

# Barriers to energy crops in Poland – from the farmers’ perspective

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## Abstract

With the recent expansions of the European Union, there are now 12 new member states that are implementing European policy. One of these policies, with implications for energy production and security, is the Common Agricultural Policy. This article will focus on the impact the Common Agricultural Policy can have on farmers in Poland who have been encouraged by calls to cultivate energy crops. In addition, this article investigates the barriers recognized by farmers in Poland to cultivating energy crops, willow in particular. The identified barriers were grouped into four categories: financial, informational, organisational, and market factors. It was also observed that levels of subsidies for energy crops differ between established member states (EU15) and new member states. Finally, this article discusses how small farmers can create cooperative links and find markets for energy products as one possible step towards increasing Poland’s renewable energy production.

*Keywords:* bioenergy, energy crops, Poland, Common Agricultural Policy.

## 1 Introduction and background

The European Union (EU) has continued to grow over the decades since its birth in 1957. The largest wave of new entrants came in 2004, with 10 new members, including Poland. With this expansion, there are now a number of new member states that are incorporating European policy into their national policies. One of these policies, with implications for energy production and security, is the



Common Agricultural Policy (CAP). Over 40% of Europe is classified as farmland, and falls under the domain of the CAP. This policy is one of the key policy tools within the EU, responsible for half of the EU budget. The EU has also developed an action plan to promote bioenergy in Europe. The Biomass Action Plan for Europe defines how to accelerate the development of bioenergy from agricultural residues, forestry residues, waste streams and energy crops, in order to generate heat, electricity and biofuels for transport [1].

## 2 Implications of the CAP for energy production and security

The CAP is an EU wide agricultural policy adopted by all its Member States. In 2003 the CAP was reformed in terms of the support schemes provided to EU farmers. The CAP reform decoupled subsidies from the production volume and the type of crop cultivated. After the CAP reform farmers can produce according to market demands, provided that it is profitable for the farmers in terms of knowledge, experience, availability of equipment and that the agro-climatic conditions support it [2, 3].

With the accession of the 10 New Member States to the EU in 2004, the utilised agricultural area increased by 30%. The new agricultural policy is continuing to bring along significant modernisation and restructuring of farming to these states. Not all the CAP mechanisms entered into force immediately for the New Member States. On the one hand, farmers received immediate access to the EU single market but on the other hand the direct payments are only phased-in gradually over 10 years, having started from 25% of the EU rate in 2004 and reaching the same rate with the EU-15 countries in 2013. There is also a possibility to “top-up” the EU payments with complementary national payments under certain conditions in order to bridge the difference [4].

Under the CAP reform 2003, there are two methods for receiving support for energy crop cultivation by farmers. The first one is the energy crop aid which is additional to the Single Payment Scheme (SPS). The energy crop aid is 45 €/ha (with a maximum guaranteed area of 1 500 000 ha as a budgetary ceiling) for all crops produced for energy purposes on agricultural land. This system is eligible for the EU15. The second method is the pre-reform system of receiving support for cultivating non-food crops on set-aside land within the SPS continues to operate, but so far only two of the 10 New Member States Slovenia and Malta have adopted the SPS [5]. Support conditions and rates for energy crop cultivation currently differ for New Member States due to the adopted temporary payment schemes (e.g. Single Area Payment Scheme) and crop specific direct payments under CAP.

## 3 Energy policy and bioenergy goals in Poland

Today, most of Poland's energy needs are met by producing energy from fossil fuels, such as, hard coal and lignite [6, 7]. The most recent available data from 2004, indicates that 4.71% of primary energy was from renewable energy and 95% of renewable energy was based on bioenergy in Poland [7]. Poland, as a



new member of the EU, has had to develop its legal system in line with EU legislation. The introduced “green electricity” obligation acts as the main driver for bioenergy development for power, and Combined Heat and Power (CHP) plants.

In the Polish context the main driver for renewable energy is the EC directive on electricity from RES (2001/77/EC) and consequently the “green” electricity quota implemented by the Polish Government for utilities distributing electricity to the final consumer [7, 8]. Based on the requirements set forth in the “green” electricity directive, the Polish Government has formulated an indicative target of 10.4% by 2010 of energy from renewable energy sources in the sales of electricity to final customers (Ministry of Economy, 2006). The share of electricity from biomass is estimated to be more than a half of that by 2010. No specific target regarding different sources of biomass, including energy crops, has been set in Poland. However, neither on the European nor on the Polish level is there a direct obligation for heat production from renewable energy sources. Yet, small and medium sized applications for generating heat seem to be promising in terms of biomass use in Poland [7].

In Poland, there is now strong competition among different actors for biomass resources. The energy sector, driven by the “green electricity” obligation, has entered the wood market as a strong actor. This has resulted in competition for wood supply between the industrial sector of pulp and paper and fibre boards and the heat and electricity sector. Due to the fact that that biomass co-firing with coal is the most viable option in the short-term for Poland, large power plants are interested in large amounts of wood fuel with moderate demands for quality, which can be co-fired in the existing boilers. However, forestry residues, as well as the by-products of wood processing industries, are used up by the industries themselves and there is no significant surplus available (ITD, 2002). Therefore the search for alternative biomass sources has been directed towards the agricultural sector. In Poland, there is an abundance of agricultural land and a need for extra income sources in rural areas and increased employment opportunities. Two main biomass sources, agricultural residues and dedicated energy crops, are being considered by many energy companies. Agricultural residues, such as straw, are a readily available biofuel. However, straw has a low calorific value, which means the combustion process is difficult. In addition, part of it needs to be ploughed back into the field in order to ensure soil health and quality. In the long term, the greatest potential for Polish bioenergy has been identified as dedicated energy crops, such as willow.

From those observations, it can therefore be concluded that there is a need for the development of alternative sources of biomass such as, for example, dedicated energy crops, in order to fulfil the Renewable Energy (RE) obligation at power and CHP plants in Poland. Although, in the short term, agricultural residues, forestry residues and forestry fuel wood have the highest potential, energy crops are estimated to gain significance in the mid and long term [9]. Immediate action to develop perennial energy crops should be taken, since the time from establishing a plantation and harvesting the first crop is considerable. For willow, the first harvest will happen 4-6 years after planting [10].



In Poland, there is great agronomic potential for biomass from energy crops, but at the moment the availability of energy crop resources is limited. It is believed that Poland is especially suited to energy crop cultivation due to large areas of agricultural land, relatively high unemployment rate in rural areas and need for alternative sources of income. The most suitable crops for energy purposes in Poland are believed to be willow and *Miscanthus* [11]. At the moment, the size of willow plantations used for energy production reaches 7000 ha, there is also 3 ha of *Rosa multiflora* being grown experimentally [12]. Willow growing areas are located mainly in central and northern Poland. It is estimated that 1 million ha of extensively used meadows and pastures and 1.4 million ha of set-aside land could be used in Poland for energy crops cultivation, especially willow [13].

#### 4 Impact of the CAP on farmers in Poland

In 2005, the area of agricultural land in use in Poland was 15.9 Mha [14], constituting almost half of the total area of 31 Mha. In Poland 39% of the total population lives in rural areas and 17% of the labour force is involved in agriculture. These figures are very high with respect to the EU15 average of 4% [15, 16]. As such, agriculture forms a significant sector in Poland. There are about 1.8 million farms exceeding 1 ha [17]. The average farm size is about 7.6 ha, 94% of all agricultural land is privately owned. The majority of farms (88%) are family owned and run, while cooperatives and private companies are uncommon; collective farms were not very common in Poland during the Soviet time. The productivity of agricultural land in Poland is rather low because of traditional farming methods and the moderate use of machinery. The proportion of subsistence and semi-subsistence farming is still relatively high. The most widely grown crops in Poland are wheat, sugar beets and potatoes [17].

As a result of the EU accession negotiations, Poland has implemented a mixed CAP system which means that the agricultural sector will be eligible for support from the EU as well as from Polish Government funds [18]. Poland has adopted the Single Area Payment Scheme (SAPS) and as a New Member State is eligible to the gradually increasing financial support from the EU [19]. Polish farmers can apply for SAPS (Support and Supplemental Direct Payments). Under SAPS all arable land (over 0.1 ha) is eligible for support of approximately € 73/ha (2006). However, this scheme does not include energy crops [20]. Supplemental Direct Payment Scheme offers traditional crops (cereals, rapeseed, maize, sugar beets, etc) an extra support (83 €/ha), so that the total amount for cereals is 156 €/ha (2006). The level of payments is increasing annually, according to 10-years direct payments phase in programme in New Member States. In EU15 under the Single Payment Scheme energy crops are eligible for the same area aid as cereals and carbon credit (45€/ha).

Since 2005, only two species of dedicated energy crops, willow and *Rosa multiflora* var. are eligible for support, which comes from the Polish national budget. To summarise, subsidies for traditional crops are 73€/ha from EU and 83€/ha from the Polish Government, a total of 156€/ha in 2006. There are also

subsidies offered for dedicated energy crops by the Polish government at 73€/ha, but nothing from the EU. This indicates that there is currently little incentive for farmers to convert to energy crops.

However, from the beginning of 2007, the European Commission proposes to extend the energy crop premium of €45/ha introduced by the CAP reforms in 2003 to the eight new Member States which currently do not benefit from it, including Poland. This energy crop premium of €45/ha will be applicable to both annual and permanent energy crops. The European Commission has also proposed allowing the new Member States to grant national aid of up to 50 percent of the costs of establishing permanent energy crops on areas where an application for the energy crop premium has been made.

## 5 Barriers for energy crops in Poland

The findings used in this article are from a research study conducted in Poland in the Grudziądz region, during 2006. The objective of this research was to explore farmers' attitudes and examine why the Polish farmers have not yet taken up dedicated energy crop cultivation. The research project focused on two main questions:

- *Why do farmers in the Grudziądz region not engage in willow cultivation?*
- *How can willow development be aided in the Grudziądz region (and in Poland)?*

The focus is on a special variety of dedicated energy crops, namely, willow. It was decided to focus on willow as it produces woody biomass. In addition, willow is one of only two varieties that qualify for support in Poland. The fact that the major energy producer in Grudziądz is interested in using willow as a biofuel in the future implies that the region may have the potential to become a willow cultivation area.

The town of Grudziądz is located in the municipality and county with the same name, in the Kujawsko-Pomorskie Voivodship in the centre of Northern Poland. Among the 29 individual interviewed farmers the farm size ranged from 2.75 ha to 90 ha, with an average of 19 ha. Most of the soils were of a low standard; only in some regions were there better quality soils. Small farms earn their income from tobacco, vegetables and orchards. Bigger farms cultivate cereals, potatoes, sugar beet, rapeseed and fodder for animals. About 21% of the area is covered by forests and over 90% of the forest area is protected. The local energy supplier in the region (OPEC Grudziądz) has been exploring the possibility of using bioenergy as an alternative to coal. They are investigating the option of using willow as a source for "green" electricity.

Information was gathered using semi-structured questions in an interview setting, with the questions translated into Polish. The findings were analysed and discussed by comparing them to the ones found previously in the literature and how other actors in the region perceived the situation. From the information collected, a number of perceived barriers were identified. The most frequently



mentioned barriers could be divided into four main groups: economic, informational, organisational and market barriers.

### 5.1 Economic

- Establishment costs were perceived by farmers as one of the main barriers to willow development. The cost of quality cuttings was deemed as being a major risk for the small farmers.
- The time farmers would have to wait for a return on their investments was also seen as a financial barrier to investment in dedicated energy crops. The level of risk for many small farmers is too great when they have to support their families on the farm's income.
- The level of subsidies are still low in Poland compared to the rest of the EU, and dedicated energy crops have not been receiving subsidies from the EU as in some member states till now.

### 5.2 Informational

- There is a general lack of knowledge and experience with energy crops in the area. This is a barrier as there are no schemes or projects that the farmers can observe and no knowledge bases for farmers to consult.

### 5.3 Organisational

- A technical barrier is the lack of equipment that could be used for cultivating and harvesting of willow. The financial investment needed to purchase harvesting equipment would be untenable for the vast majority of farmers. How this barrier would be overcome is one which needs to be developed with both the Energy Company and local farmers who want to be involved in willow cultivation.

### 5.4 Market

- There is currently a no-win situation in place. There is no willow being cultivated, which means that a market cannot develop. As there is no market, there is no demand for the willow. It is a classic case of a problem in the supply chain management of energy crops in Poland, something which is mirrored in a number of situations.
- Due to the fact that most of the farmers in the region, as in Poland as a whole, are small farmers, it can be very hard for farmers to establish a position in the negotiation process when it comes to agreements with an energy company.

Based on these insights, it can be concluded, that the financial barriers are the most significant and that under current conditions dedicated energy crop cultivation is not profitable for Polish farmers compared to other traditional food crops. In addition, issues related to the farm size were brought up. Small farmers were perceived to have less potential to become willow growers. Clearly, it is very difficult to convince farmers to take up dedicated energy crop growing



unless these crops become competitive with other crops in terms of subsidies. It was found though that willow plantations that are larger than 50 ha can get an establishment subsidy from the Polish EkoFund. A farmers' biomass cooperative could serve as a platform for knowledge and experience sharing and together they could solve some of the problems.

## 6 Measures to promote energy crops in Poland

Considering the claims of different actors and evaluating the situation it seems that, from the farmers' perspective as well as the energy producers' perspective, utilising agricultural residues, such as straw, would be the quickest way to start "green" energy production. At the moment straw is a low risk, already available source of biomass that the farmers could sell and earn extra income. The energy producer already has the boiler for burning straw pellets in place. However, they are committed to promoting willow as the main bioenergy source for the region.

To motivate the farmers engagement in willow cultivation, the perceived barriers need to be addressed. Energy crops need to become eligible for support under the EU CAP scheme on the same footing as other crops. However, the most often mentioned problem for farmers, the plantation establishment cost, could be addressed at the regional or even at the farmer level.

In the interviews, several farmers pointed out that they would expect help from the buyer or the energy producer who will buy their harvest. However, the energy producer's previous experience of supporting farmers in this way was not been successful as farmers neglected the crop, not realising that willow is not totally maintenance free. The energy producer has also stated that they are not interested in supplying harvesting equipment for the farmers.

As mentioned earlier, there is a larger number of farmers who own small farms in Poland. Therefore, it is suggested that one possible solution for addressing their difficulties with willow cultivation resulting from the farm size could be the forming of farmers' cooperatives. In addition to solving the problem with plantation establishment costs, forming a cooperative would create a number of other benefits. A cooperative aiming at supporting farmers with willow growing could offer support throughout the whole production chain from establishing the plantation, growing, harvesting, collecting, handling, transportation and storage till marketing.

At the same time, farmers could also tackle the informational and organisational barriers. The cooperative would serve as a platform for sharing knowledge and experience among the members and they could buy and share (or subcontract) the necessary equipment also jointly. A cooperative also has wider possibilities to look for new markets (export markets), since it has more resources at hand compared to individual farmers [21]. Due to its size and supply volume the cooperative would have a stronger position for negotiating prices. From the practical point of view, members of the biomass cooperative could buy cuttings in bulk and get a discount, this way reducing the establishment costs.

A cooperative would also coordinate the supply streams which is very important for willow because there is no annual yield from the plantation. It has



been suggested to plant willow over three consecutive years so that afterwards there will be an annual income [21]. This kind of coordination would be important from the farmers' (income), as well as from the energy producers' (supply stability), point of view. It is believed that by engaging in a farmers' cooperative for biomass cultivation, farmers could gain extra income in the long term and diversify their activities on the farm. New sources of income can act as a boost for the local economy and motivate rural development. The energy producer could be guaranteed biomass from one source, and this would reduce the difficulties of engaging in business relationships with individual farmers.

Based on the perceptions gathered during the research it is believed that a cooperative for energy crops could have a future among the new generation of farmers who seem to be more open minded and, although under present conditions they do not consider engaging in dedicated energy crop cultivation, do not exclude it for the future. The Representative of the Agricultural Advisory Board and the Head of the Farmers' Union both stated that there is potential for energy crops in the future for the whole of Poland [22, 23]. These statements show that these actors recognise a future for dedicated energy crops in the region. Other countries have successfully managed to overcome barriers related to energy crop cultivation, so it should be also feasible for Poland [24].

It is believed that there is no simple solution to the issue of encouraging the cultivation of energy crops in Poland. A number of different approaches can be used, such as encouraging farmers' cooperatives and promoting establishment subsidies for plantations, as well as highlighting success stories so that farmers can learn from others and realise that they too can cultivate dedicated energy crops. It is believed that energy crops can offer an additional source of income for farmers and a valuable source of energy for a more sustainable Poland.

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