

Land

Keywords

- > Agrofuels
- > Biogas
- > Corn
- > Monocultures
- > Intensive agriculture
- > EROI

Introduction

The Chorin Schorfheide biosphere reserve lies in the federal state of Brandenburg, in the Barnim district, around 45 minutes from the German capital Berlin (Figure 1). This reserve, founded in 1990, with its 129,161 hectares (ha) of lakes, swamps, forests and fields, is one of the largest protected areas in Germany. Biodiversity is high distinct species such as storks, cranes and field hares, find refuge here. However, in the middle of the reserve farmers are shifting land use towards corn cultivation for biogas production. While the area of corn fields has increased, that of uncultivated land and meadows has dramatically declined.

Background

Germany is reckoned to be a pioneer in the development and use of 'green' energy. Currently, 20% of electricity comes from renewable resources. Germany is leading Europe in harnessing wind and solar energy, and an important means of doing so is through the production of biogas from field crops, mainly corn and rape.

Since 1992 the European Common Agricultural Policy (CAP) has compelled farmers in Germany to set-aside a certain percentage of their agricultural area for ecological regeneration. The aim was to reduce agricultural production. In the early 2000s this obligation was weakened in Germany, allowing farmers to use those areas for the cultivation of energy crops. Then in 2008 the European Union canceled compensation payments for set-aside areas.

Today, biogas is seen as an important source of renewable energy. It falls under the German renewable energy act (EEG) and is hence subsidized. For every kilowatt-hour of electricity that is fed into the grid, the operator of a biogas plant gets seven euro cents from the so called NaWaRo-Bonus (NaWaRo stands for renewable resources NachWachsende Rohstoffe). The German government provides a

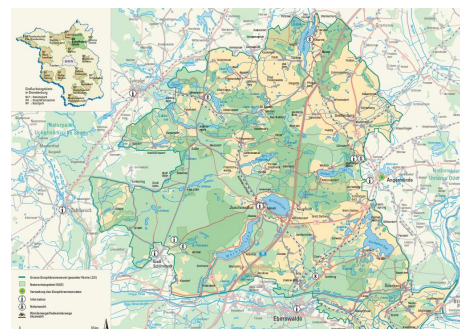


Figure 1. Location of the Biosphere Reserve Schorfheide-Chorin.

Source: <http://www.mugv.brandenburg.de>

purchase guarantee for 20 years. These subsidies have encouraged farmers, and also investors, to invest in biogas plants. Between 2000 and 2012 the number of biogas plants in Germany increased from around 1,500 to 7,521 facilities. In 2011 alone, 1300 new plants were built. Plants are mainly run on energy crops and manure, rather than on material from extensive land use and residues. The largest facilities need 1,000 tonnes (t) of corn per day. Hence, 10,000 to 12,000 ha of corn have to be cultivated annually to feed just one plant.

High prices encourage farmers to convert former fallows to fields for the cultivation of energy crops, such as rape and corn. Corn today provides 80% of the energy crop in Germany. In 2012 about 2.5 million ha were used for corn cultivation— more than 50% of that corn is used for biogas production. In the federal state of Brandenburg, the area for corn cultivation increased by almost 50% (from 112,100 to 165,400 ha) between 2007 and 2011. At the same time, the area of uncultivated land decreased by almost 60% (from 102,900 to 42,700 ha). In the district of Barnim, where the biosphere reserve is located, the area for corn cultivation increased from 3,500 ha in 2003 to 5,098 in 2010, an increase of almost 70%. In the biosphere reserve itself the area for corn cultivation has almost doubled in the last ten years. In 2009 alone, an additional 700 ha were cultivated with corn. The area for corn cultivation reached 4,121 ha in 2012, which is 10% of the total agricultural area (42,245 ha) in the reserve. Also rape cultivation increased in the biosphere reserve, reaching



Figure 2: Demonstration against a new biogas plant in Niedersachsen, Northern Germany.
Source: NDR 2011

3,237 ha, or 7.7% of the total agricultural area. Hence, in total, 17.7% of the agricultural area in the biosphere reserve is covered with intensively managed energy crop monoculture. In contrast, ecologically managed fields (32.4%) and extensively managed pasture (15%), comprise 47% of the area. With controls lacking even in protection zone two, the so called buffer zone between the core and transition area in the immediate surroundings of the Natural World Heritage 'Grumsin', energy corn is cultivated.

Environmental impact

Corn fields are monocultures. Corn does not serve as food to many animal species, above all insects and bees. Biodiversity in corn monocultures is accordingly low, that is why corn fields are also called "green deserts". Furthermore, the way of cultivation does not allow other species to reproduce.

According to the German Conservation Union (NABU) 26 of 30 bird species breeding in German fields, such as the peewit, the corn bunting, the red-backed shrike, have declined in numbers severely since the year 2000. The Union is warning of a "silent spring". Animals, such as the field hare, the lapwing and the lark are constantly decreasing.

The Renewable Energies Act (EEG) does not regulate crop rotation frequencies. As a result, corn is cultivated four years or more in a row. This requires not only high inputs of fertilizers, but also large amounts of pesticides. They are accumulated in the soil and are discharged into the surface water. Water quality in many lakes in Chorin Schorfheide has already declined. Furthermore, the soil which lies bare between November and April easily falls victim to erosion, leading to sand storms.

Biogas production is rapidly consuming land and is inefficient: To produce the same amount of energy by wind energy only 400 hectares (5% of the area used for biogas production) would be needed. If the energy used for the production of fertilizer and pesticides, as well as cultivation and harvest is included in the calculation, biogas production is hardly positive in terms of energy return on the energy invested (EROI). If the emissions from the conversion of uncultivated land to corn cultivation are also included, the balance would actually be negative. Hence, the EROI shows that the cultivation of crops only for energy production does not make sense in energetic terms.

Social conflict and consequences

Who is profiting from biogas? Small farmers can profit from their own biogas plants as they allow a diversification of income and provide subsidies. However, the main beneficiaries are the companies that build and operate larger

More on this case

- Central Webpage of biogas plant opponents (German)
<http://www.initiativen-mit-weitblick.de>
- German National Academy of Sciences Leopoldina (2012): Bioenergy – Chances and limits. Halle (Saale).
leopoldina.org/uploads/tx_leopublication/201207_Stellungnahme_Bioenergie

This document should be cited as:

Wendland, Maike. 2015. Corn cultivation for biogas in Brandenburg, Germany, EJOLT Factsheet No. 28, 3 p.



biogas plants, such as the Deutsche Biogas AG.

There are conflicts due to competition between different forms of land use. Dairy farmers, for example, cannot compete against the corn farmers regarding the high leasing prices, which have more than doubled in some areas. Pasture is therefore declining. One result is that livestock owners can no longer feed their animals hay, but have to use high energy fodder, mostly consisting of imported soy. This increases pressure on nature, creating conflict related to land and resource distribution elsewhere in the world.

Neighbours of biogas facilities complain about the smell of the plantations, increased traffic from and into the plants, and therefore a loss of living quality. Many citizens' initiatives have been formed against the expansion of existing corn cultivation for biogas, and against new biogas plantations. In Schorfheide-Chorin, for example, the association „Zukunft Biosphäre und Lebensraum Angemünde“ (ZUBILA) was founded in 2010 to fight for their right to land in the face of increased competition from biogas operations. They resist intensive livestock breeding and perform toxicology tests to control the pesticide exposure from corn monocultures.

Conflicts have led to demonstrations, pleas to politicians, and petitions (Figure 2). There have already been many examples of success by these citizen initiatives. Regional authorities for instance, now tend to reject construction applications for biogas plantations when opposition in the region is high. Companies and investors on the other hand are dismissive of legal disputes and opposition, countering with studies and publications about the environmental benefits of biogas.



This publication was developed as a part of the project Environmental Justice Organisations, Liabilities and Trade (EJOLT) (FP7-Science in Society-2010-1, under grant agreement no 266642). The views and opinions expressed in all EJOLT publications reflect the authors' view and the European Union is not liable for any use that may be made of the information contained therein. EJOLT aims to improve policy responses to and support collaborative research and action on environmental conflicts through capacity building of environmental justice groups around the world. Visit our free resource library and database at www.ejolt.org or Facebook (www.facebook.com/ejolt) or follow tweets (@EnvJustice) to stay current on latest news and events.

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