Background Paper

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Boosting environmental protection within agricultural sector and enhancing climate protection with biogas

The framework of the Common Agricultural Policy (CAP) is an important guideline for German agriculture. It is vital how the conditions are set. The German Biogas Association (FvB) welcomes the stronger focus on environmental and climate protection. The biogas sector can contribute to the achievement of these goals in many different ways: For one, it can deliver substantial greenhouse gas savings, especially by digesting manure. Second, several steps are necessary to increase climate gas savings and enhance environmental protection within the agricultural sector which can also be combined with promoting biodiversity and soil protection.

1. Increasing mobilization of manure

In Germany, only 25% of manure is used in biogas plants. However, studies show that up to 60 % could be utilized if the right incentives are set. In Europe as a whole even bigger potentials could be realized.

The fermentation of farmyard manure in biogas plants is an efficient way to reduce agricultural greenhouse gas emissions from storage tanks for manure. In Germany, this utilization already saves greenhouse gas emissions of about 2.19 million t CO_2 equivalents each year. In addition, an expansion of manure fermentation - as well as the expansion of bioenergy production in general - will lead to the creation of added value and jobs in rural areas. Thus, the expansion of manure fermentation is not only a decisive measure for climate protection, recycling management and emission reductions in agriculture, but also an important structural policy measure for rural areas.

If manure fermentation should be enhanced there must be an economical perspective. For this, the following measures are necessary and should be introduced on an EU-wide scale:

- A special remuneration must be given for biogas plants utilizing manure, as it is the case in the German Renewable Energy Sources Act (EEG 2017). Here, it is necessary to learn from experience because the current German design is not sufficient to fully develop the potential of manure fermentation. It is vital to set the right conditions:
  - Plants up to 150 kW rated electric capacity should be promoted if they use at least 80 % manure and no cap on installed electric capacity should be set. The difference between rated electric capacity and installed electric capacity is explained by the increasing flexibilization of biogas production in Germany. In order to stabilize the power system and to balance fluctuating energy from wind and sun German CHPs install double or triple the capacity they actually use. Thus, it is possible to shutdown plants in case of much sun and wind but to double power production for example overnight. The used amount of feedstock, however stays the same over the year just time of the biogas production varies much more. Without the limitation of the installed capacity, these plants will be able to use combined heat and power units (CHP) with a higher capacity for the same electricity production.
  - Remuneration should be made available to all biogas plants fulfilling the requirements – existing and new biogas plants.

- Remuneration should be so high that it is economically viable to run such plants.

- In the future, more attention should be paid to the fact that, in addition to energy production, manure fermentation also represents a climate and environmental protection achievement within the agricultural sector. It therefore seems sensible that manure fermentation should also be eligible for support under the agricultural investment promotion program.
- The gas-tight cover of digestate storage tanks is very costly for small biogas plants. However, it must be made sure that methane emissions are as low as possible to fully realize the greenhouse gas saving potential. However, the remuneration requirements for the avoidance of methane emissions should be made more technology-neutral. There are several other ways to ensure low methane emissions: For one, to minimize methane emissions from a biogas plant, it can be designed in such a way that the feedstock spends at least 150 days in a gas-tight system before it is stored openly which lowers the residual gas potential in most cases under 1 %.

  Alternatively, it can be required that it must be proven that the methane emissions from the digestate are less than 1 % of the original methane potential of the feedstock. This form of flexibility enables technological innovations (e.g. feedstock preparation) and thus the reduction of investment costs. Such requirements can be incorporated in the Renewable Energy Directive revision (RED II).

With such measures, manure mobilization could be increased in all European countries, thus leading to substantial greenhouse gas reductions. Alternatively, if no remuneration system is considered, a high enough CO_2 price would make it interesting to increase the utilization of manure considerably, especially under the new Renewable Energy Directive which reflects the high greenhouse gas reduction potential of manure.

2. Boosting sustainability, biodiversity and soil protection with biogas from agricultural land

Environmental and climate protection services can still be extended, however, this generally entails additional costs for the agricultural sector. With the help of biogas production, economic costs can be minimized by using energy production as a by-product of the environmental and climate protection services. For this, it is not only necessary to create a framework that enables and encourages the expansion of manure fermentation. In addition, the cultivation of alternative energy crops for biogas plants offers the opportunity to combine increasing claims on the environmental performance with productive agriculture. The wide range of substrates offers excellent conditions for greening measures within agriculture and CAP. The feedstock thus becomes to a certain extent a by-product of so-called "environmental or biodiversity areas" which in summary bring the following environmental benefits: Increasing biodiversity and soil protection as well as water and climate protection if respective systems are supported. In the following, the German Biogas Association shows possibilities for promoting biodiversity, sustainability and soil protection with different alternative feedstocks:

2.1. Promoting sustainable development and efficient management of natural resources such as water, soil and air

The risks of soil erosion or water pollution can be significantly reduced by growing catch crops or perennial crops. Increasing the scope of these crops can be achieved with help of targeted agri-environmental measures or requirements (e.g. eco-schemes). Agri-environmental measures have also a positive economic effect on farm management if the harvested crops grown can be utilized, that means if the biomass can be harvested and used sensibly for biogas production. In future, if animal numbers decline or if the grown biomass is not suited for feeding purposes biogas plants can use this biomass for energy production. Thus, their utilization in a biogas plant is a by-product of an environmental service and not in competition with food production. It does not increase land use but utilizes feedstock that has to be grown anyway for environmental reason. At the same time, biogas reduces the amount of economic support for the environmental measure through this cascade use.

2.2. Contribution to the protection of biodiversity, improvement of ecosystem services and conservation of habitats and landscapes

Due to the fact that almost any biomass can be digested in biogas plants, biogas plants are excellently suited for energetic use of any grown biomass of land with the aim of providing an environmental service. This increases the attractiveness of the environmental measure on the one hand and reduces the economic costs on the other hand. In the current CAP, this has already been taken into account in one point: Silphium Perfoliatum was subsequently recognized as environmentally beneficial within the framework of the greening process. As a result, areas with the presence of Silphium Perfoliatum, including its utilization in a biogas plant, may currently be counted towards the proportion of priority ecological areas.

Unfortunately, this means that only one crop among many was selected by the EU Commission. The German Biogas Association had already pointed out other ecologically valuable crops at that time and asked for their their inclusion in the greening process. With the revision of the CAP and a stronger focus on environmental services, the opportunities for these other crops and cultivation systems should be more strongly taken into account, for example in the Eco-Schemes planned (Art. 28 within revised draft of CAP).

In addition, it is laid down in ANNEX IV, GAEC 9 that “catch crops or nitrogen fixing crops, cultivated without plant protection products” can be used to fulfill the requirement of 5 % of arable land devoted to such measures. However, it is vital to state clearly that such feedstock can be harvested and utilized in a biogas plant if it fulfills all the necessary requirements. Thus, it can contribute in a double function to energy production and environmental protection while minimizing economic resources and minimize land use.

In the following, it will be explained in more detail which crops should be included in a catalogue of measures and what environmental performance is associated with them:

Annual and perennial mixed crops (wild plant mixtures)

A very good ecological evaluation is given in various studies to so-called wild plant mixtures, i.e. annual or perennial mixed cultures with a large number of different species. These guarantee a high plant diversity which at the same time serves as food source and habitat for insects and other animals which promotion is highly necessary. In particular, in the case of perennial cultivation, areas with mixed

cultures provide an ideal retreat in winter while at the same time protecting against erosion. As a rule, plant protection measures should not be necessary for perennial mixed cultures as any weeds that may occur can also be fermented and even contribute to increasing biodiversity. The German Biogas Association also assumes that mineral fertilization is not necessary but that it must be possible to recycle the nutrients. It should therefore be possible to return the digestate to the area in order to cover the nutrient removal of the plant. This is the only way to achieve economically interesting biomass yields for agriculture and at the same time to avoid soil depletion. The environmental advantage is not only given by the habitat for the many animals and insects, but also by the high nutrient absorption capacity of wild plants which makes a great contribution to groundwater protection. Currently there is no economically viable, long-term perspective for planting wild plants in fields, even it would benefit insects enormously. However, with the possibility of harvesting the flowers and fermenting them, not only additional habitat for wildlife is grown but also energy could be produced.

Mowing from the 1st of April till the 30th of June is not necessary for wild plant mixtures. An extensive protection of wild animals, especially during the breeding and rearing periods, is therefore guaranteed. The possibility of using these areas after the 30th of June would, however, create an economic incentive for their creation, which would make a considerable contribution to biotope improvement. The use of pruning would not have any negative effects on the field fauna, since the biomass of other ecological areas must be pruned at least once a year as part of a maintenance pruning. This is also confirmed by many German hunting and beekeeper associations within the framework of the Network Habitat Field Network.

Mixed crops with grain

Another option is to mix grains with other crops, especially dicotyledonous ones. Here as well, the mixing of crops ensures biological diversity. Grains in combination with vetches, peas or beans (e.g. vetch grown with rye) offer a source of food for numerous insects and thus also for field birds due to the flowering of the legume. At the same time, legumes fix nitrogen in the soil and thus reduce the need for additional nutrients, so that only an adapted supplementary fertilization with the digestate is necessary. Apart from the combination of grains with, for example, legumes, the sowing of wild plant mixtures mentioned in the previous point is also conceivable and can also be assessed as environmentally positive.

Perennial crops (Silphium Perfoliatum, energy grasses, Sida, etc.)

The German Biogas Association thinks that perennial crops should be taken into account more strongly within the CAP in future. Many research projects in Germany are concerned with the establishment of alternative energy crops, such as Silphium Perfoliatum, Sida and perennial energy grasses (e.g. tall wheatgrass, reed canary grass, etc.) The advantage of perennial crops from an environmental point of view: Only in the year of establishment there must be intervention within soil life and, if necessary, plant protection treatment is carried out. The year-round soil cover creates a habitat for wild animals and insects and leads to erosion reduction. A particularly important contribution is made by the above-mentioned permanent soil cover for water protection, as these crops have a high nutrient uptake capacity and thus the leaching of nutrients into groundwater is avoided. In addition, cultures such as Silphium Perfoliatum form colourful flowers and offer therefore a habitat for insects. These cultures have a positive influence on nature and environment and are often not sufficiently appreciated. In particular, an

established population has a positive influence on the categories field birds/low game and soil-water synergies.

Extensive grassland

As already mentioned above, the use of grassland growth in biogas plants is one of the few options for utilization when animal numbers are declining. Biogas plants are also well suited to convert the growth of grassland to energy and thus prevent non-use or even ploughing-up of grassland. In view of decreasing livestock numbers and thus insufficient utilization possibilities, biogas can help to stabilize the system. Depending on intensity and cutting frequency, biogas plants can also contribute to the promotion of extensive grassland rich in herbs. The lower yield compared to several cuts would then have to be compensated.

3. Summary

The German Biogas Association welcomes the revision of the CAP and its stronger focus on environmental and climate protection. However, GBA thinks it vital to bring together economic utilization and environmental protection in a balanced way. There are several ways to bring both together with the promotion of eco-Schemes and the obligatory use of 5 % arable land for catch crops and others. It is vital, however, that the produced biomass is allowed to be utilized in biogas plants. This must be made possible within CAP revision.

We showed that there are several possibilities like perennial wild plant mixtures, mixed crops with grains or perennial energy plants that offer ecosystem services in form of wildlife habitat, biodiversity enhancement, soil and water protection as well as energy production at the same time without additional land use. In addition, the utilization of manure should be increased by making its use more economically viable.

We strongly encourage the EU Commission to act accordingly and to bring together the different sectors by creating a sensible and balanced new agricultural policy.

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The German Biogas Association is Europe's largest representation of interests in the biogas industry with around 4,800 members. It represents manufacturers, plant constructors, agricultural and industrial biogas plant operators nationwide. The biogas industry has created over 45,000 jobs, mostly in rural areas.