ECONOMIC AND ENVIRONMENTAL STUDIES No. 7 OPOLE 2005

Daniel KAŁASZNIK, Joost PLATJE
Opole University (Poland)

SOME THEORETICAL ISSUES OF COMPARING URBAN AND RURAL AGRO-FOOD SYSTEMS AS A FACTOR OF LOCAL SUSTAINABLE DEVELOPMENT IN DIFFERENT REGIONS

1. Introduction

Although many widely known and applied criteria exist for making a general comparison between countries, this is more complicated for analysing agro-food systems and their importance for local sustainable development in different countries. In this rather explorative article we attemp to identify some conditions and criteria for making a comparative study of agro-food systems in different countries. Firstly, general information on the agricultural sector in different European countries is analysed. Then, issues of studying agro-food systems are discussed within the context of the agro-food supply chain, where stakeholders, methods of data collection, initial data required and area of economic activity are identified. Finally, a summary of conditions and criteria for making a comparative study is presented. This paper is a contribution to creating a basis for international comparative research on urban and rural agro-food systems as a factor of local sustainable development.

2. General information on the agricultural sector

The structure in agriculture, its importance for creation of value added (national income) and employment, share in international trade and food expenditure differ in EU countries, including Bulgaria and Romania which are expected to join the EU in 2007 (see Table 1). This

gives a general impression of the importance of the agricultural sector for the whole country. However, for comparing regions, the numbers should be refined for the different regions to be researched.

From the data in the table a few important observations can be made. First of all, agriculture is of great importance for the formation of landscape, as it covers about 50–60% of the total area in most of the countries (except for Greece). Thus, when changes take place in *e.g.* production technology and structure of agriculture, this has a large influence on the landscape. This may be more significant for former socialist countries, as their agriculture often uses old-fashioned, rather more ecological, production methods. The average farm size is rather small (except for Slovakia), thus mechanisation may lead to larger farms. This may be necessary from the point of view of farmers' income, but may negatively influence the landscape.

The size of farms differs significantly. Farms in Poland, Lithuania, Bulgaria, Romania, Greece and Italy can be considered as very small, with an average size between 2.7 and 7.2 ha. Farms in Germany, France and UK are rather big, while the Netherlands is somewhere in between. An exception is Slovakia, with an average farm size of 306 ha. Farm size creates interesting opportunities for comparison. A question is to what extent farm size influences efficiency and importance of farming in the food production chain (comparing different farm size), and what type of additional activities are undertaken in different countries or regions (comparing similar farm size.).

In all countries the share in value added (contribution to GDP) is smaller than the share in total employment, except for Bulgaria. This implies that in most cases farmers' primary income is lower than income in other sectors of the economy. The ratio employment share/GDP share for these countries is as follows: Poland 5.7; Romania 3.4; Lithuania 2.6; Greece 2.5; Germany 2.3; Italy 1.8; France 1.7; UK 1.7; Slovakia 1.5; Netherlands 1.5; Bulgaria 0.8. The general tendency is that the higher GDP per capita, the lower the share of the labour force working in agriculture. Thus, there is a great challenge for countries such as Poland and Lithuania, with 19–20% of the labour force working in agriculture. On one hand agricultural income should increase, which is likely to be accompanied by a decrease in employment. However, if no new jobs are created, rural unemployment, which certainly is a huge problem in Poland, increases, leading to poverty and stimulating migration to urban areas. Thus, the creation of outside agricultural jobs or agriculture related jobs, *e.g.* in food processing or provision of logistics services, should be taken into consideration in agricultural development policies.

Table 1. The agricultural sector in selected EU countries + Bulgaria and Romania

Country	Agricultural area (% of total), 2001	Average farm size (ha), 1997	Gross value added (% of GDP), 2000[1]	Agric employment (% of total), 2000[1]	Trade of agric products, 20002		Bilateral trade (CC's-EU15 & EU15-CC's), 2000		Food expenditure (% of total, 1999)
					% of total exp.	% of total imp.	% of agric exp.	% of agric imp.	
Poland	58.8	7.2[c]	3.3	18.8	8.4	6.7	44.5	53.9	29.5
Lithuania	53.4	7.0[d]	7.5	19.6	11.4	10.5	35.4	41.9	39.8
Slovakia	49.8	306.0[d]	4.5	6.7	3.5	6.4	22.8	40.1	31.8[a]
Bulgaria	49.5	4.7[c]	14.5	11.3[b]	10.5	6.2	33.5	46.6	53.3[a]
Romania	62.4	2.7[a]	12.6	42.8[b]	3.6	7.6	48.6	33.8	58.0[a]
Germany	47.8[c]	32.1	1.1	2.5	3.1	4.8	23.8	19.8	15.7
Greece	29.6	4.3	6.7	16.7	20.4	4.7	39.1	17.9	21.3
France	54.2[c]	41.7	2.6	4.4	8.4	4.4	5.2	6.7	17.8
Italy	51.5[c]	6.4	2.6	4.8	5.0	6.2	12.0	11.1	17.5
Netherlands	47.6	18.8	2.4	3.5	16.3	8.7	11.8	4.8	14.8
UK	64.4[c]	69.3	0.9	1.5	5.2	5.2	7.7	4.7	17.6

[1] Forestry, hunting and fishing included; [2] All agricultural products, excluding fish and fish products; [a] 1998; [b] 1999; [c] 2000; [d] 2001

Source: European Commission, 2002, 75. Except average farm size – source: EU – Eurostat, 2002.

Agricultural products play an important role in the export of poorer countries such as Poland, Lithuania, Bulgaria and Greece. These countries tend to be more reliant on trade between the "old" EU-15 and Central and Eastern European Countries (CCs). For these countries EU accession may be a real opportunity to improve the standard of living for people involved in the agricultural sector. With regards to the share of agricultural products in exports, the Netherlands is an exception (16.3%). This is related with, among other things, advanced technology and logistics in what may be called "industrialised agriculture".

Finally, it may be argued that the development of the agro-food sector is of more importance for former socialist countries than for more developed countries of the EU. Not only many structural changes are taking place in this sector, but also household expenditure on food products is relatively high. When the economy grows, the agricultural sector is likely to lag behind, as the income elasticity of demand for food products is rather low. However, the income elasticity in former socialist countries is likely to be higher than in richer EU countries, thus this may create opportunities for the agricultural sectors. In this respect learning from Western experience may be invaluable. This also means preventing mistakes that have been made.

3. The agro-food system

In order to define the agro-food system and look at urban-rural relations, analysing the logistic production and distribution chain for food products may be a useful approach. As Yakovleva and Flynn [2004a] argue, food production and consumption, like the other sectors of the economy, are globalising. More and more emphasis is on industrialised food processing and mass production and consumption. These factors certainly influence the functioning of local agro-food systems, and determine opportunities for their sustainable development.

Besides the globalisation process and the industrialisation of food processing, a change in the following factors heavily influences sustainability in food production and consumption [Green et al., 2001]: environmental issues in food production and distribution, economic development, household consumption patterns and technology.

Analysing the agro-food logistics chain from a system point of view, as Yakovleva and Flynn [2004a] argue, is important, as a change in one part of the system has a positive or negative impact on another part of the system. This makes it attractive to combine an analysis of the logistics chain with theories of New Institutional Economics (NIE) and other system approaches [see Meadows, 1999; Platje, 2004a, 2004b]. For exam-

ple, a change in technology not only influences the production efficiency of one producer, but also influences the cost structure of firms further on in the logistics chain, while it may influence the demand for products from an earlier stage in the logistics chain. Furthermore, technological change may influence social structures, culture, organisational structures and create the need for *e.g.* a new legal framework.

Innovations are an example of a change in the agro-food logistics chain. Very often this takes the form of new food products [Steward-Knox and Mitchell, 2003]. Most commonly this happens in the following areas [Earle, 1997, mentioned in Yakovleva and Flynn, 2004a, 12]: food ingredients and food processing; formulated foods and food manufacturing; fresh foods and distribution; packaging; retailing; food quality, including nutrition and safety. Improvements and changes analysed from the point of view of NIE, eventually in combination with the innovations mentioned before, may be in the field of incentives and transaction costs, property rights structure, investment in infrastructure / equipment, information, governance, social capital, etc. This may be of crucial importance, as for sustainable development it may be relevant to improve the situation at the beginning of the logistics chain (*e.g.* rural areas, agricultural production), while the institutional structure and organisational structures result in benefits being reaped at the end of the logistics chain (*e.g.* urban areas, final food processing, distribution).

Supply chains for food products differ according to food product. In order to analyse agro-food systems, logistics chains of different food products should be analysed. Table 2 presents the supply chain for potatoes in the UK [Yakovleva and Flynn, 2004a]. This table creates a good basis for further research on agro-food systems. The stages that can be distinguished in the supply chain are: origin of resource, agricultural production, primary processing, further processing, final manufacturing, wholesale, retail, food service, consumers, waste disposal, suppliers and regulators and policy makers. The level of vertical integration and the length of the supply chain depends on the product. For example, the supply chain for chickens in the UK is shorter than the supply chain for potatoes [Yakovleva and Flynn, 2004b]. At each stage of the supply chain stakeholders can be identified, who not only are a source of information, but are also important for identifying priorities in sustainable development and identifying potential problems with introducing change. The data collection method to be used, interviews, reports or survey, depends on the stage in the logistic chain and the type of stakeholder involved. For analysing local agro-food systems, national and regional data should be collected, in order to identify the dependence of the local production system on other regions. Initial data required before a comparative

Table 2. An agro-food supply chain – stages, stakeholders, methods of data collection, data required, area of production activity

Supply chain stage	Informants/ stakeholders	Date collection method	Geographical scale	Initial data required	Area of production activity
Origin of resource	NGOs Seed companies	Interviews, Reports	National, Local National, Local		Rural
Agricultural production	Farmers Agricultural companies Trade associations	Interviews, Reports, Survey	Local National, Local National, Local	Output: types and amounts of products Location Area covered Market structure (no. of enterprises, market share) Property rights structure Value added Import / export Share in sector output Employment and income Institutional environment: e.g. quality requirements and enforcement Infrastructure Environmental impact Awareness	Rural
Primary processing	Packers Processing companies Trade associations	Interviews, Survey, Reports	International, National, Local National, Local National, Local		Rural / Urban
Further processing	Processing companies Trade associations	Interviews, Survey	International, National, Local National, Local		Rural / Urban

Table 2. Cont.

Supply chain stage	Informants/ stakeholders	Date collection method	Geographical scale	Initial data required	Area of production activity
Further processing	Processing companies Trade associations	Interviews, Survey	International, National, Local National, Local		Rural / Urban
Final manufacturing	Processing companies Trade associations	Interviews, Survey	National, Local National, Local	Output: types and amounts of processed products Location Market structure (no. of enterprises, market share) Property rights structure Value addedImport / export Share in sector output Employment and income Institutional environment: e.g. quality requirements and enforcement Infrastructure Environmental impact Awareness	Rural / Urban
Wholesale	Merchants Wholesalers	Interviews, Survey	National, Local National, Local		Mostly urban
Retail	Large supermarkets Other supermarkets Greengrocers Local markets	Interviews, Reports, Survey	National, Local National, Local National, Local National, Local		Mostly urban

Table 2. Cont.

Supply chain stage	Informants/ stakeholders	Date collection method	Geographical scale	Initial data required	Area of production activity
Food service	Fast food restaurants Takeaways Restaurants Catering companies Public procurement: National Health Care, Defence, Schools, Criminal Justice System	Interviews, Reports, Survey	National, Local National, Local National, Local National, Local National, Local	Output: types and amounts of processed products Location Market structure (no. of enterprises, market share) Property rights structure Value addedImport/export Share in sector output Employment and incomeInstitutional environment: e.g. quality requirements and enforcement Environmental impact Awareness	Mostly urban
Consumers	Consumer associations Consumers	Interviews, Reports, Survey	National, Local National, Local	Household expenditure on products Per capita consumption (e.g. weight) Location of consumption No. of microwaves, ovens, freezers, etc. Level of awareness on food consumption Environmental impact	Mostly urban
Waste disposal	Waste companies Trade associations	Interviews, Reports, Survey	National, Local National, Local		Rural/ Urban
Suppliers	Equipment providers Packaging providers	Interviews, Reports, Survey	National, Local National, Local		Mostly urban

Table 2. Cont.

Supply chain stage	Informants/ stakeholders	Date collection method	Geographical scale	Initial data required	Area of production activity
Regulators and policy makers	EU agencies National agencies Local government	Interviews, Reports	EU, National, Local		Mostly urban located

Source: First four column adapted from: Yakovleva and Flynn, 2004a, 16. Last two columns: Joost Platje.

study between different regions can be really developed may depend on the stage in the supply chain. Here some data required, besides general economic data about the region, are identified for agricultural production, final manufacturing, food service and consumers. Some initial data required for agricultural production are: types and amount of products produced, location, area covered, market structure, property rights structure, value added, import/export, share in sector output, employment and income, institutional environment – *e.g.* quality requirements and enforcement, infrastructure, environmental impact and awareness of stakeholders. The data can help to identify which part of the supply chain is rather rural based and which part rather urban based.

Yakovleva and Flynn [2004a; 2004b] come to very interesting findings regarding the logistics chain for potatoes and chickens in the UK, which are relevant for studying the agro-food system as a factor of local sustainable development. Following Raynaud et al. [2005], vertical integration may be the result of uncertainty regarding quality delivered by participants in the logistics chain, *e.g.* the quality of potatoes used as inputs for potato chips. Or, as Yakovleva and Flynn [2004a] argue, large potato processors may sub-contract potato growers in order to guarantee the variety, quality, shape and size of the potatoes. This may be beneficial to potato growers as an increase in income and income stability may be the result, due to stable demand. However, it may be difficult to sell such potatoes to other firms, when they do not fulfil the requirements set by the potato processor. The potato grower has made transaction-specific investments, as there are few large potato processors potentially interested in such potatoes. Thus, there is a risk that when a harvested potato does not fulfil the standards, the potato is sold as animal fodder, significantly reducing income. "This situation therefore puts potato growers under enormous pressure to perform at their best and to establish long-term relationships with their customers. Thus, the specialisation in potato varieties favours large potato growers, while small potato growers are ceasing to exist. [Yakovleva and Flynn, 35]."

Yakovleva and Flynn [2004a; 2004b] argue that while in the UK the chicken supply chain is very integrated (a rather oligopolistic market structure) and many stages of processing are becoming even more integrated, the potato supply chain is also becoming more and more integrated. For example, potato packers are starting to contract farmers and sell to selected retailers. Retail trade of chickens and potatoes (almost 80%) is mainly in the hands of large supermarkets. Thus, they can be expected to obtain a large part of the total value added created in the potato supply chain. It is interesting is to compare this development with development in a country such as Poland, where since the beginning of

the 1990s many small retailers have appeared, while large supermarkets only started appearing in the second half of the 1990s. The potato trade is becoming more and more international, which increases the demand for transport with all its negative environmental effects. In the UK more and more processed food is being consumed, which is also likely to happen in former socialist countries when consumer income increases. This is important for decisions on where to invest in new production technology. In order for investment to stimulate local sustainable development, besides institutional issues, a deeper analysis of market structures and the creation of value added is required, especially as "[o]ver time, the leading innovators have moved from earlier stages of the supply chains to the latter stages of the supply chains [2004b, 32]."

4. Concluding remarks – some conditions and criteria for a comparative study

In this article, some theoretical issues of comparing urban and rural agro-food systems as a factor of local sustainable development in different regions have been discussed. In the discussion of general information on the agricultural sector some important points appeared. It may be interesting to research the influence of farm size on farming efficiency and its position in the food supply chain. This should be analysed within the context of existing additional activities and potential for creating non-agricultural jobs and jobs in food processing and logistics services. The larger income share spent on food products in former socialist countries implies that the opportunities for the agro-food sector to contribute to economic development are relatively larger than in more developed EU countries.

Analysis of the food production and distribution system, accompanied by an institutional analysis and other system approaches, seems to be useful in defining the agro-food system and finding urban-rural relations. It can be observed that most of the value added is created at the end of the logistics chain (advanced food-processing, distribution), which is rather urban focused, while for sustainable development improvement at the beginning of the logistics chain, which is more rural based, may be required. In such a case analysis of institutional mechanisms that can stimulate rural sustainable development is useful.

Before starting a comparative study on agro-food systems, it is necessary to collect general data in order to show the local, national and global relations in the system. Types of information to be collected are: product, production, location, market structure, system of property

rights, value added, import, export, employment and income, institutional environment, infrastructure, environmental impact, awareness and interests of stakeholders and identification or urban and rural based activities in the logistics chain. This information may be used to create or adapt a Geographical Information System and an institutional map of different regions. A Geographical Information System facilitates the identification of the origin and final destination of products and, as a result, the analysis of urban-rural links in the agro-food system, while an institutional map facilitates the development of effective development and investment strategies.

There are some general issues to be resolved. First of all, it is necessary to define urban and rural areas. Secondly, the products for analysis have to be chosen. These should be agricultural products that are of economic relevance to the local economy of most or all regions to be compared, while a variety of products is needed to analyse different aspects of agro-food systems. Thirdly, the question of which regions we can compare has to be answered. For analysing urban-rural links, can we compare *e.g.* small urban areas such as Opole in Poland or Kaunas in Lithuania with large urban areas such as Kiev in Ukraine, Paris in France or Hamburg in Germany? Selection of regions should be based on the initial data collected. Besides analysing regions which are similar, it may be interesting to analyse different types of regions in order to research to what extent processes of globalisation are of importance for the respective agro-food system or agro-food logistic chain. It also may provide information on to what extent rural areas may gain or lose from their relation with urban areas.

Literature

Earle, M.D., "Innovation in the Food Industry", *Trends in Food Science & Technology*, 8(5), pp. 166–175, 1997.

EU – Eurostat, *CEEC – Agricultural Situation in the Candidate Countries – country reports*. Brussels: European Commission, Directorate General for Agriculture, 2002.

European Commission, Directorate General for Agriculture, *Analysis of the Impact on Agricultural Markets and Incomes of EU Enlargement to the CEECs*. Brussels, 2002.

Green, K., Harvey, M., McMeekin, A., "Transformation in Food Production and Consumption", *Paper presented to IHDP Open Science Conference*, Rio de Janeiro, October 2001.

Platje, J., *Institutional Change and Poland's Economic Performance since the 1970s – incentives and transaction costs*. Wrocław: CL Consulting i Logistyka, 2004a.

Platje, J., 2004b, "An Analysis of Trends and Requirements for the Development of Sustainable Agriculture in Poland", in: Leal Filho, W. (ed.), *Ecological Agriculture and Rural Development in Central and Eastern Europe – NATO Science Series V: Science and Technology Policy, Vol. 44*, pp. 15–37. Amsterdam: IOS Press, 2004b.

Raynaud, E., Sauvee, L., Valceschini, E., *Alignment between Quality Enforcement Devices and Governance Structures in the Agro-food Vertical Chains*, Forthcoming in Journal of

Management and Governance, URL: atom.univ-paris1.fr/documents/ Raynaud_al2005_AlignmentQualEnforc_GS_.pdf, accessed on 03-04-2005, 2005.

Yakovleva, N., Flynn, A., "The Food Supply Chain and Innovation: a case study of potatoes", *Working Paper Series No. 15*, The Centre for Business Relationships Accountability, Sustainability and Society, Cardiff University, URL: http://www.brass.cf.ac.uk/brasspublications.html, accessed on 23 March 2005, 2004a.

Yakovleva, N., Flynn, A., "Innovation and the Food Supply Chain: a case study of chicken", *Working Paper Series No. 20*, The Centre for Business Relationships Accountability, Sustainability and Society, Cardiff University, URL: http://www.brass.cf.ac.uk/brasspublications.html, accessed on 23 March 2005, 2004b.