

## **Regional interactions of bioenergy utilization**

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### **SUMMARY**

The backwardness of the rural areas compared to the cities poses a problem all over Europe. In Hungary, a relatively small size of the population lives in the capital, more than 80% of Hungarians live in rural cities or villages. The tension between the countryside and the cities is rather intensified and the symbiotic correlation would need to be restored. Many people migrate from the countryside, especially young adults, as they have no opportunities to find a job in their hometowns. This phenomenon poses big risks because getting a job is usually difficult everywhere and because fitting into a new environment always involves a lot of difficulties.

Non-renewable energies are restricted and they will not be accessible after reaching a certain limit. People's everyday activities and the functioning of the economy presuppose the availability of the necessary amount of energy. In the future, a solution that provides the long-term stability of energy for the world will become increasingly necessary. There is a huge potential in bioenergy, more specifically in biomass. The building of biomass plants and putting them into operation creates jobs in the rural spatial environments: a locally available resource that can help in creating the energy safety of the country and the reduction of the dependence on import. The production of energy crops or the crops whose purpose of use is energy could help in strengthening the multifunctional character of agriculture and it can represent a source of income for those living off agriculture under the current uncertain conditions.

### **INTRODUCTION**

The population in Hungary – after years of steady decrease – was 10 096 000 people on 1st January 2005, and 10 077 000 a year later, in 2006. In accordance with the delimitation criteria applied in previous programs of the rural areas (unfavorable demographic circumstances and age structure, economic – infrastructural backwardness), 87% of Hungary's area was considered to be rural in 2003, where 47% of the population lives – in 96% of the settlements. These areas can be characterized by lower population density, mainly agricultural landscape use and non-urban settlement structure (village, small town or farm-like in certain regions) (New Hungary Rural Development Program, 2007).

Due to the centralized energy distribution, rural areas are in a rather exposed situation. In Hungary, there are still few local initiations within which the base material for energy production is produced locally and the energy needed to cover the needs is also locally produced.

Energy production can be considered safe if the energy needed by the range of consumers to satisfy their substantiated energy needs is available in the necessary quantity and quality at an acceptable risk level. The safety of supply basically depends on two things: the undisturbed functioning of each subsystem of the supply chain and the availability of the energy resources themselves (Gács et. al, 2006).

### **RENEWABLE ENERGY RESOURCES, BIOENERGY**

Carbohydrates (crude oil, natural gas) have a leading role in the world's energy economy. Crude oil is also a strategic energy resource, since many economic leader countries depend on it. Among others, the reasons for the quick increase of carbohydrate use and their leading role in the world's energy balance are its versatile utilization and the simplicity of its transfer (Magda, 2001).

Crude oil is of significant importance in Hungary and it is expected to be in the upcoming years as well. The role of import is continuously increasing. The highest import sources for Hungary are mainly the former Central-Asian member states of the Soviet Union (CIS) by direct pipeline connection and the Arabian countries by sea transport. Crude oil has the highest share among the basic energy resources, it has nearly 40% share in the energy sector, as a result of the developments carried out in the recent period. The needs can only be met by importing crude oil. As of current, the majority of import is from Russia (Matolcsy, 2001).

The quantity of the previously mentioned fossil energy resources is not endless, in a few decades, the developed and developing societies will not be able to operate their economies based on these resources at this safety level. In the future, other resources will also be needed.

The term 'renewable energy resource' is the common name of energy resources that are reproduced in a typical period of time and they can be used up without the risk of exhaustion (Magyar Lexikon, 2001).

Of the renewable energy resources, biomass is one of the most complex, versatile and also the most controversial resources. One reason for this phenomenon is that the range of base material used for energy production; therefore, the range of energy production technologies is rather wide (Kazai, 2008).

Biomass is the entirety of organic matter present in a certain niche at a given point of time (Barótfi, 1998).

The production and utilization of renewable energy resources is still at a significantly lower level than that of fossil energy resources in worldwide comparison. Of renewable resources, biomass has the highest importance, as the potential of green energy is rather high (Lukács, 2009).

Land use in Hungary is continuously changing (Kohlheb, 2003). If we do not want to overproduce or face masses becoming unemployed due uncultivated lands, then a change is needed in the agricultural structure (Szendrei, 2005). In Hungary, the profitability of growing traditional crops on several hundred thousand hectares is difficult to guarantee with the current subsidization system (Gyuricza, 2009).

The natural endowments of Hungary are very good for biomass feedstock production. 50-60% of the country's area is suitable for agricultural activities and production. The production of biomass energy can be performed both with herbaceous and woody crops (Janzing B. 2001). The energetic utilization of biomass gives a chance to settlements to ease their increased dependence and to learn how to exploit their local endowments (Új utak a mezőgazdaságban, 2005).

The development of a decentralized energy structure based on biomass could greatly contribute to the reduction of the rather high (more than 70%) import dependence. Within energy production, the increase of the ratio of renewable energy resources is of special importance from the aspect of the diversification of agriculture and forestry production and the improvement of the profitability that it could contribute to. It is important to enable agricultural producers and rural regions to succeed in the biomass-based bioenergy sector that is expected to be developed in the near future, as well as to help feedstock producers to appear on the market with products that provide higher income, thereby they could directly benefit from the profits (New Hungary Rural Development Program, 2007).

The Hungarian agriculture has great potential in the energetic utilization of biomass, as it can significantly contribute to the reduction of employment tension that resulted from the structural changes, as well as to the preservation and extension of rural employment opportunities and the fulfillment of environmental protection commitments. In order to achieve all these, we have to carry out a synchronized series of measures that consist of providing investments subsidizations, targeted research and development and an integrated knowledge transfer and awareness raising program (Fogarassy, 2006).

Increased attention is paid to the social effects caused by the utilization renewable energy resources, as well as the regional dimensions and the rural development-related effects of the extension of alternative energy resources. From the aspect of the reduction of regional differences and the alignment of undeveloped rural areas, this sector could be of crucial importance, since natural endowments are the most favorable for the implementation of bioenergetic programs especially in the traditionally less favored regions of the Great Hungarian Plain (Baranyi, 2010).

## **RURAL DEVELOPMENT**

Similarly to Hungary, in the other nations of the European Union, there are many uncertainties about what one considers and what one should consider to be rural development. In Hungary, this phrase was introduced only a few years ago, whereas its English counterpart is not older than a few decades either. Throughout this relatively short period of time, several approaches were developed (Nemes, 2000). Rural areas cannot be clearly and universally defined; therefore, it is almost impossible to find proper indexes to determine its concept (Kovács, 2003).

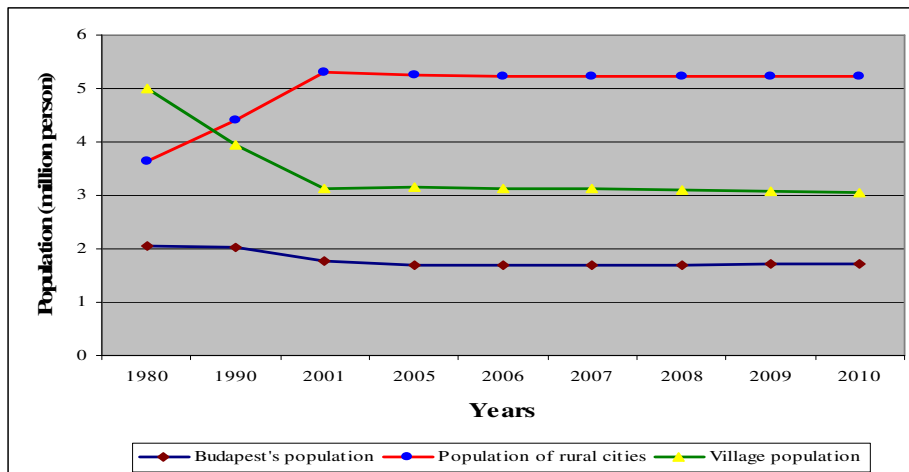
One can find several definitions of the concept of rural areas and rural regions. Both in the other nations of the European Union and in Hungary, there are efforts to create a comprehensive concept with a wide spectrum that involves the widest range of activities. The advantage and main reason for this effort is that they do not want to narrow down the range of rural development programs to come that is they want to avoid the situation when something cannot be subsidized due to the fact that it does not belong to rural development (Buday-Sántha, 2001).

In the Cork Declaration (1996), the European Union formulated the basic principles of its rural development policies, i.e. complex rural development has priority in the EU. Diversification is necessary in economic and social activities. During developments, attention has to be paid to the difference of rural areas and rural development has to protect the quality and beauty of European rural landscapes by all means (Dorgai and Miskó, 1999).

In the interpretation of the European Union, areas whose population density is lower than 100 people per km<sup>2</sup> and where the population lives off agriculture, forestry, wildlife management and fishery. More than 56% of the 27 Member States live in rural areas, constituting 91% of the total area of the European Union (II).

Less than 20% of Hungary's population lives in the capital city; the better part of the population lives in rural cities or villages (*Figure 1*).

Figure 1.: The distribution and change of Hungary's population per settlement type



Source: own edition, based on KSH

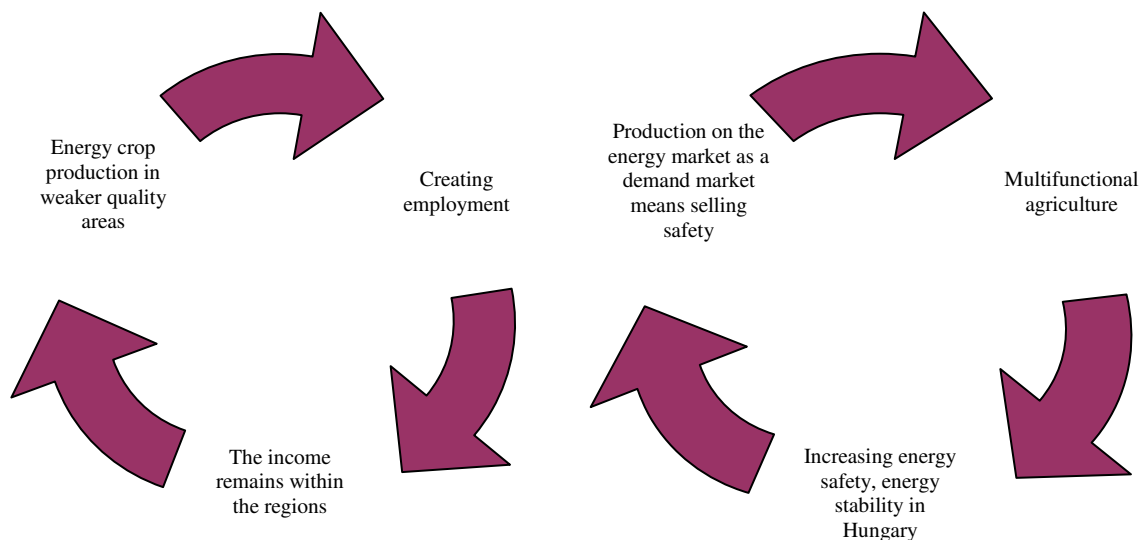
Based on the National Regional Development Concept, rural development is the identification and implementation of programs and investments developed with the participation of the given region's people who effectuate the local endowments based on the evaluation of the social, economic and environmental processes of the provincial areas. It is a complex activity with the aim to assure and improve the living conditions, quality of life and income conditions of the rural population, thereby promoting the subsistence and improvement of the rural society in harmony with the rural environment, the natural and cultural landscape, preserving its recoverable resources and by creating the sustainable development of the rural areas in accordance with the special characteristics and the endowments of the rural areas (National Regional Development Concept, 2005).

Rural development always refers to regions, groups of people and the collective of natural and built environment (Borsos-Nábrádi, 2005).

Currently, the rural population has to face different problems (social, economic, environmental). Rural development measures provide solutions to a part of these problems (National Rural Development Plan, 2004).

The demographic circumstances of the areas in question could be characterized by a low increase in population and the rather unfavorable age composition that shows aging. The number of people in younger age groups decreases. Also, the number of those founding a family and planning to have children is low. In the recent years, the number of those migrating from rural areas increased. A part of the population leaves its place of birth probably due to the lack of employment in hope of finding better ones. The only positive changes were observed in the Central Hungary, Central and Western Transdanubian regions. Those between 18-30 years of age take their chance by leaving the village environment and moving to the surrounding larger cities or the capital.

Figure 2.: Correlations the production and utilization of local biomass



Source: own edition

Rural development can also be interpreted as a collective of different sectors such as industry, agriculture, regional development, energy, tourism and the development of local communities. The main objective would be to make the rural people stay in the rural areas and also to enable them to realize the income and profit within each region (*Figure 2*). The living and working conditions should be established for the population by the sustainable utilization of local resources. If we preserve the cultural and natural values of the rural areas, we will make the rural environment more attractive for not only the people living there, but tourists, too.

The production of crops for energetic purposes would provide alternative subsistence and employment opportunities for the rural population, besides traditional agriculture. The establishment of biomass reactors would represent further opportunities to create jobs and to reduce the energy import dependency of Hungary.

### **CONCLUSIONS, RECOMMENDATIONS**

Complex rural development has a special role in the programs of the European Union. The grant and tendering opportunities are provided for the Member States. A significant amount of the available resources have to be utilized to promote the alignment of the undeveloped regions. Successful rural development also refers to the cooperation of each sector, the interdependence of the development projects to be carried out in the region, the collaboration of local spheres and the development of an active rural society that has a positive prospective for the future.

It is one of the main objectives for Hungary to reduce the migration of people from rural areas, to kick start favorable processes, to combat poverty, to increase employment, job creation and the rural living standard. The harmony of rural development and regional development has to be created. The former symbiotic economic-social interdependence of the rural areas and cities has to be re-established and strengthened.

Energy produced from biomass provides comprehensive and versatile opportunities to treat the current negative characteristics, to reduce and stop the ongoing unfavorable processes. The planned, effective and high quality production of bioenergy feedstock can, on the one hand, provide the economic and safe operation of bioenergy plants in the rural areas and it can also contribute to the maintenance and development of the rural spatial environment, as well as employment; therefore, it significantly contributes to the development of our human and social environment.

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