

## **TRANSFORMATION OF RURAL SPACE IN BORDERLANDS: PROSPECTS OF DEVELOPMENT OF SELECTED SUPPLY CHAINS IN CHELMSKO-ZAMOJSKI REGION<sup>1</sup>**

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**Abstract:** Development of peripheral regions is of crucial importance for successful development of the whole European Union. Chelmsko-zamojski region, located in the borderland of Poland and Ukraine, is one of the most underdeveloped regions in the EU. The main branch of its economy is still agriculture. Since political and economic transformation of Poland, that began over 20 years ago, agrarian structure of the region has undergone considerable changes. However, analysing agriculture without examining other elements of socioeconomic structure of the region would not enable painting the complete image of changes. The hereby paper analyses possible future changes of three selected supply chains: milk supply chain, rapeseed supply chain and beer supply chain, on the basis of their former transformations. Main sources of information are opinions of representatives of particular stages of selected supply chains. They were confronted with one another, and also with available literature, to avoid shortcomings, and prospects for development of the chains were outlined.

**Keywords:** supply chain, development, rural areas, agriculture

### **INTRODUCTION**

The future of European Community has always been subject to research efforts by innumerable scientists, trying to point to directions of development and outline development opportunities and threats for either the whole of the continent or for individual countries, or even for their regions (see for instance Galar 2008, Kukliński 2008, Rousseau 2008). Both chances and risks are highly diversified, depending on economic, social and environmental situation of a region. Peripheral regions are of special importance, because they lag far behind advanced parts of countries, therefore putting back the clock. Cohesion policy of the European Union itself reaffirms that not already economically boosting regions, but peripheral regions should be central to studies aiming at acceleration of spatially balanced development.

Among regions that need particular attention, there is chelmsko-zamojski region (NUTS 312), located in the borderland of Poland and Ukraine. In terms of economic advancement level, it is the least developed region in Poland, and also

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in the EU25. For decades it has been a typically agricultural land, with quite favourable natural conditions for development of this branch of economy. However, significance of human-connected factors shaping the economic situation of the region seems to have grown over last years. One of these factors is the organisation of product supply chains, with farmer being always the first stage and individual consumer (household) making up the last one.

The main aim of the hereby paper is to forecast future changes of selected supply chains in chelmsko-zamojski region. Rapeseed oil, beer and milk supply chains were selected for analysis. The analysis is framed by former development of the supply chains in chelmsko-zamojski region over the period of 1993-2006. Opinions and expectations of representatives of particular stages of selected supply chains were confronted with one another, and also with available literature, and prospects for development of the chains were outlined.

### RESEARCH AREA

Chelmsko-zamojski region is located in the eastern part of Lubelskie Province (see fig.1). It consists of eight districts, constituting administrative units of the second order: Biłgoraj district, Hrubieszów district, Chełm land district, Chełm urban district, Krasnystaw district, Tomaszów district, Zamość land district, and Zamość urban district.



Fig. 1. Chelmsko-zamojski region localisation in Poland.

**Source:** Own elaboration.

In terms of economy, chelmsko-zamojski region is one of the most rural and agricultural regions in the country, characterised by high share of farmland (69.7% of the total territory, 81% arable), high input of labour into agriculture, high ratio of employed in agriculture, very high number of relatively small farms, and also by peripheral meaning of other economic functions. In the structure of

farming an important role is played by field plant production, mainly wheat, sugar beet, corn, other cereals, rapeseed, locally also vegetables, hop, and tobacco. This region does not have a tradition of fruit growing, so permanent crops occupy limited areas. Lack of larger orchards results also from the appearance of frequent early spring frosts, which could destroy the fruit yields and the trees themselves.

Natural conditions of most of the region are very favourable to agriculture. It is especially clear on Lublin Upland, forming central part of the region. According to studies by the Institute of Soil Science and Plant Cultivation, this region is characterized by high quality ratio of agricultural production space, mostly thanks to very high soil quality commonly held to be the best in the country. These are, first of all, the complexes of brown and lessive soils, as well as chernozems having emerged on loesses.

Economy of the southern part of the region is more diverse with important role of tourism and forestry. Preservation of natural forests on the areas of Roztocze Upland is mostly due to historical reasons. Already in the 16<sup>th</sup> century a large private property called Zamoyski's Estate in Tail was set here, and the owners protected forests of these areas for hunting purposes. Overpopulation of other parts of the region and the resulting land hunger, were conducive to taking for cultivation of every piece of land (Bański 2007). On the other hand, in the north, where Polesie Plain is located, soils are of worse quality. Consequently, large shares of land are taken by grasslands, which serve for dairy cattle raising, and also part of land is kept fallow.

However, high agricultural potential of the region is inadequately exploited. Productivity is decreased first of all by flawed agrarian structure. Small, fragmented farms make up the most characteristic feature in rural landscape. Land used to be divided up among heirs of a farmer, which combined with high fertility rates led to high fragmentation of agrarian lands. Nowadays, average acreage of a farm is 8.2 hectares. However, in the area where best soils are common (the district of Hrubieszów) there were 12,766 farms (in 2002, Central... 2009), of which as many as 25% have only up to 1 hectare, and only 0.4% have acreage above 50 hectares (see fig.2). For this reason only a small share of farms are capable of producing to the market.

Another important reason for low productivity of the region is limited expenditure on technical means of production, resulting from the general low level of affluence of farmers. Average income in the whole of the province accounts for only 29% of UE25 average, and in the research area it is even lower. The average wage in the region is at around 78% of the average for Poland. Low level of farmers' education (only 4.3% of the rural population has university education), combined with traditional farming methods based on family-farming, low level of mechanisation, low use of fertilisers, herbicides and pesticides, bring about low profitability of farms, which, in turn, limits their investment capacity. Rapid ageing of population, caused by very low fertility (1.3) and large outmigration of the youth, resulting in a total population decrease of about 4.5% over a decade of 1995-2005, supplements the image of peripherisation of the chelmsko-zamojski region.

Approximately 55% of the employed in the region work in agriculture, but this sector contributes to merely 12% of regional GDP – data for Poland are 15.7% and 2.7%, respectively (Rocznik... 2007). The total number of farmers (employment in primary sector in full-time equivalents) in the region exceeds

103 thousand (Eurostat data for 2005) and the number has not changed over recent years. Therefore, given small acreage of farms and legal regulations concerning unemployment in agricultural sector<sup>2</sup>, hidden unemployment in agriculture is huge, although hard to univocally estimate.

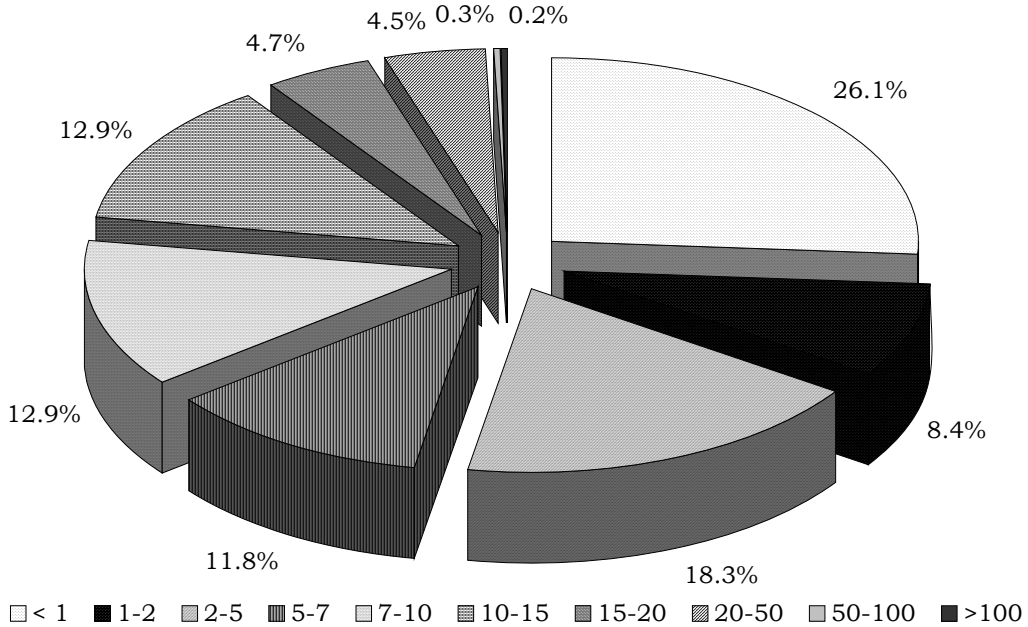


Fig. 2. Shares of farms according to acreage groups in the district of Hrubieszów, 2002  
**Source:** Own elaboration based on Central Statistical Office data, [www.stat.gov.pl](http://www.stat.gov.pl).

Nonetheless, agrarian structure of the region slowly changes, along with changes observed in the whole of the country. There is a clear year-to-year increase of the number of farms producing with ecological methods. In 2004 there were close to 1,700 ecological farms registered in Poland, while more than 2,000 were in the transition from traditional to ecological production. There are several dozen such farms active in the region in question, but they occupy merely 2% of the total of agricultural land in the region to date.

An important factor of territorial development of the region is composed by legally protected areas. Despite the fact that National Parks occupy only 1% of the region's territory, the list of special areas of habitat protection contains some 20 entities. The system of protection underwent an essential change in 2004, when Natura 2000 areas were submitted to the European Commission. These areas encompass 12% of the region's territory. Given lack of industry noxious for the environment, the region can be considered ecologically clean. Only in the vicinity of Chelm and Rejowiec, where large cement factories are situated, pollution of the air with dust may exceed the limits. Another object of care in terms of pollution is border Bug River, whose waters are not classified in any of the purity classes.

<sup>2</sup> According to national regulations reflected in 2002 census guidelines, owners of more than 1 hectare of land producing not only to cover their own needs, or owners of less than 1 hectare of land producing mainly for the market, are considered farmers. The number of people employed in a farm does not influence this classification, regardless of its size

The region faces numerous conflict, arising from diverse needs in regard to land use. Farming, forestry, environmental protection and tourism function contribute to this antagonism to largest extent. Areas with intensive farming production hold low shares of forests, which leads to quick soil degradation, steppisation and worsening of water relations. Recommendations to strengthen the water- and soil-protection functions through planting of new forests, at the expense of agricultural land, are rarely implemented on soils of good quality, because they are protected by law and are in high demand. Besides, the issue of deforestation is perceived secondary by the communal authorities, and low financial means are devoted to such practices.

Another conflict arises between some areas of protected nature, fulfilling simultaneously the tourist and the recreational functions. Tourist pressure, peaking on weekends and holidays, brings about significant changes in natural environment, including unlawful recreation housing construction, illegal waste dumps, and destruction of tree stands. Land demand for recreational and residential housing has increased in the recent years (Wesołowska 2006), while in the spatial development plans the areas attractive in terms of nature are usually protected against construction developments.

### **SUPPLY CHAINS PRESENTATION**

The region's rural space may be framed in classic triangle of sustainability dimensions: economy, society and environment. All of them meet in agricultural productive activities. For the needs of the hereby examination, three supply chains were selected: milk, rapeseed oil and beer. The products were selected to enable analysis of various types of agricultural activity, including plant growing and husbandry, examining mass products widely grown in other regions of the country (rapeseed) and plants grown mostly in the researched region (hop), and also analysing products that represent different plant groups (consumed in raw form or requiring industrial processing). Each of the chains starts with production stage (farmer) and ends with consumption stage (household), while transitory stages depend on the product. Detailed analysis of each of the supply chains would require much space, therefore only rough delineations of them will be presented below, so as to enable more comprehensive analysis of future trends<sup>3</sup>.

### **MILK SUPPLY CHAIN**

The milk supply chain is formed by four main stages, namely: milk producers, milk processing plants, retailers, and households as final consumers<sup>4</sup>. The entire milk supply chain employed over 69 thousand people, which was equivalent to 36% of employment in the region considered.

The area considered has very good conditions for dairy cattle raising, especially in its northern part. This results from the existing large areas of meadows and pastures, and from good quality arable land, where high yields can be obtained of the most valuable fodder crops. Despite these facts, the intensity of cattle raising in the region is low: only 17.8 equivalent Livestock

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<sup>3</sup> For exhaustive examination of the past situation and changes over the last decade of 20<sup>th</sup> century of each of the supply chains, see Bański J., Janicki W., Ogniwia łańcucha powiązań rolnik – konsument w regionie chełmsko-zamojskim na przykładzie wybranych produktów rolnych (incoming)

<sup>4</sup> Since over 75% of liquid milk is distributed without the intermediary of the wholesalers, this stage was omitted in the analysis

Units (LU) per 100 hectares of agricultural land (which is about 5 LU less than on the average in the Lubelskie Province, and about 8 LU less than in Poland).

Some 46,800 farms deal with production of raw milk in the region. On the average, one hectare of land is needed to feed one cow during a year. The average acreage of a farm on the area considered has been at around six hectares, while the average number of cattle units per farm has been three, which suggests the existence of a potential for the development of dairy cattle raising, provided no other barriers are present. The majority of farms dealing with production of raw milk in the region have less than 10 hectares and, in economic terms, range between 2 and 6 ESU. The average number of persons employed on a farm was 1.31.

There were four companies processing milk on the area considered – District Dairy Cooperative (OSM) in Krasnystaw, Dairy Cooperative “BIOMLEK” in Chełm, Dairy Cooperative in Tomaszów Lubelski and Dairy Production Plant Ltd. in Łaszczów. The average magnitude of a company located in the region was 356 persons, and was higher than on the average in the Lubelskie Province by 125 persons.

There were 2,947 outlets in the chelmsko-zamojski region, dealing with retail trade of liquid milk. The average number of employees of these entities was 2.2 persons, and their average annual turnover was 57,014 €.

The primary consumers of liquid milk are private households. There have been 219,832 such households within the area in question.

### **RAPSEED SUPPLY CHAIN**

Within the rapeseed supply chain, the following stages were distinguished: rapeseed production, processing to the form of oil for consumption, wholesale trade, retail trade, and consumption.

Natural conditions for rape growing are very good in the chelmsko-zamojski region, especially in its central part, where fertile soil cover lets obtain best yields. Human-connected factors shaping the situation of agriculture seem to favour farms growing rape, in comparison to an average farm in the region. Most farms producing rapeseed were equipped with agricultural machines and devices somewhat better than an average farm and labour needs with regards to hands are usually lower than disposability. The yields of rapeseed in the region reach 20 dt per hectare, this being a noticeably lower value than the national average of 26.6 dt per hectare (Rocznik... 2006). The average employment on the farm is at four persons, in most cases these persons being members of the closest family of the farm owner, helping in the conduction of the farm without additional remuneration. On the area of the entire Lubelskie Province the production of rapeseed in the years 2004 and 2005 amounted to 50-70 thousand tons (Zbiory... 2007), and data of the National Agricultural Census of 2002 let estimate that the chelmsko-zamojski region accounts for close to 70% of this number.

Processing of the rapeseed is mainly done by large oil producing plants, this sector being characterised by a high concentration of production. There is only one such plant in the region considered – the Fat Plant in Bodaczów. Its yearly production capacity is 120,000 tons of rape or sunflower seed, which means that this plant is among the smaller ones on the national scale. Rapeseed oil, produced by the plant in Bodaczów finds numerous purchasers in view of its low price. The plant conducts also the wholesale activity and provides service for the rapeseed producers. The latter practice is meant to secure adequate quality

of raw material for production and is quite commonly used in the branch. Side by side with the plant in Bodaczów, rapeseed produced in the region is purchased also by the enterprises located outside of the region, in Bielsko-Biała, Kruszwica, Elbląg, and Warsaw.

There are 15 wholesale facilities selling rapeseed oil in the region. Although most of them are of small or medium size, gradual consolidation is being observed in the wholesale sector, with the significance of the small outlets systematically decreasing to the advantage of the medium ones.

There are close to three thousand retail shops in the region. In terms of numbers – especially in rural areas – the small shops dominate, employing up to three persons, but a clear majority of the sales value is generated by the shops having larger commercial surfaces and employing more than ten persons. In view of limited surfaces of shops, in the smaller ones products from Bodaczów are not always available. In the medium sized and bigger shops the rapeseed oil from Bodaczów is commonly available, mainly due to its low price. Because of the latter, the sales market for the oil from the plant in Bodaczów is much more extensive and it encompasses the entire south-eastern Poland.

Consumption of oil has been slowly, but systematically increasing – during the last five years consumption of oils of plant origin increased in Poland from 5 to more than 6 litres per capita.

### **HOP SUPPLY CHAIN**

Share of area of the farms producing hops in total area of agricultural land of the region is limited, therefore this crop is considered a unique product. In view of the character of this product, direct marketing of hop does not exist, the degree of commercialization reaches 100%, while the producer chain is strongly developed. It is composed of six stages: hop producer (farmer), hop processing plant, brewery, wholesale facility, retail shop and end consumer.

Hop has in Poland relatively high market significance, with the production volume in the recent years placing Poland on third place in Europe and fifth in the world (Dwornikiewicz, 2006). Hop is characterized by a very intensive spatial concentration of production. More than 80% of area of hop farms in Poland exist in the Lubelskie Province, of which around 1/3 in the chelmsko-zamojski region. The number of farms growing hop, which is in most cases the sole domain of their agricultural activity, exceeds 300 in the region, and the average farm disposes only 1.76 hectare of land (in Poland mere 2 hectares). Against the background of Europe this puts Poland on a far position – in Western Europe such farms are approximately 3.5 times bigger. Only 2% of farms dealing with hop production in the region can be considered big, with surfaces between 10 and 50 hectares, and only 0.2% can be considered very big, exceeding 50 hectares.

The first stage of processing of hops consists in turning it into the form of granulate, hop extraction, or the so-called pressed hops. There are three plants in Poland, dealing with this activity, all of them being located in the Lubelskie Province. The next processing stage is brewery. Out of 65 breweries, existing nowadays in Poland, only two are located on the research area: one in a town of Zwierzyniec (it belongs to Perła Browary Lubelskie S.A., the largest beer company in the region), and one small, local brewery in Pokrówka by Chełm. The latter produces beer mainly with traditional methods and finds its market position on the basis of customers, who are attached to a brand of just a local reach. Some of the beer types sold are not pasteurized, which constitutes one of

the key elements of the marketing policy of this company.

There are roughly 30 wholesale facilities selling beer in the region. Some of them are separate businesses, but a part of them belongs to food selling networks, so that the number of companies owning these wholesale outlets is by half smaller. The biggest, by far, and the most dynamic network of wholesale facilities is constituted by the Emperia Holding company. Established in 1990 in Lublin as a small wholesale business in food products, quickly and systematically developed, attaining the position of a leader on the national market, both in wholesale and retail trade. Currently, the company runs 18 own wholesale outlets, situated mainly within the south-eastern Poland, and owns a dozen or so companies of wholesale distribution, functioning under their own names. Side by side with the wholesale activity, Emperia Holding conducts, since 1996, also retail trade, systematically developing two parallel networks of shops, currently encompassing 50 supermarkets and more than 400 shops (Grupa... 2009). This company is beyond any doubt the most important player on the local wholesale trade market.

Retail trade in the region is strongly fragmented. Most local shops have beer in their trade offer and the number of such objects is close to three thousand. Beer brands offered by the brewery in Zwierzyniec play an important role in total beer sales in the region. *Perla* beer is considered to be the leading regional brand and more than 90% of its output is meant for the market of the Lubelskie Province.

### **MAJOR SHIFTS OF THE SUPPLY CHAINS IN THE RECENT YEARS**

Transformation of political system in Poland that began in late 1980s, triggered considerable changes also in economy. Transition from centrally steered economy to market economy caused dramatic inflation, but its influence on prices of various products was uneven. Typically agricultural products' prices grew significantly slower, than prices of industrial products farmers needed for their activity, like fertilisers, herbicides, pesticides, seeds, petrol, and machinery. As a result, significant shifts in agricultural activities were observed. Each of the supply chains underwent significant organisational and technical transformations to date, and they all included struggle for bringing costs down through increased mechanisation along with adaptation to market requirements. Average farm acreage increased, partly through purchase of land, to an extent also through leasing. It became possible thanks to outflow of a significant part of farmers to non-agricultural activities in industry and services. Consequently, intensity of production increased, and it compensated for an increase in costs of labour. The intake of fertilisers dramatically decreased (by almost 2/3 at the turn of 1980s and 1990s), only in the second half of the 1990s it started gradually growing back.

The fundamental factor, enabling the initiation of changes in the milk supply chain, was subordination of the dairy sector to market mechanisms. In the later period of key significance was the preparation of Poland to integration with the EU and the resulting accession. The factors accelerating these changes were active price policies of the dairy companies (e.g. supplements to the purchase price for adequate temperature, quality class, EU certificate of superior class milk, concentration of supply, contracting, owning a cooling facility, etc.), which was made possible due to close collaboration with the farmers. Also preferential credits and subsidies from the assistance funds, as well as support of the cooperatives granted to their members (e.g. low interest loans or credit



warranties) influenced milk supply chain significantly. Among the most important effects of past shifts in milk supply chain the following may be regarded the most important: decreases of the volume of raw milk production, number of milk cows and farms raising milk cows, and increases of the milk yield per cow, concentration of supply of raw milk and prices of milk and dairy products. Also profitability of production improved, what came along with sharpening of the quality requirements with respect to raw milk and dairy products. Consolidation of processing and trading branch was observed, followed by shift from raw milk production to more processed dairy products. Additionally, production capacities of dairy cooperatives were modernised.

Rapeseed cultivation in the research area has been covering a constantly increasing area. It was motivated by the increasing purchase prices and unit profit on sale. The volume of production of the rapeseed in chelmsko-zamojski region grew by almost 30% (in Poland by 174%) between 1993 and 2006. A similar growth has been observed on the remaining stages of the rapeseed supply chain. Farmers have been extending their farms by leasing or purchasing agricultural land, which enabled an increase of intensity and mechanisation of production. This was especially important in view of the sharp increase of costs associated with employment and costs of means of agricultural production. Oil producing plants conducted intensive rationalisation of production and employment (fall by 50%), enforced by privatisation, and attempted to win new sales markets. Overall condition of the plants improved, partly thanks to increasing interest in the rapeseed from bio-fuel producers, partly as a result of rapeseed prices increase. In turn, on the sales market competitive pressure caused by introduction of large-surface wholesale and retail trade networks to the market, attracted many shops to larger traders on the basis of franchise, and consolidation of the market followed. The growth of the wholesale companies was linked to the increase of employment, but also with the progressing automation and computerisation of work. Increase of purchase power of region's inhabitants by more than 40% slightly increased also volume of the rapeseed oil sold. This development was also possible owing to the changes taking place in the nutritional structure, associated with the decrease of consumption of animal fats to the advantage of fats of plant origin.

Hop production in chelmsko-zamojski region increased by 39% between 1993 and 2006. The most important reason was introduction of more effective varieties of hop, additionally also establishment of producer groups, increasing competition on the market, outflow of population from the agricultural sector, which allowed for the increase of the average plantation area by some 15% over the mentioned period. Hop processing plants invested in new production lines and technologies. Nowadays, the quality of their products does not differ from foreign production. It resulted in a dramatic increase of their sales (by 545%), while their employment numbers decreased by close to 35%. Breweries also invested into mechanisation and computerisation of production, they also created sales departments, this alone being responsible for the increase of the number of employees in the breweries by as much as 1400%. Additional factors were consolidation of the brewery branch in Poland and increase of beer consumption. The turnover of the wholesale facilities and retail shops also increased. It was mainly due to the collapse of state-owned giant wholesalers, and also to improvement of quality and speed of customer service. Some wholesalers broadened the scope of their activity by forming the retail shop networks under their patronage.

### **PROSPECTS OF DEVELOPMENT OF THE SUPPLY CHAINS IN QUESTION**

The incoming years will face changes in examined supply chains. Some will be just continuation of transformations observed to date, some are likely to undergo more radical modifications. Various interpretations are possible, however the main source of information during the course of research were people employed in the successive chains. For each of the stages of a supply chain, representatives of two independent units were interviewed in depth. In case of farmers, they were representatives of various farmers' associations, so as to avoid collecting personal opinions of people who are not representative for the whole group of producers. Other interviewees were processing factory representatives, employees of wholesale units, retail outlet owners, and individual consumers, all connected with a chain in question. Subsequently, opinions were confronted with one another and also with existing literature to eliminate inconsistencies. Two time horizons were adopted in the course of the research: 2014 (7 years after the main body of the field research was conducted, short-time perspective) and 2021 (14 years, medium-time perspective).

### **MILK SUPPLY CHAIN**

It is expected that in the nearest years there will be a slight decrease of production of raw milk, resulting from continuing loss of interest of consumers in raw milk consumption, and also from the decrease of internal use on the farms. At the same time, there may occur an increase in the degree of commercialization of milk production. These changes shall be forced by the necessity of accelerating the process of concentration of milk production in order to lower costs and to improve quality parameters of the raw material, and thus to increase the incomes of milk producers (Program... 2004).

Also concentration of production shall take place and number of cows per farm shall increase. An expected increase of milk yields of cows from 3.9 to 4.5-5.0 thousand litres per year shall force the tendency to decrease the number of farms keeping low number of dairy cattle (1-5 units) by 50-60%, with production of milk from these farms meant first of all for the self-supply. Out of the 16,000 farms keeping nowadays 6-10 units of milk cattle some 70-80% shall increase the number of cattle raised and shall carry out the necessary modernization works in the buildings and farm equipment, and will develop this direction of specialization (a part of undertakings shall be financed from the means put to use in the framework of the Plan of Rural Development 2007-2013); the remaining farms from this group shall limit the cattle numbers and turn to production meant mainly for "self-supply". Largest farms (9,800) shall continue to develop this direction of specialization.

A factor obstructing these changes is the system of milk quotas in the EU and in Poland, and the legal principles of their transfers. It can be assumed that if the present system of milk quotas is maintained, there will be some 20-25 thousand farms in the Lubelskie Province in the perspective of the year 2021, specializing in milk production and closely associated with the processing plants. The farms from this group will also constitute a significant motive force for the land market, because of gradual area concentration of the farms.

In the sphere of processing, consolidation of the branch shall continue, consisting in the downfall of the economically weaker dairy companies and their taking over by the larger and stronger businesses. It also appears that there will

be a change in the assortment structure of production in the direction of further limitation of production of the traditional products and the increase of share of the modern, more processed products. This evolution shall take place due to the product specialization of particular dairy plants, modernisation of the production potential and introduction of innovations, both concerning the very products and the sphere of organization and production process. This will bring about the increase of quality of the goods produced and a yet improved adaptation of the assortment offer to the market requirements. One can also expect an increase of labour productivity on dairy enterprises.

In the sphere of trade a decrease of medium and small shops significance in the distribution of milk is expected to the advantage of the large commercial networks of supermarkets and chains.

It is forecasted that there will be in Poland an increase of consumption of dairy products from 174 litres per person in 2004 to even 250 litres per persons (in milk equivalent) within some fifteen years (Okrzesik 2005). Along with the forecasted increase of incomes of the population the demand for ecological products shall also increase. That is why production of this kind of goods constitutes an opportunity for gaining new sales markets. Development of such production in Poland – and also in the chelmsko-zamojski region – is easier and cheaper in view of the existing qualities of the natural environment and relatively low costs of labour. Due to the increase of demand for dairy products it can turn out that the national wholesale quota, assigned to Poland, is too small, which will bring about further intensification of the competition for the raw material between the processing plants and the necessity of increasing imports.

Farmers breeding milk cows inquired about potential alternatives to present agricultural activity, point first of all to beef cattle. It requires relatively insignificant change in terms of extensive production, typical for most farmers in the region to date, while in case of industrial farming it would involve much larger efforts. Transition to completely different agricultural production – plant growing – is also considered possible, although considerably harder to achieve, given problems connected with transformation of pastures and meadows, often swampy, into arable lands.

### **RAPSEED SUPPLY CHAIN**

It is widely expected, that demand for rapeseed shall be abruptly increasing in the near future. It shall be generated first of all by bio-fuels producers, and to a somewhat smaller extent by food processing industry. Poland has introduced National Bio-fuel Goal Action, where share of bio-fuels in sales of companies is defined for consecutive years. For instance, they are 5.75% for 2010 and 10% for 2020. Severe fines have induced an increase of bio-fuels share in sold fuels (see Rozporządzenie... 2004, Ustawa... 2006). Tax policy has been unfavourable to bio-fuels for years and their production costs exceeded market-accepted final price, therefore crude-oil refineries opposed introduction of bio-fuels (Krajowe... 2008). At present only petrol producers (Orlen, Lotos) and importers (J&S, Slovnaft, Shell, BP, Lukoil) are legally obliged to use biocomponents in sold petrol; petrol stations buy biodiesel there. Both petrol producers and importers maintain that cost of production of B100 exceeds by 5-15% the cost of crude-oil refining to diesel, which makes it impossible to sell it at market prices. In early 2008 producers used to lose 0,014 to 0,081 € per litre of sold B100 biodiesel (Krajowe... 2008).

Therefore, the demand for rapeseed is likely to rise. It is estimated, that present potential of production of esters (B100) in Poland amounts to about 400-500 thousand tons per year; further increase is possible, when new agri-refineries are constructed. Total potential of rapeseed processing amounts to 2,4 million tons. It corresponds to approximately 936 thousand tons of rape oil, however, a part of it will still be consumed as food (Günther *et al.* 2007, Biofuels... 2007).

However, EU-driven regulations enforcing laws concerning constantly increasing share of bio-fuels in both gas and diesel shall attract more and more farmers to rapeseed growing, therefore increasing supply as well. Increasing competition on the producer market may bring lower than expected increase of revenue. Nonetheless, relatively high requirements of this plant concerning first of all soil quality will constitute a considerable obstacle for potential new growers, along with funds-consuming, very much specialised mechanisation of field work. Farmers are aware of the fact that rape growing will have to undergo rationalisation changes, and they see the opportunities for intensification in the changes oriented at the increase of farm acreage. Some farmers (less than 100 farms), besides growing rape, deal with pressing of the rapeseed oil with traditional methods, trying to meet slowly growing demand for traditional food.

The management of the oil producing plant in Bodaczów see the chances for taking up further activities aiming at rationalisation of production through starting of new kinds of productive activity. They could secure a higher level of economic safety through broadening of the offer or through its complete shift towards production of bio-fuels.

The activity of the wholesale facilities dealing with food products shall most probably undergo further evolution. Currently, the biggest chances for their continued development are seen in the establishment of the company stores, which would be supplied by a given wholesaler with a complete assortment of goods. The probability of appearance of new wholesale facilities in the consecutive towns of the chelmsko-zamojski region should be considered low, in view of the relatively high degree of saturation of the wholesale market with the facilities specialising in this kind of activity.

Retail shops do not expect any significant changes in relation to trade in rapeseed oil. The rate of growth of consumption of the oil is small enough not to expect a significant change in the sales volume, unless an essential shift in unit price occurs. There would be an increase in the sales if the prices of the competitive products were raised together with the raise in the oil price, while it could drop, if the oil price increased only. The factor motivating to undertaking of further investments is the sharpening of the competition on the market and the outflow of population to bigger urban centres and, especially during the recent years, abroad. An additional circumstance, amplifying the feeling of instability in the conduction of business, is constituted by the frequent changes in Polish law, perceived by interviewees as one of the most important threats.

The analyses of the expected behaviour of consumers imply that the future increase of incomes would not bring about a counterpart increase of consumption of the rapeseed oil. Oil, namely, is a basic good and most probably the needs of consumers are already now satisfied in an adequate manner.

Rapeseed production does not seem to be seriously threatened, especially because of said increase of pressure by bio-fuel producers. Additional pressure may be posed by own demand. Some undefined, but growing amount of

rapeseed collected by farmers is already processed by them farmers on their own into bio-fuel, but this practice is restricted by legal regulations. According to biocomponents and liquid bio-fuels act of 25. August 2006, farmers are allowed to produce 100 liters of rape esters per each hectare of total agricultural area they own, provided they do not introduce esters into the market (Ustawa... 2006). No such refineries have been registered in the research region up to date. Industrial production launched in 2007, when the first agri-refinery has been officially opened in Poland (outside the research region), but farmers sometimes buy low-capability refineries and process rape without any legal registration of this process. Rough estimates say about 100 private illegal refineries in the country, and a fraction of it in the chelmsko-zamojski region (Gazeta... 2008). Apart of these, a few crude-oil refineries in Poland proceed esterification, but all are located outside the region (two in Silesian Province, and one in Lower Silesia, Łódzkie, and Pomorskie).

However, individual farmers may see it reasonable to shift to other production, in case when supply increase prevails over demand increase and prices fall down. Alternatives to rapeseed production are seen by the farmers first of all in production of cereals, while within non-agri-alternatives are seen in development of agritourism.

### **HOP SUPPLY CHAIN**

There is a conviction among the hop producers that this production will continue to grow, which ought to contribute to the improvement of their economic situation. They also expect an increase in the unit profit on sale. This conviction may result from the awareness of the constant growth of demand for beer on the Polish market. Plantation owners expect, as well, further outflow of population from farming and the increase of plantation acreages, which could also contribute to the increase of their incomes. They are unwilling to speak of the alternatives to hop cultivation, indicating most often as plausible alternatives intensive growing of vegetables or of maize. They do not intend, rather, to give up farming, and treat the agri-tourist activity, increasingly popular in rural areas, exclusively as a complement to their activity to date. Among reasons justifying such attitude, high initial costs of investments in hop production should be emphasised, including preparation of field installation with poles and wires, and first of all equipping oast chamber. Farmers expect amortisation of these investments first, before making any decision involving departure from hop growing. A change in the production profile could be forced upon them first of all by the increasing costs of materials and labour force.

Companies dealing with hop processing also expect further increase of the sales prices of their products and the increase of profits. They intend to continue undertaking investments into the newest production technologies, as well as into new cooling storage facilities, allowing for a more flexible reaction to the market situation. They found their former investments beneficial, especially those enabling production of newer type of granulate, „45”. Hop extracts and granulate “45” allow for the production of beer with better taste parameters (Poslednik, 2000). Pressed hops and extract “90” find less and less application in brewing, estimated nowadays at 15% of total input, and so their production goes down. Other factors motivating hop processors to undertake investment projects are the decrease of revenues and the increasing costs of materials and labour.

Breweries expect, too, a continued increase of sales volume, but their primary hopes are associated with the external sales markets. The regional market, in their opinion, is saturated, and they only aim at maintaining their position on this market. All the brands of beer produced in the chelmsko-zamojski region, as well as in the entire province of Lublin, are considered local. The attempts of winning other markets are associated with the necessity of bearing high financial expenditures. An additional burden is the necessity of lowering the sales prices in order for the new product to find a place on an alien market. Consequently, paradoxically, local brands attain the highest sales prices within their own region and it does not seem to change in the incoming years. The attachment of a consumer to a brand is strong, that is why changes of costs of various components of production, entailing changes in prices of end products, are not perceived as a threat to the sales volume. Ultimately, demand for production components might be referred to as inelastic. Further investment into production lines is planned, but also – establishment of an own network of wholesale distribution of beer. The respective respondents point out to the sharpening competition as the main driver of the planned changes.

Wholesalers expect an increase of the unit profit and of the turnover. In order to be able to face the competition and market demand they plan to continue expanding the network of wholesale facilities, so as to reach a bigger number of customers. They also plan developing a network of retail trade, where they expect to gain higher unit profits from their activity. Initial steps of realising of such a scenario have already been visible on the market. The largest trading companies buy consecutive shops or even smaller networks of retail stores, therefore restraining competition on the market. Paradoxically, the competition is seemingly flourishing, because in many cases former names on shops are retained.

Similarly, the groceries dealing with retail selling of beer, expect further growth of turnover, but mainly through the increase of prices rather than through the increase of the sales volume measured in physical units. The primary driver for the potential future changes for the respondents is the threat from the competitors, but also the increasingly perceptible shortage of manpower. The latter is caused by the outflow of population both towards larger urban centres and abroad. Shopkeepers, especially owners of small groceries, are very much afraid of the legal changes, and the instability of Polish law is considered by them as a significant impediment to the conduction of business.

Demand for the regional beer in the region shall most probably not increase significantly any more. It can be assumed that this market is saturated already with the product. The forecasted increase of the number of households in the region shall most probably be linked with the decrease of the average number of persons per household. The effect, therefore, will not be a perceptible increase of beer consumption in the region. One should expect, on the other hand, growing sales of the local beer outside of the region of its origin.

## **CONCLUSIONS**

Rural areas of south-eastern part of Lubelskie Province have undergone significant changes in the recent years. They affected first of all agriculture, being still the most important sector of local economy. Organisational and technical changes were observed also in examined supply chains: milk supply chain, rapeseed supply chain and beer supply chain. Future development of the

supply chains is perceived by various actors constituting these chains quite optimistically.

Depopulation of rural areas, as observed in recent years, apart from obvious disadvantages for local society and economy, has also positive aspect. Still more and more agricultural land is at the disposal of the market, and average area of a farm increases. Further increase is expected, which shall boost income of farms, therefore enabling investments in mechanisation, modernization of buildings and farm equipment, and also support efforts for specialization of production. Short- and medium-term predictions of representatives of all interviewed food-processors include widening of the sales market, continuing mechanisation of production and increase of both turnover and income. Some also predict, that new products shall be offered and new markets shall open. Both wholesale and retail trade stages of all chains expect consolidation of trade in the region, hence changes that has been observed to date shall continue. Larger companies shall take over smaller ones, creating or enlarging trade networks. Profit margins are also supposed to expand, thus facilitating increasing revenues. Trade stage of supply chains is afraid of changes of legal regulations in Poland – they used to take place quite often and no change is forecasted in this field.

Contrastingly, interviewees do not predict a noticeable increase of consumption of most of analysed products. Market seems to be saturated with the present production, so only a few possibilities of increasing revenues seem to be realistic: introducing new products to the market (e.g. highly processed dairy products), gaining new markets outside the region, widening of profit margins and transferring more and more costs to the customer, and last but not least, collapse of competing companies.

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