BULGARIAN AGRICULTURAL POLICY IN RENEWABLE ENERGY SOURCES DEVELOPMENT

Svetla Bachvarova, Nikola Kolev

National Center of Agricultural Sciences, Bulgaria

INTRODUCTION

Important renewable energy sources for Bulgaria are grain and sugar beet production for bio ethanol and bio diesel obtaining, used for transport fuel, and animal production, garbage and agricultural residues for biogas obtaining. The last years the renewable energy sources based on the agricultural production made agriculture multifunctional and that is in context of the Common Agricultural Policy of European Union.

It is known that after changes in the beginning of the 90-ties of the last century and privatization of agricultural lands Bulgarian agriculture lost his intensive development because good working block structure was destroyed of more than 15 millions small parcels. The animal husbandry lost its intensive development and production was down. At present, to determine and implement a policy towards the merger of farms, the Ministry of Agriculture and Food Supply has been drafting a Strategy and a Programme for the Consolidation of Farm Lands which framework has been established by a Concept of Land Consolidation. This concept defines the measures and lays down the road map for future actions in land relations (Annual report of MAF, 2006).

It is well known that the agriculture provides for necessities of human life and society of plant and animal parentage, which is its multifunctionallity and it has big influence over the national economy. More over the agriculture contributes to improvement of economical, social and ecological parameters of the regional development and has been recognized by decision makers as a primary concern to ensure sustainable development and political stability.

PRESENT STATUS OF GRAIN PRODUCTION OF BULGARIA

In the mid-1970s to mid-1980s, Bulgaria became self-sufficient in staple agricultural products and grain production reached to 1100 kg per capita. After 1990 there was a sharp decline in support for agriculture and agricultural science because the Bulgarian policy was not inextricably linked to productive agriculture and research works was not perceived to lead to surpluses in the future. Funding for national agrochemical and sort plant structure services and soil and land survey programs were curtailed or stopped completely in the period 1990-

2001. But now, step by step Bulgarian land survey began and it helped to be organized national system for soil monitoring and land market. Productivity of Bulgarian lands increased but its yield is very dependant of agro climatic conditions and is different from year to year. For example, grain production in 2005 was approximately 5 876 000 tons, a 21 % decrease from 2004, as shown in Table 1.

Table 1

Grain production of Bulgarian agriculture

Crop	Harvested area (hectares)		Output (tons)	
	2004	2005	2004	2005
Wheat	1 039 679	1 101 507	3 961 178	3 478 061
Rye	8 521	8 782	16 976	13 617
Triticale	9 521	8 782	16 976	13 617
Barley	328 924	264 519	1 180 836	657 863
Oats	43 002	30 571	101 486	50 138
Grain corn	383 217	298 713	2 123 022	1 585 701
Rice	5 669	4 501	28 116	20 163

Source: Agrostatistics Directorate, MAFS, 2006.

The acreage under oil crops (sunflower, rape, soya and groundnuts) amounted to 667 000 ha in 2005. It is important to know that the lands under rape increased to 52 650 ha in 2007, compared to 10 993 ha in 2005, as shown in Table 2.

Table 2

Acreage under sunflower and rape

Crop	Acreage (harvested hectares)			
	2004	2005	2006	2007
Sunflower	595 765	635 026	783 859	595 733
Rape	11250	10 993	16 545	84 060

Source: Agrostatistics Directorate, MAFS, 2008.

After the accession of Bulgaria into the European community, based on the registration regime of agricultural land users the areas of non-cultivated lands can decrease rapidly about the fast changes in the situation. There are discussions about the possibilities of using these lands for energy crops growing. That has not only economical but also big social

effect because these lands were distributed in the not well developed economy zones of Bulgaria.

As a result of the last decisions of Bulgarian government to use not less than 5 % of biofuel in fuel for the transport in 2010, there will lead to an intensification of grain production from agricultural lands. Indicative purposes of Bulgarian government are to use 10% biofuel in the fuel for transport in 2020 and that means the energy crop production in 2010 has to increase 3-5 times compared to the level of 2007 and the lands under corn crops to increase and reach 1.5 millions ha. Based on the prognosis of the Ministry of Economy and Energy of Bulgaria the lands under crops for biofuel will reach to 80234 ha and in 20010 – to 256060 ha (MEE-National program for biofuel consumption, 2007). Well known is that in 2005 more than 8-10% of agricultural lands were non cultivated and were unusable for production because the conditions for agricultural activity diminished.

The payment for producers of energy crops will be 45 EURO per hectare and this financial support will urge them to expand the lands with energy crops. There are statistical data of growing of agricultural lands with wheat, maize, barley, sunflower, raps, cotton and peanuts. The last three-four years the lands with rape increased five times.

On the other hand, a very big expansion of energy crop production will disturb the food balance of the country and will raise the prices of important foodstuffs.

We have to mention that Bulgarian government reduced excise duties with 3 % for the biofuel mixes and the account of the Ministry of economy and energy showed an reducing excise about 15 – 20 millions Euro per year by common volume of used fuel in Bulgaria.

The price pressure of the grain market in 2007, the limited sources and decreased reserves led to economic and political pressure. Bulgaria accepted legal measures to ensures the domestic consumption as decreased or removed level customs barriers. The maize market was more tranquil in comparison with the wheat market.

According to Agrimarket system Information Ltd. (SAPI OOD) purchasing of wheat from 2005 crop started at 85 Euro per ton and reached to 102 Euro per ton in June 2006 and 260 Euro per ton in January 2008 (SAPI OOD, 2006; Kostov, 2008).

After rapid increasing of fuel prices in the world market there is rapid increasing of bread wheat and fodder grain prices. In the frame of one year (2007) the prices of maize increased 50-70% and reached to 280 Euro per ton. In a state of an expectation for increased world grain yield in the next season (2008 – 2009) the prices decreased a little , but remained more high than in the same period of 2006 (Kostov, 2008; Konstantinova, 2008).

The prices of grain in Bulgaria reached to the international prices in 2007 and as a member of European Union Bulgaria can not has a policy of export, import and intervention different than it.

ENERGY CROP GROWING CONDITIONS IN BULGARIA

The period 1950-90 was the realy productive period in Bulgaria for land survey and the collection of information about the nature, distribution and properties of soils, land productivity and management, helping us for development of an understanding of the main processes in agriculture and rural society. Collected data and information in this period is now proving so important in helping to find answers to current agricultural, environmental and social problems knowing that one of them is renewable energy sources using and development.

From the geographical, agricultural and ecological points of view, the territory of Bulgaria can be divided into three large areas based on soil resources (Kolchakov, 2000):

1) North Bulgaria soil area, which includes the soils distributed on the Danube plane and the Northern Balkan territories. Chernozems and Grey forest soils are widely presented there. The Northern Bulgaria forest-steppe zone covers the Danube Hilly Plain, the Northern Balkan areas and mountainous highlands up to the altitude of 650-750m, and is characterized with Temperate Continental climate type. The territory is very suitable for wheat, barley, maize, sunflower, sugar beet and rape growing.
2) South Bulgaria soil area, which includes the soils distributed on the territoty of Southern Bulgaria. Cinnamonic forest soils, Smolnitza and Pseudopodzolic soils are presented there. The Southern Bulgarian Xerothermal zone covers the territory of Southern Bulgaria up to the altitude of 750-800m, and is characterized both with Semi-continental climate type and transitional Continental-Mediterranean climate type. The territory is suitable for wheat, barley, sunflower, cotton and sugar beet growing.
3) Mountainous soil area, which includes three main soil groups. Brown forest soils, Mountainous dark soils and Mountainous meaddow soils are mainly presented there. The mountain climate zone covers the altitude over 800 meters. The territory is not suitable for energy plant growing.

Continuous assessment of the soil properties, land degradation status and soil vulnerability and collection of soil and terrain data, are being carried out by the Institute of Soil Science ‘Nikola Poushkarov’, Sofia. By 1988 the soil cover of the entire territory of Bulgaria was mapped at 1:25,000 scale and soil maps at a scale of 1:10,000 cover almost the

entire territory of Bulgaria. Bulgaria has its place in the European digital soil map in scale 1:1 000 000 (Stoichev and Kolchakov, 1998).

The enormous important information about the land resources of Bulgaria is now summarized, estimated and systematized together by the Institute of Soil Science and the Executive Agency 'National Soil Survey Service' to build up a Soil Geographic Information System. Digitalisation to the lowest taxonomic levels of the existing soil maps was an important step in the building up the SGIS, as the reduced version of the digitalized soil map of Bulgaria in scale 1:400 000 shown in Fig.1.

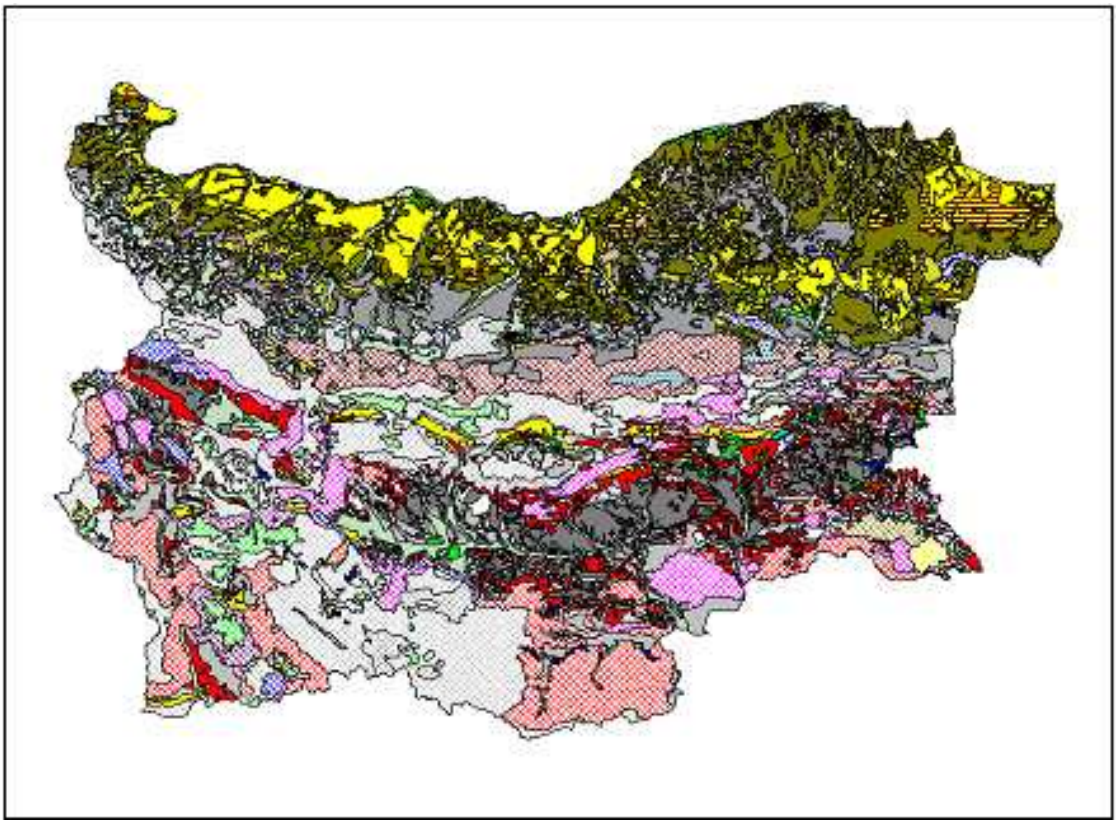

Fig. 1: Reduced version of the digitalized soil map of Bulgaria, based on the soil map (Koinov et al, 1973) in scale 1:400 000.

In the 1950 – 1990 period five cycles of soil fertility testing of agricultural lands have been performed. After 1991 systematic soil mapping and fertility testing was stopped at state level. It is now realized on customer basis for selected farms.

The Ministry of Environment and Water is responsible for protection of the land as a natural resource and there are well-developed procedures for preventive protection of agricultural lands from pollution. The Executive Environmental Agency (EEA) of the

Ministry is responsible for monitoring of the state of lands. The Agency organises and supports monitoring network for air, water and soil resources.

From the beginning of 2006 to the end of 2007 the Institute of Soil Science participated in an European Project titled "Environmental Assessment of Soils for Monitoring", which created common criteria and indicators for soil assessment and grid networks for the monitoring.

With an information about the landscape and climate elements, nutrient contents and different anthropogenic impacts, the Institute of Soil Science, together with other agricultural research institutes of the National Center of Agricultural Sciences, makes possible planning of energy crop growing, organized projects for crop growing, based on land agro ecological potential estimation and predictions of land degradation risks. These work helps the Identification system for administrative management and supervision of agricultural lands, working from the end of 2007 under the Ministry of agriculture and food supply. The purpose of the system is to check and manage farmers registered data of their cultivated lands based on ortho-photo survey. More than 79000 farmers and land rentiers were declare over 3,3 millions ha cultivated lands (Dnevnik, 2008).

BIOGAS RESOURCES IN BULGARIAN AGRICULTURE

The European committee of food safety defined in 2006 that thermomechanical method of biogas production from plant residues, animal and other organic waste mater is an innovation and is human harmless and supported it. This procedure is well described in Regultion N1678/2006 of the European Commission. This regulation for biogas production from plant residues and animal wastes is important for expanding of renewable energy output, which will make the rural economy more independent and flexible and will be an advantage of economy activity of rural regions and will stabilize the life of citizens form these regions.

The input materials for biogas production based on thermomecanical processes are corn silage, liquid manure of pigs and cattle, chicken dung, grass silage, energy grass, vegetable waste, pomace, draff, food waste, kitchen waste, biowaste, old cooking oil, chip fat, flotation sludge, slaughter house waste and others.

Bulgarian agriculture is a resource for biogas production, as shown in Table 3 (Ivanov, 2007). There is well shown from the Fig. 2, that the agriculture in Bulgaria is the main source for biogas. The next two figures (Figs. 3 and 4) show the maps of distribution of liquid and solid waste in Bulgaria (Ivanov, 2007).

Table 3

Agricultural and forest resources for biogas.

Supply sector	Type	Example
Forestry	Dedicated forestry	Short rotation plantations (e.g. willow, poplar, eucalyptus)
	Forestry by-products	Wood blocks, wood chips from thinnings
Agriculture	Dry lignocellulosic energy crops	Herbaceous crops (e.g. miscanthus, reed canarygrass, giant reed)
	Oil, sugar and starch energy crops	Oil seeds for methylesters (e.g. rape seed, sunflower)
		Sugar crops for ethanol (e.g. sugar cane, sweet sorghum)
		Starch crops for ethanol (e.g. maize, wheat)
	Agricultural residues	Straw, prunings from vineyards and fruit trees
	Livestock waste	Wet and dry manure

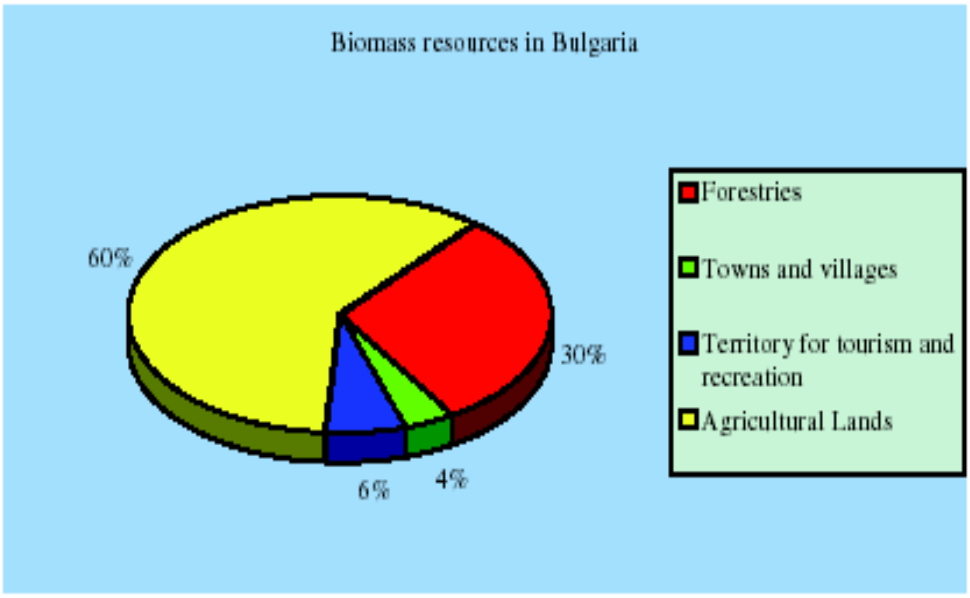

Fig. 2. Biogas resources in Bulgaria (Source: Energoproject, 2007)

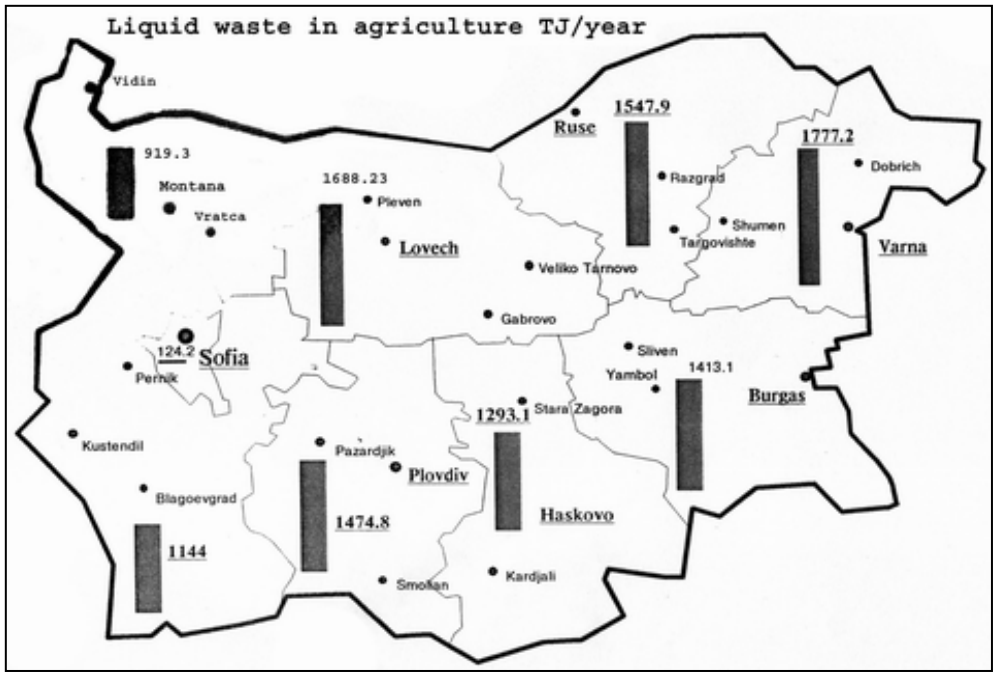

Fig. 3. Bulgarian liquid waste map (Source: Energoproject, 2007)

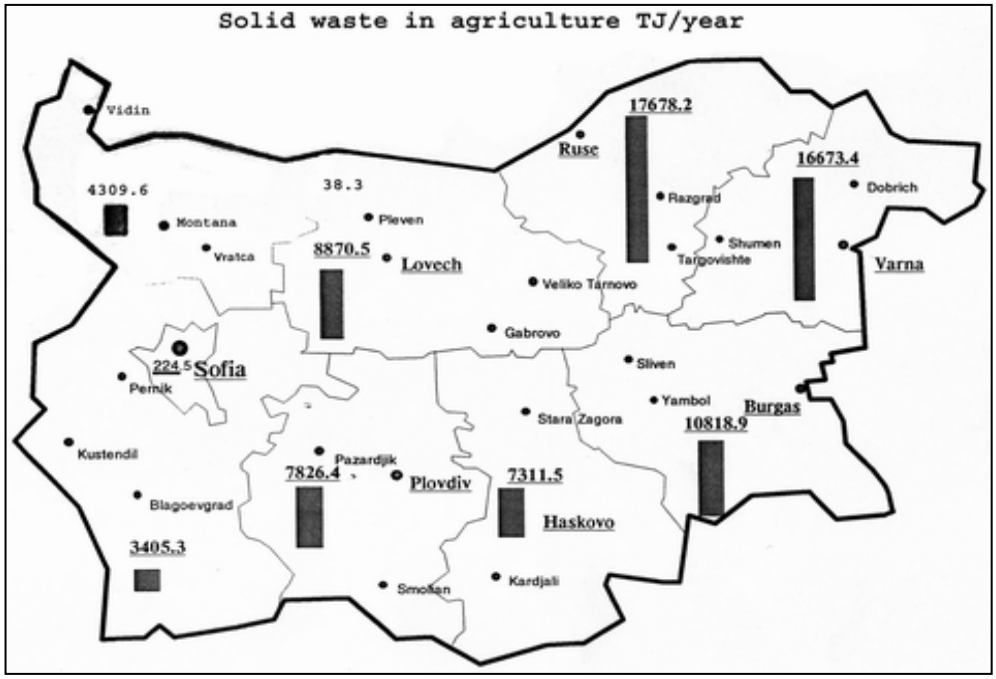

Fig. 4. Bulgarian solid waste map (Source: Energoproject, 2007)

Up to now there is no biogas installation working in Bulgaria and we need a new policy to achieve fast building of biogas installations working with biomass from the agricultural field and from the cattle-breading and poultry farms (Yovcheva et al.,2007). We have to determine the potential impacts on greenhouse gas reduction, employment and environmental issues and to etermine the potential capacity for biogas production and utilization for Bulgaria. We need an exchange of experiences and knowledge with expert

countries and we plan preparation of training events and promotion campaigns. There is an international project, titled “BIG-East”, leaded by German experts, which will organize training courses for planning and constructing biogas plants based on agricultural resources for Bulgarian farmers and specialists.

CONCLUSIONS

There is biogas production potential in Bulgaria, but there are no existing biogas installations at the moment. We expect that the development of the renewable energy expansion particularly in the years 2008 to 2010 will affect by an intensive construction phase of new biogas plants since commencement of the Regulation N1628/2006 of EC.

Analysis of the driving forces and the current state of land resources in Bulgaria shows that the agro ecological potential of agricultural lands is enough for covering indicative purpose of Bulgarian government to use not less than 5 % of biofuel in fuel for the transport in 2010 and 10 % in 2020, which will lead to an intensification of grain production from agricultural lands. It is important that large territories of the country are with high soil productivity. Further improvements of the legislation, the national systems of soil and agrochemical monitoring, and advisory service are the fundament for developing the national policy and strategy for sustainable land use and increase of energy crop production.

Development of national and regional programs for introducing and stimulating environmentally agricultural practice will result in a grow of renewable energy agricultural resources and the land productivity potential.

The authors note that there are good governmental policy and agroecologucal and climatic conditions for expanding of energy crop production and biogas sources and submit ways for their realization. There are three directions of agricultural production policy as source of renewable energy: increasing of energy crop growing lands, implementing of new high productivity sorts of energy crops and active using of liquid and solid waste from animal farms for biogas production.

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