerania	2
	Świętokrzyskie	3
Total co-operative		13
Association	Kujawy-Pomerania	6
	Świętokrzyskie	1
Total associations		7
Union	Łódź	2
	Mazovia	1
	Greater Poland	4
	Lublin	9
	Lubuskie	1
	Małopolska	1
	Pomerania	1
Total unions		19
Grand total		68

Source: own research based on data from the Ministry of Agriculture and Rural Development for the European Commission report on fruit and vegetable producer groups and organizations.

Table 3. Average number of members of fruit and vegetable producer organizations in Poland

Voivodeship	Average number of members	Number of members	Number of organizations
Łódź	51.20	256	5
Mazovia	37.64	527	14
Greater Poland	63.36	697	11
Lublin	61.00	732	12
Lubuskie	16.00	16	1
Kujawy-Pomerania	29.69	475	16
Małopolska	261.50	523	2
Świętokrzyskie	52.00	260	5
Lower Silesia	20.00	20	1
Pomerania	27.00	27	1
Total	51.96	3533	68

Source: own research based on data from the Ministry of Agriculture and Rural Development for the European Commission report on fruit and vegetable producer groups and organizations.

As far as the products are concerned, the fruit and vegetable producer groups concentrate in four major categories: fruit, vegetable, fruit and vegetable and mushrooms. A total number of 213 groups, which amounts to 89.1%, belong to these four categories. The most important is the fruit and vegetable category with 67 groups, closely followed by the vegetable (66), and fruit (60) categories. The mushroom producing groups constitute 20 groups. The lowest number of groups participate in the culinary herbs (1), and culinary herbs, vegetable, other (1).

Fruit and vegetable producer groups fall into two categories with regard to the adopted legal forms: limited liability company (Ltd.) and co-operative. The number of groups with Ltd. legal form, which amounts to 228, overwhelms the number of co-operatives (11 groups), which translates into 95.4% limited liability companies. The highest number of Ltd.'s is located in the voivodeship of Mazovia with 73 groups. The highest number of co-operatives are located in the voivodeship of Małopolska with 4 groups. It is worth noting that the voivodeship of Mazovia, despite having the highest number of limited liability companies, has also one of the lowest numbers of co-operatives (2 groups). It is highly arguable why the legal form of a limited liability company is more popular in Poland than the co-operative form, however, it appears to be determined by the more favourable image, and more business-like approach of a company. Moreover, an important argument might also be the voting system according to the number of shares in contrast to the number of members in the co-operative system.

A single fruit and vegetable producer group consist of a number of members. In all fruit and vegetable producer groups in Poland there are in total 3101 members. The minimum number of members stands at 5. Some groups, however, tend to be much larger. The analysis shows that the average number of members in a group is 12.97. The most densely populated province in terms of group membership in Poland is the voivodeship of Lublin with an average of 23 members per group. The most sparsely populated groups occur in the voivodeship of Warmia-Masuria, with an average of 5 members per group. In absolute terms the region with the highest number of members is the voivodeship of

Mazovia (1269 members), the second highest number is only 483 members in the voivodeship of Lublin. The third highest number of membership can be found in the voivodeship of Małopolska (223), closely followed by the voivodeship of Greater Poland (217 members) and the voivodeship of Kujawy-Pomerania (205). It is interesting to notice that the eastern provinces of Poland with relatively less developed small farms as compared to the western part, show the highest concentration of membership in fruit and vegetable producer groups. This is in line with the general idea of the EU and Polish legislation aimed at strengthening the bargaining power of small agricultural producers by means of their concentration and collaboration.

Table 4. Categories of fruit and vegetable producer groups in Poland

Voivodeship	mushrooms	fruit	fruit, other	fruit, vegetables	fruit, vegetables, mushrooms	fruit, vegetables, other	vegetables	vegetables, other	culinary herbs	culinary herbs, vegetables, other	Total
Lower Silesia		2		1			6				9
Kujawy-Pomerania		3	1	11		1	9	2		1	28
Łódź	1	6		4			1	2			14
Lublin	4	4	1	6		2	4				21
Lubuskie	2			1			2				5
Małopolska	1	5		1		1	2				10
Mazovia	4	30		25	1	3	12				75
Opole	1	1					4				6
Podkarpacie		2				3	1	1			7
Podlasie				1		1					2
Pomerania	1	2		1		1	4				9
Silesia	1						2				3
Świętokrzyskie		2		7			2	1			12
Warmia-Masuria				2			1				3
Greater Poland	5	3		6		1	15	2	1		33
West Pomerania				1			1				2
Total	20	60	2	67	1	13	66	8	1	1	239

Source: own research based on data from the Ministry of Agriculture and Rural Development for the European Commission report on fruit and vegetable producer groups and organizations.

In terms of membership, the highest number of members is concentrated in the categories of fruit and vegetable producing groups (1046 members) which constitutes 33.7% of the total number of members. In the second place comes the number of members of the fruit production category (833), and the third is the category of fruit, vegetable and others, with 531 members, followed by the vegetables category (365). Four of those categories constitute 89.4% of the total number of members.

Table 5. Legal form of fruit and vegetable producer groups in Poland

Legal form	Voivodeship	Total
Ltd.	Lower Silesia	9
	Kujawy-Pomerania	27
	Lublin	21
	Lubuskie	5
	Łódź	13
	Małopolska	6
	Mazovia	73
	Opole	6
	Podkarpacie	5
	Podlasie	2
	Pomerania	9
	Silesia	3
	Świętokrzyskie	12
	Warmia-Masuria	3
	Greater Poland	32
	West Pomerania	2
Ltd. Total		228
Co-operative	Kujawy-Pomerania	1
	Łódź	1
	Małopolska	4
	Mazovia	2
	Podkarpacie	2
	Greater Poland	1
Co-operatives Total		11
Total		239

Source: own research based on data from the Ministry of Agriculture and Rural Development for the European Commission report on fruit and vegetable producer groups and organizations,

As shown in the above analysis, currently in Poland there are 68 fruit and vegetable producer organizations with an average number of 51.96 members, and 239 preliminarily recognized fruit and vegetable producer group with an average number of 12.97 members. For the fruit and vegetable producer organizations the highest number of organizations are placed in the voivodeship of Kujawy-Pomerania, for the fruit and vegetable producer group it is the voivodeship of Mazovia that holds the highest number of groups. The most common legal form for both organizations is the limited liability company. In both, the producer organizations and the preliminarily recognized producer groups, the category of fruit and vegetable concentrate the highest number of entities. In the current economic environment which favours the strong retail chains and disposes the family farms of their bargaining power, it is of high importance for the fruit and vegetable farmers to organize into strong groups in order to gain at least some control over the supply and the production part of the distribution chain. Despite a high commitment from the Polish authorities to

167

promote this form of management of fruit and vegetable production, the level of organization of the market, as measured by the share of producer organizations in the marketing of fruit and vegetable production, was estimated in 2005 at around 2%. In the EU, the average amounts to 40% and in some countries even up to 80% [Jabłońska 2005]. Today, the EU average has stayed approximately the same, however according to Boguta [2012] the Polish average has improved to around 20%. Nevertheless, the size of the groups remains fairly small. A few obstacles to broader cooperation between farmers have been identified. They are a reluctance to conduct joint activities, farmers' individualism, mutual distrust between agricultural producers, bad experiences related to the functioning of agricultural cooperatives in the People's Republic of Poland, lack of experience of farmers in joint economic activities under free market conditions, lack of a basis (an office building, infrastructure) on which the groups could establish their economic activities, lower position of farmers in the agricultural market due to the lack of shares in agri-food processing establishments and establishments for wholesale marketing of agricultural products [Martynowski 2012]. Nevertheless, as shown in a research on agricultural producer groups, the highest number of positive answers with regard to cooperation between farmers was related to the improvement of household welfare [Malchar-Michalska 2011].

Table 6. Average number of members of fruit and vegetable producer groups in Poland

Voivodeship	Average number of members in group	Number of members	Number of groups
Lublin	23.00	483.00	21.00
Małopolska	22.30	223.00	10.00
Podkarpacie	20.71	145.00	7.00
Mazovia	16.92	1269.00	75.00
Łódź	13.50	189.00	14.00
Świętokrzyskie	11.50	138.00	12.00
Lubuskie	10.40	52.00	5.00
Kujawy-Pomerania	7.32	205.00	28.00
Greater Poland	6.58	217.00	33.00
Podlasie	6.00	12.00	2.00
Silesia	5.33	16.00	3.00
Lower Silesia	5.33	48.00	9.00
Opole	5.33	32.00	6.00
Pomerania	5.22	47.00	9.00
West Pomerania	5.00	10.00	2.00
Warmia-Masuria	5.00	15.00	3.00
Total	12.97	3101.00	239

Source: own research based on data from the Ministry of Agriculture and Rural Development for the European Commission report on fruit and vegetable producer groups and organizations.

Table 7. Number of members of fruit and vegetable producer organizations in Poland

Voivodeship	mushrooms	fruit	fruit, other	fruit, vegetables	fruit, vegetables, mushrooms	fruit, vegetables, other	vegetables	vegetables, other	culinary herbs	culinary herbs, vegetables, other	Total
Lower Silesia		11		5			32				48
Kujawy-Pomerania		17	5	91		22	54	10		6	205
Łódź	7	74		86			6	16			189
Lublin	22	22	68	82		269	20				483
Lubuskie	34			5			13				52
Małopolska	13	91		37		70	12				223
Mazovia	45	528		587	8	33	68				1269
Opole	5	7					20				32
Podkarpacie		10				115	5	15			145
Podlasie				6		6					12
Pomerania	5	11		6		5	20				47
Silesia	5						11				16
Świętokrzyskie		47		65			10	16			138
Warmia-Masuria				10			5				15
Greater Poland	31	15		61		11	84	10	5		217
West Pomerania				5			5				10
Total	167	833	73	1046	8	531	365	67	5	6	3101

Source: own research based on data from the Ministry of Agriculture and Rural Development for the European Commission report on fruit and vegetable producer groups and organizations.

European perspective

Taking the broader European perspective, the statistical data for 2004 shows that the country with the highest number of producer organizations in the European Union is Spain (616), followed by France (314), Greece (113) and Italy (102). However, the organization level varies strongly across the EU, with the share of producer organizations in national production being the highest in Belgium, the Netherlands and Ireland. Typically for the Netherlands and Belgium, more than 90% of all fruit and vegetables are marketed through producer organizations. Moreover, in Belgium 90% of sold products are produced by only a few associations. In Flanders, 15 producer organizations make up a total of 17.200 members [Avermaete & Huygens 2009]. The organization rate in the 'Old European Union' is also much higher than in Poland which currently stands at around 20% [Szeleźniak 2012] as mentioned in the previous chapter. For example, in Spain the organization rate in 2007 was 36.3%, in Italy 35.4% and in France 46%. For some product

categories the organization rate can be even higher, mainly the export oriented branches [Camanzi et al. 2009]. The study also reveals high specialization levels on some products such as apples or onions and an adequate high capability of concentrating agricultural supply by the largest producer organizations, especially in Spain and Italy [Camanzi et al. 2009].

It should be emphasized that creating effective institutional structures in the agricultural sector is not an easy and quick process. It requires not only time, but also strong and efficient public financial support [Malchar-Michalska 2011].

In a publication named 'The prospects for CAP reform after 2013 – a summary of the Commission proposals', there is a provision also for aid to producer groups. Support should be offered to small operators for organizing joint working arrangements and share resources, including by horizontal and vertical co-operation in the supply chain, local markets and local food chains [The prospects… 2011].

In the long term perspective it is important to keep this financial support for the benefit of such organizations in the next EU financial framework 2014-2020. The lack of financial encouragement can weaken the dynamics of creation of these business entities (nowadays the main stimulating factor remains financial help). As far as changes in international agricultural commodity markets and the issue of food security are concerned, it is necessary to reform the CAP. The instruments supporting agricultural producer groups in the new member countries favour structural changes in rural areas and that is why they should be maintained in the next EU budget [Malchar-Michalska 2011].

Conclusion

There are currently 68 fruit and vegetable producer organizations and 239 initially recognized fruit and vegetable producer groups in Poland. Both groups remain highly concentrated within a few voivodeships. In the case of producer organizations, they are the voivodeship of Kujawy-Pomerania, voivodeship of Mazovia, voivodeships of Lublin and Greater Poland.

The four provinces aggregate around 77.9% of the total number of producer organizations. In the case of producer groups, it is the voivodeship of Mazovia, the voivodeship of Greater Poland and the voivodeship of Kujawy-Pomerania. The three provinces aggregate around 56.9% of initially recognized producer groups. In both cases, there is a high concentration of groups in few provinces in Poland.

The most popular legal form for conducting business by the producer organizations as well as the initially recognized producer groups is the limited liability company, followed by the co-operative form. The union legal form which stands out in the producers organizations is also used.

Despite having a strong support from the EU in the form of financial aid, the level of participation of family farms in the producer organizations in Poland is still not sufficient. This situation will hinder the development of fruit and vegetable producers and their bargaining power abilities. If the well being of family farms is to be preserved, fostering diversity and improved conditions of life in the countryside, individual farmers should not only commit to the producer organizations, but go even further and allow the organizations to merge into stronger entities in order to compete with other members of the supply chain.

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