Linking direct payments to green outcomes – designing and testing points- and landscape-based farm remuneration in the CAP

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1 Introduction

Connecting area-based direct payments to environmental performance has been a long-term strategy of CAP reform to move stepwise from income support towards remuneration of public goods and services provided by farms and farmers. The introduction of Greening payments, however, has had little effect on the ground due to unambitious requirements. While most environmentally oriented reform strategies for the CAP call for shifting of funds from the first to the second pillar to increase the budget for agro-environmental programmes, others emphasise that direct payments affect almost the entirety of agricultural land in the EU and are therefore an important vehicle to increase the environmental performance of agriculture across the Union. Against this background, the main question of this paper is: How can direct payments be more effectively linked to environmental performance and the provision of landscape diversity? Theoretically, the paper builds on recent discussion on environmental policy design in public policy analysis (Howlett 2018; Howlett, Mukherjee, and Woo 2015; Howlett 2014). The empirical part of the paper builds on systematic literature review, in-depth interviews and focus groups.

Two strategies to link area-based direct payments more closely to environmental performance have emerged over recent years. The first strategy aims to link the reception of such payments to a certain level of environmental performance which is measured through a differentiated system of points. A prominent example is the point-based system presented by the German Association for Landscape Conservancy (Deutscher Verband für Landschaftspflege, DVL) which defines a list of environmentally friendly agricultural practices which are linked to a system of credit point which reflect the environmental benefit and the opportunity costs of each measure. The amount of payment entitlements then depends on the number of credit points earned by a farm holding.

A second strategy links the payment entitlements to landscape features. Rather than merely requiring that existing landscape elements are not removed, the density and quality of landscape elements would be used to differentiate the amount of premium entitlements per hectare. The key objective of such a strategy would be to valorise existing, non-productive landscape features. This strategy is based on the observation that more diverse landscapes generally support higher biodiversity (along with perceived landscape amenity and other landscape functions).

Both strategies require a novel policy design surrounding the system of area-based payments which currently dominate the first pillar of the CAP. The research project ZA-NExUS (Future-oriented agricultural policy – conserving nature, protecting the environment), which has been funded by the German Federal Agency for Nature Protection (BfN) – has developed a proposal for a novel architecture of the CAP. The proposal was endorsed by the then German Federal Minister for the Environment, Dr Barbara Hendricks, in 2017. Since December 2017, a follow-up project, ZA-NExUS-02, has operationalised the policy instruments and tested their acceptability and likely effectiveness through in-depth interview with farmers across Germany.

In the remaining parts of this paper, section 2 presents the key justification for linking are-based payments to environmental performance and landscape diversity, building on a broad literature review of approximately 500 sources on the environmental effects of farming and farm policy (Feindt et al. 2019).

Section 3 introduces the instrumental operationalization of the two strategies mentioned above. The first instrument is a point-based "premium for basic environmental and animal welfare measures". We present a list of measures from which farmers can choose those that fit best to their farm concept and proposed point values. The second instrument is a "landscape diversity premium". We present a list of landscape features to be included and ways to register and monitor their presence. This is followed by a discussion of critical policy design choices at the conceptual level.

Section 4 explains the methodology.

Section 5 presents preliminary findings from two empirical sources: First, semi-structured in-depth interviews with approximately 30 farmers and farm managers that present a broad range of different

farming systems in Germany. These interviews have been conducted between January and April 2019. Second, five focus groups with agricultural and environmental administrators and other experts in CAP implementation in Germany that were conducted between March and May 2019.

The concluding part of the presentation discusses the findings. The proposed policy instruments are assessed against a set of criteria, including environmental effectiveness, efficiency, acceptability and controllability. We also discuss how these instruments could fit into the "new delivery model" proposed by the European Commission, and whether a points-based premium or a landscape diversity premium that link direct payments to green outcomes are promising strategies to address the environmental issues linked to Europe's agricultural sectors.

2 Justification for linking are-based payments to environmental performance and landscape diversity

Direct payments were introduced as the key element of the CAP as part of the MacSharry reform in 1992 to compensate arable farmers for reductions in guarantee prices. During the Fischler reform 2003, all production-based direct payments were converted into area-based payments. With few exceptions, they were also decoupled from production. At the same time, the "cross compliance" requirements made the reception of direct payments conditional on compliance with various pieces of European legislation on environmental protection, animal welfare, food safety and traceability, as well as the obligation to maintain the land in "good agricultural and ecological condition". The Ciolos reform 2013 moved 30% of the area-based direct payments into a "greening" payment that was conditional of three requirements: provision of 5% of the land as ecological focus area, minimum crop diversity on arable land and a prohibition to convert permanent grassland into arable land.

The conversion of price support into direct payments was originally intended as a transitionary measure to avoid frictions on land markets where artificially high market prices had been capitalized. The Fischler reform changed the rationale of the direct payments which were now partly justified as a compensation for the costs of higher standard required from European producers in comparison to their competitors on liberalized global markets.

An acknowledged environmental benefit of the decoupling of the direct payments from production during the Fischler reform was that it removed an incentive to produce. However, in some, mostly marginal areas coupling of direct payment to extensive grazing systems might be necessary to maintain agricultural systems with landscape benefits.

However, the favourable environmentalist view of the Fischler reform was coloured by the expectation of further reforms that would enhance the environmental conditionality. These expectations were later disappointed. During the legislative process for the CAP 2014-2020, the Commission's greening proposals were significantly watered down (Hart 2015). As a result, the overall environmental effects of the "greening payment" were negligible (European Court of Auditors 2017). Cross compliance was increasingly criticised as paying farmers for obeying the law – a clearly exceptional treatment compared to other sectors.

Several recent overview studies that have assessed the environmental performance of the CAP have come to a critical conclusion (e.g., Pe'er et al. 2017; Feindt et al. 2019). The authors' own review of approximately 500 sources on the environmental effects of farming and farm policy, with a focus on the situation in Germany, found inter alia the following issues (Feindt et al. 2019):

Soils:

- Thresholds for critical loads for lead, quicksilver, cadmiums, eutrophication and acidification were surpassed.
- Legal values for the immission of veterinary medicines were missing.
- Legal values for Uranium content in phosphate-based fertilizers were missing.
- Harmful mechanical compression of soils is legally addressed but without a target value.

- Soil erosion is generally acknowledged but lacks an operationalized target value.
- Levels of water erosion exceed scientifically recommended values.
- Topsoil formation is acknowledged as an objective in law, but lacks a target value.

Biodiversity:

- Species diversity and landscape quality: In Germany, the population index for 59 representative bird species stood at 63 % of the target value (Stand: 2011), with a significant downward trend (BMUB 2015). The partial indicator for birds in agrarian landscapes even lower with 56 % (BMUB 2015).
- Endangered species: The indicator for the endangerment of species stood at 23 % in 2013 (BMUB 2015), far above the target value of 15 %.
- The index for the conservation status of FFH-listed species stood at 46 % in 2013 (BMUB 2015), far ways from the target valued of 80% in 2020.
- The index for the quality of FFH habitats stood at 46% instead of the target value of 80% in 2020. The quality of agriculturally shaped habitats was assessed particularly unfavourable (BMUB 2015).
- 70% of domestic agricultural animal species were in danger of extinction (BMUB 2015).

Greenhouse gas emissions:

- In Germany, the agricultural sector accounts for about 7% of GHG emissions, with another 4% due to agricultural land use and land use change.
- In its ""climate protection plan 2050" (BMUB 2016), the German Federal government set out to reduce overall GHG emission by 80 to 95% by 2050 compared to 1990. For the first time the plan includes targets for the agricultural sector. Previous requirements included requirements for the management of organic manure, the preservation of permanent grassland and the protection of moorlands and wetland.

Impacts on landscape diversity:

- The German Nature Conservation Law stipulates that nature is the protected good "has to be protected so that [...]the diversity, singular character and beauty as well as the recreational value of nature and landscape are sustainably secured" (BNatschG 2009, § 1, Abs. 1). Many landscapes have been shaped by agricultural activities over centuries. Increasing intensification and abandonment of agricultural land management endanger many characteristic elements of these landscapes, which often are also critical for the maintenance of biodiversity due to their habitat quality. Political aims for landscape diversity are mostly described in generic and qualitative terms (e.g., BMUB 2007, 41) and measurable aims have not been established. Potential indicators for assessing agricultural impact on the landscape include:
  - Preservation of traditional and nature-compatible forms of agriculture (one of the aims of the German biodiversity strategy) (Deimer 2005), e.g. extensive grassland. The national aim for the share high-nature value at the agricultural area is 19 % in 2015.
  - Conservation and maintenance and of the cultural landscape (Deimer 2005), diversified landscapes (Bundesamt für Naturschutz 2014), including conservation of grassland, maintenance of farming in marginal areas, prevention of succession as expansion of forest areas, diversified crop rotation (Deimer 2005; Heißenhuber, Haber, and Krämer 2015; Heißenhuber et al. 2004), landscapes characterised by small, natural and clost-to-natural biotopes (Deimer 2005), conservation and maintenance of landscape elements (Heißenhuber et al. 2004)
  - Landscape diversity: size of fields, extended crop rotation, ecological priority areas.

Clean air:

- The NEC Directive contains maximum values for the emission of sulphur dioxide, ammoniac, non-methane volatile organic compounds (NMVOC) and nitrogen oxides. Germany exceeded three of these four values.
- According to the NEC Directive, ammoniac emissions were to be limited to 550kt/year by 2010. However, in 2013 ammoniac emissions were 671 kt and there had been no reduction since 1994 (Umweltbundesamt 2013). Another aim was to reduce the average emission of NMVOC and

nitrogen oxides by 70% by 2010 compared to 1999 (Umweltbundesamt 2015, 60). The actual reduction was 42.5% (Umweltbundesamt 2015, 60).

Clean water:

- In 2010, only 14% of watercourses and 39% of lakes in Germany were deemed in good or very good quality (Umweltbundesamt 2010).
- 37% of groundwater bodies were in bad chemical condition. 27% of them had nitrate levels above the set quality norm and 4% had higher concentrations of plant protection chemicals than the quality norm (Umweltbundesamt 2010).
- Also in 2010, 14% of control points showed nitrate concentrations in drinking water above the threshold of max. 50 mg N/l specified in the Nitrate Directive (Umweltbundesamt 2010). More recently, Germany was sentenced by the European Court of Justice for non-compliance with the Nitrate Directive.
- About 150 active ingredients of medicines, including antibiotics, have been found almost all year and in all regions in watercourses (Umweltbundesamt 2014)

To reduce the negative impacts of agricultural practices listed above, an approach is needed that incentivizes and encourages a change in land use and land management across the board. Because area-based direct payments reach almost all agricultural areas in the European Union, they could serve as a vehicle for the promotion of better environmental practices. This was indeed the idea underlying cross compliance and greening. However, to improve the environmental situation in agricultural areas, a more effective policy design is obviously needed.

3 Operationalization of policy instruments

Apart from cross compliance and greening, two strategies have been developed over recent years to link direct payments to improved environmental performance. The first strategy are systems with lists of environmentally friendly measures, the second strategy links payment entitlements to landscape features. We now discuss both in turn.

3.1 Point-based "premium for basic environmental, climate protection and animal welfare measures"

The first strategy aims to link the reception of direct payments to a certain level of environmental performance which is measured through a differentiated system of points. A prominent example is the point-based system presented by the German Association for Landscape Conservancy (Deutscher Verband für Landschaftspflege, DVL) which defines a list of environmentally friendly agricultural practices which are linked to a system of credit point which reflect the environmental benefit and the opportunity costs of each measure. The amount of payment entitlements then depends on the number of credit points earned by a farm holding. A similar approach are the eco points schemes in Austria.

Based on these ideas and experiences, the ZANEXUS project developed the concept of point-based "premium for basic environmental and animal welfare measures" (Feindt et al. 2019). This instruments works as follows:

Farmers are presented a list of measures that provide an environmental or climate benefit on most locations. Measures for enhanced animal welfare can also be included. Farmers can then choose those measures that best fit their farm concept. Each measure receives a specified number of points that are based on the typical opportunity costs. In order to receive a specified payment, farmers need to reach a threshold average number of points per ha.

In our model, we suggest to include measures that provide options for arable land, grasslands and animal husbandry. These contain mostly of 'light green' options from current AEM, e.g. enhanced crop diversification, winter cover, fellow land, mulching, direct and strip seeding, husbandry systems with enhanced animal welfare, and summer grazing. A full list of measures is included in appendix 1.

A variation of the points-based model with a minimum threshold that qualifies for a unified premium amount is the "market model". Here farms can collect as many points as they like. Their premium is calculated as their number of points divided by the points acquired by all farms and multiplied with the available budget. In this variation, the overall amount of points represents the supply of environmental, climate and animal welfare measures, and the available budget represents the societal demand. The price for each point rises of the overall supply decreases and vice versa. In the long run we would expect this model to find an equilibrium that would also determine the premium for each measure. Of course, this equilibrium would critically depend on the relative points allocated to the various measures.

3.2 Landscape diversity premium

A second strategy links the payment entitlements to landscape features. Rather than merely requiring that existing landscape elements are not removed, the density and quality of landscape elements would be used to differentiate the amount of premium entitlements per hectare. The key objective of such a strategy would be to valorise existing, non-productive landscape features. This strategy is based on the observation that more diverse landscapes generally support higher biodiversity (along with perceived landscape amenity and other landscape functions).

A possible instrument would be a "landscape diversity premium".

Farms would receive payments in correlation to the density of landscape elements on their agricultural area. If the overall density of such element on a farm is higher than average, the farm would receive an above-the-average payment, and vice versa.

The basis for this premium would be all landscape elements on a farm's agricultural area as well as agricultural areas that are affected by bordering landscape structures. The instrument would include all landscape elements that are currently registered in the CAP monitoring system. Their continued existence would be verified by remote sending data (SENTINEL) and drones.

The premium could be allocated semi-automatically, based on existing data from the integrated control system, remote sensing and satellite data.

A maximum of 20% of an area unit would qualify for the premium because little additional ecological value is expected from a higher density of landscape elements.

3.3 Embedding the instruments into the the CAP

Both policy instruments are part of a proposed "new architecture for the CAP", which was presented to the public in a policy paper in January 2017 in a press conference with the German Federal Minister for the Environment at the time, Dr Barbara Hendricks. The overall approach is depicted in the figure below. For more details see Feindt et al. (2017) and Feindt et al. (2019).

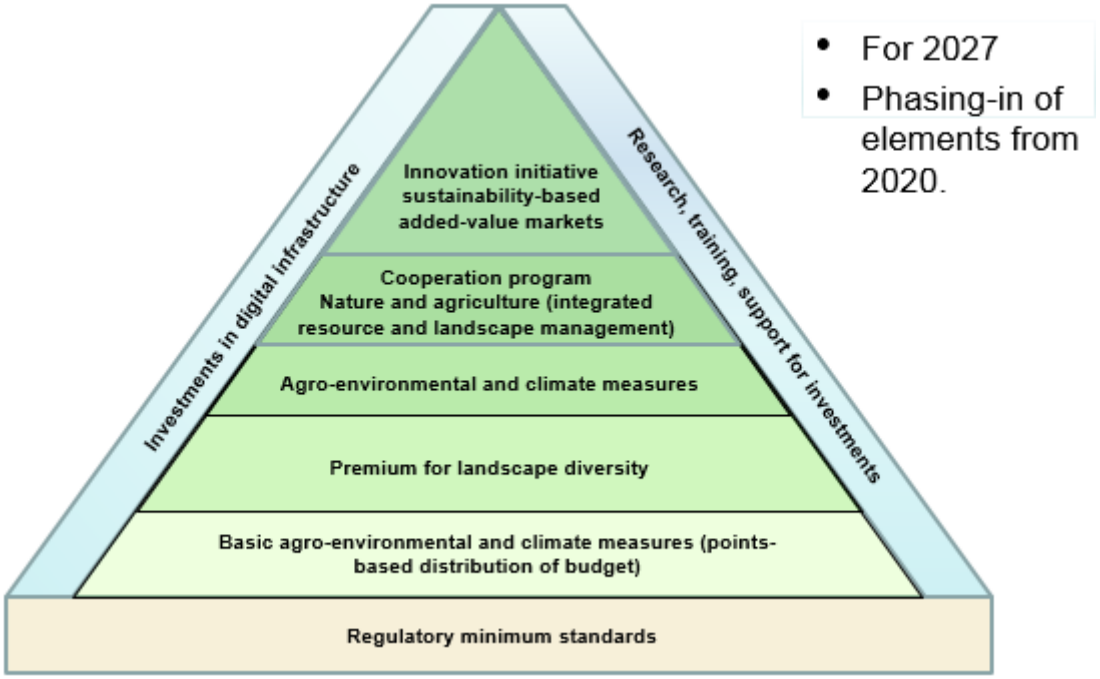

Figure 1: ZANEXUS architecture for an alternative CAP. Source: Feindt et al. (2017)

From a structural point of view, both instruments discussed in this paper could be fitted into the legislative proposals presented by the European Commission in June 2018, pending a more nuanced analysis of the legal text. The premium for basic agro-environmental and climate measures can be understood as enhanced conditionality for the direct payments. The instrument could also be implemented under the eco-scheme umbrella. However, the variant "market model", in which the value of one point depends on the overall amount of points achieved by all farmers, is unlikely to be compatible with the legislative proposals.

The premium for landscape diversity is more difficult to reconcile with the current logic of conditional direct payments. The main reason is the intended distribution of payments according to the density of landscape features. This would be difficult to configure as enhanced conditionality for two reasons: first, similar categories of action would lead to different premiums; second, this instrument is designed to incentivize the creation of additional landscape elements, and as a result the amount per eligible instrument would depend on the dynamic development of the overall amount of eligible landscape elements and their acreage.

3.4 Budget assumptions for the interviews

To be able to apply the ZANEXUS architecture to the farms, we had to make assumption about the available budget and its distribution across the different instruments in order to derive the amount of the available premiums.

Starting point was the concept of a "budget for public goods in agricultural landscapes". Under our assumptions, this includes the current budget of the EAGF minus the young farmers' premium and current budget for market orders. Added to this are the budget for AEM including the national co-financing. We further assume that other second pillar (EAFRD) measures are not affected. Under these assumptions the available "budget for public goods in agricultural landscapes" in Germany would be € 5.283 million per year.

We then assume that one third of this budget is spent on the basic premium for agro-environmental and climate protection (1.761 mio. €), one third on the premium for landscape structures (€ 1.761 mio) and the remained is equally divided between agro-environmental measures, a cooperation program for

integrated landscape and resource management at landscape level, and support for initiatives that create added value based on enhanced sustainability production.

Under these assumptions, in Germany € 111 per hectare would be available for the basic premium for agro-environmental and climate protection.

We based the allocation of points on a review of current payments under AEM in the German Landers. On this basis, we calculated of an average of premiums for currently offered agro-environmental measures. The points per measure were calculate so that one point per ha would equal an average current premium of 111 Euro. Hence, the farm would receive 111 €/ha if at least 1 point/ha has been reached.

Regarding the premium for landscape diversity, it was necessary to estimate the overall area covered or affected by landscape element. According to a study by the Julius Kühn Institute, about 1% of current agricultural area in Germany is covered with landscape elements. We estimate that another 1% is influenced by bordering landscape structures. Together this amount to 334,300 ha in Germany. Under the assumption that a budget of 1,761 Mio €, the premium per qualifying area would be 1,761 Mio € / 334,300 ha = 5,500 €/ha of qualifying area. In other words, each square meter of landscape element on agricultural land would entitle the farm to an annual payment of 55 ct.

4 Testing the instruments: Methods and data

4.1 In-depth interviews with farmers

To test how the instruments would be perceived by practitioners, we conducted 27 semi-structured in-depth interviews with the managers or owners of farms across Germany.

Each of the project partners – Humboldt University at Berlin, project office market & region in Northern Bavaria, Justus-Liebig University at Gießen and University of Osnabrück – aimed to recruit eight respondents that represented the diversity of farm holdings in their area. The recruitment strategy used contact persons at agricultural chambers and independent farm advisors as middleman to identify potential interview partners that would be willing and interested to have an extensive discussion about a hypothetical farm policy. As a result, it is likely that the sample is more qualified and interested in agricultural policy than the average farmer. However, as one participant in our focus groups put it, they might be more representative of "the farms that have a future".

In each interview, the ZANEXUS model and its elements were discussed and applied to the farm. The aim of the interviews was to assess the likely responses to such a model and to the individual policy instruments.

Due to the complexity of the topic, the team decided to divide the interview into two parts. Part 1, which included the two instruments presented in this paper, lasted approximately 2 hours. Part 2 which included a more in-depth discussion of agro-environmental measures and cooperation programs, lasted another 90 minutes approximately.

In each interview of the first wave, we first inquired some general data and characteristics of the farm. We then introduced the overarching ZANEXUS model and asked for a first assessment. This was followed by an explanation of the points-based premium for basic environmental and climate measures and its application to the farm. After that we explained the premium for landscape diversity and applied it to the farm. A final section asked about the farm's current involvement in agro-environmental measures (AEM) and the respondents' opinion about potential improvement to AEM.

The first wave of interviews was conducted between late January and late March 2019 with overall 27 interviews. These interviews form the basis for the findings presented here. The second wave of interviews was conducted in March and April 2019.

The interviews were transcribed and analysed through a combination of inductive and deductive coding, supported by qualitative data analysis software. In addition, the interviewers wrote analytical memos shortly after each interview which formed a first basis of analysis.

Since the in-depth analysis is still ongoing, in this paper we present a first set of results, based on sets of closed questions and analytical memos by interviewers.

4.2 Focus groups with agricultural and environmental administrators and other experts in CAP implementation

The interviews with farmers were complemented by five focus groups with agricultural and environmental administrators and other experts in CAP implementation in Germany and Brussels. Preliminary findings from the interviews formed the basis for discussion and were jointly interpreted.

Two focus groups took place in Brussels with altogether eight experts from the European Commission, the European Parliament and various experts. Three focus groups in Berlin and Hanover assembled altogether 17 participants from agricultural administrations at the level of German federal states (the CAP implementation level in Germany), chambers of agriculture, and environmental NGOs.

All five focus groups followed the same guideline and were facilitated by the project coordinator and main author of this paper.

Because the focus groups were conducted under Chatham House rules, we did not record and transcribe them. Instead, two or three members of the research team took notes during the conversations which were then transcribed into a protocol for each workshop. The members of the research team wrote an analytical memo during a debriefing session immediately after the workshop, of individual memos shortly after.

At this stage, results from the focus groups are preliminary and subject to further in-depth analysis.

5 Findings

5.1 Findings from interviews with farmers

We now present preliminary findings from semi-structured in-depth interviews with 27 farmers and farm managers that present a broad range of different arming systems in Germany. These interviews were conducted between January and April 2019. We first characterize the farms in the sample before presenting the responses to the ZANEXUS model in general, the points-based premium for basic environmental, climate protection and animal welfare measures and the premium for landscape diversity.

5.1.1 Characteristics of the farms in the sample

The sample included a diverse set of farm sizes and types that reflects the diversity of farms in Germany's regions. Two farms in the sample were smaller than 50 ha, six farms managed between 51 and 100 ha, seven between 101 and 200 ha, five between 201 and 500 ha, and five farms operated on more than 500 ha, three of which on more than 1000 ha. The most frequent crops produced were cereals (25), maize (21) and animal feed (13), but interviewees also produced pulses (7) ,vegetables (7), rape seeds (5), potatoes (4), oilseeds (1) and soybeans (1). The diversity if the sample is further illustrated by the diversity of farm types shown in table 1, the different types and sizes of animal production shown in table 2, and the different compositions of the workforce shown in table 3.

Table 1: Operational branches in farm sample

Source: Own compilation, N=27

Type of branch	Frequency
Arable crops	23
Feedstuff	19
Pig fattening	8
Milk production	7
Suckler cows	7
Bioenergy	6
Piglets	4
Forest	3
Permanent cultures	2
Horse boarding	2
Cattle	2
Energy (photovoltaic)	2
Poultry	1
Young hens	1
Young sows	1
Potatoes	1
Compost works	1
Horse riding	1
Sheep	1
Direct marketing	1

Table 2: Participants: Types and size of animal production

	Dairy cows	Mother cows	Calves and kits	Cattle (> 6 months)	Rearing pigs	Mother sows
Up to 100 cattle	4	4	6	5		
101 -300 cattle	1	1	2	1		
> 300 cattle	2		1			
Up to 500 pigs					3	3
500-1000 pigs					2	1
> 1000 pigs					4	1

Table 3: Participants: Types of workforce on the farm

Occupational group	Number of farms
Only farm owner, family members, and temporary staff	8
1-3 permanent employees	10
4-10 permanent employees	6
> 10 permanent employees	3

For almost half of the respondents (13) agriculture accounted for more than 90% of income, for six out of 27 respondents agriculture contributed less than 50% to overall income (of either the household in the case of family farms or the business in case of corporate farms and cooperatives).

Seven of the 27 farms are involved in regional processing activities. Also seven farms are active in direct marketing.

A large share of the farms in the sample have experienced major change in the last five years or expect major changes to their business over the next five years (see table 4 below). Examples mentioned were generational change or change of ownership, major investments, turning organic or a move towards more animal welfare.

Table 4: Major change experienced or expected on the farm

	Major change in past 5 years	Major change in next 5 years expected
Yes	13	12
No	14	15

Overall the sample, while not statistically representative, included a broad range of different types and sizes of farms that will enable the researchers to understand how the proposed and tested instrumental approach would affect a range of different farms. The diversity of the sample also allows to look for tentative explanations to differences in response patterns.

5.1.2 Responses to the ZANEXUS model

The ZANEXUS model was generally seen as understandable and plausible (see figure 2 below). Interview partners were also open to discuss such a model and apply it to their farm. Some participants spontaneously vented anger that society feels that farmers do nothing for the environment. Some farmers said that they would completely abandon farm support to get rid of controls if prices were higher. In particular managers of large farms were sceptical about the ecological focus of the ZA-NeXUS model.

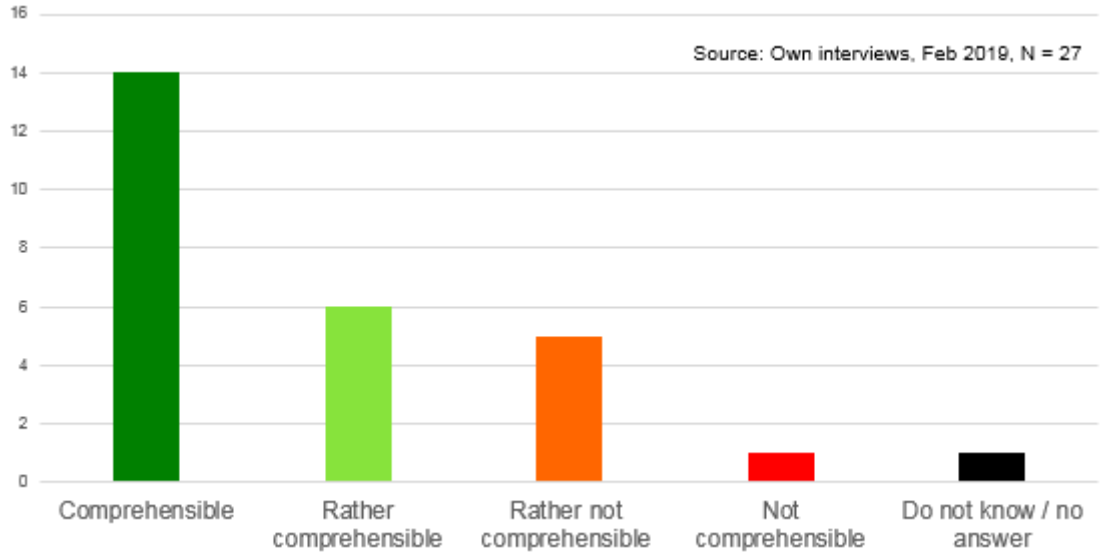

Figure 2: Comprehensibility of the ZANEXUS model

5.1.3 Responses to the points-based premium

The concept of a points-based premium was generally seen as comprehensible and plausible (see figure 3 below).

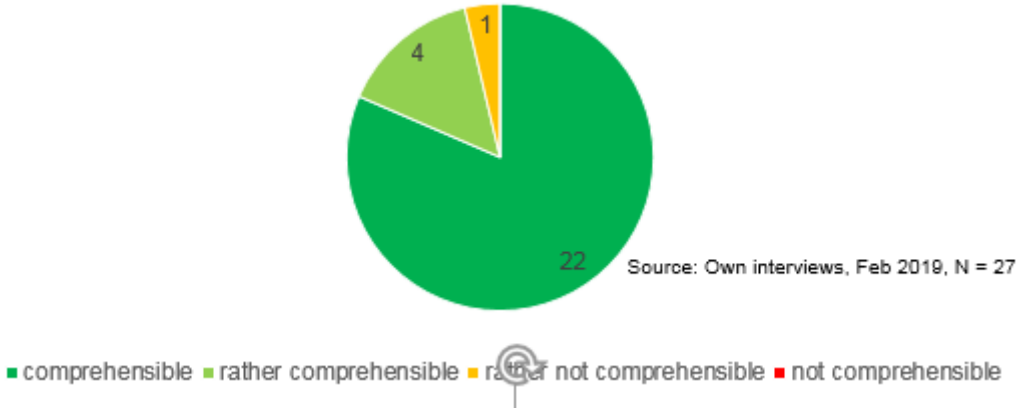

Figure 3: Comprehensibility of points-based premium for environmental and climate protection

The application of the model showed that only few of the farmers in our sample would have to adopt additional measures to qualify (see figure 4 below). Some interviewees were even surprised that they already "do so much for the environment". Seven respondents said they would discontinue current measures if they were not needed to receive the premium and not remunerated otherwise. These referred to measures that were currently remunerated under agro-environmental programs.

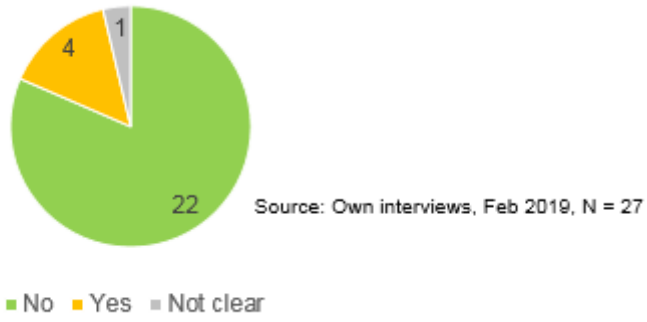

Figure 4: Changes to production structure required to receive the points-based premium?

The amount of the premium for the basic measures was mostly perceived as too low (see figure 5 below). It was clear that respondents implicitly compared the amount with the current basic premium, which in Germany is about 290 Euros per hectare. Notably, at this stage of the interview respondents could not know which payments they would receive under the other elements of the model.

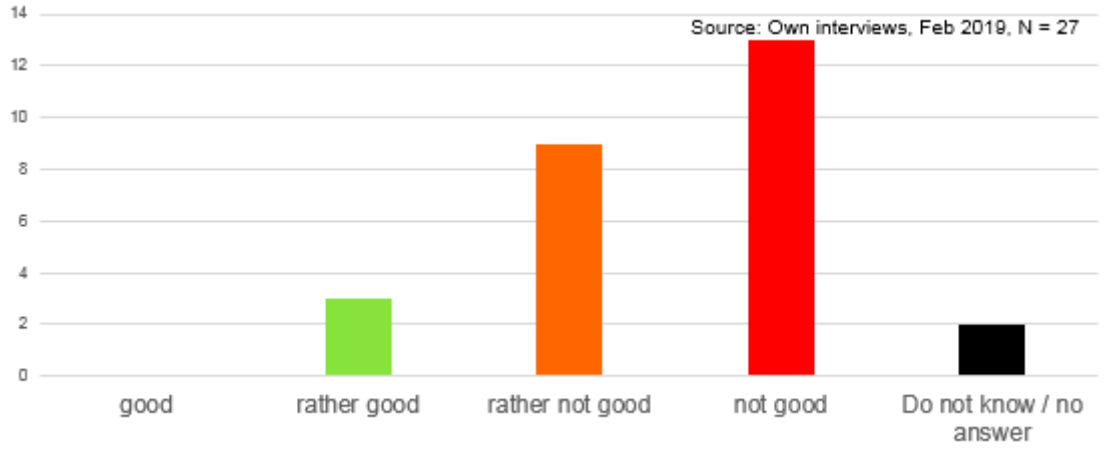

Figure 5: Assessment of amount of premium for basic environmental and climate measures

However, despite the disappointment over the amount, only few respondents would opt out of the premium (see figure 6 below). These were mostly vegetable producers. For the other respondents the premium was seen as an important and indispensable source of income.

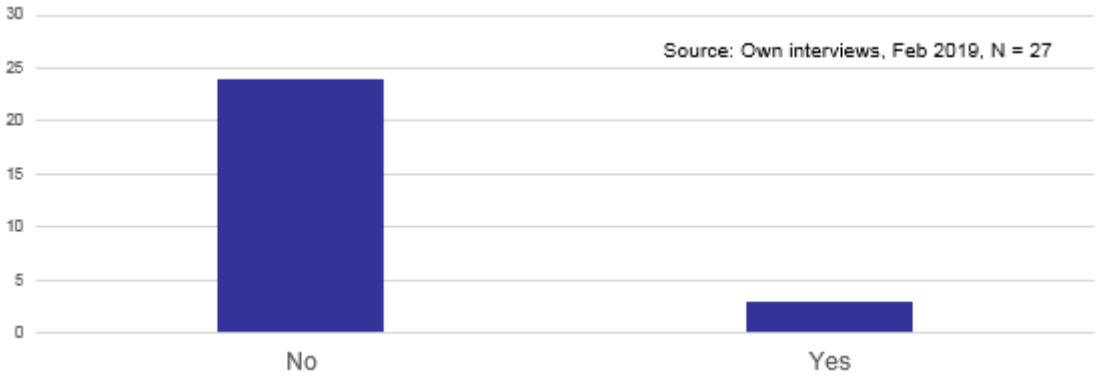

Figure 6: Responses to the question whether respondents would opt out of the premium for basic environmental and climate measures

We then introduced a variation of the points-based model in which farms can accumulate as many points as they like and their premium is determined as their farms number of points divided by the points acquired by all farms and multiplied with the available budget. We call this a market model because the overall amount of points, which represents the supply of environmental and climate measures, determines the price for each point, given a fixed budget that represented the demand.

Among our respondents, the market model was not favourably perceived (see figure 7 below). Interviewees would expect a decrease in the premium. They particularly disliked that the amount per point would be uncertain which would create a lack of planning security.

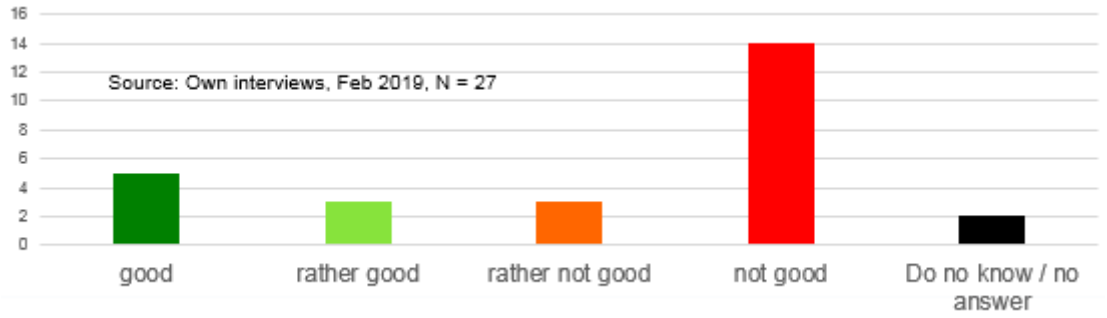

Figure 7: Assessment of points-based premium as a 'market model'

Another suggestion, the differentiation of points according to soil quality points (as an indicator of land productivity and profit foregone) was – not surprisingly – criticized by farmers on poor soils.

5.1.4 Responses to payments for landscape structures

The concept of payments for landscape structures were widely perceived as comprehensible (see figure 8 below).

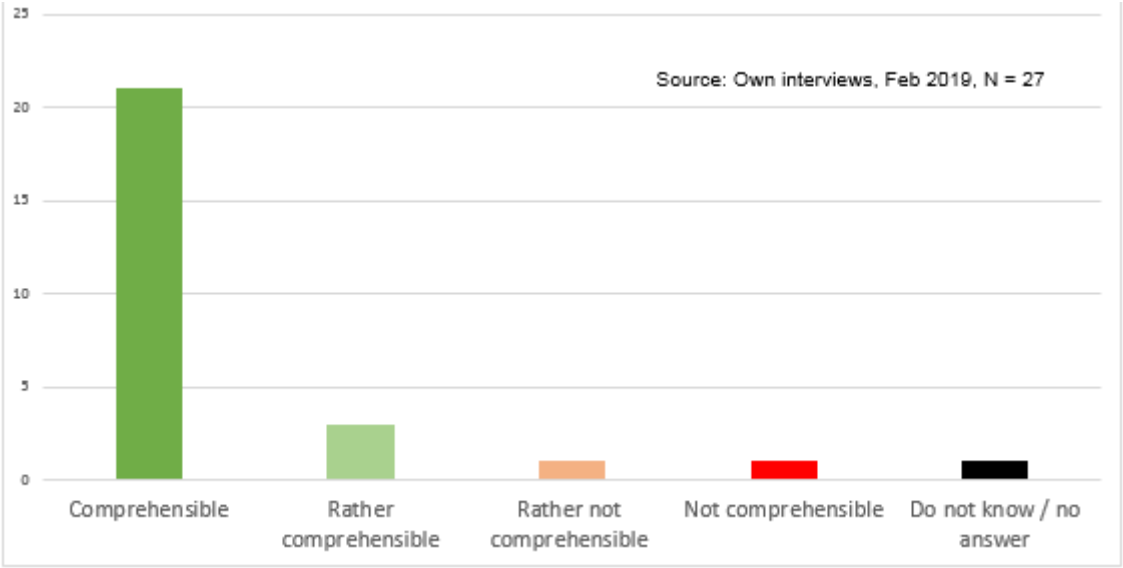

Figure 8: Comprehensibility of premium for landscape structures

We then presented a number of statements and asked the respondents to indicate whether the agree, partly agree, partly disagree or disagree with each statement (see table 5 below).

Table 5: Agreement with statements about the premium for landscape structures

Statement	Agree	Rather agree	Rather not agree	Do not agree	No answer/ Do not know
It is right to link the area-based payments more strongly to how diverse the landscape is on a farm.	9	12	1	5	0
It is right that farms, that have landscape elements on their land receive a remuneration.	24	2	1	0	0

It is good to use satellite and remote sensing data to verify the presence of landscape elements on a farm.	16	7	2	2	0
The automatic allocation of a premium based on remote sensing data reduces bureaucracy.	17	2	6	1	1
Using data from drones for verification purposes is a good thing.	17	3	4	2	1
It is right if farms that have more landscape elements on their land received more money than farms with fewer landscape elements.	17	6	1	2	1

As table 5 above shows, our respondents generally had a positive response to the principle of a premium for landscape structures, but some had productivist objections.

Responses to the fourth statement betrayed some scepticism about control via remote sensing. Several respondents justified their scepticism with past experience that every new instrument had increased bureaucracy.

Asked about the presence of eligible landscape elements, surprisingly some respondents did have no such features on their farm:

- 23 of the 27 farms in the sample had landscape elements on their agricultural land, but 4 did not.
- 25 of the 27 farms had landscape elements bordering on their agricultural land, 2 did not.

Some respondents were particularly positive about the inclusion of bordering structures. However, one participant objected that he would not have control over actions by his neighbour.

When interviewers revealed the amount that our respondents would receive from this premium, responses were very different (see figure 9 below). However, the responses only partly correlated with the presence of landscape elements on their own farm. This requires further analysis.

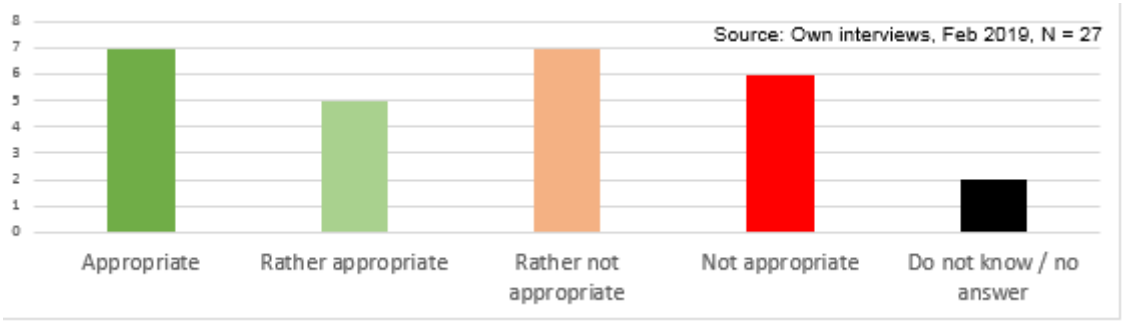

Figure 9: Perceived Appropriateness of remuneration from the premium for landscape structures

We then revealed how the density of the farm compared to the national average, and whether the farm would receive more or less payments from such an instrument than the average farm in the country. This change framing triggered different responses. Generally, farmers below average felt the system was unfair because regionally different structures, while some farmers above the average felt they were overcompensated. However, response patterns were not clear-cut and require further analysis.

In the next question we asked whether our respondents would expect that farms would create new landscape elements to receive a higher premium for landscape structures. 20 of our 27 respondents did expect such an effect, 6 did not find this conceivable, and one said perhaps.

We finally asked whether our respondents themselves would create new landscape elements on their own farm to receive a higher landscape structure premium. 15 respondents said this was conceivable, nine said

this was not conceivable and 3 were not sure. Respondents elaborated inter alia that they would calculate whether the creation of new landscape elements would be financially rewarding. The role of land owners on leased land was seen as problematic for the creation of new landscape elements.

5.2 Findings from focus groups

Pending a more in-depth analysis of the workshop discussions, at this point we want to highlight selected key issues that were raised by the participating experts.

Points-based premium:

- For WTO compatibility it is essential that the system is based on cost and income foregone.
- If the calculation of costs (and hence the allocation of points) is not differentiated by region, there is a significant risk of creating windfall profits and/or little take-up rated highly productive land.
- If measures are not specified with a view to regional needs, and if costs are not calculated on a regional basis, the steering capacity of a generic points-based model is limited.
- To have an ecological effect, farmers should commit for a set of measure over several years. This, however, could create a psychological barrier. An opt-out option could overcome anxieties by farmers to be trapped in a system with uncertain implications.
- The list of measures does not address all environmental issues. Any generic points-based premium would ned to be complemented with more targeted and regionalised agro-environmental programs.
- A mechanism is needed to ensure that measures cover the entire farm and that leakage is prevented.
- Differentiation of the premium according to soil quality was discussed controversially.
- More attention should be paid to issues of soil preservation.

Premium for landscape diversity

- The principle of paying farmers for landscape features that already exist received intense discussion. Some participants fundamentally disagreed, others supported the aim to create financial for landscape features.
- It was widely agreed that the instrument would provide incentives to create new landscape elements.
- Several participants felt that reception of the premium should be conditional on active measures to maintain the landscape elements.
- Starting to pay for already existing landscape elements could trigger their destruction if the payment would be phased out in the future.
- Conditions in contracts for leased land could be a barrier of land owners are opposed to measures that reduce the productive capacity of their land.
- A possible danger is that farms could concentrate their landscape elements in one part of their land while intensifying the management of the remaining land, unless appropriate counter-measures are taken.
- Different opinions were voiced whether the amount paid should be differentiated by type of landscape element, whether payments should be based on opportunity cost and/or on ecological value in a particular region.
- A critical implication is the re-distribution of the model across regions. Payments could therefore be based on changes against a baseline scenario.

6 Discussion and conclusions

The research presented here builds on the ZANEXUS project, which provided a critical assessment of the environmental impacts of agriculture in Europe and specifically in Germany. It described the capability of the current CAP to address these environmental problems as impeded by its institutional path dependency, which has limited the agro-environmental ambition of past reforms to marginal additions around a policy core geared towards income support for farmers. The ZANEXUS project therefore developed a proposal for

a possible new architecture of the CAP, which was presented to the public in January 2017, thereby preceding the legislative proposals for the CAP post-2020 by the Commission.

This paper has focused on two elements of the ZANEXUS model which can be understood as attempts to link direct payments to environmental performance and outcome: a points-based premium for basic agro-environmental, climate protection and animal welfare measures and a premium for landscape diversity. While starting from an interest in enhancing the environmental performance of the agricultural sector, and from the principle that all payments should be linked to specific measures and/or outcomes, the conceptual design of both instruments still betrays a significant degree of path dependency, i.e. a modification rather than an abolishment of the system of land-based direct payments.

The hypothetical application of the model to selected farms in Germany demonstrated that farmers found the entire model and each instrument comprehensible. Respondents also often agreed with the underlying principles. The overall assessment of the model, however, mostly depended on its financial effects on the farm, with the currently received payments as the measuring rod.

When assessing proposed instruments, it is important to note that the effect of each instrument depends on the overall policy design. The integrity of each instrument depends on its embedding in the overall architecture of regulatory minimum standards, the conditions for direct payments and the menu of mandatory and voluntary measures.

Regarding their environmental effectiveness, efficiency, acceptability and controllability, both types of instruments have potential weaknesses.

The environmental effectiveness and efficiency of the points-based premium for basic agro-environmental, climate protection and animal welfare measures depends in particular on the list of measures, the allocation of points and the calculation of the costs from which the remuneration is derived. Unitary lists of measures, cost calculations and point allocations significantly reduce the steering capacity of a points-based premium. The acceptability of such an instrument among farmers appears to depend largely on the comparison with current levels of payments, unless farmers perceive that the current system of payments with unambitious conditionalities would no longer be politically supported. Controllability of the measures was a major concern. However, the list of measures offered in the test application contains mostly data that are already included in current control systems.

The environmental effectiveness of the "premium for landscape diversity" received contradictory assessments. While the underlying principles were mostly agreed by the farmers in our interviews, expert participants in several workshops disagreed that farmers should be paid for "something that is already there". Other participants, however, agreed to the idea that such an instrument would valorise landscape features. There was consensus that such an instrument would incentivize the creation of new landscape elements. The efficiency of such an instrument will again depend on implementation details and the level of premiums offered. Making the payment conditional on active stewardship of the eligible elements could enhance the integrity of the system. The acceptability of a premium for landscape diversity was generally high. However, if the premium creates major redistributional effects between farms, regions or member states, acceptance among (potential) losers would be low. The controllability of this instrument was mostly perceived well, given that it builds on already available data. However, updating of the database through remote sensing and drone-generated data could create high transaction costs if the IT systems are not well designed.

Overall, the two instruments discussed here present different strategies to link direct payments to "green" outcomes. Our empirical findings suggest that both strategies could be implemented during the next CAP period, given the political will. Direct payments could be linked either to a required minimum level of "green" measures or to the presence of landscape features, or both. The effectiveness and efficiency of both strategies depends on the details of the policy design. For both instruments, our findings indicate that generic lists of measures and payments based on generic cost calculations a likely to create limited steering potential.

There is significant potential in both types of instruments to create windfall profits through payments for unambitious measures. Interested political parties are likely to detect and exploit such weaknesses during the conceptualisation and implementation stages, as happened during the watering down of the greening requirements in 2013. Potential counter-strategies would be the regionalization of measures and cost calculations, and the monitoring of progress against a baseline scenario. This, however, would require a solid database.

The basic form of both types of instruments presented here could also be fitted into the new "delivery model" proposed by the Commission for the post-2020 CAP, either as enhanced conditionality or as eco-scheme. However, the more dynamic versions of both instruments that would simulate a market for environmental measures or landscape elements respectively are more difficult to align with the administrative logic of both area-based direct payments or agro-environmental programs that provide cost-based payments for specified measures.

Overall, our findings indicate that linking direct payments to "green outcomes" is likely to be a second-best strategy for improving the environmental performance of Europe's farms or to achieve environmental benefits in agricultural landscapes, compared to targeted regional programs based on an analysis of needs and a baseline. Attempts to enhance the environmental steering capacity of direct payments are likely to assimilate them to agro-environmental measures. Clearly, more targeted approaches to improve the environmental effectiveness of conditional direct payments contradicts the intended non-discriminatory character of area-based payments as 'flat rate'. The best argument for linking direct payments to green outcomes as a strategy to achieve agro-environmental aims is therefore probably a strategic one: it accepts the path dependency of the CAP and its current system of direct payments and is therefore likely to encounter less resistance than a full-blown system change.

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8 Appendix 1

Maßnahmen Ackerbau

- Fruchtartendifferenzierung: 4 Kulturen
- Fruchtartendifferenzierung: 5 Kulturen und mehr
- Winterbegrünung
- Mulchsaat, Streifen- oder Direktsaat
- Herbizidverzicht
- Blühflächen und -streifen
- Brache
- geringe Kulturdichte
- späte Stoppelbearbeitung
- Stehenlassen von Teilflächen im Kleegras
- Mosaiknutzung im Kleegras
- Anbau seltener Kultursorten
- Mineraldüngerverzicht
- Wasserschutzstreifen (6m)
- Umwandlung Ackerland in Grünland

Maßnahmen Grünland

- extensive Grünland Nutzung
- reduzierte Düngung
- Heunutzung (nur Milcherzeuger)
- Verzicht Bewirtschaftungsmaßnahmen
- Mahdtermin ab 1.6.
- Mahdtermin ab 1.7.
- Mahdtermin ab 1.8.
- Mahdtermin ab 1.9.
- Hochschnitt (12cm)
- Saumstreifen
- Wasserschutzstreifen
- überjährige Streifen

Maßnahmen Tierhaltung

- extensive Beweidung
- Sommerweideprämie
- artgerechte Stallsysteme – Milchkuh
- artgerechte Stallsysteme – Mastschwein
- Haltung vom Aussterben bedrohter Nutztierrassen (Rinder, Pferde)
- Haltung vom Aussterben bedrohter Nutztierrassen (Schweine, Ziege, Schafe)