



Towards multifunctional agricultural landscapes in Europe: Assessing and governing synergies between food production, biodiversity, and ecosystem services – TALE

Policy analysis – report of work package 1

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Glossary

AECM	Agri-environment-climate measure(s)
AKIS	Agricultural Knowledge and Innovation System
ANC	Areas facing natural or other specific constraints
ANLb	Agricultural Nature & Landscape Management
AP	Agricultural policy
AT	Austria
BAT	Best Available Techniques
BLW	<i>Bundesamt für Landwirtschaft</i> (Federal Office of Agriculture)
BPS	Basic Payment Scheme
CAP	EU Common Agricultural Policy
CF	Cohesion Fund
CH	Switzerland
CPR	Common Provisions Regulation
DE	Germany
DZV	<i>Direktzahlungsverordnung</i> (Direct Payments Ordinance)
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
EFA	Ecological focus area(s)
EMFF	European Maritime and Fisheries Fund
ERDF	European Regional Development Fund
ES	Spain
ESF	European Social Fund
ESI	European Structural and Investment
ESS	Ecosystem services
FAS	Farm Advisory System
GAEC	Good agricultural and environmental conditions
GAK	<i>Gemeinschaftsaufgabe "Verbesserung der Agrarstruktur und des Küstenschutzes"</i> (Joint task "Improvement of the agrarian structure and the coastal protection")
GHG	Greenhouse gas
IoS	Institutions of Sustainability
IUV	Initial Unit Value
LFA	Less Favoured Area(s)
NL	The Netherlands
NUTS	Nomenclature of territorial units for statistics

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ÖPUL	<i>Österreichisches Programm zur Förderung einer umweltgerechten, extensiven und den natürlichen Lebensraum schützenden Landwirtschaft</i> (Austrian Programme for Environmentally Friendly Agriculture)
PA	Partnership Agreement(s)
PEP	Proof of Ecological Performance
PES	Payments for Ecosystem Services
PES	Payments for Ecosystem Services
RDP	Rural Development Programme(s)
SAPS	Single Area Payment Scheme
SDG	Sustainable Development Goals
SMR	Statutory management requirement(s)
SN	Saxony
SPS	Single Payment Scheme
TH	Thuringia
UUA	Utilised agricultural area
WFD	Water Framework Directive
WP	Work package



Executive summary

Within the project TALE, work package 1 “Policy analysis” assesses the institutional framework impacting on agricultural land use, biodiversity conservation and the supply of selected ecosystem services in the TALE case study regions Broye catchment (Switzerland, CH); Ilm/Mulde river basin (Germany, DE); Kromme Rijn (The Netherlands, NL); Cega-Eresma-Adaja basin (Spain, ES) and Mostviertel (Austria, AT). The aim of this exercise is to identify and understand institutional structures, to identify policy strategies and examples for “good practice” or innovative policy measures and thus to lay the foundation for policy recommendations in connection with land use scenarios in TALE.

This report provides an overview on results of work package 1. After describing the methodology of the policy analysis and listing EU, national and regional strategies in the relevant policy fields, different types of agri-environmental instruments, namely regulatory, economic or advisory and institutional instruments are characterised in general. Which policy measures are implemented in the case study regions is described in more detail, focussing on measures that directly influence agricultural land use and land management in the TALE case study areas. Also the governance structures which shape the concrete implementation of policy measures are included.

While sectoral legislation is setting the mandatory baseline, various measures of the agricultural policies of the EU and of Switzerland aim at providing incentives for an environmentally sound management in particular via direct payments with attached environmental conditions and agri-environment climate measures (AECM) and comparable payments in Switzerland. Advice and extension services can help to reach environmental objectives in agriculture for example by increasing the acceptance of policy measures and/or implementing them more effectively. Further instruments, such as planning instruments, are included in case of specific importance in single case study regions.

The way agri-environmental policies are designed and who influences this process and the way they are implemented on the ground certainly affect their effectiveness and efficiency. The governance structures in the TALE case study regions vary and mainly depend on the overall administrative structures in the specific countries, especially regarding the division of power between the central government and the regions.

The described measures all support, to a stronger or lesser degree, a land-sharing approach. However, various target areas are regulated or supported with a different intensity.

Some rather innovative approaches, such as collective action and result-oriented schemes, for which we found several examples in the case study regions, require high commitment from farmers and willingness to communicate and to learn and are thus bound to have lasting effects on environmental awareness.

Overall, the analysis shows that the EU and Switzerland have developed elaborate systems of policy instruments aiming at making agricultural land use more environmentally friendly. In order to increase their effectiveness and also their efficiency, good practice examples should be shared and adopted more frequently.



1 Background, objectives and methodology

1.1 Background and objectives of the policy analysis within TALE

The TALE project analyses the pressure on natural resources that increases due to multiple competing demands for land. The resulting demand driven land use changes come at a cost in the form of trade-offs between food or bioenergy production, biodiversity conservation and other ecosystem services (ESS) like clean water, erosion control or soil fertility. By assessing and governing synergies between food production, biodiversity and ecosystem services, TALE will develop related strategies. Across Europe countries differ regionally with respect to biodiversity, landscape structure, structure of the agricultural sector, conflicts regarding the provision of ESS (e. g. production vs. soil protection or water provision) with regard to preferences for particular agricultural ESS (e. g. provisioning versus regulating or cultural services). Integrated approaches are required that cover a representative range of ESS over contrasting case study landscapes. Within TALE the ESS are defined by a set of common indicators to be quantified in each case study region. By providing regional indicator assessments, TALE enhances the knowledge base on ESS provision across Europe. Common methods and tools are applied to allow for comparability and to enable the transferability of case study results and related implications to other regions in Europe.

The provision and the protection of biodiversity and ESS in agricultural landscapes are influenced by various policy measures. Work package (WP) 1 analyses the institutional framework impacting on land use decisions regarding agricultural land use, biodiversity conservation and the supply of selected ESS in the TALE case study regions Broye catchment (Switzerland, CH); Ilm/Mulde river basin (Germany, DE); Kromme Rijn (The Netherlands, NL); Cega-Eresma-Adaja basin (Spain, ES) and Mostviertel (Austria, AT).

The aim of WP1 is to identify and understand institutional structures at the regional level, to identify policy strategies and examples for “good practice” policy measures and thus to lay the foundation for policy recommendations in connection with land use scenarios in TALE.

The core tasks of WP1 are:

- the collection, categorisation and comparative analysis of existing instruments and policy measures steering actively or influencing strongly the use and management of agriculturally used land in the case study regions of TALE, and
- to describe and assess the governance structures which shape the concrete implementation of policy measures.

The analysis aims at delivering insights into the characteristics, design and application of policy instruments and policy measures considering different land use types, targeted policy fields, mechanisms of supporting or prescribing certain ways of land management and regarding governance structures. WP1 thus provides background information and a reference point for TALE regarding the development of scenarios and future land use options and related policies. WP1 also intensified the stakeholder processes of the project by building up contacts and knowledge regarding policy settings in the case study regions. **As a very broad arena is covered (different case study regions, various policy fields, a number of different**



instruments and measures) the policy analysis does not aim to be exhaustive and elaborate on every detail, but try to identify general options of how to regulate, incentivise and govern agricultural land use and strengths and weaknesses of different approaches. The focus is on key policy fields and measures that apply to all or most of the case study regions. Selected regional-specific approaches are also included with special attention on “good practice” policy measures which already proved to be successful or “innovative approaches”, both of which might be transferrable to other case study regions and included in future scenarios. In line with the project proposal also the aspect of segregative or integrative approaches (land sharing/land sparing) is considered: In how far are agri-environmental policies directed at the wider agricultural landscape compared to approaches that concentrate on certain target areas (e. g. for nature protection)?

1.2 Contents of this report

This document gives an overview on results of WP1 “Policy analysis”. After describing the methodology of the policy analysis, chapter 2 summarises EU, national and regional strategies in the relevant policy fields. In chapter 3 different types of instruments for steering land use are characterised in general. Which policy measures are implemented in the case study regions is described in chapter 4, while chapter 5 elaborates on governance structures. The findings are summarised in chapter 6.

1.3 Methodology

1.3.1 Institutions of sustainability (IoS) and its adaptation to TALE

The IoS as an analytical framework

Understanding how farmers take land use decisions (which again affect biodiversity conservation and ESS supply) requires the identification and analysis of the relevant elements and structures of these interactions. Developing an understanding of these processes and interactions is the key building block for policy recommendations on future land use strategies.

The analytical framework “Institutions of Sustainability” (IoS) from Hagedorn et al. (2002) provides an applicable basis for such an analysis. It considers five different elements: Institutions, governance structures, actors, properties of transactions and the actions arena. Institutions are “the rules of the game in a society or, more formally, the humanly devised constraints that shape human interaction” (North 1990). Institutions are often laws and regulations but can also be unwritten norms or traditions such as traditional agricultural practices. Governance structures can be defined as “organisational solutions for making institutions effective, i.e. they are necessary for guaranteeing rights and duties and their use in coordinating transactions” (Hagedorn 2008). Such governance structures are e. g. administrative hierarchies to transpose EU legislation into national policy measures; farm advisory services structures are also a governance structure. Analysing governance structures requires the identification of actors, their position, characteristics, attitudes, perceptions and how they act in decision making processes (see Prager et al., 2011). Actors are defined as all persons or groups related to the object of analysis. An analysis of nature-related transactions in agriculture focusses on the effect farming practices as technical measures have on



environmental conditions. The following definitions (see box below) show what we understand by “instruments”, “policy measures” and “technical measures”.

- **“Instruments”** (or “policy instruments”): Different ways of delivering desired measures e. g. regulatory measures or advice.
- **“Policy measures”**: Concrete piece of legislation or support measure defined under the framework of an instrument with concrete requirements (e. g. maximum allowed N-input, ban on converting permanent grassland into arable land etc.). Policy measures may be e. g. single agri-environment-climate measures (AECD¹) such as “support of traditional orchards”, “extensive management of grassland”, “establishment of flowering strips” or pieces of legislation such as the EU Nitrates Directive, the Decree on the Use of Fertilisers (*Besluit gebruik Meststoffen*) in The Netherlands, or the Nature Conservation Law in Thuringia in Germany.
- **“Technical measures”**: Concrete land management practices in the field, e. g. mowing only after the 15th of June, abstaining from fertiliser application, direct seeding, establishing flowering strips, etc.

The centre of the IoS is a specific action situation that is defined by the research object – a social environmental interaction issue such as “soil conservation practices and policies” (an example provided by Prager et al. 2011) that is further broken down into different levels of interaction such as farming practices, policy implementation and policy design. All the above illustrated factors – institutions, governance structures, actors and nature-related transactions - influence the action arena.

Adaptation of the IoS to the requirements of TALE

In TALE, the action situation can be described as the interlinkage of land use practices, EES and biodiversity provision and related policies. For the operationalisation the action situation can be further broken down into four different steps: “design of policy instruments”, “transposition into policy measures”, “implementation of policy measures” and “technical measures”.

Starting with the first, the “design of policy instruments” is the stage at which decisions on the type of policy instrument and on the policy content are taken. This also includes the design of the specific policy measures, which requires the definition of technical measures that are to be regulated or supported. In some cases policies have to be transposed e. g. from EU level into national legislation. In order to become effective, policy measures have to be implemented at the regional or local level, that means farmers have to be informed and might require specific advice, participation in voluntary measures and payments have to be administrated, and compliance with mandatory requirements or contractual agreements have to be enforced.

How the processes of each step are organised is highly dependent on existing institutions as well as modes of governance and the characteristics and the power of actors/actor groups. Moreover, governance structures but also rules set e. g. at EU level, determine what kind of actors are to be integrated into decision making processes. This part of the analysis can be described as “**institutional and policy analysis**” and provides the methodological framing

¹ AECD, formerly agri-environment measures, are support measures offered under the CAP. Farmers are being paid a fixed amount per hectare (or other units such as numbers of livestock or trees) for a specific farming practice. Participation is voluntary (see also chapter 4.4).



for the analysis in WP1. Based on Prager et al. (2011) we consider the following steps to be part of the institutional and policy analysis:

1. Identification of EU, national and regional objectives in the relevant policy fields
2. Identification and characterisation of most relevant types of instruments
3. Identification and description of policy measures prescribing or incentivising certain technical measures
4. Governance structures for the implementation of policy measures including the identification and characterisation of actors (which actors at what administrative level are relevant for policy design, implementation and transposition; what are their responsibilities and interests)

Existing officially proclaimed environmental targets at EU-, national and regional level (e. g. biodiversity strategies) are compiled in order to illustrate the political requirements in this field, which are to be addressed by policy measures (see chapter 2.2). After chapter 3 lists and characterises types of policy instruments in general, chapter 4 describes the concrete policy measures implemented in the TALE case study regions. Actors and governance structures are assessed in chapter 5.

Additionally, the bio-geo-physical conditions, the agricultural structure, as well as ESS functions and the interrelation with the actual land management and farming practices are relevant in the IoS-concept, the so-called "**agri-environmental analysis**" (see Prager et al. 2011). However, assessing farming practices regarding their environmental impact is not a focus of WP1. At this point we refer to the well-established knowledge on this issue and the multiplicity of existing scientific literature. Also a detailed evaluation across the different types of instruments with their high number of policy measures and also the broad spectrum of policy fields was way beyond the scope of TALE. The components of the agri-environmental analysis have thus been treated as follows:

- For the general biophysical and land system (agricultural land use and agricultural structure) settings of the different case study regions as well as major driving forces and environmental pressures in the case study regions connected to agricultural land use we refer to WP5 (Van der Zanden et al. 2016) (for a summary see chapter 2.1 below).
- Assessment of policy impacts: The identified technical measures have been rated according to their impacts on the different policy fields (e. g. water protection, biodiversity) (see Annex VI). Examples for effects of concrete policy measures are included in chapter 4.

Within WP1 we aim to answer questions such as:

- Which type of land use, which policy fields and which technical measures are addressed by which types of instruments? What is similar across the case studies, what is specific for single case studies e. g. do mandatory or voluntary measures dominate; does this differ depending on the policy fields or between the case studies?
- Do integrative or segregative approaches dominate: Do policy measures address predominantly the wider agricultural landscape or do they focus mainly on target areas? Does this differ depending on the policy fields, the instruments or between the case studies?



- Regarding payments for ecosystem services (PES): Which are the most relevant measures/measure types in and across the case study regions?
- Which “new” or “innovative” approaches may be particularly promising and also interesting for other case study regions?

1.3.2 Focus of the analysis

ESS, public goods and policy fields

Based on the project proposal, discussions at the TALE kick-off meeting and a first compilation of indicators to be used in the case study modelling exercise within WP2, a number of ESS have emerged as being particularly relevant within TALE. Those have been, in addition to biodiversity, considered for the policy analysis in WP1

The concept of ESS has been developed within ecological science to describe the dependence of human societies on certain ecosystem functions which are the basis of related services (Daily 1997). Ecosystems generate different types of services through the functioning of ecosystems, namely “provisioning”, “regulating and maintaining” and “cultural” services. Services might be valued by markets (e. g. the production of food), but often the public characteristics of many services require further policy and institutional actions in order to foster their provision or conservation.

Ecosystems are strongly influenced by human activities such as farming. Agricultural land use may result in positive (e. g. maintenance of the cultural landscape) or negative (e. g. N-emissions) environmental externalities. We include the control of negative externalities also in the policy analysis within TALE, as the relevant measures are means to conserve ESS at a minimum level. In which cases which type of instrument is applied, i.e. mandatory limits to N-application on one side, or farmers getting paid to reduce fertilisation in order to avoid N-emissions to the groundwater, is – finally – a question of defining the boundaries of property rights (see e. g. Matzdorf et al. 2014): Who bears the costs in which case is a societal decision, which may differ across countries and also change over time. The “polluter-pays-principle” obliges farmers to bear costs of preventing negative environmental impacts of their management, as long as these activities are not based on entitlements under private property rights. Above this level (Scheele 1999 referred to it as “reference level”), society pays for incentives to provide positive environmental effects (see figure 1).

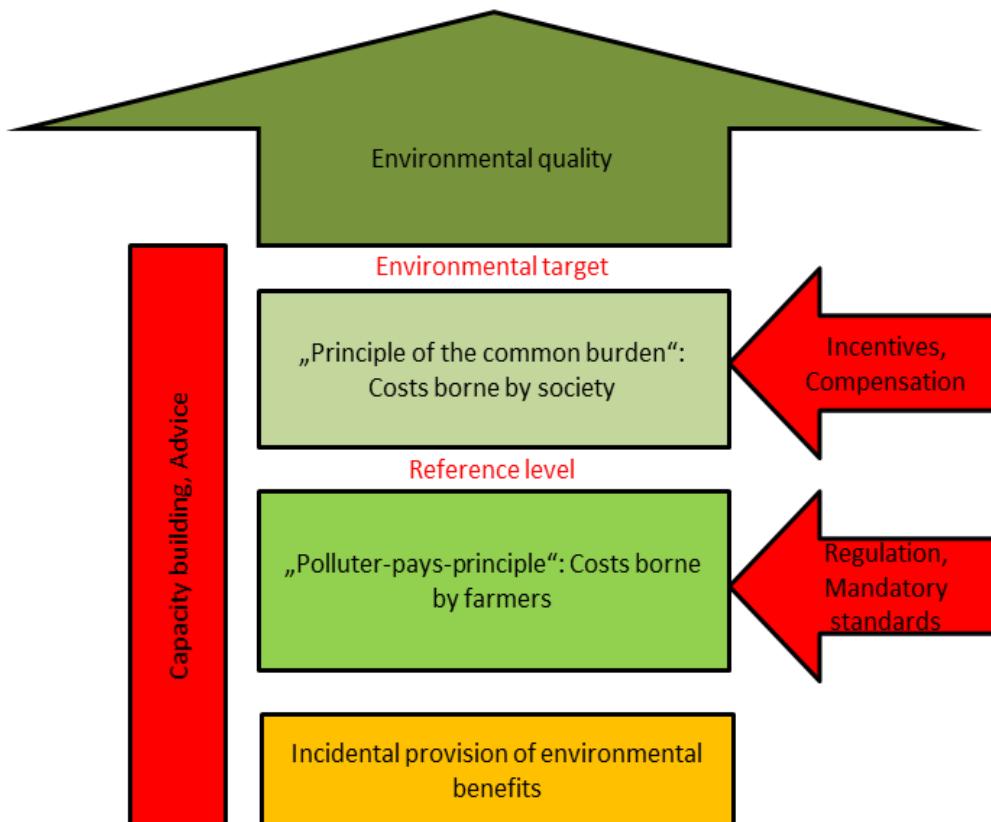


Figure 1: Policy instruments and principles of allocation of costs

Adapted from Scheele (2010: 14), Cooper et al. (2009: 13), OECD (2001) and Scheele (1999)

Most ESS are interconnected. Thus policy instruments can make use of synergies. On the other hand conflicts may occur. For example, water protection might be a side-effect of extensification of land management with the primary objective of biodiversity protection. There is clear evidence, that diverse ecosystems support ESS with high importance for agricultural production such as pollination, biological pest control or soil fertility (e. g. Kleijn et al. 2009; Tscharntke et al. 2005). Conversely, intensive production may conflict with other ESS: Main reasons for the loss of biodiversity in agricultural landscapes are due to agricultural intensification processes within the previous decades (see e. g. reviews of Attwood et al. 2008; Benton et al. 2003; Donald et al. 2006).

Restricting the analysis on the ESS most relevant in TALE facilitates comparability between case study regions and keeps the analysis manageable. Apart from the **production of crops and livestock** as the main purpose of agricultural activities, central ESS or environmental aspects for analysis within WP1 are:

- **Biodiversity** is as such no ESS but is linked to maintaining nursery populations and habitat as well as to pollination
- **Chemical water conditions**: reducing N-losses from agriculturally used soils to water courses and groundwater (pesticides are not considered specifically as they are also not a focus of the TALE modelling approach)
- **Control of erosion rates**



Climate protection is in so far part of the policy analysis as soil organic C is concerned. As organic soils do not seem to be particularly important in the case study regions, the relevance of this indicator is limited: protection of grassland preserves soil organic matter as do some management practices on arable land, although the accumulation of soil C on arable land can be reversed quickly. The reduction of further greenhouse gas (GHG)-emissions is often a side-effect of measures reducing livestock density or increasing N-efficiency. In the field of water quantity, irrigation is included, in the case study regions concerned. We also point out side effects of measures on the aesthetic landscape value.

Scope of instruments and measures

WP1 concentrates on **instruments and measures that directly influence agricultural land use and land management in the TALE case study regions**. This includes open land biotopes that need maintenance through agricultural activities such as mowing or grazing, even if this happens mainly for nature conservation. Forest land or land occupied for infrastructure will not be included. Livestock that is not directly linked to land use e. g. via grazing is only taken into account by limitations of an allowed maximum application of organic fertiliser or by maximum or minimum livestock densities per hectare.

1.3.3 Sources of information

In order to acquire comparable information on policy settings and governance in the case study regions two templates were designed, specifying the information needed and potential sources. Project partners were asked to provide information on:

- Strategies and obligations concerning agricultural land use and its environmental impacts
- National and/or regional implementation and specifications of the CAP and of the Swiss agricultural policy
- Relevant environmental regulation
- Additional measures
- Actors and governance

Sources of information were public documents and legislative texts but also expert interviews with representatives of the agricultural or environmental administration, farmers' organisations and NGOs or feedback from regional stakeholder meetings.

While information on measures of the agricultural policies and also legislative texts are generally available (albeit mostly not in English), facts on governance (administrative setting, enforcement, advice) have partly been difficult to acquire. Also information on the coverage of voluntary support measures and their effectiveness is limited in so far, as due to the latest CAP reform, most of those measures were only offered from 2015 on and detailed numbers had not been published yet at the time of the analysis. Partners provided the information.

The contribution of project partners has been backed up by research on policies at EU-level and further publicly available German and English information regarding case study countries. The information has been acquired mainly within the first half of the year 2015. For all information stemming from own research by the authors of this report the specific sources are cited. All other information is taken from the partners' contributions. Information from the case study teams was checked for obvious inconsistencies by the authors and cross-checked with

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publically available information in German or English, where possible. The case study teams were asked to proofread the texts compiled by the authors of this report. Although the information gathering and analysis was carried out with true care completeness and absolute accuracy cannot be guaranteed.



2 Case study regions and EU, national and regional objectives in the relevant policy fields

2.1 Characteristics of the case study regions

Analysis of policy measures, development of land use scenarios and modelling of land use options in TALE is carried out within five case study regions (see figure 2).

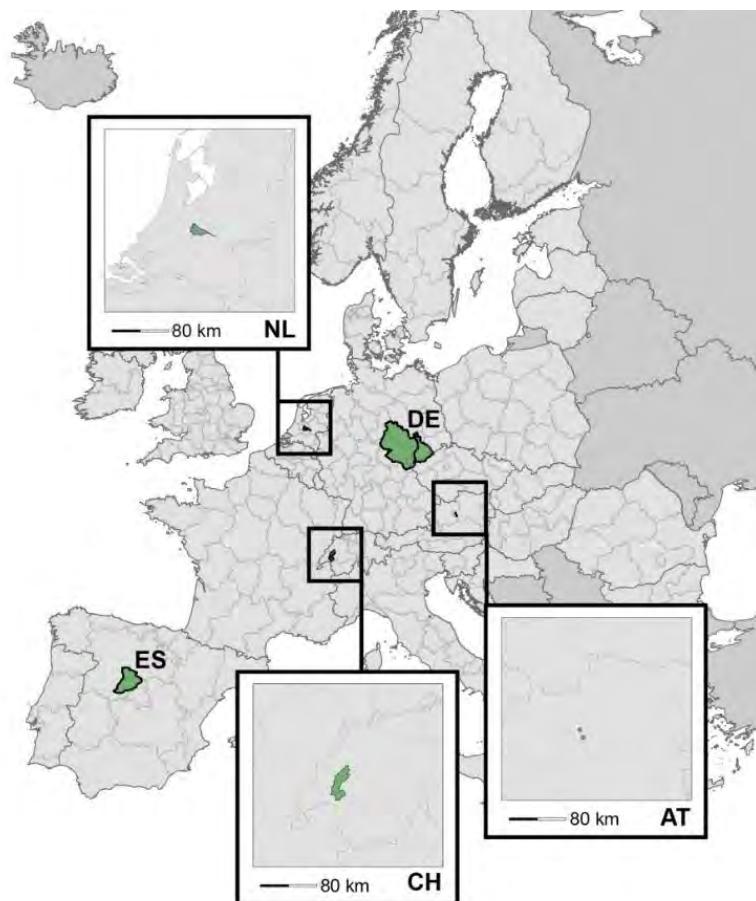


Figure 2: Location and outline of TALE case study regions

Source: van der Zanden (2016)

The characteristics of the different case study regions have been compared within WP5 (see van der Zanden et al. 2016):

- **The Austrian Mostviertel (AT)** is part of the federal state of Lower Austria (NUTS² 2). Land use ranges from intensive arable farms, prone to further intensification in the future, to a more extensively managed grassland dominated landscape, which is at risk of land abandonment. Also landscape elements such as orchard meadows are of importance.

² NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the European economic territory. NUTS 2 represents basic regions for the application of regional policies.



- **The Broye catchment in Switzerland (CH)** in the Canton Vaud (NUTS 3) (and also partly the Canton Fribourg) contains medium-scale intensive arable land, but also open large-scale grassland. Since water for irrigation is mostly abstracted from the surface water of the Broye river, conflicts of water use can emerge in particularly dry years with negative impacts on water quality and aquatic biodiversity.
- **In the German Ilm/Mulde river basin (DE)** large-scale very intensive arable land dominates, some area is large-scale extensive arable land. The Ilm watershed shows a gradient from the hilly regions to the flat Thuringian basin. It is subject to two administrative regions, the federal state (NUTS 2) of Saxony and the federal state of Thuringia.
- **The Spanish case study region (Cega-Eresma-Adaja basin) (ES)**, a Mediterranean heterogeneous landscape with pine forests, mostly rain-fed cereal agriculture, pastures and irrigated lands, is located in the Southern Central Plateau of Spain and is part of the Douro River Basin. It is characterised by medium-scale intensive arable land, but also large-scale extensive arable land. Around 30 % of the territory has protected legal status, which is highly fragmented across the territory. Overall, there are two main drivers of change that are threatening the maintenance of biodiversity and ESS. On the one hand, traditional agricultural activities with high value for biodiversity are being abandoned. On the other hand, agricultural activities on the low lands are increasingly being intensified, leading to mosaics of grasslands and rain-fed cereal agriculture being replaced by large scale cereal production, increase of irrigated farming and replacement of traditional livestock rearing by intensive pig farms. From a water resources point of view, aquifers in the area suffer from over-extraction and nitrogen pollution. The case study region is part of the administrative unit Castile and León (NUTS 2).
- **The Kromme Rijn area in The Netherlands (NL)** has small-scale intensive grassland and enclosed intensive mosaic land use. It also includes a per-urban/urbanisation gradient with related pressures on land. It is part of the Province of Utrecht (NUTS 2).

Apart from the Dutch case, the share of arable land in the case study regions is very high: > 90 % of the agricultural area in AT, CH and ES, > 80 % in DE (only 14 % in NL). From a European perspective, grassland, permanent crops and extensive systems are rather unrepresented.

Changes in agricultural funding and economic aspects of agriculture including structural growth and pressures due to high intensity of agricultural production are major drivers of environmental change in the case study regions. Water quality and nutrient load are environmental threats in all case study regions. Also loss of permanent grassland occurs in most of the areas, apart from the Swiss case, as does soil degradation (with the exception of The Netherlands). Fragmentation and/or loss of landscape elements have been named in Austria, Germany and Spain. Water quantity (drought limitations and increasing irrigation not least due to climate change) is an issue in particular in the Spanish and the Swiss case study regions and is in Spain also connected to salinisation. Abandonment of land concerns again the Spanish but also the Austrian case.



2.2 Strategies with potential relevance for the environmental impacts of agricultural land use on a global level

Strategies and officially proclaimed targets represent main commitments of governments, justify the need for action and are part of the setting in which policy measures are developed. The performance of policy instruments has to be evaluated against the objectives set in strategies, laws or agreements. Are there instruments in place that address the formulated objectives? Are the instruments theoretically suitable to reach those objectives and are they implemented in a way that the objectives are actually met? Strategies and adequately chosen objectives can therefore be very valuable to guide policy design and evaluation.

In order to illustrate the political requirements in the field of agricultural land use, which are to be addressed by policy measures, existing officially proclaimed environmental targets at global, EU-, national and regional (case study) level were compiled. The relevant targets are shortly described in the following paragraphs. For more detail on global and EU strategies, please refer to Annex I.

On the global level the following selected international agreements related to the environmental impacts of agricultural land use are in place:

- Convention on Biological Diversity (from 1993 / Aichi Targets from 2010): the Convention addresses several issues related to agricultural land use and sets targets accordingly, e. g.
 - Target 7: by 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity or
 - Target 8: by 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity (CBD 2016).
- United Nations Framework Convention on Climate Change (from 1994, UNFCC 2014): the overall objective is the stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Convention makes references to agricultural land use, e. g. in the respect that sustainable land management and combating desertification/land degradation should contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change (strategic objective 3, expected impact 3.1). The so-called “Paris Agreement” that builds upon the Convention entered into force in November 2016. The Paris Agreement’s central aim is to keep the global temperature rise this century below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. It requires all signatories to put forward their best efforts through “nationally determined contributions” (UNFCC 2016).
- Sustainable Development Goals (2016): The 17 SDGs were adopted by the United Nations General Assembly in September 2015 and came into effect 2016. Many of the goals are directly or indirectly related to agriculture, the strongest connection to the environmental impacts of agricultural land use exist in (UN 2016):



- Goal 2 “Zero Hunger – End hunger, achieve food security and improved nutrition and promote sustainable agriculture”, where the following targets are set: by 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
- Goal 6: “clean water and sanitation” with the following targets: by 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials; substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity by 2030; protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes by 2020
- Goal 15: “Life on Land – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”, with the following targets: take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity, by 2020, protect and prevent the extinction of threatened species; by 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

2.3 Strategies with potential relevance for the environmental impacts of agricultural land use on EU level

On EU level mainly the following strategies and directives set goals with respect to agricultural land use:

- EU Biodiversity Strategy (from 2011): halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss
 - Target 3A — Agriculture: by 2020, maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU 2010 Baseline, thus contributing to enhance sustainable management (EC 2016a).
- 2020 EU Climate & Energy package (from 2007)
 - Target 1 until 2020: 20 % cut in greenhouse gas emissions (from 1990 levels). Effort Sharing Decision: reduction of around 10 % in total EU emissions from the non-ETS sectors including agriculture (from 2005 levels).



- Target 2 until 2020: 20 % of EU energy from renewables. No targets are set for the contribution of the agricultural sector (EC 2016b).
- EU Soil Thematic Strategy (from 2012): Main objective is to define a common and comprehensive approach, focusing on the preservation of soil functions, based on the following principles: Preventing further soil degradation and preserving its functions by acting on soil use and management patterns, when soil is used and its functions are exploited (EC 2016c). A proposal for a more concrete and binding EU Soil Framework Directive was withdrawn by the European Commission in 2014 after it had been pending for eight years as a result of a blocking minority of five Member States (Masson 2015).
- The 7th Environment Action Programme (from 2014, Decision No 1386/2013/EU): Key objective 1 is to protect, conserve and enhance the Union's natural capital. The programme shall ensure amongst other things that by 2020:
 - The loss of biodiversity and the degradation of ecosystem services, including pollination, are halted, ecosystems and their services are maintained and at least 15 % of degraded ecosystems have been restored.
 - The impact of pressures on transitional, coastal and fresh waters (including surface and ground waters) is significantly reduced to achieve, maintain or enhance good status, as defined by the Water Framework Directive (WFD).
 - Land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway.
 - The nutrient cycle (nitrogen and phosphorus) is managed in a more sustainable and resource-efficient way.
- EU WFD (from 2000, Directive 2000/60/EC): The Directive is more than a strategy, but a binding legislation at EU-level that has to be transformed into national legislation by the EU Member States. However, it sets some prominent general objectives in the area of water protection that had not been covered in any other strategy so far. Inland surface waters, transitional waters, coastal waters and groundwater have to meet a "good ecological status" by 2015. Each Member State has to ensure the establishment of a programme of measures for each river basin district and. The WFD itself does not set concrete requirements for agricultural land management directly. This is left to the Member States. For the implementation of this Directive and other EU legislation of relevance for environmental impacts of agricultural land use, such as the Nitrates or the Habitats Directive, see chapter 4.5.

2.4 Strategies with potential relevance for the environmental impacts of agriculture on national or regional level in the TALE case study regions

Biodiversity and climate change are the policy fields that are most often addressed by strategies on a national or even regional level in the TALE case study regions.

In all countries represented in the TALE project national biodiversity strategies are in place. To give an example, the German National Strategy on Biodiversity from 2007 states with regard



to agriculture that a reduction of surplus nitrogen in the overall balance sheet to 80 kg/ha should have been reached by 2010, with a view to a further reduction by 2015. Also, a representative and functional system of interlinked biotopes covering 10 % of its territory should be present. Reference is also made to the 20 % target for organic farming named in the German National Sustainable Development Strategy. Every four years the progress of the implementation of the National Strategy on Biodiversity is measured and published in an indicator report based on 19 indicators. Besides the indicator for coastal and marine ecosystems it is mainly the indicators on biodiversity in agricultural ecosystems that show deterioration or are still a long way from the set objectives (BMUB 2015 cited after Herberg et al. 2016).

The Austrian National Biodiversity Strategy 2020+ names objectives with regard to agricultural land use such as improving conditions of species related to agricultural and forest land use significantly between the reference period 2010 and 2020, keeping the level of agro-biodiversity (rare plant and livestock breeds) at least constant or increasing the number of beehives to 400.000. The Federal States of Thuringia and Saxony, where the German case study region is located, additionally have biodiversity strategies on federal state level. The Thuringian Biodiversity Conservation strategy, for instance, also sets objectives for agriculture in a vision for 2020, like a share of organic farming of 10 % of the utilised agricultural area (UAA) or to minimise soil compaction.

All countries have adopted strategies with regard to climate change also addressing agricultural land use. In Switzerland, a specific climate strategy for agriculture is in place, aiming at the reduction of greenhouse gas emissions from agricultural production and the adaptation to changing climatic conditions in order to maintain agricultural productivity. In the Spanish case study region a regional climate strategy has been adopted which, with regard to agriculture, aims at the reduction of greenhouse gas emissions from agriculture and at enhancing carbon stocks in soils. In November 2016 the German Government adopted the National Climate Protection Plan 2050. The aims set in the field of agriculture were strongly debated by farmers` organisations and environmental NGOs and also between the Federal Chancellery as well as the Ministries of the Environment and the Ministry of Agriculture. Some of the measures and targets contained in the draft version, like a reduction of animal stocks, halving the greenhouse gas emissions from agriculture until 2050 or halving the consumption of animal products by 2050, were watered down or withdrawn. However, it still contains the objective to reduce greenhouse gas emissions from agriculture from now 72 million tons CO₂-equiv. to between 58 and 61 million tons CO₂-equiv. by 2030 (Awater-Esper 2016, bioland 2016).

Some countries and regions, like Germany, have adopted comprehensive sustainability strategies that also address agriculture, or strategies for agricultural development. Some regions address issues of specific importance to the local situation, like water management, with specific strategies.

Overall, binding targets or quantitative objectives for the environmental impact of agriculture are rare. If they are in place this mainly due to obligations stemming from binding EU legislation, e. g. on national emission ceilings (NEC-directive). It can also be observed that objectives formulated in strategies are frequently not met, which shows that policy makers do

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not yet sufficiently keep track of politically agreed goals and do often not take the actions appropriate to adjust insufficient policy instruments.



3 Characterisation of different types of policy instruments

3.1 Types of policy instruments for steering agricultural land use

Policy instruments provide positive and negative incentives or information that are intended to affect the behaviour of producers and consumers in such ways that the target variables, which can be addressed by these instruments, are moving in the desired direction (Van Tongeren 2008). Agri-environmental policy instruments can be roughly classified as either “regulatory”, “economic” or “advisory and institutional” (Vojtech 2010). The major difference lies in the degree to which they are of a binding character: Whereas regulatory instruments prescribe or prohibit certain actions, advisory and institutional instruments are based on voluntary participation. Market intervention aims at setting incentives to internalise negative or positive (environmental) externalities where market mechanisms do not function; they can either use existing markets, e. g. by attaching a tax to fertiliser purchase, or they “create” markets (World Bank 1997), e. g. by paying a premia for a desired action. Figure 3 gives an overview of potential policy instruments for steering agricultural land use.

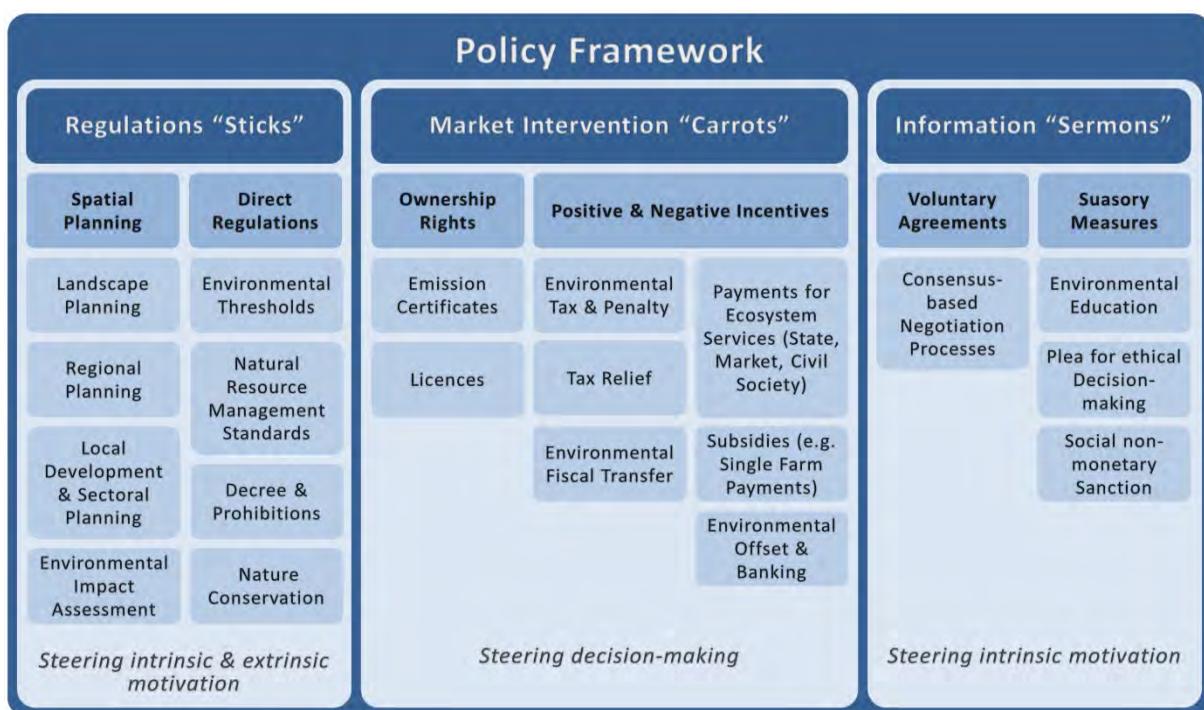


Figure 3: Policy instruments for agricultural land use

Source: CLAIM Knowledge Platform (2014)

In practice, we will often find a mixture of different types of policy instruments to address agri-environmental issues. Specifically for agriculture the OECD (2015) claims: “Concerns about negative impacts of farming on the natural environment should be addressed through a mix of market-based solutions, regulation and taxation”. E. g. farmers are faced with a maximum allowed amount of N-input defined by fertiliser law, a further reduction of N-fertilisation might



be reached through incentives set by voluntary measures and by information and advice to farmers.

3.2 Effectiveness and characteristics of different types of policy instruments – costs and targeting

In economic analysis environmental policy instruments are mainly evaluated according to two different criteria: Cost effectiveness and ecological effectiveness. Sometimes further criteria are added such as political feasibility or legitimacy.

Ecological effectiveness refers to the question if the environmental target is achieved and in some cases, how quickly it is reached. Ecological effectiveness can for example refer to the existence of a certain number of plant or animal species such as the red kite on agricultural land that is reported (see Russi et al. 2016; Matzdorf et al. 2008). Cost-effectiveness refers to the question how an environmental goal can be reached with minimum costs.

3.2.1 Public and private costs of policy instruments

Costs related to policy instruments concern both, public and private costs. With regard to agri-environmental policies the following categories of costs can be differentiated:

- **Opportunity costs** arise when commodity output is reduced due to more extensive management (e. g. late cut on grassland, reduced fertilising) or by a practice that introduces alternative land use (e. g. creation of hedges or field margins). Such costs are not expected to differ considerably, whatever instrument is used to implement a certain management, as long as management requirements are comparable. However opportunity costs consequently vary with changing management requirements. They may as well vary between locations (e. g. soil productivity) and intensity of production and also over time as commodity prices change, with competing incentives and with changing rental prices for land. Thus, opportunity costs clearly vary widely not only between different land types within regions and even on a small scale. To support e. g. buffer strips through voluntary measures with a flat-rate area-wide premium, would clearly attract rather a participation of farmers with low productive land and thus low opportunity costs. If such practices should be implemented on a wider scale, this could only be done via mandatory requirements or by adapting premia to these varying opportunity costs. Another option could be to choose different management practices with similar outcomes in areas with high opportunity costs, but that do not involve such high loss of income (e. g. supporting the creation of “skylark” windows rather than switching from autumn to spring grown cereal, which would also be beneficial for field birds).
- **Management costs** depend on the cost to carry out a prescribed practice at farm level in a certain location under given circumstances and incur on a regular basis. They may be close to zero in case e.g. an existing landscape feature may not be removed up to significant costs for time- and/or input-consuming management such as regular grazing or cutting. **Establishment costs** occur only in case an environmental good has to be newly created e. g. planting of a hedge, sowing of a flowering mixture.



- **Transaction costs** include costs of administrations for designing, implementing and enforcing policies and costs for farmers e. g. the time involved in searching for information, getting familiar with the measure and related management practices, claim benefits, keeping records, participating in inspections etc. The differentiation between setup and running costs has to be considered, as well as the fact, that growing experience has significant potential to reduce transaction costs due to capacity building or resulting better coordination between administrations (OECD 2007a). Public transaction costs necessarily emerge, when governments pursue policy objectives, however they are less “visible” compared to the amount of e. g. transfer payments, and thus add considerably to uncertainty about cost-effective solutions. Private transaction costs are important to consider, as they affect compliance as well as participation in voluntary schemes (OECD 2007a).

There may be as well benefits involved for land managers when adapting their management practices as a reaction to agri-environmental policies. A clear self-interest is e. g. linked to soil quality, where the farmer benefits directly from an improvement. A high quality of the cultural landscape and high farmland biodiversity are attractive for tourists, and creation or maintenance of landscape features might increase or secure the value of the land e. g. for hunting; both have the potential to provide additional income.

3.2.2 Targeting

As shown above, costs for carrying out certain management practices and the resulting benefits often differ widely between different locations. This offers the potential to increase cost-effectiveness by targeting. Thus, the efficiency of agri-environmental policies is not only dependent on the choice of the appropriate instrument but depends greatly on the decision where (which geographical regions or which farms or even single plots) to reach which objective or to implement which management practice. The OECD (2007b) defines a targeted policy as “Policy measure that targets specific outcomes, populations, or areas.”

Spatial targeting is most widespread. Measures may be offered area wide or be limited to certain geographical regions or land characteristics, where benefits are expected to be highest, e. g. a measure for soil protection might only be applied in areas prone to erosion and measures, which aim at improving N-effectiveness in nitrate vulnerable zones. Also certain land uses and land cover may be targeted (e. g. grassland or row crops), farm types or even single farms or plots. As well, measures can be targeted to areas or farmers, where the cost of compliance with a desired management can be expected to be low. For example, if land is of low productivity, the limitation of management intensity or abandoning agricultural production altogether with a focus on nature conservation entails lower opportunity cost than on more fertile land. Differentiation of operational objectives or prescribed management practices is also a way of spatial targeting.

Targeting needs to be balanced with higher administrative cost (Vatn 2002; Engel et al. 2008; OECD 2007a; OECD 2008). Farmers may also face higher transaction costs, if they have to enter in an individually negotiated contract (OECD 2007b). However, in most cases, given the heterogeneous distribution of environmental assets, targeting is preferable to non-targeted policies. Targeting of measures and adapting requirements and payments to local conditions is an approach that tends to result in high effectiveness regarding the desired outcomes or has



the potential for large reductions of transfer payments compared to broad-based policies while still reaching the set objectives (OECD 2007; OECD 2008).

3.3 Characteristics of different types of policy instruments

3.3.1 Regulation

With regulatory instruments, norms, acceptable behaviour or limitations of activities are defined and as such they aim at prescribing or preventing “certain types of human behavior” (Lemaire 2010). Under regulatory measures so-called “command and control” or mandatory measures are subsumed. Examples are specialised legislation such as the EU Nitrates Directive or the Habitats Directive and derived national or regional law. Detected non-compliance with mandatory standards defined under such legislation can result in administrative offences and subsequent fines.

Applying mandatory regulation has the advantage of addressing all farmers (in the area where the legislation is valid) and securing standards in the long-term. The effectiveness of direct regulation depends on clear definitions of requirements, and of sanctions in case of non-compliance and on effective control procedures. In line with the polluter-pays-principle costs of compliance are borne to a large extent by the addressees of the policy (i. e. the farmer). Public administrations have to carry costs for enforcement but not for transfer payments. Cost effectiveness of command-and-control instruments may suffer from the fact that such regulation often prescribes horizontal standards, which are the same for all farmers in the respective regulation area (Engel et al. 2008). Farmers have little flexibility to react on mandatory standards, and consequently, scope for most cost effective adaptation at farm level is generally low. Property rights are restricted by mandatory standards. Especially concerning biodiversity forcing farmers to carry out conservation measures through mandatory rules may be counterproductive as it might discourage them to raise the conservation value of their property in order to avoid restrictions on the way they are allowed to use their land (Wätzold and Schwerdtner 2005). Therefore developing new mandatory standards involves considerable effort for decision-making and is publicly accepted only to a certain degree.

Mandatory environmental standards can also be attached to existing support payments. Examples are cross compliance (or the Proof of ecological performance in Switzerland), both linked to the receipt of direct payments to farmers. Such an approach reaches the majority of farmers, but is in the long-term ultimately dependent on the ongoing existence of the related support payments. These kind of links between standards and support payments can be seen as quasi-mandatory as, in the current situation, dependency of farms on direct payments support is high.

Another kind of standard that can be quasi-mandatory especially for large producers, as their fulfilment is the prerequisite for market access, are codes of good agricultural practice developed by processing companies or retailers (cf. Herzfeld and Jongeneel 2012).

Planning measures may also be considered to be regulatory instruments³.

³ In some publications regulatory instruments are further differentiated into legal instruments and planning instruments.



3.3.2 Market-based instruments

Several market-based instruments are applied in the agri-environmental context, the most prominent being incentives set within the concept of payments for ecosystem services (PES). The AECM within the CAP are such an example. PES are generally much more accepted by farmers than mandatory measures, as they strengthen their property rights. PES also have a great potential to be implemented in a targeted way and adapted to regional conditions. On the other hand the voluntary character of such payments entails their effectiveness being dependent on sufficient attractiveness for farmers. Thus they are less suited if the supported management should be accepted area-wide, and a long-term securing of standards solely through voluntary measures is questionable. As farmers receive transfer payments that cover their opportunity, management and partly transaction costs, public cost may be high. Also public transaction costs have to be considered⁴. Therefore most of the PES schemes are designed and offered by public bodies, while potential private providers are an exception (Kroeger and Case 2007). Moreover, many ESS have public good character and private actors have little incentive to provide payments, while others might free ride. However, some examples for non-governmental payments exist (see e. g. Matzdorf et al. 2014).

A specific case are compensatory payments to farmers for mandatory restrictions. E. g. in Natura 2000 areas or in drinking water protection areas compliance with existing management restrictions may be mandatory for farmers but farmers' costs are remunerated by payments. Not all authors consider such measures as PES (e. g. compare Wunder 2005, who defines PES as voluntary transactions).

Taxes or tradable emission rights can also be named as economic instruments. While taxes on fertiliser or pesticides purchase have been applied in some EU Member States (e. g. Denmark, France, Sweden), tradable permits or quota have so far not been applied within the agricultural sector in the EU. Examples exist in countries outside the EU, including tradable rights for the development of wetlands for water extraction rights and water quality trading in the United States (Cooper et al. 2009).

3.3.3 Information

Information instruments are non-binding measures to change the perception and preferences of actors and include appeals, knowledge transfer and (social) sanctions. For example, farmers can be informed or receive specific advice on nature conservation measures. Certifications and labels such as the EU label on organic farming provide consumers with information about specific products. Information instruments are often applied complementary to regulatory and market-based instruments. They could also aim at changing strong mental models that hinder the uptake of other instruments. Providing information and advice is also suited to situations where synergies can be achieved between farm economic and environmental considerations. E. g. cropping with reduced tillage may be a case, where the practice is beneficial to a farmer as well as to the environment. If practices are sufficiently attractive to farmers to be adopted, acceptance is high, and they need not necessarily to be supported by AECM or prescribed by legislation or cross compliance. Information instruments can be further specified and

⁴ Mann (2005) considered transaction costs of various agri-environmental programmes in Switzerland for being in many cases at around 10 % of transfers to farmers.

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differentiated by e. g. the level they are designed and applied at. Moreover, the type of organisation can be specified, e. g. if advisory services are privately organised or public and who pays for the service.



4 Identification and description of policy measures in the TALE case study regions prescribing or incentivising technical measures for agricultural land use

Policy instruments are usually implemented within specific administrative regions, while the case study regions are partly based on catchment areas. This chapter describes and compares policy measures that come into effect in the different TALE case study regions; that means, measures that are designed at administrative levels within which the case study regions are situated.

The analysis within TALE focuses on:

- Instruments within the reformed **EU Common Agricultural Policy (CAP)** and the **Swiss Agricultural Policy (AP 14 – 17)** (direct payments with attached environmental conditions, AECM, support of organic farming and payments for disadvantaged areas and comparable payments in Switzerland) (see chapters 4.1 to 4.4)
- **Regulatory instruments:** Sectoral legislation for agricultural land use with a focus on fertilisation (water protection) and biodiversity (see chapter 4.5)
- **Information policies and extension services** regarding agri-environmental aspects are presented in chapter 4.6

Further instruments are only included in more detail, in case they are identified as specific regional approaches (e. g. planning policies in The Netherlands). Particular attention will be paid to innovative approaches such as result-oriented or collective approaches.

Investment measures or regulation regarding stables, slurry tanks or machinery or support of marketing are not in the focus, and also not the transport or storage of slurry. However, we are aware that such measures can directly or indirectly influence the environmental conditions in agricultural landscapes and that they are often complementing land use related measures.

4.1 The agricultural policies in the EU and Switzerland

4.1.1 The Common Agricultural Policy (CAP) of the EU

The CAP has a predetermined maximum budget which is fixed for seven years and divided into two “pillars”:

- **Pillar One** contains payments concerning market and price policy with its main instrument, the direct payments to farmers. Pillar One is financed to 100 % by EU budget through the European Agricultural Guarantee Fund.
- **Pillar Two** supports the development of rural areas. The rural development policy is implemented through national and/or regional development programmes and is co-financed by national and/or regional funds.

As agreed under the new EU multiannual financial framework for 2014 – 2020 CAP expenditure 2014 – 2020 will amount to 37.8 % (277.85 billion € in 2011 prices) of the total EU budget. Pillar Two receives about 23 % (84.94 billion €) of total EU CAP spending (EC 2013).



The CAP, originally designed after World War II to avoid food shortages and to stabilise farm incomes, has undergone several reform steps. Important reform steps were the so-called Mac Sharry-reform in 1992, the Agenda 2000 reform in 1999 with the introduction of the development of rural areas as the second pillar of the CAP, the so-called Fischler reform in 2003, when direct payments were decoupled from production and linked with compulsory environmental, food safety and animal welfare standards, the so-called cross compliance obligations (EP 2011 and Hofreither 2011). Also, progressive modulation rates allowing a transfer from funds from Pillar One, the European Agricultural Guarantee Fund (EAGF), to Pillar Two, the European Agricultural Fund for Rural Development (EAFRD) were introduced (EC 2011a).

In the 2003 CAP reform a new system of support, the Single Payment Scheme (SPS) was introduced, which entered into force in 2005. In the SPS an annual payment was made to farmers based on the value of the payment entitlements held and activated by the farmer. The SPS allowed the Member States not only to choose between different models of calculating the payment entitlements but also allowed exceptions from full decoupling.

Most new Member States applied the Single Area Payment Scheme (SAPS), which is a simplified income support scheme which was offered to new Member States joining the EU in 2004 and 2007. The levels of the single area payments in each country are obtained by dividing the country's annual financial envelope by its respective UAA (EC 2011a).

In the 2009 "Health Check" of the CAP further decoupling of all payments (except suckler cows, sheep and goat and cotton premia) as from 2012 was pursued. Through Article 68 of Council Regulation 73/2009 the possibility for Member States to grant specific support for certain environmental or sectoral goals using up to 10 % of their national SPS budget was introduced (EC 2011b).

As from 2015 EU farmers will have access to compulsory schemes applicable in all Member States, and to voluntary schemes (depending on the choice of the Member States).

Compulsory schemes for all Member States are (EC 2015c):

- The Basic Payment or Single Area Payment
- The Greening Payment
- The Young Farmers Scheme

Voluntary schemes (optional for Member States) are:

- Redistributive payment
- Support in areas with national constraints
- Coupled support

With the 2013 CAP reform the Basic Payment Scheme (BPS), replacing the Single Payment Scheme (SPS), was created. The Member States having previously applied the SAPS were allowed to and decided to apply the SAPS for a transitional period until 2020.

The BPS offers a basic layer of income support to farmers to be topped-up by other direct payments targeting specific issues or beneficiaries. Similarly to the SPS the BPS is based on payment entitlements that have to be activated on eligible land (EC 2016d).

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A new element has been the introduction of a “**Greening Payment**” (30 % of the direct payments of Pillar One), linked to environmental basic practices.

Up to 2 % of the national envelope has to be used for top-ups for new entrant **young farmers** not being older than 40 years.

Redistributive payments for the first hectares may cover up to 30 ha of each farm (or higher in case of higher national average farm size); may amount up to 30 % of the national envelope.

Member States may spend up to 5 % of their national envelope to provide additional **payments to Areas with Natural Constraints/Less Favoured Areas** (independent of funding under Pillar Two).

Member States may provide **coupled support** out of economic, social or environmental reasons for certain eligible sectors and regions, which undergo certain difficulties.

Farms with a basic payments of more than 150,000 € per year are subject to a reduction by at least 5 %; a further reduction can be implemented from 300,000 €/holding upwards (“**Degressivity**”). Funds remain in the Member State but are transferred into Pillar Two, where they can be spent without national co-financing.

Member States may spend up to 10 % of their national envelope for a **Small Farmers Scheme**, where farmers, that have decided to take part, receive a fixed yearly payment of between 500 and 1250 € per farm. Farmers contributing in the Small Farmers Scheme are exempt from greening and cross compliance.

Member States may decide to **transfer up to 15 % of their national envelope for direct payments to the second pillar or vice-versa**. Member States with a level of aid per hectare below 90 % may reach 25 % of transfer from their second pillar envelope to their direct payments envelope (EC 2015c).

The following chart summarises the new design of direct payments (see figure 4).



Cross Compliance	**Coupled Support	**Natural constraint support	O R ↑	**Small Farmer Scheme
	up to 10% or 15%	up to 5%		
	**Redistributive Payment			
	<ul style="list-style-type: none"> ○ up to 30% ○ max 65% of average direct payments (first ha) 			
	*Young Farmers Scheme			
	<ul style="list-style-type: none"> ○ up to 2% ○ +25% payments (max 5 years) 			
	*Green Payment			
	<ul style="list-style-type: none"> ○ mandatory 30% ○ greening practices or equivalent 			
	*Basic Payment Scheme			
	<ul style="list-style-type: none"> ○ no fixed percentage ○ 5% degressivity over 150 000 EUR 			
	* Compulsory ** Voluntary			

Source: DG Agriculture and Rural Development.

Figure 4: The new design of direct payments (and share of direct payments envelope)

Source: EC (2013: 8)

Payments to Member States (the “national envelope”) will be aligned until 2019 in order to reduce the gap between Member States (“External Convergence”). As well, Member States will have to ensure gradually a more uniform allocation of payments within their country at a national or regional level (“Internal Convergence”) (EC 2013).

In order to implement this internal convergence Member States could choose from three different main models (EC 2015b):

- Flat rate from 2015: all payment entitlements have the same unit value in a Member State or in a region from 2015 onwards. In this model, the value of payment entitlements is calculated by dividing a fixed percentage of the national ceiling available for granting direct payments for each year by the total number of payment entitlements allocated in 2015 (except the ones allocated from the reserve). This fixed percentage corresponds to the share of the BPS ceiling excluding the reserve in the national ceiling in 2015 (theoretical BPS ceiling excluding the reserve).
- Flat rate from 2019: progressive conversion until reaching a uniform value of payment entitlements by 2019. In this model the objective is to reach a uniform amount per hectare in maximum 5 steps. The starting point is the Initial Unit Value (IU) calculated basically on the basis of the direct support the farmer was entitled to in 2014 adjusted



to the proportion of the basic payment scheme in 2015 and to the national ceiling as amended by the Multiannual Financial Framework 2014 – 2020. The ending point is the average value in the target year in which the flat rate should be reached (2019 the latest). The average value should be calculated on the basis of the "theoretical BPS ceiling excluding the reserve".

- Partial convergence: In this model (also called the "tunnel model"), the rules for the starting point and the transition between the starting and the ending points are the same as in the "flat rate by 2019" model, but with a different ending point. The target value is a percentage of the 2019 average which can be set by the Member States between 90 % and 100 % of the 2019 average calculated at the basis of the "theoretical BPS ceiling excluding the reserve". Each payment entitlement should as a general rule reach a minimum value 60 % of the 2019 average by 2019.

Member States may decide to apply the BPS at regional level. In order to define the regions Member States shall use objective and non-discriminatory criteria such as agronomic and socio-economic characteristics, regional agricultural potential, institutional or administrative structure (EC 2016d).

Pillar Two of the CAP is based on the European Agricultural Fund for Rural Development (EAFRD). In order to obtain financial support for rural development Member States have to design rural development programmes (RDP). Member States have the option to prepare either a national RDP for its entire territory or a set of regional programmes or both a national programme and a set of regional programmes. In the TALE case study countries Germany and Spain RDP are regionally programmed by the federal states and autonomous regions, while in Austria and The Netherlands there is only one national RDP.

In the current funding period, the RDP are programmed based upon at least four of the six common EU priorities with support measures which can be taken up voluntarily by farmers or further defined beneficiaries (Regulation (EU) No 1305/2013):

1. Fostering knowledge transfer and innovation
2. Enhancing competitiveness of all types of agriculture and the sustainable management of forests
3. Promoting food chain organisation, including processing and marketing, and risk management
4. Restoring, preserving and enhancing ecosystems
5. Promoting resource efficiency and the transition to a low-carbon economy
6. Promoting social inclusion, poverty reduction and economic development in rural areas

Each of these priorities is further specified into areas of intervention (or focus areas). For example, priority 4 contains three focus areas, namely 1) restoring and preserving biodiversity (including in Natura 2000 areas and areas of High Nature Value farming) and the state of European landscapes, 2) improving water management and 3) improving soil management. The Member States or regions have to define quantified targets and measures in their RDP by which means they aim to reach the focus area targets. Further, it is specified how much funding is allocated to each measure (EC 2016e). The setup of national and regional RDP is a multiple stage process involving a number of different actors (ENRD 2016a). The final content of each



RDP as well as changes are negotiated between the European Commission and the national authorities (EC 2015a).

The programming of RDP measures is supported by a monitoring committee as required by the CPR. The monitoring committee shall integrate local stakeholders and involve different societal actors in the development of regionally adapted measures (Regulation (EU) No 1303/2013). Quality, impacts and the implementation progress of RDP are assessed via a broad monitoring and evaluation framework based on a range of indicators and conducted ex-ante, in annual implementation reports and ex-post (EC 2015a).

Additionally to the support of rural development through the EAFRD there are further European Structural and Investment (ESI) Funds. Those funds are the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF) and the European Maritime and Fisheries Fund (EMFF). Common regulations for all ESI funds are established in the Common Provisions Regulation CPR (Regulation (EU) No 1303/2013). All funds are instruments of the Europe 2020 strategy, aiming at growth and economic development in the EU, and are coordinated under a Common Strategic Framework (CSF) (ENRD 2016b). Partnership Agreements (PAs) summarise the Member State strategic objectives and investment strategies. Each Member State, respectively national authorities, has to negotiate its PA with the European Commission (EC 2014). Figure 5 displays the general framework of the rural development programming.



Figure 5: Rural Development Programming

Source: The European Network for Rural Development (ENRD) (2016b)



Member States have to spend at least 30 % of their budget on certain measures tackling climate change and environmental aspects. Public expenditure will be covered by nationally allocated EU funds by up to 53 %. Co-financing can be higher (80 % as a rule, and up to 90 % in specific regions) e. g. for measures supporting knowledge transfer, cooperation, the establishment of producer groups and organisations. Funds for operations contributing to the objectives of environment and climate change mitigation and adaptation, among them AECD, are borne to 75 % by the EU. Funds, which have been transferred from Pillar One can be spent without national or regional co-financing. Member States can design thematic sub-programmes for certain issues (such as mountain areas or biodiversity), where in some cases higher co-financing rates are granted.

As shortly indicated in the previous sections, rural development in the European Union is governed by a notable number of regulations and an increasing complexity (SMUL 2016a). A paper by the Saxon State Ministry of the Environment and Agriculture (EAFRD-RESET) claims that “the volume of rules and provision, in particular in the EAFRD, has now reached such a significant and disproportionate level that their implementation by the Member States threatens to collapse under the bureaucratic burden while the positive technical objectives increasingly fade into the background” (SMUL 2016a: 1). In view of the future funding period 2021 – 2027 the paper calls among other changes for a “fundamental revision of all EAFRD regulations but in particular administrative and control procedures” (ibid.: 11).

4.1.2 The Agricultural Policy of Switzerland

The basis for the Swiss Agricultural Policy is the Agricultural article (article 104) in the Swiss federal constitution. In this article the Swiss Confederation ensures that agriculture considerably contributes through sustainable and market-oriented production to a) the reliable food supply of the population, b) the conservation of the natural resources and maintenance of the cultivated landscape and c) the decentralised settlement of the land.

Based on this article the main principles of the Swiss Agricultural Policy (AP) are laid down in the Agriculture Act (*Landwirtschaftsgesetz*). The different payments to farmers are defined in the Regulation on direct payments (*Direktzahlungsverordnung*, DZV).

The Agricultural Policy for 2014 – 2017 (AP 14 – 17) is based on five pillars (see also figure 6):

- **Cultivated landscape payments** (*Kulturlandschaftsbeiträge*, KLB)
 - Zone payments for preservation/maintenance of the cultural landscape (*Offenhaltungsbeitrag*)
 - Slope payments (*Allgemeiner Hangbeitrag*)
 - Steep slope payments (*Steillagenbeitrag*)
 - Slope payments for vineyards (*Hangbeitrag für Rebflächen*)
 - Transhumance/Alpine farming payments (*Alpungsbeitrag*)
 - Summer grazing payments (*Sömmerungsbeitrag*)
- **Food security payments** (*Versorgungssicherheitsbeiträge*, VSB)
 - Basic payments (*Basisbeitrag*)
 - Production handicap payments (*Produkterschwernisbeitrag*)
 - Payments for open arable land and permanent crops (*Beitrag für offene Ackerfläche und Dauerkulturnen*)



- **Biodiversity payments** (*Biodiversitätsbeiträge*, BDB)
 - Quality payments (*Qualitätsbeitrag*)
 - Interconnectedness payments (*Vernetzungsbeitrag*)
- **Landscape quality payments** (*Landschaftsqualitätsbeiträge*, LQB)
- **Production system payments** (*Produktionssystembeiträge*, PSB)
 - Organic production system
 - Extensive production system (*Extenso*)
 - Grassland-based milk and meat production payments (*Beiträge zur Förderung der graslandbasierten Milch- und Fleischproduktion*)
 - Animal welfare payments (*Tierwohlbeiträge*)

There are additional payments for resource efficiency (*Ressourceneffizienzbeiträge*, REB) (e.g. low-emission application of slurry, soil conservation on arable land) as well as a Transition payment to smoothen the transition from the former programming period. In the figure below these five pillars are visualised.

Further on a Single crop payment (*Einzelkulturbetrag*) is granted for the cultivation of specific crops on arable land (based on a separate regulation on single crops (*Einzelkulturbetragsverordnung*, EKBV)).

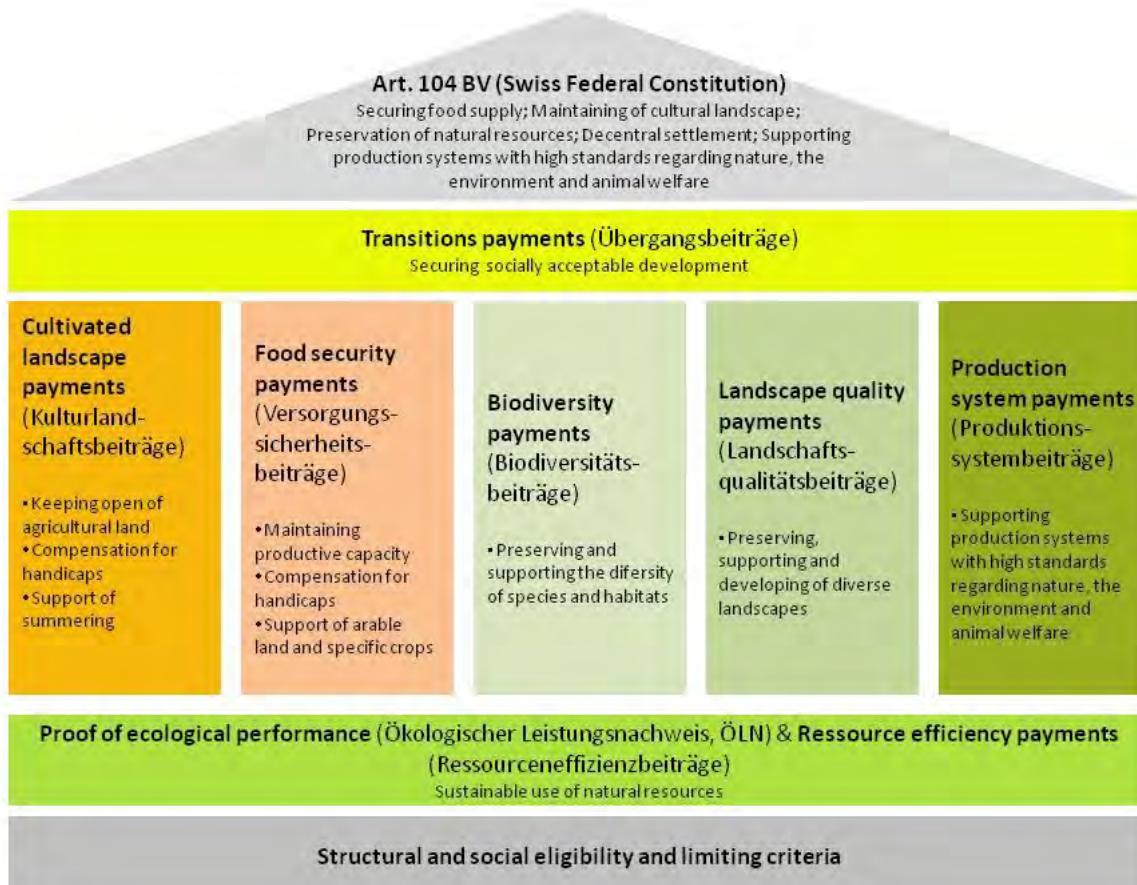


Figure 6: The composition of the Swiss Agricultural Policy 2014 – 2017

Source: Federal Office of Agriculture (BLW), own translation (Proof of ecological performance see chapter 4.2.3)



Regarding the planned budget, the Food security payments represent the “largest” pillar, with about 39.5 % of the planned budget for direct payments (BLW 2013). The payments are financed nationally with a funding period of four years (eight years for Interconnectedness payments and Landscape quality payments).

4.2 Direct payments of Pillar One of the CAP and comparable payments in Switzerland

4.2.1 Components and height of direct payments

EU Member States (AT, DE, ES, NL)

As mentioned above Member States were able to choose between different options regarding some aspects of the implementation of direct payments.

The main choices of the countries with a TALE case study region are summarised in the following table.

Table 1: Choices of Member States with a TALE case study region regarding different components of CAP Pillar One

	AT	DE	ES	NL
Regionalised BPS		X (federal states)	X (50 regions based on historical land use and comarcas ⁵)	
Redistributive payment		X		
No reduction of payment		X		
Voluntary coupled support	X		X	X
Small farmers scheme	X	X	X	

Source: EC (2015c: 5)

Concerning the issue of internal convergence, the countries with a TALE case study have opted for the following models (EC 2015b) (see also figure 7):

- Germany: flat rate from 2015 (at regional level). Germany will adapt progressively the regional BPS ceilings between 2017 and 2019 in order to reach a uniform unit value at national level in 2019.
- The Netherlands and Austria: flat rate in 2019, five equal steps starting in 2015.
- Spain: partial convergence by 2019 (at regional level), five equal steps starting in 2015, target value of payment entitlements (in percentage of 2019 average): 90 %.

⁵ Traditional name for regional or local administrative unit in some parts of Spain

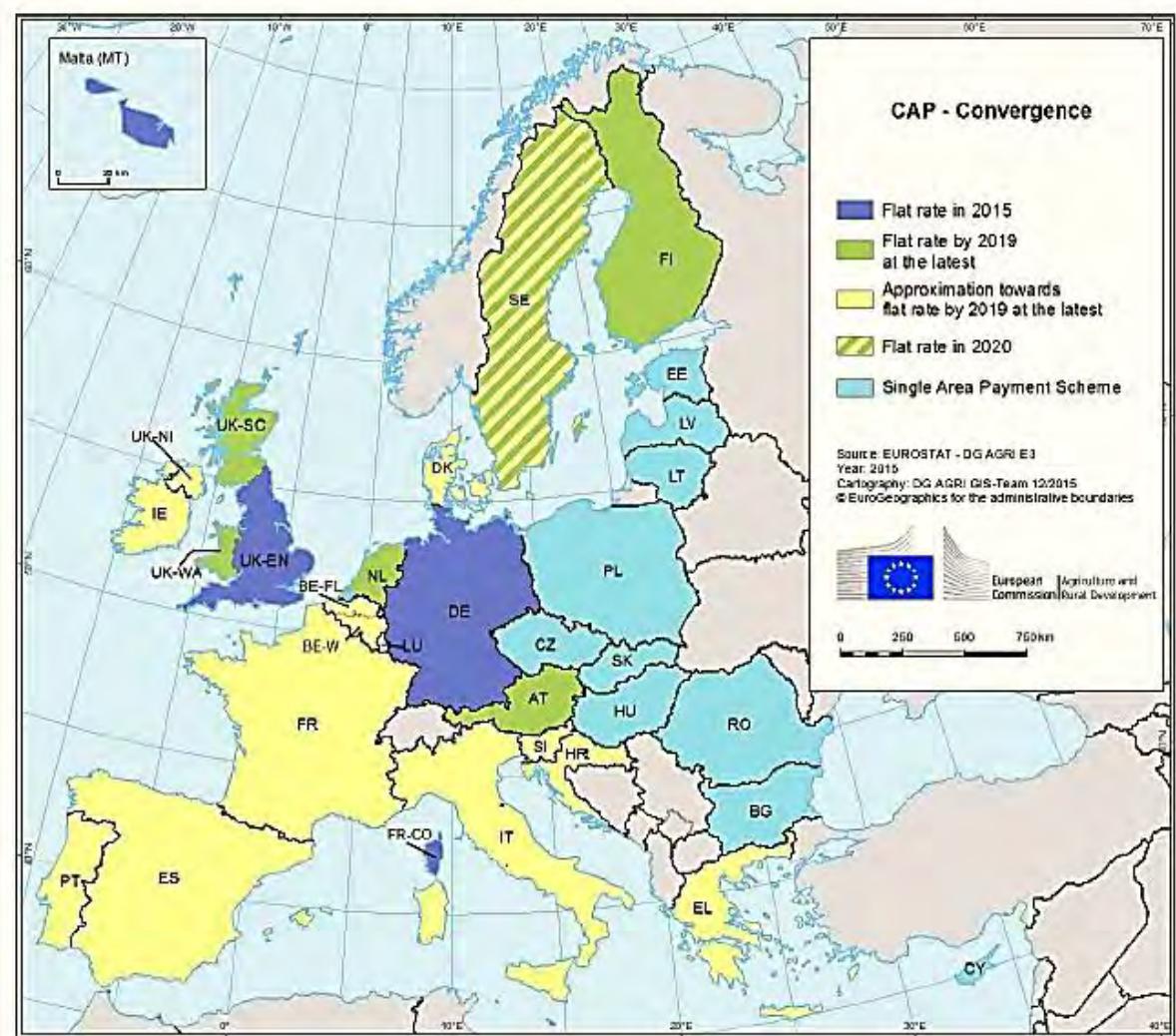


Figure 7: Internal convergence in EU Member States

Source: EC (2015a: 7)

Of the Member States with a TALE case study only Germany and The Netherlands have decided to transfer funds from the annual financial envelope for direct payments to Pillar Two (DE: annually 4.5 % from the financial year 2016 until 2020, NL: between 4 % and 4.3 %).

With regard to voluntary coupled support Austria and The Netherlands have allocated less than 8 % to the scheme for 2015 and 2016, Spain has allocated 12 % in 2015 and Germany does not make use of this option.

The sectors subject to voluntary coupled support in the countries with a TALE case study are shown in the following table 2.

**Table 2: Sectors subject to coupled support in Member States with a TALE case study**

	AT	ES	NL
Beef	X	X	X
Fruit and vegetables		X	
Grain legumes		X	
Milk		X	
Nuts		X	
Protein crops		X	
Rice		X	
Sheep and goats	X	X	X
Sugar beet		X	

Source: EC (2015d: 20)

Decoupling has some indirect impacts on environmental aspects of agricultural land use: It gives greater flexibility for extensification or diverting land for non-agricultural use. Landscape elements, such as hedges and the land upon which they are installed, belong to the area eligible for support, which may help to increase their acceptance by farmers. However, without coupled payments grazing systems might come under pressure of being abandoned as e. g. suckler cows were in the past highly dependent on coupled payments. Most EU Member States have therefore kept some element of coupled support within the boundaries allowed by the EU, namely regarding roughage consuming livestock. While In Austria and The Netherlands beef and also sheep and goat are subject to coupled payments, in Spain a number of products are covered by this scheme.

The following table 3 summarises information with regard to convergence and voluntary coupled support in the TALE case study regions in EU Member States.

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**Table 3: Direct payments in the TALE case study regions (excluding Switzerland)**

	AT	DE	ES	NL
Average height of premia (per ha)⁶	2014: 334 €/ha Prediction 2019: 195 €/ha	2015: 290 €/ha (differences between regions) Prediction 2019: 281 €/ha (national wide)	229 €/ha (from 38 to 500 €/ha)	2014: 430 €/ha Prediction 2019: 390 €
Level of regional harmonisation Some Member States have decided to regionalise the Basic Payment Scheme (BPS), some Member States have reached or will reach a regional/national flat rate, some have a partial convergence to the flat rate.	Regional flat rate in 2019 (progressively starting in 2015)	Regional flat rate from 2015 (federal states) (progressively reaching a national flat rate in 2019)	Partial convergence by 2019 at regional level (50 regions based on historical land use and <i>comarcas</i> , progressively starting in 2015)	National flat rate in 2019 (progressively starting in 2015)
Voluntary coupled support Percentage of total direct payments envelope and sectors supported	2.1 % paid for: - 62 €/livestock unit for cows, ewe and adult female goats - 31 €/livestock unit for all other cattle, sheep, and goats Applies only for listed animals kept on alpine pastures for 60 days/year	Germany does not make use of the option of voluntary coupled support	12 % paid for: - Suckler cows, cattle for slaughter, cattle for milk production, sheep, goats - Rice, protein crops, nuts and locust beans, quality vegetables, sugar beet, tomato for industries	0.5 % paid for: - Beef and sheep on extensively grazed nature areas

Source: Description by project partners, EC (2015e)

Comparable payments in Switzerland

The direct payments best comparable with the EU direct payments of Pillar One are the Swiss Food security payments with their four components. They are also the largest “pillar” in Switzerland and aim at maintaining production capacity.

The Basic payments, the Production handicap payments and the Payments for open arable land and permanent crops are all part of the Food security payments. In addition a Single crop payment is offered (see table 4). Those payments aim at maintaining the agricultural production capacity and are thus not granted for set-aside land (contrary to direct payments of

⁶ The listed average premium heights include all direct payments and represent a national average, except Austria where the average of the case study region is displayed (four districts: Waidhofen/Ybbs, Amstetten, Melk, Scheibbs).

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Pillar One in the EU). The importance paid to food security is also reflected in the existence of the Payments for open arable land and permanent crops and a Single crop payment for specific arable crops, in addition to the Basic payments. As more than half of the agricultural area in Switzerland is situated in the hill or mountain zone, where mostly only grassland use is possible, the difficult production conditions in those regions are compensated through the Production handicap payments. Payments on grassland are coupled to a minimum density of roughage consuming livestock.

The listed payments can be cumulated, and consequently offer a high incentive to keep agricultural land under production.

Table 4: Swiss payments to farmers comparable to European direct payments

Type of payment	Basic payments (Part of the Food security payments)	Production handicap payments (Part of the Food security payments)	Payments for open arable land and permanent crops (Part of the Food security payments)	Single crop payment
Height of premia (per ha)	<ul style="list-style-type: none"> - 900 Fr. (824 €)⁷ - 450 Fr. (412 €) for permanent grassland managed as biodiversity promotion areas 	<p>240 – 360 Fr. (220 € – 329 €) (depending on zone: hill zone and four mountain zones)</p>	400 Fr. (366 €)	<ul style="list-style-type: none"> - 700 Fr. (641 €) for oil crops and seed production - 1000 Fr. (915 €) for legumes (e. g. soy, faba beans, peas, lupines) - 1600 Fr. (1464 €) for sugar beet for sugar production
Land use types covered	All agricultural land contributing to food supply (including also e. g. rape seed and maize for energy production)	Same as for basic payments	Arable land Permanent crops	Arable land
Further specifications (selection)	<ul style="list-style-type: none"> - Decreasing with farm size from 60 ha upwards - For permanent grassland a minimum number of roughage consuming livestock is required⁸ - Set-aside land, Christmas tree plantations, miscanthus, and landscape elements such as hedges or field woods are not covered - Also paid for agricultural land abroad cultivated by Swiss farmers at least since 1st May 1984 (EU direct payments are deducted) 	<ul style="list-style-type: none"> - Same as for basic payments - No reduction with farm size - Not paid for agricultural land abroad 	<ul style="list-style-type: none"> - No livestock needed - Also paid for agricultural land abroad cultivated by Swiss farmers at least since 1st May 1984 (EU direct payments are deducted) 	<ul style="list-style-type: none"> - For oil crops and legumes only granted, if crops are harvested in a ripe condition and as seeds - Also paid for agricultural land abroad cultivated by Swiss farmers at least since 1st May 1984 (EU direct payments are deducted)

Sources: Description by project partner, Regulation on direct payments (DZV), Regulation on single crops (EKBV)

⁷ Amounts in € are calculated at an exchange rate of 0.9151 EUR = 1 Fr. (27.07.2016).

⁸ Minimum livestock density specified according to area zoning (e. g. valley zone, mountain zones). If minimum density is not reached, the payment is reduced proportionately.



4.2.2 Eligibility conditions for direct payments in EU Member States (AT, DE, ES, NL)

Short description of general conditions

For farmers, eligibility to BPS/SAPS is a precondition for receiving support under the other direct payment schemes (the redistributive payment, greening payment etc.), except for the Voluntary Coupled Support. It is also a precondition to access the Small Farmers Scheme in those Member States where this scheme is applicable (EC 2016d).

Since 2015 direct payments are paid only to “active farmers”. For instance, an individual who operates an airport, a railway service or a recreation facility, is in principle not considered an active farmer unless he/she proves that farming is not a marginal activity. Member States have the option to apply a stricter definition of active farmer. Of the TALE case study countries Germany and The Netherlands added activities or businesses to the negative list. Spain and The Netherlands further exclude natural or legal persons whose agricultural activity form only an insignificant part of their overall economic activity or whose principal activity or company objects does not consist of exercising an agricultural activity (EC 2015d).

With the introduction of BPS, the payment entitlements allocated to farmers under the SPS expired and Member States had to allocate new payment entitlements in 2015.

Member States can determine a minimum size per holding for famers who may newly apply for the allocation of payment entitlements. Generally, this size should not be higher than one eligible hectare, but Member States may adjust this threshold to their specific conditions.

Table 5: Minimum size of the holding necessary to qualify for first allocation (in ha) in countries with TALE case studies

AT	DE	ES	NL
1.5	1.0	0.2	0.3

Source: EC (2016: 4)

Eligible hectares for which payment entitlements can be activated are defined as any agricultural area of the holding that is used for an agricultural activity or predominantly used for agricultural activities. In the latter case the non-agricultural activity must not significantly hamper the agricultural activities. Member States must establish criteria regarding this issue. Member States can also draw up a list of areas which are predominantly used for non-agricultural activities and therefore not entitled to direct payments (Regulation (EU) No 1307/2013). For example, Germany defines, amongst other areas, airport runways, parks or areas mainly used for military purposes as areas which are predominantly used for non-agricultural activities (*Direktzahlungen-Durchführungsverordnung* 2014).

Agricultural area is defined in the EU direct payments regulation as any area taken up by arable land, permanent grassland and permanent pasture, or permanent crops. Permanent grassland and permanent pasture means land used to grow grasses or other herbaceous forage (self-seeded or sown) and that has not been included in the crop rotation of the holding for five years or more. It may include other species such as shrubs and/or trees which can be grazed provided that the grasses and other herbaceous forage remain predominant as well as, where



Member States decide so, land which can be grazed and which forms part of established local practices where grasses and other herbaceous forage are traditionally not predominant in grazing areas (Regulation (EU) No 1307/2013). Such definition can have very concrete impacts locally as the following examples illustrate:

- The definition of permanent grassland means that also arable land that has not been into crop rotation for five years will be codified as permanent grassland. This includes land that has been set-aside or grown with grasses or other forage crops. In Germany this led to farmers ploughing such areas and growing crops at least for one year only in order to keep the status of arable land.
- In the Spanish case study region extensive livestock keeping is means to conserving biodiversity also in protected areas (Guadarrama National Park and Natura 2000 areas). However, despite AECM, extensive grazing with cattle and sheep is still decreasing. Moreover, within the new CAP traditional silvo-pastoral systems are subject to a reduction coefficient to the area that can be considered as permanent grassland and thus being eligible for direct payments. The surface covered by trees and shrubs is discounted from the eligible area. Area corrections resulted not only in high administrative effort but in delays and reductions of payments.

Cross compliance

In the EU, cross compliance as a compulsory element has been introduced in 2005 and has been modified with the recent CAP-reform. In order to receive direct payments of Pillar One, farmers have to comply with standards in the areas of environment, climate change, good agricultural condition of land, public health, animal health and plant health as well as animal welfare (see Annex II of Regulation (EU) No 1306/2013). Participants in certain measures of Pillar Two, among them AECM, have in addition to comply with further minimum requirements for fertiliser and plant protection product use and other relevant mandatory requirements established by national legislation and identified in the programme.

“Statutory management requirements” (SMR) consist of rules stemming from existing EU legislation⁹, partly being directly valid in the Member States partly being implemented in national legislation. The common framework leaves little flexibility for the Member States. Regarding standards for “Good agricultural and environmental conditions” (GAEC), only the framework is set at EU-level, while the concrete obligations for farmers are defined by the Member States, taking into account their specific conditions. As legislation on the control of nitrates and on biodiversity protection, as far as agricultural land use is concerned, is covered in chapter 4.5 (and this also concerns those aspects that are additionally included into cross compliance via SMR), the comparison of cross compliance in the TALE will focus on GAEC.

The requirement for maintenance of permanent grassland regarding its ratio in relation to the total agricultural area declared have been included into the “greening” requirements (see below). However, the rules under the former cross compliance regulations on this issue are still valid in 2015 and 2016. They are not included in the following analysis.

⁹ In the area of the environment these are rules regarding the Nitrates Directives and the Directives on the protection of wild birds and on the conservation of natural habitats and of wild flora and fauna.



The requirements linked to GAEC in the TALE case study regions are listed in table 19 in Annex II.

In all Member States involved in TALE the GAEC standards are defined at the national level¹⁰.

- GAEC 1 on the establishment of buffer strips along water courses must at least cover conditions for the application of fertiliser close to water courses as implemented in the Member States based on the EU Nitrates Directive. While Germany focuses on restrictions for the applications of N-fertiliser, Spain also includes a narrow strip (2 m) without any agricultural production and restrictions for the application of plant protection products. Those obligations are also obligatory under environmental legislation. Austria prohibits soil management in a 10 m strip along water courses and the maintenance of existing strips of permanent grassland within 20 m. These requirements go beyond already existing additional legislation outside of cross compliance. The Netherlands have a combination of different measures, including buffer zones (no-production zones) along water courses with restricted application of N-fertiliser. For natural streams, broader buffer strips of minimum 5 m are required. Other measures are focussed on restrictions for N-fertiliser applications. GAEC 2 prescribes compliance with existing authorisation requirements regarding water use for irrigation. All TALE Member States have implemented this standard.
- GAEC 4 sets standards for soil cover: In all case study regions requirements for soil cover on set-aside land exist (self-established green or sown green cover), however in Spain also traditional tillage operations may be carried out. Germany specifies restrictions regarding cutting of vegetation and soil management between the 1st of April and the 30th of June on set-aside land for nature conservation reasons. In Austria also the obligation to prevent succession is included (an aspect that could have also been addressed under GAEC 7). Spain also bans ploughing between harvest of the main crop and the 1st of September, and Germany states that catch crops approved as ecological focus areas under the greening measure must remain on the field until the 15th of February.
- GAEC 5 on soil management considering site specific conditions mainly deals with preventing soil erosion: Spain and one Dutch province (not identical with the case study region) define restrictions on slopes (mainly regarding tillage operations on arable land). In Germany arable plots are classified according to their sensitivity to erosion and respective standards for soil management and allowed crops are set. Austria abstains from such obligations but bans soil management on frozen waterlogged or snow covered soils. All requirements within GAEC 4 and 5 go beyond existing environmental legislation.
- GAEC 6 deals with soil organic matter and requires a ban on burning arable stubble, which is already laid down in existing legislation in Germany, Spain and The Netherlands.

¹⁰ There may be slight regional variations e. g. regarding soil erosion in the Netherlands, which is only relevant in one region; the Code of Good Agricultural Practices regarding buffer strips in Spain; also in Germany small differences between the Federal States may occur regarding landscape elements or certain biotopes to be protected under cross compliance, in order to take account for regional characteristics.



- Under GAEC 7 all TALE Member States define a set of landscape elements protected under cross compliance and ban cutting of hedges and trees during the bird breeding and rearing season. These obligations are partly already covered under nature conservation legislation.

Greening

Further environmental standards, in addition to cross compliance, linked to payments of Pillar One, came into force in 2015. The aim was to improve the environmental performance of the CAP. The so-called greening standards are attached to the receipt of 30 % of the EU Member States direct payment budgets (greening payment). The three types of obligations are:

- Crop diversification
- Conservation of permanent grassland
- Establishing ecological focus areas (EFA)

The EU has set a framework for the implementation of those obligations in the Member States (Regulation (EU) No 1307/2013). Organic farms are “green by definition” and don’t have to prove compliance with the conditions described. Also, “small farmers” can be exempted (depending on the implementation of Small Farmers Scheme in member states).

Regarding **crop diversification** the EU obligations are as follows:

On farms with more than 10-30 ha arable land at least two, on farms with more than 30 ha at least three different crops have to be cultivated, the main crop covering not more than 75 % of the arable area, the two main crops not more than 95 %. Farms, where more than 75 % of the arable land are covered by grass or other herbaceous forage or are lying fallow and farms whose UAA consists to more than 75 % of permanent grassland, are exempted from these obligations, if their remaining arable land is not larger than 30 ha. There are further specific cases, where exemptions are possible¹¹.

The TALE case study Member States implement the rules according to those EU prescriptions. In all case study countries the greening standards are valid at the national level¹². While obligations for crop rotation are the same and oriented at the EU prescriptions, the countries made use of some flexibility regarding the obligations for permanent grassland and EFA. Tables 20 and 21 in Annex III show the EU prescriptions for the maintenance of permanent grassland and for ecological focus areas and, for the TALE case study Member States, the specification of those rules in these countries (only concretisation of obligations or deviations from EU rules).

Regarding **environmentally sensitive permanent grassland** that may not be ploughed, Austria defined the smallest percentage of Natura 2000 grassland as “environmentally sensitive”, by restricting the definition to grassland ecosystem types within Natura 2000 areas (while areas determined under the Birds Directive are theoretically included, the limitation to the grassland ecosystem types defined under the Habitats Directive concentrate the target

¹¹ Experiences in AT show that 80 % of farmers with 60 % of the UAA are “green by definition” or exempted from the requirements regarding crop diversification and EFA due to e. g. due to a low (share of) arable area, being small producers or organic farmers (presentation of K. Bauer, agricultural chamber of Austria, 7 April 2016, Loccum, Germany).

¹² There might be slight regional differences, e. g. in Germany the Federal States may allow for deviations on dates for ploughing cover crops, or in some Federal States ditches are accepted as eligible landscape elements for EFA.



areas on those areas). Both Germany and Spain included permanent grassland in special areas of conservation according to the Habitats Directive. In The Netherlands all permanent grassland in Natura 2000 areas is covered. None of the TALE Member States chose to integrate sensitive permanent grassland outside Natura 2000.

Table 6: Percentage of environmentally sensitive permanent grassland in Natura 2000 areas in relation to total permanent grassland in those areas

AT	DE	ES	NL
6 %	64 %	100 %	100 %

Source: EC (2015c)

Regarding the **maintenance of the ratio of permanent grassland**, Austria, The Netherlands and Spain calculate the ratio at national level. A reconversion of converted grassland is required in case the allowed decrease of the ratio by 5 % is exceeded. Austria includes a “pre-stage” at a decrease of more than 4 %, when any further conversion has to be approved by the authorities. Germany has the strictest obligations: the ratio is determined at the level of the federal states. Any conversion of permanent grassland to different land use requires permission, which will generally be granted, unless the above ratio has already decreased by more than 5 % or any other regulation prohibits a conversion. The farmer also has to provide an equivalent plot of land, where new permanent grassland is created in the same region, which is to be defined by the federal states (exceptions are possible e. g. in case of undue hardship or in case the permanent grassland status has resulted from more than five years set-aside arable land in 2015¹³).

Regarding **ecological focus areas (EFA)**, Member States could choose from a list of possible EFA-types. Those include EFA on set-aside land or landscape elements, but also on productive land, such as cover crops, nitrogen-fixing crops, short rotation coppice and agro-forestry, which all presumably have a positive environmental impact. Also afforested land can under certain circumstances be recognised as EFA. While the EU prescribes certain conditions to the EFA, Member States may define further rules (e. g. regarding width of strips, list of crops to be used as cover crops, short rotation coppice or legumes, some regulations on plant protection products and fertilisers in certain EFA-types and further technical criteria etc.). On set-aside land the requirements of cross compliance for minimum maintenance are applicable. In case AECM are also applied on the same plot with requirements above the greening standards, those obligations surmount the standards attached to the single EFA-types. All together in the 68 % of the arable land in the EU is subject to the EFA-requirements (EC 2016d). While Germany adopts all types of EFA, the other case study countries are more selective. All of them allow nitrogen-fixing crops (with specified lists of allowed crops; e. g. in The Netherlands, only certain species of feed legumes are accepted (EC 2015d)), Austrian farmers may also select certain landscape elements, set-aside land, catch crops and short

¹³ This rule has been included in order to prevent the conversion of long-term set-aside arable land back to cultivated land with the only purpose to keep the status of arable land (this development has been initiated by a mandate of the European Court of Justice that made the permanent grassland status mandatory for any arable land that had been set-aside or covered by grass for more than five years). Nonetheless, many farmers felt themselves forced to plough long-term set-aside arable land, with very environmental impacts.



rotation coppice. In The Netherlands cover crops, short rotation coppice (willow) and grass margins are approved as EFA. In Spain, set-aside land can be part of EFA, but also afforestation and agro-forestry. As a rule, all EFA have to be situated on arable land (there may be exceptions regarding afforested land, also short rotation coppice, some landscape elements and buffer strips). Experiences from Austria and Germany show, that the obligations are mainly fulfilled with catch crops, legumes and also set-aside area.

While **regional implementation** of the EFA is not possible in the four TALE EU-countries, The Netherlands enable **cooperative compliance**: Farmers' collectives can decide to register connected EFA (within the boundaries of the legislative framework). In that case, a maximum of 50 % of a farm's requirement may be fulfilled by other farmers within the collective.

Certain equivalent measures may be used as an alternative to the greening requirements (e. g. AECM covering such management or national or regional environmental certification schemes).

Table 7: Equivalent measures as alternative to greening requirements

AT	DE	ES	NL
Only through rural development measures of Pillar Two	None	None	only through Certification Schemes

Source: EC (2015c: 23)

Austria accepts the participation in the AECM "Environmentally friendly and biodiversity promoting management" as an equivalent to the greening obligations on EFA.

The Netherlands aim to stimulate sustainability certificates that are equivalent to the greening requirements. In this context, three "packages" have been accredited:

- Package "Fieldstrips (including birds-fields)": Combination of a managed grass margin on arable land (at least 30 % of EFA) with nitrogen-fixing crops, agricultural ditch/ditches, cover crops and landscape elements with a contract to improve agrobiodiversity. Furthermore, a "bird-field" is required: alfalfa in combination with a grass margin.
- Package "Skylark" – developed by the Skylark foundation. Farmers that are connected to the Skylark foundation are more flexible in the rules of the EFA (e. g. can choose different nitrogen-fixing crops, < 30 % of EFA as managed grass margin etc.) because their connection to the foundation requires them to develop and commit to a sustainability plan for their holding (targeting both the farming system and the area) already.
- Package "Biodiversity + label": Green Deal "*Biodiversiteit + label*" has been developed to provide a new certificate for products from farms that comply with more ambitious biodiversity related measures than the standard requirements of the EFA.

In 2015 5 % of the obligation on EFA in The Netherlands have been implemented via certification systems, mainly by creating field strips (EC 2016d).



4.2.3 Eligibility conditions for direct payments Switzerland

Short description of general conditions

In Switzerland, several ecological and socioeconomic conditions apply for the receipt of direct payments (see regulation on direct payments, DZV), among them the following:

- The farmer has to possess a certain agricultural education.
- A work load of a minimum of 0.25 in standard labour has to be required on the farm.
- At least 50 % of the work load has to be carried out by in-house workers.
- The age limit of the farmers is 65 years.
- Pig and poultry farms and farms fattening calves may not exceed maximum numbers of animals¹⁴.
- Direct payments per year and farm are limited to 70,000 Fr. (64,120 €) (not included the Resource efficiency payments, the Interconnectedness payment and the Transition payments).

Only UAA is generally eligible for direct payments. This includes arable land, permanent grassland, litter areas, areas with permanent crops, land with crops in sheltered cultivation (e. g. greenhouses), areas with hedges, riparian or field woods as long as they do not belong to the forest area (BLW 2016a).

Also under the following conditions areas are excluded from the UAA:

- the main use is non-agricultural,
- plots with a high occurrence of specific weeds or invasive neophytes, and also plots, where the preservation aspect prevails do not count as agriculturally used area and are thus not eligible for direct payments,
- rated as construction site,
- golf and camping sites, airfields, military zones, and within defined areas connected to railroads or public streets.

Summering areas are not part of the UAA but are eligible for certain types of payments.

In order to receive direct payments farmers also have to cultivate the land according to the Proof of ecological performance (*Ökologischer Leistungsnachweis*, ÖLN) (see below).

Farmers applying for the Single crop payments also have to comply with the Proof of ecological performance and the requirements regarding work load on the farm and the age limit of the applicant.

Recognised summering or cooperative alpine grazing farms that are eligible for the Summering payment, the Landscape quality payments and the Biodiversity payments, are exempted from the Proof of ecological performance as well as from the limits for age or workload and from the educational requirements. However, they have to secure certain management standards on the summering area e. g. maintenance of building, regular control of livestock, to prevent encroachment of bushes on grazing areas, no use of mineral N-fertiliser and no area-wide application of herbicides (BLW 2015).

Proof of ecological performance (*Ökologischer Leistungsnachweis*)

¹⁴ According to the regulation on maximum livestock density (*Höchstbestandesverordnung*).

Project acronym: TALE

Short title: Review on agricultural policies

Work package 1 Version 2 | Date: 10/4/2017



Cross compliance in Switzerland in the form of the Proof of ecological performance has been implemented in 1993 by national legislation, in particular through the Agriculture Act (*Landwirtschaftsgesetz*) and the corresponding regulation for direct payments (DZV). The cantons are responsible for implementation.

Table 8 compares the Proof of ecological performance with comparable EU requirements covered by cross compliance (which have been described in more detail above). Table 9 compares the Proof of ecological performance with the EU greening requirements.

Project acronym: TALE

Short title: Review on agricultural policies

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Table 8: Comparison of standards of the Proof of ecological performance (environmental aspects only) with corresponding EU requirements for cross compliance

Main issue	EU requirements and standards	Proof of ecological performance
Water	GAEC 1: Establishment of buffer strips along water courses	DZV Art. 21: Buffer strips have to be established along surface water courses, forest's edges, paths, hedges, forest stripes, riparian woods and biotopes of national importance ¹⁵
	GAEC 2: Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures	
	SMR 10 (Reg. (EC) 1107/2009): Proper use of plant protection products, including the application of the principles of good plant protection practice and compliance with the specifications on the labelling)	DZV Art. 18: Targeted selection and use of plant protection products
	SMR 1 (Dir. 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources): compliance with code of good agricultural practice and with obligations in nitrate vulnerable zones defined by the Member States	DZV Art. 13: Balanced nutrient saldo including soil analyses at least every 10 years; the nutrient balance should show that no surplus N or P fertilisation is applied considering the nutrient needs of crops (deviations of 10 % are allowed). In defined areas P fertilisation may only be applied to cover 80 % of the crop need. (Farms under a certain livestock density and not introducing additional N- or P-fertiliser are exempted from calculating a nutrient balance and taking soil samples).
Soil and carbon stock	GAEC 4: Minimum soil cover	DZV Art. 17: Appropriate soil protection:
	GAEC 5: Minimum land management reflecting site specific conditions to limit erosion	- soil protection to be ensured by soil coverage, erosion prevention and protection against chemical and physical soil contamination
	GAEC 6: Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons	- soil coverage through winter crops, catch crops or green manuring
Landscape, minimum level of maintenance	GAEC 7: Retention of landscape features,, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species SMR 2 (Dir. 2009/147/EC on the conservation of wild birds): compliance with measures for the protection of habitats of wild birds SMR 3 (Dir. 92/43/EEC on the conservation of natural habitats and of wild flora and fauna): compliance with measures prescribed in special areas of conservation by the Member States	DZV Art.15: Rules for the management of lowland moors, dry grasslands and pastures as well as breeding grounds for amphibians that are indicated by the authorities as biotopes of national importance ("Inventarflächen") have to be followed.

Sources: Reg. (EU) No 1306/2013; Regulation on direct payments (DZV)

¹⁵ Biotopes of national importance are so-called "Inventarflächen", consisting of peat bogs, lowland moors, meadows along surface waters ("Aue"), breeding grounds for amphibians and dry grassland and pastures.



Table 9: Comparison of standards of the Proof of ecological performance (environmental aspects only) with EU greening requirements

EU greening requirements	Proof of ecological performance
Maintaining environmentally sensitive grassland & Maintenance of the ratio of permanent grassland to the total agricultural area	See also DZV Art. 15
Crop diversification: On farms with more than 10-30 ha arable land at least two, on farms with more than 30 ha at least three different crops have to be cultivated, the main crop covering not more than 75 % of the arable area, the two main crops not more than 95 %. Farms, where more than 75 % of the arable land are covered by grass or other herbaceous forage or are lying fallow and farms whose UAA consists to more than 75 % of permanent grassland, are exempted from these obligations, if their remaining arable land is not larger than 30 ha.	DZV Art. 16: Balanced crop rotation: - agricultural holdings with arable land > 3 ha have to cultivate at least four different types of crops (each with at least 10 % of arable land) per year - maximum shares of coverage are defined for each main crop (e. g. max. 66 % of arable land for grain (without maize or oat), 40 % for maize (50 % for maize with catch crops or undersown grass); 25 % for rape seed, potatoes, oat or beet root; 35 % for rape seed + sunflower) - Cultivation breaks have to be observed
Maintaining ecological focus areas: At least 5 % of the arable land on farms with > 15 ha arable land must be declared as EFA. EFA may be e. g. terraces, field margins, hedges, trees, set-aside land, landscape features, biotopes, buffer strips, agro-forestry, afforested land, short-rotation coppice, areas with catch crops or nitrogen-fixing crops. Farms where more than 75 % of the arable land is used for the production of grass or other herbaceous forage, for legumes or lying fallow, and farms whose UAA is to more than 75 % permanent grassland, are exempted, if their remaining arable land is not larger than 30 ha.	DZV Art. 14: Appropriate share (minimum 3.5 % of special crops area and 7 % of other agricultural land) of biodiversity promotion areas: - extensively or little intensively used grassland - extensively used pastures and forest pastures - litter areas - hedges, field woods and woods along shores - shore grassland along surface waters - flowering or rotational fallows - field strips - vineyards with natural species diversity - species-rich grassland and litter areas on alpine pastures - region-specific areas supporting biodiversity - flowering strips (may account only for a maximum of 50 % of the biodiversity promotion areas)

Sources: Regulation (EU) No 1306/2013; Regulation on direct payments (DZV)

In addition, if further mandatory requirements of the legislation for the protection of water, the environment or nature are breached in combination with farm management, the direct payments will also be reduced in Switzerland. These sanctions are independent from further administrative penalties.

In addition, EU farmers have to comply with SMR in the area of public health, animal health and plant health and animal welfare. Similarly, the Proof of ecological performance includes requirements to comply with the relevant rules for agriculture set in animal welfare legislation (DZV, Art. 12) and requirements for the production of seeds and seedlings (DZV, Art. 19) and for special cultures (DZV, Art. 20). Those aspects are not listed here due to the focus on land use only.



Swiss farmers can decide to fulfil the Proof of ecological performance or parts of it (e. g. balanced nutrient saldo, biodiversity promotion areas or a balanced crop rotation and soil protection and plant protection) in cooperation with other farms within the neighbourhood. Such cooperation has to be authorised by the canton.

A comparison between the Proof of ecological performance and standards under cross compliance and greening in the EU shows, that many aspects are covered in both systems, although the concrete requirements differ:

- Buffer strips along water courses
- Limiting environmental impacts originating from the application of plant protection products (while Switzerland sets restrictions for the application of herbicides, insecticides and granulates that go beyond existing plant protection regulation, the EU requirements relate to existing legislation (SMR 10) with the obligation for proper use according to the principles of good plant protection practice, which entails application in conformity with the conditions of their authorised use and in an efficient way).
- Limiting environmental impact originating by nutrients (Switzerland is setting standards for a balanced N- and P-saldo beyond further legislation; in the EU central aspects of the national implementation of the EU Nitrates Directive (SMR 1) for the application of N-fertiliser and the storage of organic fertiliser have to be observed).
- Soil protection, in particular regarding soil cover and requirements preventing erosion
- Environmentally sound management of defined features or areas protected under nature conservation (in Switzerland this refers to certain biotopes of national importance, in the EU to some landscape features and also to requirements regarding the Habitats and Birds Directive under SMR 2 and 3).
- Crop diversification/crop rotation
- Ecological focus areas/biodiversity promotion areas

In both cases direct payments are also reduced if obligations from environmental legislation with relevance for agricultural management are breached (in addition to a potential administrative fine) (for the EU the relevant SMR with direct impacts on the environment are already listed in the above table).

Non-withstanding the detailed obligations, there are marked differences between the EU and Switzerland. In some areas Switzerland applies more ambitious requirements:

- Regarding fertiliser and pesticides use, Switzerland sets rather strict standards that go beyond further legislation. In the EU comparable obligations linked to cross compliance are stemming from central EU legislation on the use of fertiliser and plant protection products that farmers have to comply with regardless of cross compliance.
- Requirements for crop rotation are stricter than EU prescriptions for crop diversification (as they apply already for farms with a minimum of 3 ha arable land, require four different crops and define maximum shares of coverage for each main crop)



- Buffer strips under the Proof of ecological performance also have to be observed along forest's edges, paths, hedges, forest stripes, riparian woods and biotopes of national importance¹⁶.

Some aspects are only addressed in the EU by cross compliance or greening but not in the Proof of ecological performance:

- Compliance with legal obligations regarding irrigation
- Maintenance of the ratio of permanent pasture to the total agricultural area declare

EFA/biodiversity promotion areas are approached in a different way in the EU compared to Switzerland: In Switzerland they cover 7 % of agricultural land (including permanent grassland; lower percentage for special crops) instead of 5 % of only arable land as in the EU. While elements such as hedges, set-aside land or field and buffer strips are included in both cases, this list covers also extensively managed permanent grassland and species-rich vineyards in Switzerland, and in the EU productive arable land such as legumes, catch crops, short-rotation coppice and agro-forestry and also afforested land under certain conditions. However, in the EU, the Member States have high flexibility in choosing from the possible list of EFA.

4.2.4 Conclusions on eligibility conditions for direct payments

General eligibility conditions

Conditions for eligibility for direct payments are composed of general conditions such as characteristics of persons applying for the payments or of the eligible farms. While in the EU main requirements are being an "active farmer" and a minimum size of farms, in Switzerland there are some more specific rules e.g. on education or experience as a farmer and requirements regarding the work load on a farm. An interesting feature in Switzerland is the exclusion of pig and poultry farms and farms fattening calves that exceed maximum numbers of animals. Also plots heavily encroached by certain weeds or invasive neophytes are not accepted as eligible area. Such restrictions do not exist in the EU; however Member States may attach obligations regarding the prevention of encroachment of unwanted vegetation to cross compliance). Livestock numbers in the EU are restricted indirectly via the maximum N-amount to be applied with organic fertilisers of 170 N/ha (however, slurry may also be exported). In Switzerland direct payments are limited to a maximum amount per farm (70,000 Fr. or 64,120 €, not included the Resource efficiency payments, the Interconnectedness payments and the Transition payments), while in the EU a degression of payments per hectare by at least 5 % is applied for farms receiving basic payments of more than 150,000 € per year.

Cross compliance, greening and the Proof of ecological performance

More directly relevant for environmental aspects of land use are the standards for cross compliance and greening in the EU and the Proof of ecological performance in Switzerland. Conditions for receipt of direct payments, in particular environmental cross compliance and

¹⁶ In Switzerland those strips have to be at least 3 m wide along forest edges, hedges and field or riparian woods (with a maximum of 6 m in the three latter cases), at least 6 m along surface waters and 50 cm along paths. The EU prescribes strips with a width of at least 1 m with a maximum of 10 m along forest edges. In between this framework the Member States can determine the width, e.g. Germany allows for field and buffer strips of up to 20 m, in the Netherlands grassy field margins may also be up to 20 m wide.



greening requirements, serve as basic requirements for all farmers receiving those payments. As horizontal instruments they set or improve enforcement of minimum standards for land management even on land without productive use. Due to a common framework these instruments are comparable across the EU. The Swiss approach for cross compliance covers similar standards. Those elements have, contrary to the voluntary AECM, a rather mandatory character, even if they are not covered by any other existing legislation: While farmers are not obliged to apply for direct payments their economic dependence is generally so high, that they do not consider abstaining from these payments and a cut of payments in case of detected non-compliance with e. g. the requirements of cross compliance takes the effect of a fine. Also enforcement is easier than in case of environmental legislation, as a withdrawal of payments is more straightforward than to impose an administrative fine. However, the effect of those measures is ultimately dependent on the ongoing existence of the support payments they are connected to. Cross compliance standards that are also mandatory under further existing legislation (SMR, some GAEC) and also some pieces of environmental legislation on Switzerland have to be complied with by farmers also independently of the receipt of direct payments. However, in case of detected non-compliance sanctions might include an administrative fine plus a cut in direct payments. This can be expected to improve enforcement of such standards, especially if linked to the provision of information and a systematic control system, as it is required under EU cross compliance.

A comparison of GAEC standards in the TALE Member States shows that they are an important instrument for soil conservation especially regarding soil cover of set-aside land and on prevention of erosion. While farmers should have a self-interest in maintaining soil quality such standards are not obligatory outside cross compliance. Other GAEC obligations partly cover already existing mandatory standards (e. g. regarding buffer strips, irrigation or the maintenance of landscape elements), although in single cases additional requirements have been defined.

Regarding greening standards in the TALE Member States the following aspects can be summarised:

- Crop rotation: the TALE Member States stick to the EU prescriptions, to cultivate, depending on the size of their arable area, two or three different crop types on their arable land, the main crop covering not more than 75 % of the arable area.
- Permanent grassland: Apart from Germany, the TALE Member States have decided on the most flexible way to comply with the requirements to keep the ratio of permanent grassland by requiring action only when a decline of more than 5 % at the national level is present (in Austria requires approval of conversion from 4 % on). Germany has a stricter approach, calculating the ratio at the federal states level and demanding approval of grassland conversion from the beginning and as a rule a replacements of the converted area. While in The Netherlands and in Spain all permanent grassland in Natura 2000 areas is defined as environmentally sensitive grassland, in Germany it is 64 % and in Austria only 6 %. None of the countries has included grassland outside of Natura 2000 areas.
- The Netherlands and Spain allow for four different types of EFA. Austria and Germany offer more than 10 types of EFA (including different types of landscape elements). Member States have some freedom to determine e. g. lists of allowed species for cover



crops, legumes and short rotation coppice, for widths of strips, sowing dates and standing times, or for the use of fertiliser and pesticides. The choice of EFA and the concrete management rules influence the environmental performance.

- Equivalent measures are offered in Austria in the form of an AECM and in The Netherlands in form of certification schemes (two schemes for EFA, one scheme for all greening requirements).
- Only The Netherlands allow for cooperative compliance with EFA, where farmers can register a common EFA.

The Swiss Proof of ecological performance covers more or less similar environmental aspects. However, the Swiss requirements are stricter in several fields such as fertiliser and pesticides use, requirements for crop rotation and buffer strips. On the other hand, regarding standards beyond further legislation, there is no Swiss equivalent to the maintenance of the ratio of permanent pasture. EFA/biodiversity promotion areas are approached in a different way in the EU compared to Switzerland: In Switzerland they relate to all agricultural land, not only arable land. Extensively used grassland may be included as biodiversity promotion area, while in the EU different types of productive arable land can count as EFA. Only recognised summering farms are exempted from the Proof of ecological performance (however, they have to adhere to some alternative obligations), while in the EU organic farms and farms in the "Small Farmers Scheme" are exempted from the greening obligations. Also farms with an arable area of less than 10 ha and farms with a high percentage of grassland or feed crops do not have to comply with crop rotation requirements. Cross compliance has to be respected by all EU farms receiving direct payments.

In the EU equivalent measures can substitute for defined greening requirements if the Member States chose to implement them. Cooperative compliance with some elements of the Proof of ecological performance is possible in Switzerland; also EU Member States can decide to use such an approach for EFA (as The Netherlands have done).

4.3 Compensatory allowance granted in areas facing natural constraints

The Natural handicap payments, granted in the EU in the framework of Pillar Two, aim at securing agricultural activities and compensating for permanent natural and economic disadvantages, thus supporting the continuation of agricultural land management in mountain and other less-favoured areas.

In less favoured areas farming is handicapped by a natural or other specific constraint. The areas have to be delimited by Member States on the basis of biophysical criteria (e. g. low temperature, dryness or slope) (Annex II of Regulation (EU) No 1305/2013), with some flexibility for Member States to use other criteria for up to 10 % of their agricultural area.

In these areas, farmers face higher costs of production and are eligible for compensatory payments calculated on the basis of the additional costs incurred and income foregone.¹⁷

¹⁷ Minimum and maximum amounts of the support per ha per year are defined in Annex III of regulation 1305/2013



The EU regulation requires Member States to provide for degressivity of payments above a threshold level of area per holding, to be defined in the programme, except if the grant covers only the minimum payment per hectare per year.

There are three different categories of such area:

1. mountain areas, which are handicapped by altitude, difficult climatic conditions and a short growing season;
2. areas, other than mountain areas, facing significant natural constraints;
3. other areas which face specific constraints and where the land needs to be managed in order to conserve or improve the environment, to maintain the countryside, to preserve the potential for tourism or to protect the coastline.

Before the 2013 reform of the Common Agricultural Policy, such areas were known as “Less Favoured Areas” (LFA) and were defined under much vaguer criteria. During a phasing out period ending in 2020 Member States are allowed to grant payments to beneficiaries who were entitled to such payments in the old programming period and are no longer eligible following the new delimitation.

Comparable payments in Switzerland are the Zone payments for preservation/maintenance of the cultural landscape (part of the Cultivated landscape payments, *Kulturlandschaftsbeiträge*) aiming at maintaining the cultural landscape in less-favoured areas and which is graded according to one hill and four different mountain zones. Table 10 compares the height of premia, the eligibility and the main conditions in the TALE case study countries.

Table 10: Payments to farmers in areas facing natural or other specific constraints (ANCs) in the TALE case study regions
(EU: Payments to areas facing natural or other specific constraints, CH: Zone payment for preservation/maintenance of the cultural landscape)

	AT	DE (Saxony)	DE (Thuringia)	ES	CH
Height of premia (per ha)	97 € on average ¹⁸ (depending on farm size, livestock density and degree of handicap)	63 – 134 € (depending on the production measurement number, height and farm size)	30 – 195 € (depending on farm size, agricultural reference figure and share of main forage area)	60 to 96 €	100 – 390 Fr. (92 – 357 €) (depending on zone; hill zone and four mountain zones)
Eligible areas	All UAA (incl. alpine meadows)	All UAA without maize, wheat, wine, apples, pears and peaches sugar beet and intensive crops (vegetables, fruits, hops, tobacco, flowers and ornamentals, nursery areas)	All UAA (incl. landscape elements protected under cross compliance, excl. set-aside land/other non-cultivated areas)	All UAA	All UAA (excl. certain permanent crops)
Conditions	<ul style="list-style-type: none"> - Farm size >2 ha - Agricultural use of land (biodiversity and nature protection areas within the agri-environmental programme) 	<ul style="list-style-type: none"> - min. 3 ha of disadvantaged area located in Saxony - min. considered field size: 0.3 ha 	<ul style="list-style-type: none"> - min. 3 ha of disadvantaged area - min. payment 300 € 	Farms must have an area >5 ha for rain-fed crops or >10 ha for irrigated crops	Forest expansion has to be prevented by appropriate means (cutting, removal of bushes and trees, etc.)

Source: Description by project partners, additionally: EC (2015c), AMA (2016) (for AT), BMEL (2015a) (for DE)

¹⁸ Average for 4 districts: Waidhofen/Ybbs, Amstetten, Melk, Scheibbs; 2014



In Austria the height of premia is calculated according to farm size, livestock density (farms above threshold receive higher premiums) and farm specific points related to production disadvantages (*Erschwernispunkte*). The calculation of the height of premia in Germany (Thuringia and Saxony) follows a similar scheme: payments are granted according to the agricultural reference figure (Thuringia: *Landwirtschaftliche Vergleichszahl* LVZ) or a production measurement number (Saxony: *Ertragsmesszahl*) (areas with higher figures receive a lower payment), the main forage area share (*Hauptfutterflächenanteil*) in relation to the entire UAA of a farm (the higher the share the higher the payment) in Thuringia, the height of the area in Saxony and the size of the farm (decreasing payments with increasing farm size) in both federal states.

Spain links the eligibility to receive LFA payments to the applied irrigation system. In the current funding period The Netherlands abolished LFA payments completely.

4.4 Agri-environment-climate measures (and comparable measures) and support of organic farming

4.4.1 Introduction

Payments for Ecosystem Services (PES) in agriculture provide positive incentives to farmers to carry out land management in such a way, that the provision of the desired environmental services is supported. While such support can take the form of one-time payments e. g. for investments or single actions, the focus in TALE is on payments targeted at land management carried out regularly. Most prominent measures in the EU are the now-called agri-environment-climate measures (AECM) offered in the EU under Pillar Two of the CAP. Agricultural management practices that exceed standards set by legislation, cross compliance and greening may be eligible for support payments. Farmers are being paid a fixed amount per hectare for a specific farming practice such as no tillage for enhancing ecosystem functions of soils or buffer strips for the provision of certain ESS such as species richness and clean water¹⁹. This approach also includes support for organic farming. The annual payments have to be calculated as such that they to cover expenses and income foregone; the EU does not allow for including additional financial incentives for participants. In Switzerland comparable measures exist.

The following measures will be covered under this heading (see table 11). For the EU we refer to measures of the new programming period (2014 – 2020).

¹⁹ There may be some exemptions, e. g. support of N-efficient manure spreading based on volumes or support of grazing based on livestock numbers.



Table 11: Agri-environment-climate measures/support of organic farming and comparable measures in Switzerland

EU	CH
Agri-environment-climate measures (AECM)	Biodiversity payments (<i>Biodiversitätsbeiträge</i>)
Support of organic farming	Landscape quality payments (<i>Landschaftsqualitätsbeiträge</i>)
	Support for organic farming and Extenso within Production system payments (<i>Produktionssystembeiträge</i>) and
	Slope payments, Payments for transhumance and alpine farming management and Payments for summer grazing within the Cultivated landscape payments (<i>Kulturlandschaftsbeiträge</i>)
	Resource efficiency payments²⁰ (<i>Ressourceneffizienzbeiträge</i>)

Important measures are measures on less-input grazing, erosion control and water protection, and specific nature conservation measures e. g. addressing high-nature value grassland. The bulk of measures is integrated into agricultural production systems and does not require land to be set aside.

Production-related measures aim at a (more) environmentally friendly agricultural production. They are often offered regardless of concrete areas or local protection goals, but are based on the conviction that a lower intensity of production or the adoption of a certain production technique yields a positive effect for the environment and for biodiversity (Thomas et al. 2009). Other measures - often in the field of nature protection or the maintenance of the traditional cultural landscape - are directed specifically towards certain target areas. The scope and geographic coverage of rural development measures varies widely between and within countries. As a very high variety of such measures exist, we will identify main types of measures and group them into defined categories.

4.4.2 Framework for setup of measures in the case study regions

EU Member States have to setup national or regional Rural Development Programmes (RDP) with the respective support measures (among them AECM and the support of organic farming) according to the framework prescribed by the EU.

Austria, with the case study region "Mostviertel" in the Federal State of Lower Austria, has one agri-environmental programme (*Österreichisches Programm zur Förderung einer umweltgerechten, extensiven und den natürlichen Lebensraum schützenden Landwirtschaft, ÖPUL*). ÖPUL for the current funding period consists of 23 measures including organic farming and animal welfare. Most measures are available to farmers all over Austria.

In **Germany**, the federal states publish their own RDP. However, the German National Framework for Rural Development (Joint task "Improvement of the agrarian structure and the coastal protection" or *Gemeinschaftsaufgabe "Verbesserung der Agrarstruktur und des*

²⁰ Without "Payment for precise application technique"



Küstenschutzes", GAK), describes common measures, for which the federal states receive national co-financing, if they decide to implement them. They constitute the core of the programmes of the federal states. The German case study region extends over mainly two federal states, Thuringia and Saxony. Both have developed their own RDP, and AECM and the support of organic farming of both federal states will be depicted separately.

In **Spain**, national government sets up a national RDP. Each autonomous community designs its own RDP, identifying regional needs, and establishing action priorities and choosing among the measures included in the national RDP, for which they receive national co-financing. The case study region "Cega-Eresma-Adaja basin" is situated in the Autonomous Community Castile and León.

While **The Netherlands** have handed in one RDP to be approved by the European Commission, the provinces are responsible for the management of AECM. The "Catalogue Green and Blue Services" (*Catalogus Groene en Blauwe Diensten*, CGBD) lists all measures that are applied in any province of The Netherlands. Measures exist for nature and landscape management, agro-biodiversity, landscape elements and "blue services" (water management). While the national level is involved in order to guarantee that the measures are in line with the EU requirements, the provinces are responsible for their own landscape and nature policies and set up their own framework for AECM. Every year, new measures may be added to the national list. Farmers may only choose measures that fit the assigned habitat type, management functions and clusters of management activities.

The catalogue of the CGBD is broader than just AECM as it includes nature, landscape, cultural history, recreation and water management. In TALE we look at the measures of the Agricultural Nature & Landscape Management (ANLb 2016), as this system deals with agricultural land management and is therefore most relevant for farmers. The scheme is built around habitat types, four agricultural habitat types (open grassland, open arable land, wet veining and dry veining) and one water category. The individual grant scheme for farmers has been changed to be open for collectives of farmers only from 2016 onwards. The collective arranges the individual contracts and payments with the individual farmers. Farmers' collectives often make use of so-called "management packages", a combination of ecological or hydrological effective management activities. Using a linking table for habitat types, management function and clusters of management activities, farmers' collectives can decide which management packages fit the local situation. Every province publishes maps that define the habitat types, management functions and clusters of management activities. Farmers are advised by environmental organisations on the available measures and how to use them best for nature conservation and water protection. The collective has to explain how and where the individual measures are implemented. The idea behind this new approach is an improved consistency in management. For measures targeted at Nature and Landscape, which are not linked to agricultural land, individual subsidies are offered to landowners. This system will also become collective from 1 January 2017 onwards.

In the **Province of Utrecht in The Netherlands** the following schemes are offered: 1) schemes for nature management and development (Nature and Landscape focus), 2) Quality impulses for nature and 3) Subsidies for agro-biodiversity, landscape elements and "blue services" (water management). For all these measures, the yearly renewed "Nature



management plan” of the province provides the boundaries of the areas for which it is possible to request subsidies.

1. The management of Nature and Landscape is mainly targeted at large landowners, such as nature focussed foundations but also private landowners. The area eligible for this scheme is listed as a certain land management-type by the province (for the Kromme Rijn area: pond or small historic water, wooded bank/windbreak, alder treeline, forest treeline or small forest, hedgerow, tree avenue, pollard trees, high-stemmed orchard, tree line/solitary tree). Altogether 19 different management options are offered for those elements. Farmers often participate in this scheme, because the Kromme Rijn area is very rich in landscape elements.
2. Quality impulses for nature: A map indicates agricultural land that could be managed primarily for nature and species conservation. Here, also individuals (or groups of individuals) could be eligible for specific subsidies.
3. Specific habitats may be supported regarding agro-biodiversity and “blue services”. In the Province of Utrecht, four habitat types are eligible: open grassland, dry veining, wet veining²¹ and water (open arable land is not included in this province²²). In the Kromme Rijn area mainly “dry veining” and “water” is relevant.

Only the measures for agro-biodiversity currently applied for in the Dutch case study region for the “Subsidies for agro-biodiversity, landscape elements and blue services” (covered by the ANLb 2016) have been described in more detail and are included in the further analysis in this report.

In **Switzerland**, with its case study region “Broye catchment”, the support measures that will be compared to the AECM and support of organic farming in the EU Member States are defined in the national regulation on direct payments (DVZ) and are available all over Switzerland. Only the Landscape quality payments are related to regional projects, and a concept of own measures has to be developed by a canton or a regional organisation in cooperation with farmers. This concept has to be approved by the Federal Office of Agriculture (*Bundesamt für Landwirtschaft*, BLW), and subsequently the canton concludes contracts with the farmers over several years. Also the Interconnectedness payments depend on projects of the canton, where the canton concludes contracts with farmers managing so-called “biodiversity promotion areas” (*Biodiversitätsförderflächen*), defined by the canton (in both cases, 90 % of the payments are borne by the national level). Within the Resource efficiency payments in Switzerland also the purchase of equipment for precise pesticide application is supported. As an investment measure this will not be included in the analysis.

4.4.3 Area-coverage in the case study regions

The numbers in table 12 illustrate the wide variation of area-relevance of AECM in the case study regions. Numbers relate to the former programming period, thus, measures are not directly comparable with the set of measures offered in 2015; also organic farming has been

²¹ “Veining” relates different linear landscape elements, such as tree lines, hedgerows, dikes, roadsides etc. For wet veining, this also includes linear water elements, such as ditches as well as point-elements such as pools.

²² Those habitat types characterise landscapes rather than the land use of single plots. E. g. “Open arable land” stands for landscapes with a majority of arable land that suits the requirements of arable species. The other habitat types may also contain plots of arable land, but without this being the dominant character of the area.



part of the former set of agri-environment measures. Numbers were mostly only available for administrative regions beyond the single case study regions. However, they give an impression of the area reached.

Table 12: Area-relevance of AECM

	AT (Mostviertel, Lower Austria) ²³	DE (Ilm/Mulde catchment, Saxony)	DE (Ilm/Mulde catchment, Thuringia)	ES (Cega-Eresma- Adaja basin, Castile and León)	NL (Kromme Rijn, Utrecht)
Region	Mostviertel- Eisenwurzen (NUTS 3)	Saxony (NUTS 2)	Thuringia (NUTS 2)	Castile and León (NUTS 2)	Kromme Rijn
% of UAA	65 %	38 %	32 %	20 %	1.07 %
% of permanent grassland	88 %	29 %	36 %	58 %	2.7 %
% of arable land	43 %	41 %	31 %	12 %	0.6 %
Data source and date of survey	ÖPUL 2007-2014 2014 (including organic farming)	Grajewski & Schmidt (2015) 2013 (including organic farming)	Grajewski & Schmidt (2015) 2013 (including organic farming)	Calculation of project partner, 2007-2014 (including organic farming)	Calculation of project partner 2014

ÖPUL, as a very broad programme with a high variety of measures and a high acceptance, reached 65 % of the UAA. Permanent grassland was covered by 88 %. The largest measures were support of organic farming and the “Environmentally friendly management of arable and permanent grassland” (*Umweltgerechte Bewirtschaftung von Acker- und Grünlandflächen*) as a low entry basic measure, which was a prerequisite for many other more specific measures. A subsequent measure in the current programming period is the “Environmentally friendly and biodiversity promoting management”. Another important measure was the “Eco-points-programme” (*Ökopunkteprogramm*), which is no longer available in the current ÖPUL program period. It was also available on arable as well as on grassland and allowed for higher premium levels per ha due to higher remuneration of landscape elements. This system is largely replaced by other measures in the current ÖPUL program period 2014 – 2020 that cover most of the detailed measures required in the “Eco-points-programme”, such as maintenance of landscape elements or diversified crop rotations.

In the German federal states Saxony and Thuringia about a third of the UAA were under agri-environmental contracts. Saxony offered one widely available arable measure for conservation tillage and direct seeding which contributed to the rather high participation with arable land; measures for permanent grassland are predominantly directed at specific target areas. Most wide-spread measures in the current programming period have been, according to applications in 2015, measures targeted to permanent grassland. In arable farming the measure for strip

²³ Estimation, as numerous schemes can be combined; can be considered the lower bound for ÖPUL participation.



and direct seeding was only available from 2016 on; regarding the other measures for arable land, those with abiotic objectives were responsible for about two thirds of supported area; however biodiversity measures increased strongly compared to the former programming period (SMUL 2016b).

In Castile and León 20 % of the UAA have been under agri-environmental contracts. The most important measure on arable land has been “Rain-fed extensive agroecosystems”, but this measure is not available any more as it had too much overlapping with the new greening requirements. Measures for arable land are now limited to certain crops, organic farming is rare. Regarding grassland, support for extensive livestock rearing has been well accepted as a way to render traditional livestock keeping more profitable for farmers. An area-coverage with AECM of 21 % of the UAA is planned for the current programming period; however available funds have been reduced.

In the Dutch case study region AECM cover only a small proportion of land. Reasons are that the AECM focus on linear landscape elements (also organic farming is not included in those numbers). For the Kromme Rijn area, the management packages that target Landscape management are considered entry-level schemes, as these elements are traditionally part of the landscape and also regarded as such by farmers. Therefore these schemes are clearly most popular: Of the 158 management units for a local farmers’ collective (*ANV Langbroek*), 151 were under Landscape management measures in 2016. Most popular are pollard trees. Also the measure “management breeding birds on arable land” is rather well accepted as it does not affect the general farming practices (except for a zone of 50 m² around nests). Field-based activities, such as “flowering / herb-rich meadows” are less popular, because of their effect on production.

No numbers were available for Switzerland. However, in 2014 the municipalities of the case study region the Biodiversity payments containing the Quality payments and the Interconnectedness payments received the biggest share of funds (13.7 % of all direct payments²⁴). A high share of the budget was also allocated to the Landscape Quality payments (6.1 %). Further financially dominating measures outside those we compare with the AECM in the EU were the Animal welfare payments (10.9 %), the Payments for open arable land and permanent crops (8.9 %) and the Single crop payments 5.8 %.

4.4.4 Support of organic farming in the case study regions

As it is also stated in article three of the EU-regulation on organic production and labelling of organic products (Regulation (EC) No 834/2007), which sets out the principles, aims and overarching rules of organic production in the EU, organic production aims at positively influencing a broad range of objects of protection, such as biodiversity, water and soil as well as animal welfare.

The general rules for the support of organic farming are laid down in article 29 of Regulation (EU) No 1305/2013: Support under this measure shall be granted, per hectare of agricultural area, to farmers or groups of farmers who, on a voluntary basis, convert to or maintain organic farming practices and methods as defined in Regulation (EC) No 834/2007. The payments are meant to compensate, completely or partly, for the additional costs and income foregone that

²⁴ Calculated according to numbers provided by the Federal Office of Agriculture (BLW)



is connected to this production system. Additionally, transaction costs up to a value of 20 % of the premium paid for the commitments may be covered. Annex II of Regulation (EU) No 1305/2013 sets out the maximum amounts per hectare and year for annual crops, specialised perennial and other land uses.

Organic farming support through area payments and the relevance that countries give to organic farming support in the new funding period varies considerably across the Member States (see also table 22 in Annex IV). Differences in premia heights also exist between Member States due to payment differentiations by land use type, different economic assumptions and different cost and income foregone components in payment calculations (IFOAM EU and FibL 2016).

Table 13: Area-relevance of organic farming

	AT (Mostviertel, Lower Austria)	DE (Ilm/Mulde catchment, Saxony/Thuringia)	ES (Cega-Eresma- Adaja basin, Castile and León)	NL (Kromme Rijn, Utrecht)	CH (Broye catchment, Vaud/Fribourg)
Region	Mostviertel- Eisenwurzen (NUTS 3)	Saxony / Thuringia (both NUTS 2)	Castile and León (NUTS 2)	Province of Utrecht (NUTS 2)	Canton Vaud (NUTS 3)
Share of organic farming of UAA	13 %	4.1 % / 4.2 %	0.3 %	2.9 %	5.7 %
Data source and date of survey	ÖPUL 2007-2014, 2014	BMEL 2016, 2015	RDP 2014-2020, 2016	Calculation of project partner, 2014	Bundesamt für Statistik, interaktive Datenbank, 2015

The share of organic farming in the different case study regions differs widely (see table 13), although, apart from The Netherlands, all TALE case study regions (and all EU Member States) support organic farming with area payments under the agricultural policies (in the EU within Pillar Two). The share of organic farming depends, of course, not only on policy support, but also on market conditions and prevailing production systems (e.g. already extensively managed grassland systems are easier to convert than intensive arable production systems).

While some regions pay the same amount for arable land and for grassland, like Saxony and Thuringia in Germany, Switzerland and Austria pay a higher amount for arable land. The premia paid for permanent crops is higher in most case study regions. In Spain, the height of the premia also depends on whether the crops are irrigated or rain-fed. Spain is also the only country where synergistic effects are taken into account by prioritising farmers of the same village.

Whereas the Austrian case study region and the two German states require the whole farm to operate organically, in Switzerland and Spain the support is also granted for single fields. Only Thuringia pays a higher amount during the time of conversion.

The height and design of area payments are, of course, an important, but not the only (political) factor influencing the decision of farmers to convert to or maintain organic production. Other



factors, like the control system, the availability of extension services, market access and the anticipated development of demand and prices also play a big role.

In The Netherlands organic farming is at policy level now seen as one of the forms of sustainable agriculture that can make use of the general agricultural measures and policies. In order to make organic farms more competitive with conventional agriculture, the Dutch government signed covenants with supermarkets, the Dutch Confederation of Agriculture and Horticulture (LTO) and other parties for the joint promotion of organic products and a wider selection in the shops.

4.4.5 Comparative analysis of AEPM (and comparable Swiss measures)

Measures in the single case study regions

Austria (Mostviertel, Lower Austria):

- The ÖPUL offers a variety of AEPM, five of them covering several land use types. Among them are two measures targeting biodiversity protection mainly, one of them being a whole farm approach with rather low entrance conditions (“Environmentally friendly and biodiversity promoting management”). Contrary the measure “Nature conservation” aims at the management of sensible areas and valuable agricultural habitats, the management requirements are set by the nature conservation authority, and are thus adapted to specific conditions. This measure also includes – as a variation – a result-oriented pilot scheme. In the measure “Limitation of yield increasing inputs” farmers participate with their whole farm, while the measure “Preventative groundwater protection (regional)” offers options for a participation of single fields both with arable land or permanent grassland.
- Six further measures are solely addressing arable land and have predominantly abiotic goals (water and soil protection) by supporting e. g. cover crops, direct seeding or buffer strips.
- Three measures for grassland only (two of them specifically for mountain or steep grassland) address mainly biodiversity.
- There are further measures for permanent crops only and greenhouses as well as for endangered livestock breeds and for rare crops.
- “Mountain grazing and herding” and the “Cultivation of mowed mountain grassland” are apparently targeting defined grasslands only. Three other measures are offered in designated target areas related to water protection. While “Reduction of yield increasing inputs”, greening measures for arable land and direct or mulch seeding are supported area wide, “Preventative groundwater protection”, “Management of arable areas particularly threatened by leaching” and “Preventative surface water protection on arable land” are available only in designated areas.

All together the mix of rather broad horizontal measures and specific regional measures is important for the programme’s success. E. g. the measures “Environmentally friendly and biodiversity promoting management” requires farmers to cover a broad range of environmentally friendly activities, while dedicated and regionally focused measures shall improve the quality status of water bodies. The evaluation has shown that for Lower Austria, field specific measures (e. g. cover crops) alone reduce erosion by 5 % on average



and all ÖPUL measures together reduce erosion by 11 %²⁵ (BMLFUW 2010). With respect to soil carbon contents, long term monitoring shows increasing soil organic matter, which is attributed to ÖPUL participation (e. g. cover crops, reduced tillage intensity) (BMLFUW 2010). The measure “Greening of arable land” has been evaluated with respect to nitrogen leaching potentials in ground water. Nitrogen leaching can be significantly reduced with cover crops by about 50-80 % during the cover crop period and compared to bare soil but in case of a long growing period of cover crops with high biomass growth, soil and climate conditions. The latter can favour soil organic matter contents as well but is subject to repeated establishment of cover crops (WPA/BAW 2013).

Germany (Ilm/Mulde catchment, Saxony):

- Saxony offers seven measures to be applied on arable land only, among them four with mainly abiotic goals supporting area-wide grass strips, direct and mulch seeding, cover crops and the introduction of legumes or feed crops in the rotation. Mainly biodiversity objectives are addressed by measures on set-aside land, the support of late stubble and specific measures for wild herbs and field birds.
- Measures for grassland all have mainly biotic goals. One result-oriented measure for species-rich grassland is available area-wide. The other four measures, some of them with several sub-measures, are directed in particular at species conservation and/or biotope grassland with detailed management requirements.

Germany (Ilm/Mulde catchment, Thuringia)

- Most measures in Thuringia are solely targeted to arable land, addressing both abiotic and biotic objectives. While support of crop rotation, the conversion to grassland and the protection of the Red Kite is offered area wide, support of erosion control is limited to designated areas prone to erosion and leaves the farmers flexibility of how to achieve the objective. The integration of a wide variety of structural elements (such as field strips, buffer and erosion strips etc.) is partly restricted to target areas for nature conservation.
- Two measures are available for permanent grassland only. The support for “Species rich grassland” is available area-wide and is programmed as a result-oriented measure. “Maintenance of biotope grassland” offers a variety of sub-measures to be selected according to the local conditions.
- Thuringia provides a measure directed at open space areas that are not in the direct payment system with the objectives to avoid succession on grassland biotopes.
- Support is also granted for specific rare livestock breeds.

Spain (Castile and León):

- Integrated production is supported area wide and across different land use types, however with a limited choice of crops (winter cereals, vegetables, vineyards and fruit trees).

²⁵ Those figures are average values that take also less erosion prone grasslands into account. Effectiveness for particular erosion prone areas and crops likely is higher.



- Another measure with mainly abiotic goals is solely targeted at sustainable production of sugar beet. It introduced several requirements linked to water quality and quantity improvements (reduced pesticide use, improved crop rotation, and crop mixes with less water needs).
- “Sustainable management of grasslands and support of traditional transhumant systems” is offered area-wide, if native breeds are used, and is otherwise limited to Natura 2000 areas. Grazing on communal grassland or arable stubble is also supported by the measure “Forage and stubble exploitation through grazing activities with goats and/or sheep”.
- Permanent crops only are supported in connection with unique landscapes in designated areas.
- Another measure deals with native livestock breeds.

The Netherlands (Kromme Rijn, Province of Utrecht)

- In The Netherlands the AECM are predominantly focussed on nature and landscape conservation. The most important scheme regarding agricultural land management is the “Agricultural Nature & Landscape Management” (ANLb 2016), which is built around defined habitat types.
- In the Province of Utrecht the following schemes are offered: 1) schemes for nature management and development (Nature and Landscape focus), supporting a variety of landscape elements (e. g. ponds, wooded banks/windbreaks, lines of trees, small forests, hedgerows, high-stemmed orchard, solitary trees) 2) quality impulses for nature and 3) subsidies for agro-biodiversity, landscape elements and “blue services” (water management) under the ANLb 2016. All measures may only be applied in specific target areas, depicted yearly in the provincial “Nature management plan”.
- The ANLb 2016-measures in the Komme Rijn consist of four measures all targeting biodiversity, namely breeding birds and grassland plant species. Further actions are concerning water management. The “Herb-rich meadow” is clearly the most effective measure for biodiversity conservation regarding listed focus species, followed by “Breeding bird management on arable land” and “Botanical meadow”.

Switzerland (Broye catchment):

- Although the payment system is not directly comparable to the EU, a number of payment schemes can be identified that have a similar approach to AECM.
- Several payments are targeting several or even a broad variety of land use types. Apart from low-emission application techniques for liquid organic fertiliser, the other measures are mainly targeted at biodiversity or landscape: The Quality payments have sub-measures reflecting different quality stages of a number of defined land use types (among them arable land, different types of extensive permanent grassland, species-rich vineyards, traditional orchards and also hedges and field woods), the second stage being result-oriented, and the third stage only being available in biotopes of national importance. The Interconnectedness payments and the Landscape quality payments both are based on regional projects of the canton. The projects define the target area



and specific management measures. Also payments on slopes for different degrees of steepness are offered (another measure is specifically targeted to steep vineyards).

- Two measures with predominantly abiotic goals are specifically directed at arable land. The support of Extensive production systems (Extenso) aims at limiting the input of pesticides while the “Payment for conserving soil management” targets in particular erosion. A top-up measure for abstaining from herbicide-reduction is available. Both measures are provided area-wide, however Extenso supports certain crops only.
- Specific grassland measures focus on alpine grazing in summer, one measure supporting the farms in the valley for sending their livestock to alpine grazing areas, the other is directed at recognised summering or cooperative grazing farms. Also grassland-based milk and meat production is supported, however without further additional management requirements for grassland.

Addressed land use types

The tables 23 to 28 in Annex V list the measures offered to farmers in the case study regions structured according to targeted land use types and measures for rare breeds/traditional crops. While some of them might only be available in certain designated areas, the measures are ordered here regarding the general land use type (e. g. arable land or permanent grassland)²⁶. Some measures have a number of sub-measures (e. g. including the option to combine them with EFA), which are not listed in detail.

There are further support measures that are connected to grazing but have the principal goal of animal welfare and are thus in EU Member States not programmed as AECM (e. g. grazing of livestock in AT). These measures are not included in the analysis. Also the animal welfare payments in Switzerland are not considered further.

Support payments may also be paid to compensate beneficiaries for additional costs and income foregone resulting from disadvantages due to mandatory restrictions in Natura 2000 areas or areas related to the WFD. Strictly speaking, these are also no AECM as the compliance with those restrictions, once they are mandatory, is not voluntary, but is “only” compensated by payments. E. g. Austria offers such support (“*Natura 2000 – Landwirtschaft*”).

In Austria and Switzerland several measures cover a **broad set of land use types**. E. g. for the ÖPUL-measures “Environmentally friendly and biodiversity promoting management” and “Limitation of yield increasing inputs” farmers participate with their whole farm. The measure “Preventative groundwater protection (regional)” offers options for participation of single fields both with arable land or permanent grassland. Also regarding “Nature conservation” farmers have choices to apply with different types of plots. Several of the Swiss payments are available for a variety of land use types (e. g. the Quality payments - among others - to arable land, different types of extensive permanent grassland, species-rich vineyards, traditional orchards and also hedges and field woods). For the Swiss Interconnectedness payments and the Landscape quality payments decisions of the regional projects are decisive for eligible land use. Within the Resource efficiency payments low-emission application of liquid organic fertiliser is supported with a possible top-up on the renunciation of herbicide use. In the

²⁶ Land use types refer to plots, where the single measures are carried out. Thus this category is not the same as the habitat types eligible for the different ANLb, 2016 measures in the Dutch case study region.



Spanish case study integrated production is supported for winter cereals, vegetables, vineyards and fruit trees, and another measure is applicable for grassland and arable stubble to be grazed by goat and/or sheep. In the Dutch case study region one measure for breeding birds addresses arable land and permanent grassland.

Austria and the two German federal states offer a considerable variety of measures **solely targeting arable land**, many of them focussing on soil and water protection by supporting e. g. cover crops (AT, SN), direct seeding (AT, SN), diverse crop rotation (SN within the measure "Environmentally friendly production methods of fodder and legume cultivation", TH) or buffer strips (AT within the measure "Preventative surface water protection on arable land", TH). In the two German federal states also measures primarily targeting biodiversity are offered. Also the Spanish measure "Sustainable agro-industrial crops: extensification of sugar beet production" includes requirements for a diverse crop rotation. Several measures for arable land restrict the input of fertiliser and pesticides, as also does the measure Extenso in Switzerland that is targeted to specific arable crops only regarding pesticides (see also chapter 5.3). In Switzerland also erosion reducing sowing regimes are supported, again with the option to choose a ban on herbicide use as top-up.

Several measures and sub-measures of Saxony and Thuringia are available for **permanent grassland only** with a focus on species-rich and biotope grassland. Three of the four measures listed here for the Dutch case study region address permanent grassland and support breeding birds and/or plant species. In Austria and Switzerland grassland measures are targeted at alpine mountain grassland (in addition, Austria supports the renouncement of silage production instead of hay-making). As in Switzerland, the only pure grassland measure in the Spanish case study region concerns the support of traditional grazing regimes.

Specific measures for **permanent crops only** exist in Austria for vineyards, fruits and hops. In Spain, such a measure is only offered in "unique landscapes".

Single measures address greenhouses (AT) and open land not eligible for direct payments (TH). In Spain traditional grazing is supported on communal stubble and grassland.

In Austria, Thuringia and the Spanish Autonomous Community Castile and León defined endangered breeds are supported by AECM, in Austria also certain traditional rare crops. In the Dutch case study regions a variety of measures offered under schemes not listed in the tables mainly address different landscape features.

The following figure shows the number of AECM in the TALE case study regions for the different land use types that may be enrolled in those measures (NL is not included as only the four main measures have been specified).

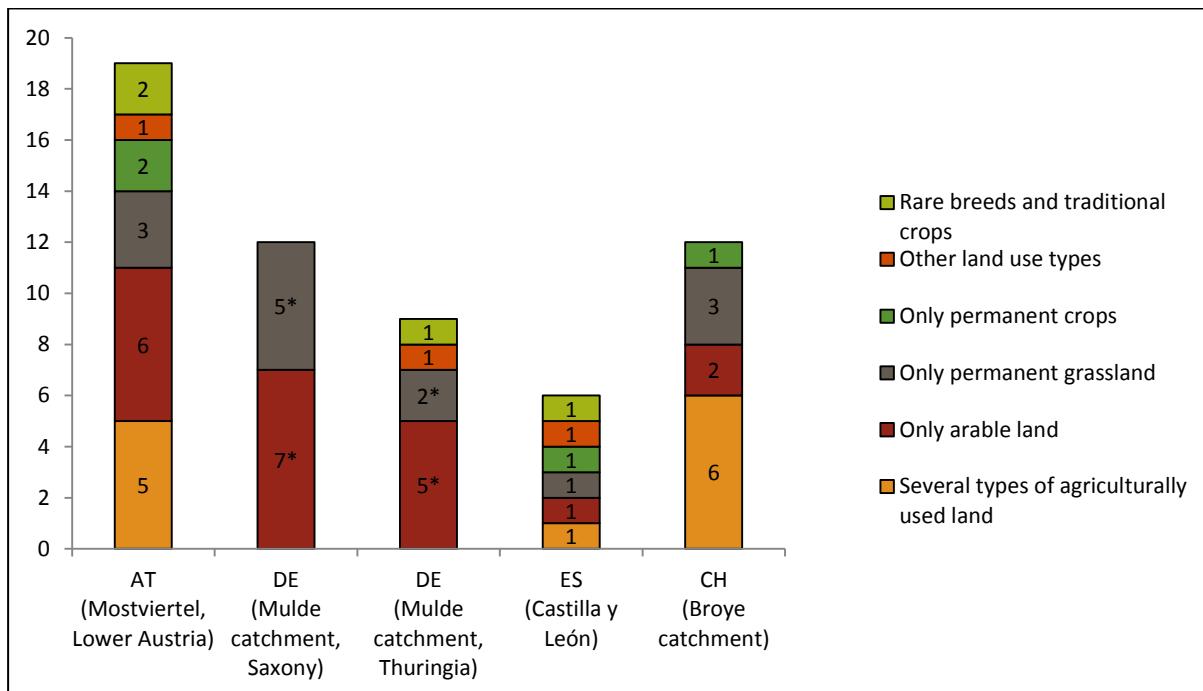


Figure 8: Comparison of distributions of main measures according to different land use types in the TALE case study regions (without NL) (some main measures also have further sub-measures indicated with *)

Further characteristics of measures

Tables 29 to 34 in Annex VI are ordered according to the addressed land use types and primary objective (abiotic²⁷ or biodiversity/landscape) and provide information on various characteristics of the measures e. g. on the required technical measures, if farmers participate with their whole farm or with single plots and on target areas. For the category “required technical measures” the information provided by project partners have been harmonised (and simplified) to enable a summarised comparison.

Not all measures listed in chapter 4.4.5 have been considered for a more thorough characterisation. TALE concentrates on measures impacting on agricultural land use directly; also pesticide use is not in the focus. Thus, measures supporting rare breeds or crop varieties or solely the reduction of pesticide use are not taken on further. Also the payments for grassland-based milk- and meat production, which define a minimum share of grass-based feed, are not included as no further requirements for land management are part of this scheme (although grass-based livestock keeping is supported by the measure and consequently indirectly grassland as a land use type). Also some measures for very specific land use or management measures that are not covered by the quantitative modelling tools in TALE are not part of the comparative analysis (the ÖPUL-measures for permanent crops and on surface-near spreading of liquid farmyard manure; the payments for low-emission application and the slope payments for vineyards in CH; and also a measure “Conservation oriented herding and grazing” in Saxony). Those measures are also not described further and also not included

²⁷ Abiotic objectives include soil, water and climate protection.



Annex VI. For the Dutch case study region only the measures currently applied under the Agricultural Nature & Landscape Management (ANLb 2016) system are included.

Only few measures address a **broad set of land use types and are mainly targeted to abiotic issues** (see table 29 in Annex VI):

- Austria offers two measures for water protection, the “Preventative groundwater protection” being only open in dedicated areas. The measure “Limitation of yield increasing inputs” is particularly important in extensively managed grassland regions and “attractive” for farms with mainly permanent grassland management closely related to organic farming. Main requirements are the limitation of inputs, which is in the case of the regional measure on “Preventative groundwater protection” accompanied by professional training and soil samples.
- In the Spanish case study region integrated production is supported for certain arable and permanent crops. The measure also requires a diverse crop rotation on arable land and the incorporation of crop residues in vineyards and fruit trees.
- The other TALE countries have targeted such measures specifically at arable land only.

Several more AECM for a **broad set of land use types are directed at biodiversity or landscape issues** (see table 30 in Annex VI):

- **Austria** provides for two biodiversity measures targeted at a broad variety of land use types. “Environmentally friendly and biodiversity promoting management” is a whole farm approach requiring the maintenance of permanent grassland as well as of certain landscape features, diverse crop rotation on arable land and the management of at least 5 % of the area of arable land and of mown grassland (without mountainous hay meadows) as biodiversity areas. It can be seen as a measure with rather low entrance conditions for farmers. Contrary the measure “Nature conservation” aims at the management of sensible areas and valuable agricultural habitats. Management requirements, set by the nature conservation authority, are adapted to specific conditions with the option of integration into a regional nature conservation plan. An alternative pilot-scheme within this measure is the result-oriented nature conservation plan. Indicators measuring the achievement of the results include particular plant and animal species and habitats. They are individually negotiated between the farmer and an advising ecologist, who also evaluates the area at the end of the period. Other so called “control measures” are developed, which are monitored as part of the standard monitoring procedure. They include more visible land use characteristics (e. g. max. 20 % soil damage from livestock trampling)
- **In Switzerland** five payment types focus predominantly on biodiversity or landscape issues and are offered for several land use types. The Quality payments support biodiversity in three consecutive stages, the second one being result-oriented and the third one only being available in biotopes of national importance. Depending on the land use type different detailed requirements are defined e. g. regarding input reduction and grazing or cutting regimes. On arable land set-aside and field strips for biodiversity objectives are supported. For specific areas (e. g. certain areas protected under nature conservation legislation and also for areas under quality stage three specific contractual obligations are determined). The Interconnectedness payments and the Landscape quality payments are both based on regional projects of the canton and



have to be approved at the national level. The obligations for farmers can be specified according to the needs of the area. A landscape quality project for the case study region Broye catchment includes a long list of regional measures, among them:

- Diverse crop rotation
- Flowering strips or flowering set-aside arable land
- Strips of extensively cultivated cereals
- Creation and maintenance of grass strips
- Diverse grassland types and establishment of a flowery meadow by the technique of hay flower
- Establishment, maintenance and/or specific quality of landscape features (e. g. trees, hedges, walls, terraces, wetlands)
- Diversity of biodiversity-promoting areas on the farm
- Various measures for vineyards and tree plantations

Switzerland also offers payments on (steep) slopes. These are similar to the payments in areas with natural handicaps in the EU and without more specific obligations. Their main purpose is to keep up agricultural management on such land.

- In the Dutch case study region a result-oriented measure for the management of breeding birds on arable and permanent grassland is supported under the Agricultural Nature & Landscape Management scheme (ANLb 2016). The measure is linked to areas listed for certain management functions in connection with defined land use clusters. Farmers have to apply as collectives.

A high number of measures is targeted to arable land and addresses primarily abiotic goals (see table 31 in Annex VI):

- **Austria** offers a considerable variety of measures solely targeting arable land, many of them focussing on soil and water protection by supporting e. g. cover crops, direct seeding or riparian buffer strips. Two of them are directed at regions prone to high nitrate concentrations in water or other defined target areas along water courses.
- **Saxony** provides four measures under this category, two of them focussing on the prevention of erosion via grass strips or erosion reducing sowing regimes. Also a diverse crop rotation is supported.
- **Thuringia** has got a different approach concerning erosion. The respective measure is offered in designated areas prone to erosion only and leaves the farmer a broad choice, which management to apply. Also the conversion of arable land into extensively managed grassland is supported. The measure “Integration of structural elements” is also targeted to biodiversity protection, but includes buffer strips along surface water bodies and for the prevention of erosion.
- **Castile and León** specifically issues a measure for irrigated sugar beet cultivation, which also requires a diverse crop rotation (specifically including crop mixes with low water needs), a limitation of inputs and in vulnerable areas a green cover before sugar beet cultivation. This measure had been introduced mainly as to stabilise farmers’ income before the background of sinking prices for sugar beet. Also, the high water demand of sugar beet (and potentially other crops in the rotation) can be a problem for aquifers.



- The **Swiss** measure Extensive production system (Extenso) specifically targets certain arable crops and strictly limits the input of chemical-synthetic pesticides, fertiliser and growth regulators.

Several measures for arable land ban the use of chemical-synthetic fertiliser (or any fertiliser) and pesticides e. g. in cover crops (AT), in specific vulnerable areas (AT) or features (grass strips in SN, structural elements in TH) or arable land converted to grassland (TH). Participants of the measure Extenso in Switzerland may not apply herbicides, insecticides or growth regulators to certain crops. For measures with abiotic goals in Austria and Spain that address arable land among other land use types see table 29. They all contain restrictions on inputs (in particular fertiliser).

Two measures prescribe buffer strips (with a width of 12 m in AT and 5-30 m in TH). While the Spanish measure on diverse crop rotation requires legumes as part of this rotation (20 %), as also does the Thuringian measure on diverse crop rotation (10 % of legumes), in Saxony legumes may be replaced by fodder crops. Requirements for crop rotation are also included in measures targeted at a broad set of land use types, that have been described above: integrated farming in Spain (see measure for a broad set of land use types) and “Environmentally friendly and biodiversity promoting management” in Austria (listed in table 30).

Only in the German case study region some **measures for arable land target specifically biodiversity** (see table 32). These include measures on set-aside land (self-greened or sown with flowering mixtures) and specific nature conservation measures for herb and field birds or, in Saxony, specifically the Red Kite, that require extensive crop cultivation, restricted management dates and/or certain harvesting schemes. A measure for diverse crop rotation has been allocated in the RDP of Thuringia primarily to biodiversity. However, abiotic effects are also important. All these measures are offered area-wide. Also the Thuringian measure for the integration of structural elements should be mentioned here again as it includes different types of field strips for biodiversity and some sub-measures are restricted to target areas for nature conservation.

All measures regarding permanent grassland are primarily targeting biodiversity (see table 33 in Annex VI). Apart from the Austrian measure banning the production of silage all of them are specifically linked to grassland of rather high value for biodiversity. Abiotic factors are addressed indirectly. Further measures that also include grassland have been described above under the sections on measures regarding several types of agriculturally used land).

- **Saxony** offers four measures, some of them with several sub-measures, in particular directed at species conservation and/or biotope grassland with detailed management requirements (e. g. adapted cutting or grazing schemes, ban of chem.-synth. fertilisers and pesticides, restricted mechanical maintenance or amelioration) (a further measure specifically for grazing is not depicted). The premia for biotope mowing also consider different degrees of difficulties (e. g. due to steep slopes) Also fallow and fallow strips on grassland are supported. Both, **Thuringia** and Saxony offer a result-oriented measure on species-rich grassland, where farmers have to prove the biotic quality of the plots by the existence of a minimum number of indicator species (while this result is linked to extensive management regarding cutting or grazing and also input management, farmers are not obliged to comply with specific management



requirements). Also Thuringia supports the management of biotope grassland. Some of the measures are specifically targeted to designated biotope grassland or certain grassland ecosystem types (although in the respective Saxon measures a designated target area is not explicitly specified).

- In **Austria and Switzerland** pure grassland measures are targeted at alpine mountain grassland with cutting or grazing regimes and bans of chem.-synth fertiliser and pesticides²⁸. Payments are granted per livestock unit. In addition, Austria supports the renouncement of silage production instead of hay-making. This measure is particularly important in areas specialised on the marketing of so-called hay-milk and with a tradition for hard cheese production.
- As in Switzerland, the only pure grassland measure in the **Spanish case study region** concerns the support of traditional grazing regimes, either using native livestock and/or being restricted to Natura 2000 areas.
- Three of the four measures offered under the Agricultural Nature & Landscape Management scheme (ANLb 2016) in the Kromme Rijn, the **Dutch case study region** address biodiversity on grassland, mainly targeting breeding birds and grassland plant species. The measures are only available in areas listed for certain management functions in connection with defined land use clusters, and farmers have to apply as collectives.

For Castile and León and Thuringia further **measures have been mentioned which are targeted at other land use types** than arable land or permanent grassland (see table 34 in Annex VI):

- **Thuringia** offers a measure directed at open space areas that are not in the direct payment system and where at least 50 % can be agriculturally utilised. The remaining area may consist of other landscape features. The lower nature conservation authority has to approve the value of the area for being supported by this measure. The goal is to avoid succession on grassland biotopes and is restricted to target areas.
- In comparison to all case study regions only in **Castile and León** permanent crops in unique landscapes are directly addressed by a measure, which is specifically targeting areas in natural parks, terraced areas or steep slopes. In order to maintain traditional sheep and goat grazing activities in communal stubble and grasslands, Castile and León provides a supporting measure for this extensive grazing regime, which is targeted specifically to communal grassland and arable stubble.
- Some further measures targeted to permanent crops only (e. g. vineyards) in Austria and Switzerland have not been included in the analysis.

²⁸ On Swiss summering areas the input use is already restricted as a precondition of payment receipt.



4.4.6 Common technical measures and their impact

Impact of technical measures

Table 36 in Annex VII sets the defined technical measures in relation to their general impact on biodiversity, agricultural landscapes, water quality, water quantity, soil functionality and climate protection. The following relations have been widely recognised in literature:

- **Biodiversity on arable land** can be supported by reduced fertilisation and renouncement of pesticides or even setting-aside plots or strips of arable land for the benefit of wild herbs, various insects, field birds or other animals (e. g. Kovács-Hostyánszki et al. 2011, Smith et al. 2005, van Buskirk & Willi 2004, Boatman et al. 2004, Morris et al. 2004). Set-aside land can be enhanced by sowing flowering mixtures (Haaland et al. 2011). Wild animals also profit from stubble over winter. A diverse crop mix offers more habitats than mono-cropping. **Extensively managed grassland** is a priority habitat in Europe. A reduced input of fertiliser and pesticides correlates with higher biodiversity (Fritch et al. 2011, Stoate et al. 2009, Kleijn et al. 2009, Hopkins & Holz 2006). Also the number and timing of cuts and the intensity and timing of grazing are relevant. Maintaining species-rich grassland should always be preferred to a "re-creation", as changes in biodiversity via extensification take a long time (Kleijn et al 2009, Hopkins & Holz 2006).
- The attractiveness of **agricultural landscapes** is supported by measures contributing to diversified landscapes, to species-rich habitats or to the maintenance of traditional management systems such as grazing or traditional orchards.
- Measures securing or improving **water quality** are those that result in reduced emissions of nutrients and plant protection products into surface or groundwater, e. g. by reducing their input, nutrient surplus or the risk of leaching or erosion (Bobbink & Hettelingh 2011, Johannsen & Armitage 2010, Mateo-Sagasta 2011). Also measures that lower the risk of conversion of permanent grassland to arable land have indirect effects on water quality (Jankowska-Huflejt 2006). Such measures are particularly effective, when targeted at vulnerable areas in respect to water quality.
- **Water availability** can be influenced by an adapted choice of crops and limits for irrigation (EC 2000, Evans & Sadler 2008). Also soil functionality is connected to water quantity.
- **Soil functionality** profits from measures that reduce the risk of soil erosion (e. g. via soil cover or adapted soil management), from reduced input of fertiliser and pesticides, and measures that increase or maintain soil organic matter (JRC 2009).
- **Climate change mitigation can be achieved by reducing GHG-emissions from animal husbandry (FAO 2013) and fertilisation (CH_4 , N_2O)** (Sanz-Cobena et al. 2014, Snyder et al. 2009) and by increasing C-sequestration in soils. Related technical measures support e. g. low-emission application of slurry, reduced nutrient surplus and a higher efficiency of fertiliser use in general. C-sequestration may be increased by soil conserving management on arable land, the conversion of arable into permanent grassland or the set-aside of arable land (Lal 2011). Measures that prevent the conversion of permanent grassland into arable land or the melioration of grassland have an indirect effect. Most important are such measures on organic soils.



The impact of the technical measures on agricultural production is not depicted in the table. However, while there are often synergies between different environmental impacts (e. g. maintenance of soil organic matter improves soil conditions but also contributes to climate change mitigation), agricultural production (which has not been rated in the matrix) can be affected negatively. E. g. limited fertilisation or late cuts of grassland may result in reduced yields. However, this also depends on the concrete conditions: e. g. in case the land has a low productivity and can hardly be managed more intensively the production loss is not apparent. Regarding a ban on converting permanent grassland to arable land, this measure does not change the actual management practice, but a farmer faces opportunity costs, in case he wants to switch to arable management.

Technical measures supported by AECM and comparable Swiss measures

Policy measures which influence effects of agricultural land management on environmental assets, have effects on concrete land management practices in the field, which are carried out (or being omitted) by the farmer. To link the different policy measures collected in TALE to these “technical measures” is one aspect of characterisation and comparison of these policy measures. Based on Cooper et al. (2009) and Keenleyside et al. (2011), but adapted for the purposes of TALE, table 35 in Annex VII lists technical measures, which are incentivised, prescribed or banned by the policy instruments described in case study regions of TALE.

In order to keep this list manageable, we integrated similar technical measures in one category (e. g. grazing regime includes maximum livestock densities but might also entail allowed times for grazing or a restriction to certain livestock types). Organic agriculture, although combining a broad variety of related technical measures, has been listed as an own technical measure here in order to highlight the multiple effects of this management form (Bengtsson et al. 2005, Hole et al. 2005, Pfiffner und Wyss 2008). Further requirements that might be included in AECM, but are not shown in the table, are actions such as the obligation for farmers to undertake professional training or consultation as part of their agri-environment agreement (e. g. in Austria within the measures “Environmentally friendly and biodiversity promoting management” or “Preventative groundwater protection”), to carry out regular soil samples or to document various management actions or outcomes.

For the following comparison the measures listed in the tables 29 to 34 in Annex VI are included (apart from the Dutch case study region, as due to the complex system no comprehensive list of measures was available). Figure 9 shows, how often the various technical measures are included in AECM.

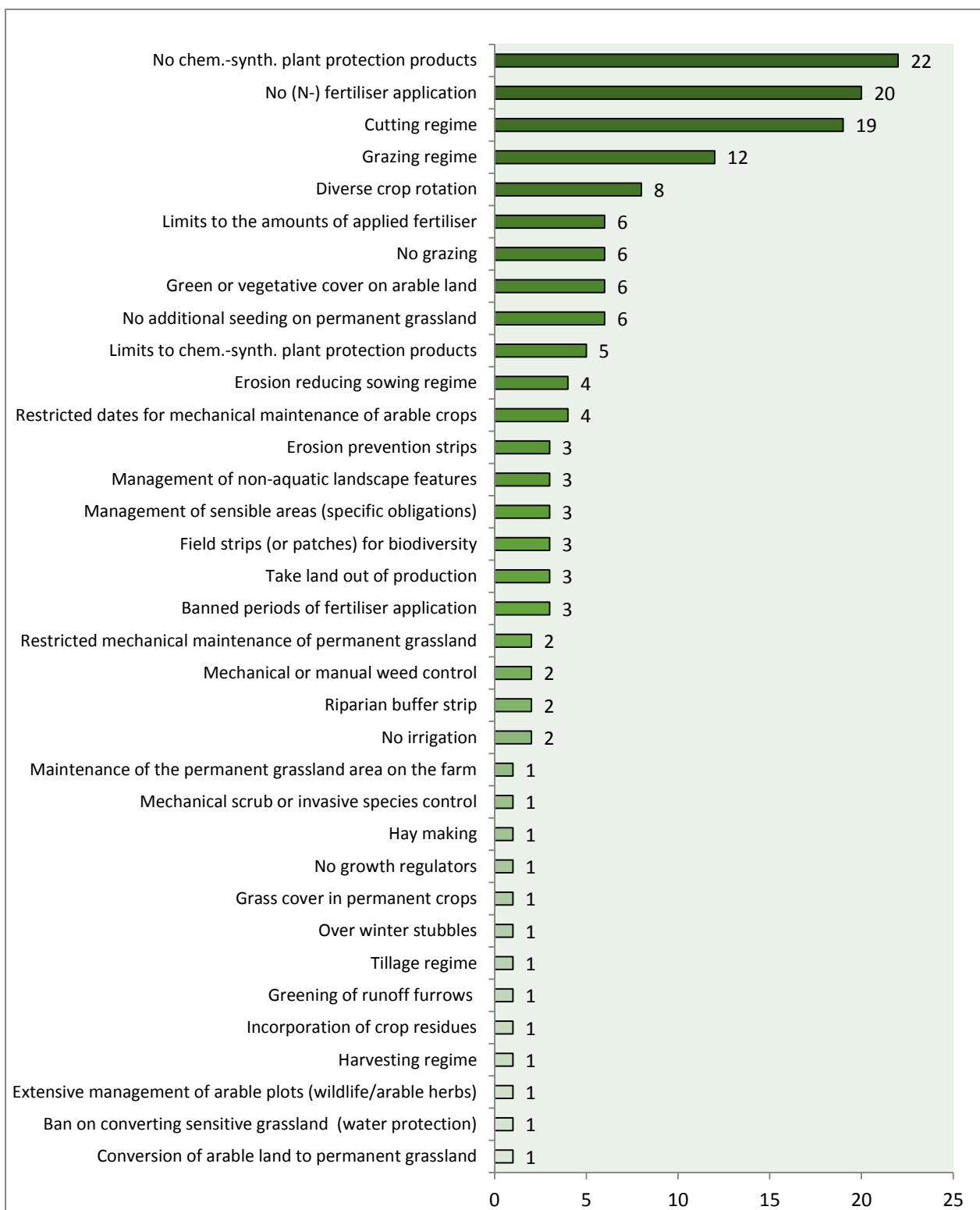


Figure 9: Frequency of AECM technical measures supported in the TALE case study regions (without The Netherlands; each offered measure is counted)



4.4.7 Summary on the comparative analysis of AECM (and comparable Swiss measures)

Addressed land use types

- The highest number of single measures in the case study regions (sub-measures are not counted) is directed at arable land only. Second are measures for permanent grassland. In Austria and Switzerland several measures cover a broad set of land use types. Specific measures for permanent crops only exist in Austria for vineyards, fruits and hops and in Spain, the latter one only offered in “unique landscapes”. Single measures address greenhouses (AT) and open land not eligible for direct payments (TH). In Spain traditional grazing is supported on communal stubble and grassland. In Austria, Thuringia and the Spanish Autonomous Community Castile and León defined endangered breeds are supported by AECM, in Austria also certain traditional rare crops. In the Dutch case study regions a variety of measures offered under schemes not listed in the tables mainly address different landscape features.

Whole-farm approach or support of single plots

For most measures across the case studies the participation with single plots is possible. However, some measures oblige the farmer to participate with their whole area or the whole targeted land use type(s):

- Environmentally friendly and biodiversity promoting management (AT)
- Limitation of yield increasing inputs (AT)
- Greening of arable land/system „Evergreen“ (AT)
- Renouncement of silage (AT)
- Crop rotation (TH)
- Erosion control (TH) (all arable land on the farm within the designated area of erosion risk)
- Extenso (CH)

Main goals and target areas

- Biodiversity protection is the key environmental objective of the AECM (more often on permanent grassland than on arable land, although the German case study regions offer measures specifically for biodiversity on arable land, and most of the respective measures in Switzerland, and partly also in Austria, are not restricted to one single land use type). More than half of those measures is only applicable in defined target areas (e. g. certain biotope grassland, habitat types, steep slopes or alpine meadows).
- Abiotic goals most often relate to water protection, partly also to soil protection. The relevant measures concentrate on arable land. While most measures are available area wide, in some cases support is restricted to defined target areas corresponding to water protection (e. g. regions prone to high nitrate concentration in water), in one case also to areas prone to erosion.

Supported technical measures



- Most frequently, AECM prohibit or regulate the application of inputs:
 - Measures supporting extensive grassland management often ban the use of plant protection products (in many cases single plant treatment remains allowed); those products are also banned on land managed or set-aside for biodiversity or water protection on arable land or on supported cover crops. In further measures, the application of plant protection products is limited in another way or biological pest control is supported.
 - Omitting fertilisation (mainly referring to N-fertilisation) is also frequently required in such measures.
- Many measures on permanent grassland are characterised by a type of cutting or grazing regime. This can encompass requirements to carry out mowing or cutting either for a specified number of times (including restricted periods) or in a specific way (e. g. phased mowing). Stocking densities all over the farm or regarding specific plots and the dates at which livestock are allowed to graze may be limited. Grazing may also be banned on certain grassland. Also improvement techniques (mechanical maintenance, additional seeding) may be prohibited.
- Diverse crop rotation is also a common technical measure (e. g. cultivation of at least 5 main crops, including legumes, each on a minimum of 10 % of the arable land of a farm and cereals not covering more than 66 %).
- Various measures include improved soil cover on arable land up to converting arable land to grassland.
- A number of measures are dealing with creating or maintaining landscape features, or setting aside or managing single plots or part of plots for biodiversity (e. g. management for arable herbs, sowing flowering mixtures on set-aside arable land, or other specific management requirements depending on local conditions and goals).

4.4.8 Considerations on effectiveness and innovative and good practice approaches

As shown above, a high variety of AECM is available in the case study regions, targeting different land uses and objectives. The impacts of these measures on the environmental issues in question is dependent on the supported technical measures (see chapter 4.4.6).

Because landscapes and other environmental conditions as well as farm structures and agronomic situations differ, it is also crucial on which concrete location the measures are applied and how large the contracted area actually is.

Ecological effectiveness refers to the question whether the environmental target is achieved and in some cases, how quickly it is reached. Cost-effectiveness refers to the question how an environmental goal can be reached with minimum costs. Actual evaluations on cost-effectiveness of agri-environmental measures however are rare and often hampered by including limited access to economic evaluation tools, data and training (see Ansell et al. 2016). From an environmental point of view ambitious measures might have big effects locally, but might be applied on a comparably small area only because high efforts by farmers are required and premia and also transaction costs are higher than in entry-level-schemes with low requirements (see also chapter 3.2). E. g. the Austrian measure on protection of arable land



prone to nutrient leaching is deemed to be of high ecologic effectiveness the participating area is rather small, which limits its total effects on the environment.

In the following sections we will highlight some aspects that influence impacts of AECM and give examples from the case study regions.

Targeting

As cost for carrying out certain management practices and the resulting benefits often differ widely between different locations, this offers the potential to increase cost-effectiveness by targeting. Given the heterogeneous distribution of environmental assets, targeting geographical regions or land characteristics is preferable to non-targeted policies and tends to result in high effectiveness regarding the desired outcomes. Such targeting also has the potential for large reductions of transfer payments compared to broad-based policies while still reaching the set objectives (OECD 2007, OECD 2008).

Some examples for targeting of measures in the case study regions are shown below:

- Diverse Austrian measures on water protection are targeted towards areas prone to erosion and nutrient leakage.
- The German case study regions offer several measures for permanent grassland that are predominantly directed to certain biotopes.
- The measures in the Dutch case study region are all linked to specific habitat types. A yearly renewed “Nature management plan” of the province provides the boundaries of the areas for which it is possible to request subsidies.
- The Swiss measures offer various options for targeting:
 - Specification according to geographic zones (e. g. valley, hill or mountain zone)
 - Project based funding e. g. via the Landscape quality payments and the Interconnectedness payments requires local concepts with a locally adapted set of measures.
 - Also within the Resource efficiency payments innovative projects may be supported that aim at securing the sustainability in the use of natural resources relevant for agriculture (e. g. climate protection, reduction of pesticide and soil emissions into water courses, biodiversity protection). They may be developed by cantons or other organisations and are, after notification, supported by the national budget. Projects are characterised by an integrated approach and a mix of measures (structural, technical or organisational innovation in agriculture; also training and education, advice, information and scientific monitoring).

Interviewed stakeholders considered the adaptation possibilities of measures at cantonal level to be sufficient. The extent to which these possibilities are made use of is dependent on the political will and the availability of resources. High costs and administrative effort may hinder the development of such projects.

- Result-oriented measures are also a way of ensuring management adapted to local conditions (see below)

Regionally targeted measures, be they designed in a way that leaves scope for an adaptation at regional level or allowing farmers to adapt their management flexibly, have the advantage of reacting to regional (or local) characteristics. Thus higher efficiency achieving environmental



goals, higher acceptance by farmers, identification and awareness rising can be expected. Also, regional markets (e. g. vine production) may profit. A disadvantage is a comparably high administrative effort.

Attractiveness for farmers

Finally measures have to be attractive for farmers in order to encourage participation. Besides adequate payments, farmers generally rather contract measures that require only little adaptation in farm management. This has been supported by stakeholder opinions e. g.:

- In the Dutch case study region Kromme Rijn the “Landscape management” scheme has been accepted very well due to low interference with agricultural production because the focus of the measures was mainly on landscape elements, which already have a long tradition of being managed. Measures that affected production, such as flowering / herb-rich meadows are less popular.

Choice and flexibility for management decisions is also among arguments of farmers for joining measures:

- E. g. in Austria the support of “Greening of arable land” offers six strategies for cover crops, differentiated by premium level, sowing and harvesting dates as well as allowed crop species and mixtures. The choice depends on farming systems and climatic conditions. As the effectiveness of cover crops depends on the choice of cover crops and the period they remain on the field, consequently, the effectiveness on groundwater protection varies among regions (BMLFUW 2010).
- The Thuringian measure for “Maintenance of biotope grassland” offers a variety of sub-measures to be selected according to local conditions.
- Again, result-oriented measures are a way of leaving concrete management decisions to farmers (see below).

From an administrative point of view measures with a large menu of options however result in higher administrative costs.

Another argument is reliability. An example from the Dutch case study showed that it can be difficult to attract farmers, when they have experienced that a programmed measure was abolished unexpectedly: In the former programming period this happened with a measure for farmland birds. Such loss of credibility has to be counterbalanced with high effort for active encouragement and the aim to avoid such unexpected changes in the future.

Result-oriented measures

Traditional “action-oriented” measures are based on defined management requirements farmers must follow in order to receive the premia (e. g. restrictions for fertilising, mowing or grazing). The farmer receives the payment independently of the actual ecologic result. In comparison, “result-oriented” or “outcome-oriented” measures are characterised by the direct linkage of the support payment to the desired environmental outcome. Within such measures farmers agree to achieve a concrete result, measured e. g. by proving the existence of defined indicator plant species or further result indicators that might suit the particular conditions. The higher flexibility of farmers is among the main arguments for result-oriented measures. Farmers may adapt their management practices to the conditions of each plot and adjust them according to weather conditions or regarding an optimal integration into their farm



management. A further benefit is that farmers are getting more actively involved with the actual objective that is to be supported. For farmers a drawback of result-oriented schemes is their exposure to a greater level of risk than in case of action-based approaches, as results are often not entirely within the control of a land manager. In the TALE case studies the following result-oriented measures have been implemented:

- **Thuringia and Saxony** both have a result-oriented measure for permanent grassland. The ecological quality of the grassland has to be proven by the existence of a minimum number of species from a defined list of indicator plant species.
- In **Switzerland**, the second stage of the Quality payments as part of the Biodiversity payments is organised as a result-oriented measure and covers different types of extensive grassland (meadows and pastures), but also traditional orchards, species-rich vineyards, hedges, riparian and field woods. The ecological quality of permanent grassland is determined by the presence of a minimum number of indicator species (differentiated according to differentiated according to geographical area and partly altitude). For permanent pasture also a minimum share of structural elements is requirement. For traditional orchards, hedges and riparian and field woods further quality indicators apply. As the areas also have to qualify for the first stage, certain management requirements have also to be met as a precondition, thus, the measure is not purely outcome-oriented.
- In **Austria**, a new result-oriented measure has been introduced under the sub-measure "nature conservation": the pilot project "Results-based nature conservation plan" (*Ergebnisorientierter Naturschutzplan*). In this farm specific approach, individual goals for nature protection on areas with high value for nature conservation are defined by an advisor together with the farmer. Within this plan the indicators for objectives and controls are individually determined for each plot. They may refer e. g. to habitat structure and quality, landscape elements or indicator species. Extensive meadows are a priority land use in the Nature protection measure. A critical management decision is the date of the first harvest. Farmers can opt for flexible mowing dates based on the phenology of particular plants. To allow for an objective decision, farmers all over Austria monitor and report the phenology of particular grass species and shrubs. The results are aggregated to a map that gives the cutting dates for a particular year.
- The **Netherlands** have experience with result-oriented measures for breeding birds for several years. In the case study region the measure "Managing breeding birds on arable land or grassland" is offered to farmers' collectives. The fields are visited several times during the year, nests of breeding birds are marked and disturbances around the nests through agricultural activities have to be omitted. The measure apparently strengthens the relationship between farmers and the ANLb system (improves the image of the system). However an evaluation report (Oosterveld & van Drooge 2015) criticises the low effectiveness of this measure, as for many bird species more ambitious management restrictions would be necessary.
- In the **Thuringian** measure on erosion control farmers have to achieve a 20 % reduction of soil erosion yearly on their arable land in the designated areas prone to erosion. Farmers can choose from a list of erosion-reducing management options (although not on every single plot such a management has to be implemented). The



erosion risk is calculated according to a given planning instrument with reference to the potential soil erosion without any erosion-preventing management.

Collective action

A general definition of collective action is: "action taken by a group (either directly or on its behalf through an organisation) in pursuit of members' perceived shared interests" (Scott and Marshall 2009 in OECD 2012:145).

Agri-environmental policies mainly focus on individual farms. However, most ESS require landscape level management to provide optimal benefits and thus a coordinated approach (Stallman 2011). So far most participation of farmers in AECM or similar measures depends on the individual decision of each farmer. One option to "bundle" certain measures within one area is offering them only in specific target areas or under specific conditions. Also information and extension services promote farmers' participation in measures, where they are most beneficial, or advice farmers on where or how to implement certain measures (e. g. in order to achieve interconnectedness of biotopes). Collective action that involves several farmers in one area therefore is a promising approach to coordinate land management on a larger geographic scale. Further benefits could be economies of scale, as they can pool resources (see also Polmann et al 2010). E. g. cooperatives could rather invest in specialised machinery for maintaining hedges than single farmers. Collectives can also make use of skills and knowledge of all its members. In addition the generally local focus of collective action enhances options for adapting activities to each local situation (OECD 2012). Problems that are inherent to this approach is the "free rider problem", meaning that some group members are profiting from other members' activities while they are contributing only to a small extent. Moreover, additional transaction costs e. g. for establishing collectives and for communication and bargaining must be considered (OECD 2012).

Regarding ESS, Stallman (2011) sees a high potential in collective action in particular for enhancing pollination services and recreation with a focus on species richness and abundance (e. g. bird watching), the abundance of one species (e. g. hunting) or on water quality (e. g. swimming) by landscape level management.

There are some traditional ways of collective action such as alpine grazing cooperatives. For summering cattle on alpine pastures generally a cooperation of farmers is necessary. The Summer grazing payments in Switzerland are only paid to recognised summering or cooperative grazing farms, which often take care of livestock from a number of other valley farms. Examples in the wider agricultural landscape are rare. In the TALE case study regions some approaches enabling or promoting collective action stood out in particular:

- The **Swiss** Interconnectedness payments as well as the Landscape quality payments are related to regional projects with the aim of involving several farmers in the targeted area. Still, farmers apply individually, but they are integrated into a broader concept.
- The **Netherlands** seem to have undertaken the biggest step towards collective action: Regarding AECM, the individual grant scheme for farmers who adopted nature-friendly management practices has been changed to be eligible for collectives only from 2016 on. The collective arranges the individual contracts and payments with the individual farmers. Farmers' collectives often make use of so-called "management packages", a combination of ecological or hydrological effective management activities. Using a



linking table for habitat type, management function and clusters of management activities, farmers' collectives can see which management packages fit the local situation. Farmers are advised by environmental organisations on the available measures and how to use them best for nature conservation and water protection. The collective has to explain how and where the individual measures are implemented. The idea behind this new approach is to have an improved consistency in management as well a better opportunity for specific areas. For measures targeted at Nature and Landscape, which are not linked to agricultural land, individual subsidies are offered to landowners. This system will also only be open for collective participation from 1 January 2017 onwards. With regards to EFA, Dutch Farmers' collectives can decide to register connected EFA; a maximum of 50 % of an individual EFA requirement can be fulfilled by other farmers within the collective.

Although ANV (agricultural nature organisations) already traditionally existed in The Netherlands, the new ANLb system is innovative in its collective focus. A stakeholder interviewed in the framework of TALE sees the collaboration between the province, collectives and the RVO (the agency responsible for the execution of the CAP) as the biggest challenge, which could also affect the "image" farmers have of the approach. It also takes time and effort to activate farmers. As the programme has only recently started it remains to be seen how uptake and effectiveness are developing.

- Also in The Netherlands, selective ANLb measures for landscape management, especially regarding pollard trees, are traditionally carried out by voluntary groups in collaboration with the farmers. This reduces the management burden on farmers, while it also serves a societal role (connecting inhabitants with the local landscape and nature).

Awareness raising

As will be shown in chapter 4.6 on information and advice, awareness raising is an important basis for environmentally sound management. Measures that require more engagement of the participant than compliance with predefined management rules, are beneficial in this respect. For example in Austria there are several measures that are connected to advanced training.

Also result-oriented measures, collaborative action or further measures requiring communication and engagement with how to reach certain environmental objectives are bound to have lasting effects on environmental awareness.

A very innovative project is also Biodiversity monitoring with farmers in **Austria**: farmers can participate in a citizen science project. They monitor selected species over the programming period. Ecologists support those monitoring activities. The measure increases awareness on biodiversity issues and serves as platform to discuss issues of landscape maintenance and biodiversity. Furthermore, the initiative provides spill-overs to the broader society (www.biodiversitaetsmonitoring.at/).



4.5 Sectoral legislation for agricultural land with a focus on fertilisation (water protection) and biodiversity

Agricultural land use is also influenced by specialised sectoral legislation, independently of the agricultural policy measures described above. Examples are specialised legislation such as the EU Nitrates Directive or the Habitats Directive and derived national or regional law.

In the following we look at central legislation defining mandatory environmental standards for agricultural land management. The analysis will be limited to management restrictions or specific requirements that are directly relevant for farmers and agricultural land management and that are subject to sanctions if non-compliance is detected.

In line with the information requested and provided for the different case studies, we focus on mandatory standards influencing water quality (limitation of N-losses from agriculture to ground- and surface-water) and on biodiversity. Soil protection and climate protection are rarely regulated independently through mandatory standards (where this is the case we mention examples). Pesticide law will not be included. Further regulation (e. g. emission regulation will only be included – but not set in relation to other countries - in case they are of high importance for a case study region).

Standards for the single policy fields might be covered in different pieces of legislation. E. g. in the case of water quality this may include general legislation on fertilisation and on pesticides use, specific rules for land management along surface waters, in drinking water protection areas or in flooding areas and also in target areas addressed by nature conservation legislation. Therefore, we will partly cross-refer to other policy fields or treat different types of legislation under the same heading (e. g. water quality). The aim of this exercise is not a thorough listing and analysis of single pieces of legislation, which is beyond the scope of TALE, but to provide an overview of what types of standards are addressed by legislation for the different policy fields.

4.5.1 Environmental legislation at EU level

The majority of mandatory standards in national and regional legislation in EU Member States is influenced by EU-Regulations and -Directives, that are meant to ensure EU-wide minimum standards. EU-Directives require an implementation into national and/or regional law, while Regulations are valid directly in the Member States.

Central mandatory standards covered by this legislation are also linked to cross compliance, meaning that they are systematically controlled on farms receiving direct payments under the CAP and non-compliance might result in a cut of those payments in addition to a potential administrative fine. For a list of EU legislation influencing agriculture in terms of environmental issues see table 14.

Project acronym: TALE

Short title: Review on agricultural policies

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**Table 14: Central legislation at EU-level influencing agriculture in connection with environmental issues**

Area	EU law	CC ²⁹
Water protection	Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources	X
	Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration	(X ³⁰)
	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive)	
	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC	X
	Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides	
Nature protection	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds	X
	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora	X
Soil protection	Council Directive of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture	
Emission control	Directive 2010/75/EU of the European parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)	
	Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants	

Water Framework Directive (WFD)

This Directive creates a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater.

Mandatory goals for surface water are:

- To reach a good ecological and chemical status by 2015 (a good ecological potential and a good chemical status for heavily modified or artificial waters)
- No deterioration of the water bodies

Mandatory goals for groundwater are:

- Good quantitative and chemical status by 2015
- Reversing any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity
- Preventing or limiting the input of pollutants into groundwater

²⁹ Contains mandatory standards also subject to cross compliance.

³⁰ CC-requirements refer to dangerous substances, as listed in the Annex Directive 80/68/EEC on groundwater in its version in force on the last day of its validity, as far as it relates to agricultural activity.



- Preventing the deterioration of the status of groundwater bodies

Each Member State shall ensure the establishment for each river basin district, or for the part of an international river basin district within its territory, of a programme of measures. The WFD itself does not set concrete requirements for agricultural land management directly. This is left to the Member States, which can also base their management programmes on voluntary measures.

Nitrates Directive

This Directive aims at preventing and reducing water pollution caused or induced by nitrates from agricultural sources, taking into account different regional conditions.

Member States have to set up an action programme for vulnerable zones³¹ (which may also cover the whole area of a country) specifying mandatory requirements for farmers regarding fertilisation. The Directive lists measures to be included into these action programmes:

- Periods when the land application of certain types of fertiliser is prohibited
- Storage capacity of vessels for livestock manure
- Limitation of the land application of fertilisers
- A maximum amount of 170 kg N/ha that may be applied with farmyard manure every year at farm level (under certain conditions Member State may allow for exemptions up to 210 kg).

In addition Member States establish a Code of Good Agricultural Practice, to be implemented by farmers on a voluntary basis, and, where necessary, set up a programme including training and information for farmers, promoting the application.

Habitats Directive and Birds Directives

Both Directives represent the central legal basis for nature conservation in the EU. Measures taken pursuant to the Habitat Directive shall be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of community interest and to conserve all species of naturally occurring birds in the European Union.

A central aim is setting up a coherent European ecological network (Natura 2000), related to the defined natural habitat types and habitats of species and areas protected under the Birds Directive. Where they consider it necessary, Member States shall improve the ecological coherence of Natura 2000 by maintaining or developing further landscape features which are of major importance for wild fauna and flora. Member States shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species. For those areas the necessary conservation measures and appropriate statutory, administrative or contractual measures have to be established (these may include restrictions for agricultural land management). Plans and projects which might negatively affect those species and habitats have to be subject to an impact assessment. For defined animal species a strict protection regime has to be established.

³¹ Vulnerable zones are those areas that can affect water bodies with a concentration of nitrates > than 50 mg/l.



Groundwater Directive

This Directive complements the WFD and sets criteria for the assessment of the good chemical status of groundwater bodies. Regarding the prevention or limitation of inputs of pollutants into groundwater it refers to Directive 2000/60/EC (this directive was repealed in 2001), containing rules to limit direct and indirect emissions of listed substances into groundwater. Farmers have to handle substances such as fuels, plant protection products and biocides or slurry, silage juice and farmyard manure, as to avoid pollution of groundwater bodies.

Legislation on plant protection

Legislation on plant protection³² refers to authorisation, marketing and application of plant protection products containing certain substances. Directive 2009/128/EG requires Member State to develop a national action plan and set up quantitative objectives, targets and measures and timetables to reduce risks and impacts of pesticide use on human health and the environment and to encourage the development and introduction of integrated pest management and of alternative approaches or techniques. Other provisions include compulsory testing of application equipment, training and certification of all professional users, distributors and advisors.

Sewage Sludge Directive

This directive regulates the use of sewage sludge in agriculture in such a way as to prevent harmful effects on soil, vegetation, animals and man. The use of untreated sludge on agricultural land is only allowed, when it is injected or incorporated into the soil. Maximum limits are defined for heavy metals in sewage sludge and in soils. The nutrient load has to be considered in fertiliser planning. For certain crops there are further restriction (e. g. pasture, areas with fodder crops, in fruit or vegetable cultures). Detailed records must be kept.

Legislation on emission control

Directive 2010/75/EU regulates pollutant emissions from industrial installations. This also affects stables (e. g. intensive pig or poultry production above certain livestock numbers). Such facilities are subject to procedures regarding approval, monitoring and control. Permit conditions including emission limit values must be based on the Best Available Techniques (BAT).

Directive 2001/81/EC sets national targets for maximum emissions of certain atmospheric pollutants, among them NH₃, that EU Member States have to fulfil. It does not contain direct requirements for farmers.

4.5.2 Characterisation of the legislative framework in the case study regions

As explained above, we concentrate in the following on legislation in relation to water quality (and here focussing on fertilisers) and biodiversity. Other legislation will be named, depending on its importance in the case study region and also depending on the available information.

³² The two pieces of legislation named above are supplemented by number of others.



Austria (Lower Austria)

In Austria, environmental regulation is set at federal level. However, the provinces have more formal influence on nature protection policies.

Legislation on water protection and/or fertilisation: The Action Programme Nitrate 2012 (*Aktionsprogramm Nitrat 2012*) is the national implementation of the EU Nitrate Directive and is valid for all of Austria. Central requirements are:

- Limits of total N/ha application with fertilisers, subject to crop and yield potential
- Limits to the application of N with organic fertilisers
- No application during winter (dates subject to crops, weather conditions and type of fertiliser)
- No application on frozen, water-saturated and snow-covered ground
- No application of N-fertiliser close to water bodies
- Further restrictions regarding fertilisation on hilly land

The law also regulates the maximum storage capacity and mandatory book-keeping of nutrients at farm level.

In addition, there is further regulation on water protection: the Austrian Law on Water Protection (*Wasserrechtsgesetz*) does not directly include concrete management requirements for farmers. However it empowers other actors at regional or local level to issue restrictions regarding land management in drinking water protection areas and in areas in danger of flooding. In case of significant restrictions, financial remuneration is granted.

Legislation on biodiversity protection: The provinces in Austria are in charge of the implementation of both, the EU Habitats and the Birds Directive. Central legislation in Lower Austria is the Act on Nature Protection" (*NÖ Naturschutzgesetz 2000*) and the Directive on European Protected Areas (*Verordnung über die Europaschutzgebiete*).

The land management of Natura 2000 areas is mainly handled via contracts, subsidised by the Austrian agri-environmental programme ÖPUL. However, landscape change outside villages such as drainage, excavations, and embankments are prohibited for wetlands if habitats are endangered. Parts of nature and landscape can be designated as protected areas (e. g. landscape protection area, nature protection area, natural monument, national park). Depending on area type and existing ordinances agricultural management may be restricted (in case of significant restrictions, financial remuneration is granted).

Legislation on soil protection: The provinces in Austria are in charge of regulating soil protection measures. The Act on Soil Protection in Lower Austria (*NÖ Bodenschutzgesetz*) aims at the maintenance of soil fertility and soil health by protection from pollutants, soil erosion, and soil compaction. It sets limitations for the application of sewage sludge. Regarding soil erosion the law covers research and extension services on erosion, but sets no mandatory standards.



Germany (Saxony and Thuringia)

In Germany legislative competence is partly situated at national and partly at the federal states level (concurrent legislation). In general the permission to issue legislation is in the hand of the federal states as long as the national level doesn't exercise this option. In cases where there is a need for national regulation, the right to issue legislation is at the federal level.

Legislation regarding fertiliser and pesticides use, sewage sludge and emission control is dominated by national acts ("Gesetze") and statutory ordinances ("Verordnungen"), which are valid directly in the federal states. In the area of water and nature protection, framework regulation exists at the national level, which has to be taken into account in the subsequent legislation issued by the federal states.

Legislation on water protection and/or fertilisation: The Fertiliser Ordinance (*Düngeverordnung – DüV*) is the central piece of legislation for the implementation of the EU Nitrates Directive. It applies all over Germany and is based on the national Fertilising Law (*Düngegesetz*).

Central obligations directly relevant for farmers are (detected non-compliance may result in an administrative fine):

- Maximum limits for the yearly application of N from organic fertiliser
- Time limits for the application of fertiliser in winter; no application on frozen, water-saturated and snow-covered ground)
- Restrictions for fertiliser application near water bodies
- Restrictions on fertilisation after harvest
- Immediate incorporation of slurry if applied to bare soil
- Determination of nutrient demands of crops and of nutrients in soil (N, P)
- Calculation of a yearly nutrient balance (maximum N- and P-saldo is set but violation not rated as an administrative offence)
- Spreading equipment has to comply with defined technical standards

Apart from farm yard manure, only officially approved fertilisers may be applied and only within their allowed areas of application (e. g. there are some specific restrictions for fertilisers containing bone meal).

Amendment of the DüV is underway, several standards will be strengthened.

The national Water Act (*Wasserhaushaltsgesetz*) prohibits the conversion of permanent grassland to arable land in buffer strips along water courses (5 m) and in flooding areas (for details also see Möckel, 2016b). The federal states can concretise this rule in terms of width of the buffer strip and management standards. E. g. the Thuringian Water Law (*Thüringisches Wassergesetz*) requires buffer strips of up to 10 m. The Saxon Water Law (*Sächsisches Wassergesetz*) requires generally a width for buffer strips of 10 m and bans the use of fertiliser and pesticides in agriculture within the first 5 m. The lower water authorities can also adapt standards in buffer strips to local conditions.

Drinking water protecting areas are determined by ordinance of the federal states and their water authorities and may contain restrictions regarding agricultural management (e. g.



application of fertilisers or pesticides; allowed crops or farming methods). In case of significant restrictions farmers have the right to be financially remunerated.

The storage of solid manure, silage, slurry or similar liquids is also regulated under water law (for the case study regions the *Thüringer Anlagenverordnung*, *ThürVAwS* and the *Sächsische Anlagenverordnung*, *SächsVAwS*). Those ordinances regulate facilities for handling substances harmful for water and demand, among other requirements, a minimum storage capacity for silage, slurry or similar liquids of 180 days in accordance with the EU Nitrates Directive.

Legislation on biodiversity protection: The German Federal Nature Conservation Act is the central legislation for transforming the Bird and Habitats Directive into national law. Again, the federal states have the right to specify this legislation as long as it does not violate the national law. According to the national requirements the Thuringian Nature Conservation Act (*Thüringer Gesetz für Natur und Landschaft*) and the Saxon Nature Conservation Act (*Sächsisches Naturschutzgesetz*) state that parts of nature and landscape can be designated as nature reserve, conservation area, nature reserve, natural monument, protected landscape elements, national park or biosphere reserve. Also specially protected biotopes are defined. Restrictions for agricultural management of the concerned areas might be issued in such areas. Such mandatory restrictions may be compensated financially.

Natura 2000 areas may not be significantly impaired in relation to the protection goals. Such changes and disturbances are prohibited (however, no concrete restrictions for farming are stated). Following EU legislation, prior to the approval or the implementation of projects (e.g. conversion of permanent grassland to arable land), their compatibility with the conservation objectives of a Natura 2000 area shall be assessed. A project is inadmissible if it may result in significant adverse effects regarding the elements of the site that are relevant for the conservation objectives or protection purpose (such a project may still be approved under certain conditions).

The Federal Nature Conservation act also defines principles of “good practice” for agricultural use. Farming corresponding to those rules (in addition to those stipulated under soil protection legislation) shall not be deemed an intervention:

- Cultivation must be appropriate to the relevant location, and the sustained fertility of the soil and long-term usability of the land must be ensured
- The natural features of the arable land (soil, water, flora, fauna) must not be impaired beyond the extent required to achieve a sustainable yield
- The landscape components required for the linking of biotopes shall be preserved and, where possible, their numbers increased
- Animal husbandry must be in a balanced relationship to crop cultivation, and harmful environmental impacts are to be avoided
- On slopes at risk from erosion, in flood plains, at sites with a high groundwater level and in boggy locations, farmers shall refrain from tilling grassland
- Fertilisers and plant-protection products must be used in accordance with the provisions of specialised laws pertaining to agriculture

However, non-compliance with these (partly not very concrete) principles is not directly subject to sanctions. They may be rated as interventions, which might be prohibited, requiring



authorisation and potentially substitution or compensation. Altogether there is a need for a concretisation of the rules for good farming practice (Möckel, 2016b).

Legislation on soil protection: The German Soil Protection Act (*Bundesbodenschutzgesetz, BBodSchG*), including the listed principles of good practice, has rather advisory character for agricultural practice. Requirements that regulate the application of potentially environmentally detrimental substances to the soil are regulated elsewhere (e. g. specialised legislation on fertilisation or pesticides, emission regulation, or regulation sewage sludge or organic waste).

The Netherlands

The Ministry of Infrastructure and the Environment is responsible for developing policies in the national context and the provinces are responsible for translating these guidelines into the regional context. The municipalities develop and implement local policies on spatial planning and the environment. Municipalities may also work together with public authorities such as Water Boards on water quality and wastewater treatment. The latter ones are, together with the provinces and the national government, responsible for the implementation of the WFD.

Legislation on water protection and/or fertilisation: The main focus of policies that focus on a reduction of leakage of nitrogen and phosphorus from fertilisers and manure into the environment is to protect soils, groundwater and surface water and to comply with the EU Nitrates Directive and the WFD. Legislation is designed at the national level. Currently, the main law regarding fertilisers is the Act on Manures and Fertilisers (*Meststoffenwet*). Other pieces of relevant legislation are the Decree on the use of fertilisers (*Besluit gebruik Meststoffen*), the Implementary Decree to the Act on Manures and Fertilisers (*Uitvoeringsbesluit Meststoffenwet*) and the Soil Protection Decree, Open Cultivation and Livestock Production (*Lozingenbesluit Open Teelt en Veehouderij, LOTV*)

Based on the above legislation the following categories of standards are set:

- Maximum limits for the application of N with farmyard manure
- Maximum limits for N and P from total fertilisation. Limits for N are dependent on crop and soil type. P-limits depend on the P-content of the soil
- Restrictions for the application of farmyard manure on areas that primarily are attributed to nature conservation
- Ban to apply fertiliser on frozen, snow-covered or water-logged soil (some exceptions are possible)
- Time limits for the application of fertiliser depending on type of fertiliser, land use, crop type and soil type
- Periods, where conversion of permanent grassland is not allowed depending on soil type and subsequent crop
- Low-emission application of farmyard manure (with few exceptions e. g. for solid manure on grassland)
- Organic fertilisers have to be applied evenly on the plot
- Further restrictions for fertiliser application in certain areas: on hilly land (specific rules depend on e. g. fertiliser type, land use, steepness and vulnerability to erosion)



- Directly after harvesting maize on sandy and loamy soils catch crops have to be sown and remain on the field over winter
- Minimum storage capacities for organic fertilisers (7 months)

The Soil Protection Decree, Open Cultivation and Livestock Production also prescribes buffer zones along water courses without fertilisation, the width depends on the cultivated crop and also on sensitivity of the water course. Standards are also set for spreading equipment.

Also, transport of farmyard manure is strongly regulated (e. g. GPS-system required for transport vehicles, that transmits information on weight, provider and recipient). Type, amount and N- and P-content have to be recorded and the information provided to the authorities.

Since July 2015, a new approach regarding nitrogen has started, the so-called programme-based nitrogen action plan (*Programmatische Aanpak Stikstof, PAS*). For the PAS, the national government (Ministry of Economic Affairs, Ministry of Defence and Ministry for Infrastructure and Environment), provinces, nature organisations and entrepreneurs collaborate together to balance nature quality and economic developments. The aim of the PAS is to halt the reduction of nature quality in Natura 2000 areas as a result of N-deposition, by focussing on measures at the deposition source as well as by nature restoration efforts. An area analysis (including ecological valuation) forms the basis of the nature management and restoration plan.

In relation to existing legislation the action plan contains additional standards on:

- Maximum emission values for (new) animal housing (depending on animal type and housing category)
- Low-emission application of manure

In addition voluntary standards regarding livestock feed and management have been decided upon.

Legislation on biodiversity protection: In the recent years the nature policy has been decentralised in The Netherlands. Now, the provincial level is responsible for all nature policies. The main pieces of legislation on nature conservation in The Netherlands are the Nature Conservancy Act (*Natuurbeschermingswet*), the Flora and Fauna Act (*Flora- en Faunawet*) and the Forestry Act (*Boswet*). The national government is mainly responsible for assistance to the provinces and has the final responsibility for the international mandatory environmental legislation, such as the Habitats and Birds Directives and the WFD.

In The Netherlands, the *Natuurnetwerk Nederland* is the Dutch network for current and prospective nature areas (by law, this network is called the National Ecological Network (*Ecologische Hoofdstructuur, EHS*)). The *Natuurnetwerk* consists of 1) existing nature reserves (incl. 20 national parks), 2) areas that are used to develop "new nature", 3) agricultural areas under agricultural nature management, 4) large water zones (lakes, rivers, Noordsea coast) and 5) all Natura 2000 areas. Since 2014, the provinces are responsible to further develop this network. They also make sure that the areas are in line with the conditions of the Spatial Planning Act from the provinces and the municipalities.

- Protected nature reserves and Natura 2000 areas are defined by the Nature Conservation Act. This legislation also determines which activities are allowed in these areas and under which conditions. In Natura 2000 areas there may be legal restrictions or requirements for agricultural management (e. g. regarding fertiliser or pesticides use,



ban on the conversion of grassland or limits for livestock density), depending on the protection goals of the specific area. Mandatory restrictions may be compensated financially.

- The Flora and Fauna Act also includes the protection of certain plant or animal species independently of protected areas.
- Landscape elements may also be protected by the Forestry Act, which regulates the management of woods outside built-up areas.

Spain

In Spain legislative competence is partly situated at national and partly at the level of Autonomous Communities (NUTS 2). Each Autonomous Community has their Autonomy Statutes that establish regional competencies and basic regulations. National government is in charge of all environmental legislation that affects several Autonomous Communities (e. g. Planning and Management of river basins covering more than one Community). However, if the environmental issue involves only one Autonomous Community (e. g. a protected area fully located in one Autonomous Community), regional governments must deliver laws and regulations within the basic framework regulations issued at a national scale. As well, most environmental management competencies are in the hands of regional governments. Municipalities deliver public services related to the environment, e. g. ordinances for slurry management.

The Agricultural Law (*Ley Agraria*) integrates all legislation affecting agricultural territorial planning and the management of communal agricultural land (stubbles and grasslands). It aims, among other goals, at improving competitiveness of the agrarian sector, at preserving environmental balance at rural areas and at conserving natural, genetic and cultural heritage associated with traditional agricultural activity, and has thus impact on erosion control and, in connection with maintenance of extensive agriculture, also at biodiversity. The respective legislation in the case study region regulates the management of its communal grassland and stubbles (e. g. harvest periods, grazing intensity), supplemented by municipal ordinances (*Ordenanzas de Pastos*) establishing periods for grazing on communal areas. The regional law also defines a minimum level of maintenance of agricultural land; if this is not carried out, the regional government can expropriate these parcels and include them in a Fund of Available Land in Castile and León. This law also establishes associations of farmers at a municipal level (*Juntas Agropecuarias Locales*). They play a role in the cooperative approach for managing communal grasslands and agricultural land as stubbles, as well as for investing in common machinery and buying inputs.

Legislation on water protection and/or fertilisation: The EU Nitrates Directive is transposed into national legislation, stipulating that Autonomous Communities must declare the vulnerable zones and approve the Code of Good Practices, which establishes the basis for designing action programmes. Castile and León does it by the Decree 40/2009 of 25th June (Decreto 40/2009). The seven vulnerable zones in Castile and León cover 31 % of the total case study region and 68 % of total arable land. Another piece of legislation (Orden MAM/2348/2009) approves the action programmes with measures that farmers within these zones must adopt:

- Maximum limits for the yearly application of N by types of fertilisers



- Maximum nutrient saldo for N (calculated by an estimation of N needs for each type of crop and N content of each type of fertiliser)
- Time limits for the application of fertiliser (depending on the type of crop)
- Further restrictions for fertiliser application in certain areas (e. g. flooding areas, buffer strips, and cities)
- Minimum storage capacity of 4 months for slurry and further requirements for storage

In addition to these rules municipal ordinances can specify norms for slurry management, such as minimum distances for application to the village centre or to water courses, type of storage tanks, way of application, periods where application of slurry is prohibited (rainy seasons or during weekends).

Legislation on industrial emissions: Due to the problems with N-pollution in the case study region, mainly due to intensive livestock keeping, legislation on emission control is of high importance and will thus be described shortly.

National regulation (Ley 5/2013) implementing Directive 2010/75/EU is the main instrument for slurry management. Any farm with more than 40,000 places for poultry, with more than 2,000 places for production pigs (over 30 kg) or with more than 750 places for sows must obtain an authorisation and comply with standards set by the Guide to Best Available Techniques (2010). Farmers must communicate pollutants emission to the atmosphere, soils and water (e. g. N) to the Regional Government. Controls are based on a registration book of livestock excrements where farmers must annotate details on slurry management (slurry production, periods and location for spreading the slurry, etc.).

In addition, such farms must adhere to the following rules, regardless, if their land is situated in a nitrate vulnerable zone or not:

- Stocking characteristics for slurry tanks (e. g. minimum stock capacity of 3 months)
- Maximum limits for the yearly application of livestock manure (area-wide or in target areas)
- Maximum nutrient saldo for N

Another regional law (Ley 11/2003)³³ states that livestock farms with more than one livestock unit or 20 animals need environmental authorisation for their activity. Farmers must report on their slurry management at the Municipality, that issues this authorisation, and prove that they comply with legislation regarding manure management.

Legislation on water quantity: The main instrument for water use regulation in the case study region is the “*Plan Normativo*” which transposes the National Water law to the level of the Duero Basin. With regard to water for irrigation farmers must:

- Require authorisation for irrigation that must respect other water uses, environmental flows and the good state of ecosystems
- Establish a water meter to monitor the consumption of water
- Pay a tax for the use of water per irrigated hectare (not per litre of water)

³³ Regional law regulating which activities must process local environmental licenses or only a communications to the local administration for underpinning their activity.



When the water body is declared “at risk of not attaining the good state”, water authority must issue an action plan with measures for reversing this status and establish:

- An area where no new authorisations for irrigation can be issued
- An “area with specific limitations” where only abstractions of less than 7000 m³/year can be authorised
- Water users must constitute a users’ community for the common management of water

When an aquifer is in bad chemical status (> 50ml of N/l) farmers must comply with the Code of Good Agricultural Practices and the action plan for vulnerable zones (fertiliser application practices, maximum N-application, etc.).

Legislation on biodiversity protection: The National Parks Regulation (Ley 42/2007) is the main instrument for regulating biodiversity protection in the case study region. It comprises regulations of National and Natural Parks. Autonomous Communities are responsible for declaring these Parks and drafting the main instrument for their management: the Natural Resources Ordinance Plan for Natural Parks or a Uses and Management Master Plan for National Parks. In the Spanish case study region the Guadarrama Mountains were declared Natural Park in 2010, but became a National Park in 2013. However, the above mentioned plan is still not approved so only basic management restrictions are available through general national legislation on National Parks.

Requirements that affect farmers are:

- Environmental impact assessment of any project and activity undertaken at designated sites or with potential significantly negative impact
- Prohibition of land cover change (e. g. from rain-fed to irrigated crops)

Compensatory funding for economic activities (e. g. traditional livestock rearing) in the area of the National Park or at its area of influence under the requirement that they are compatible with nature conservation.

In the course of implementing the EU Bird and Habitats Directives the Basic Plans for Management and Conservation of Natura 2000 Network in the Castile and León region have been approved in 2015. In line with the national Prioritised Action Framework for Natura 2000, the Director Management Plan of Castile and León coordinates the management of all the Natura 2000 areas in the region. There are no concrete mandatory prescriptions for farmers in the Basic Management Plans but the objectives are legally binding in line with EU-requirements:

- All economic activities that need an environmental impact assessment, environmental authorisation (e. g. pig farms with more than 2000 heads) or an environmental license, must prove that they do not affect the conservation status of Natura 2000 areas.
- This concerns also activities within Natura 2000 areas, within the Public Hydraulic Domain or areas within the boundaries of management plans for threatened species or every activity leading to a change of forest cover.

Apart from these preventive activities, cross compliance obliges farmers to create refuge areas for wild fauna on land receiving direct payments under the CAP by one of these options:

- Create woody hedges through the abandonment of crop strips of 10 x 2 m/ha



- No harvest of the 0.1 % of their agricultural land
- In case of rain-fed crops, 10 % of this area must be cultivated sunflower, forage crops or nitrogen fixing crops

Further measures listed in the Management plans are addressed, e. g. by the new greening component of the CAP. Others could be funded e. g. by Pillar Two of the CAP. However, many proposed measures were not included into the Rural Development Plan.

Switzerland

Agricultural land use is mainly affected by the Act on Environmental Protection (*Umweltschutzgesetz, USG*), setting the basis for various environmental protection issues, the Act on Nature Protection (*Natur- und Heimatschutzgesetz, NHG*) and by the Act on Water Protection (*Gewässerschutzgesetz, GSchG*). Also there are ordinances on air protection, water protection, soil protection and on chemical risks.

Legislation on water protection and/or fertilisation: The national Swiss Act on Water Protection (*Gewässerschutzgesetz, GSchG*) (together with the subsequent Ordinance on Water Protection (*Gewässerschutzverordnung*) is the main piece of legislation regulating water protection including fertiliser management.

Regarding livestock keeping the national legislation requires a balanced nutrient saldo. As a rule, storage capacity for livestock manure is 3 months, and the amount of organic fertiliser applied may not exceed an equivalent of 3 LU/ha (the cantons may reduce this amount depending on soil conditions and topography). A farmer must be able to apply at least half of his livestock manure on his own farm.

In drinking water protection areas agricultural management might be restricted (e. g. use of fertiliser or pesticides, prohibitions of certain crops, conversion of grassland, obligation for permanent soil cover).

Water law also regulates the proper storage and handling of slurry and other substances that are potentially dangerous for waters.

According to the Ordinance on Reducing Risks of Chemicals (*Chemikalien-Risikoreduktions-Verordnung, ChemRRV*) N-fertiliser may only be applied at times when an uptake by crops is possible. Liquid fertiliser may on be applied on absorptive soil, which means not on frozen, water-saturated and snow-covered ground. According to this ordinance fertiliser may not be applied in nature conservation areas, bogs, hedges and field woods. Generally they may not be applied within 3 m along hedges and field woods and water courses.

A relatively new feature is the “*Gewässerraum*” (room for water bodies). The cantons have to define the exact areas until 2018. As a general rule, the “*Gewässerraum*” has a width of at least 11 m for water courses of less than 2 m width (those 11 m encompass the water body itself and buffer strips on both sides). It is broader for large water courses, for water courses in certain areas e. g. in cantonal nature conservation areas or in case of flood protection or other defined goals of nature and landscape protection. For standing water courses this buffer is at least 15 m. In these areas no fertiliser and pesticides may be applied. Agricultural use is allowed for extensive grassland, litter areas, hedges or field woods.

Legislation on biodiversity protection: The national Swiss Nature protection law (*Natur- und Heimatschutzgesetz, NHG*) (and the subsequent ordinance) regulates, among others, the



designation of protected areas with restricted use. Such restrictions can be compensated financially. The cantons issue additional legislation in the areas of nature conservation. Also there are various ordinances on the protection of biotopes.

Legislation on soil protection: Based on the Act on Environmental Protection (Umweltschutzgesetz, USG) the Ordinance on Soil Pressures (*Verordnung über Belastungen des Bodens*, VBBo) states that soil compaction and soil erosion shall be avoided.

4.5.3 Comparison of legislation on water and biodiversity protection in the case study regions

Regulation of fertilisation

According to the framework legislation set at EU level, in particular the Nitrates Directive, national and/or region legislation exists for all case study regions that regulate fertiliser application on agricultural land, mainly regarding N (storage and transport of organic fertiliser is not considered here). Similar legislation is set up in Switzerland.

The respective legislation and standards are set at national level and apply area-wide, only in Spain, the different autonomous regions have defined specific nitrate vulnerable zones according to the Nitrates Directive with the associated action programmes containing mandatory standards within those zones. In addition municipal ordinances can specify norms for slurry management and application, and big farmers covered under emission regulation have to comply with some rules also outside the nitrate vulnerable zones (e. g. maximum limits for the yearly application, maximum nutrient saldo for N). Also, in case an aquifer is in bad chemical status, farmers have to comply with Good Agricultural Practice and the requirements of the action programmes.

In Austria and Germany mandatory standards for farmers restricting fertilisation are also formulated in water law. Fertilisation (and possibly also the application of pesticides and conversion of permanent grassland to arable land) is or might be restricted in flooding areas, water protection areas or further buffer strips.

The types of standards directly affecting land management are comparable in all the case study regions (see table 37 in Annex VIII). Maximum yearly input of N per hectare is restricted in any case for organic fertiliser, in some cases also for total N (depending on crop and soil characteristics). Partly requirements for a nutrient-saldo are defined. Time limits for the application of fertiliser with a significant content of N usually exist in winter and also under soil conditions, where an uptake of fertiliser is not guaranteed. Detailed restrictions exist in vulnerable locations such as along water courses or other target areas (e. g. flooding areas, drinking water protection areas, partly on hilly land). Further restrictions might exist in areas protected under nature conservation law. Some countries have defined additional mandatory standards such as low-emission application or further restrictions on fertilisation after harvest of the main crop. In Switzerland the application of fertiliser along hedges and field woods is banned. A particularity in The Netherlands is the prohibition on converting grassland during certain periods (depending on soil type and subsequent crop) and to prescribe catch crops under certain conditions.



Legislation regarding biodiversity

Mandatory restrictions for agricultural land management regarding biodiversity are more or less limited to various types of protected areas. Such restrictions may be issued as general obligations for defined habitat types at national or regional level, but are most often laid down in local ordinances for the protection of single areas, in which e. g. fertilisation and pesticides use may be forbidden or limited, and certain land use or land use change prohibited.

Plans and projects which might negatively affect species and habitats connected to Natura 2000 areas have to be subject to an impact assessment.

In German nature conservation legislation principles of good practice are stipulated for farming, however they are not directly enforced.

4.6 Information policies and extension services

4.6.1 Introduction

Advice and extension services can help to reach environmental objectives in agriculture for example by increasing the acceptance of AECM and other policy measures and/or implementing AECM more efficiently and more effectively (Rocha 2009, Hart and Baldock 2011).

Agricultural advisory or extension systems are embedded and play a central role in the national and/or regional Agricultural Knowledge and Innovation System (AKIS), which is according to the World Bank defined as “a system that links people and institutions to promote mutual learning and generate, share and utilise agriculture related technology, knowledge and information. The system integrates farmers, agricultural educators, researchers and extensionists to harness knowledge and information from various sources for improved livelihoods” (The World Bank 2012).

In the context of multifunctionality of agriculture different functions of farming can be assigned to agricultural advisory or extension services, such as improving primary production, services or amenities for urban populations, food safety and farm workers’ health, environmental protection, cohesion (job creation, diversification) or political functions, e. g. food security (Laurent 2001 and Renting et al. 2005 cited after Labarthe et al. without year).

In the context of the TALE project we describe the general setup and structure of the extension system in the case study regions, but focus on the way farmers are informed about agri-environmental policies and how advice and extension services can support the implementation of such policies or serve as an independent instrument applied in order to reach environmental objectives (cf. Boland et al. 2005).

As skills and knowledge are needed to choose the AECM suited best for the specific farm, to handle the sometimes complex application process and to actually implement the management requirements advisors are important facilitators of such programmes (Hejnowicz et al. 2016). This is especially true for more complex and knowledge intensive measures, such as result-oriented AECM (Cooper et al. 2009).

Advisory services, however, can also play an important role complementing environmental legislation. In a study on specialised dairy farms in Ireland, which belonged to a minority of Member States that included direct controls on chemical P fertilisers in its EU Nitrates Directive



national action plans, Buckley et al. 2016 show that besides fertiliser prices, contact with extension services significantly influence phosphorus balances and use efficiency. Farmers participating in discussion groups led by advisors are encouraged to use soil tests and are more likely to have access to information on optimal fertiliser application schedules and other improved management practices.

Advice and training as policy instruments are especially fruitful if the farmers are self-motivated to change their behaviour, be it for economic reasons, out of the desire to change the bad public image of agriculture or out of a truly intrinsic motivation. However, even in such cases, information and incentives do not guarantee success as behavioural changes are lengthy processes afflicted with many obstacles (Thomas 2003). Another limiting factor are the high costs connected to especially successful, but time-consuming advisory methods based on personal one-to-one contact between the farmer and the advisor (*ibid.*).

The institutional arrangements of agricultural extension systems worldwide and within Europe are diverse and different typologies to classify the actors in agricultural extension systems have been developed (cf. Rivera 2000, Hoffmann 2004, Birner et al. 2006). These systems mainly focus on the questions by whom the service is provided and who funds the service. A simple classification scheme is offered by Hoffmann 2004.

Table 15: Classification of agricultural extension services based on funding and provision of the service

Funding		Provision	
		Public	Private
Public	Free of charge extension by public organisations	Subsidized extension, e. g. contracts or vouchers	
	Extension by public organisations subject to a charge		Private extension

Source: Hoffmann (2004: 89)

Birner et al. 2006 further differentiate the types of actors into public actors, private actors and third sector actors (NGOs). Reality, however, is even more complex as many extension services draw from different funding sources and some organisations work on the boundaries between sectors, e. g. chambers of agriculture largely funded by the state or private consulting companies owned by farmers' unions (Labarthe et al without year).

AKIS as well as the respective system of extension services in the EU are, as mentioned above, diverse as every country has developed a system that corresponds to its needs and general institutional arrangements. In countries with a strong regional structure (federal or devolved countries) such as Germany, the UK, Italy and Belgium, the systems also differ from one administrative unit to the other (Knierim et al. 2015).

The way agricultural extension services are organised and funded influences (Thomas 2007):

- on which topics advice is offered and demanded,
- which target groups are reached, how client-centred the service is,
- the access to training and knowledge exchange for the extensionists



- and which responsibilities are allocated to the extensionists, including possible role conflicts.

Agricultural extension in the fields of environmental protection and nature conservation differs from other fields, such as advice on production or farm management issues, in the respect that the extensionist does not solely serve the interest of his or her client (the farmer), but also society's interests. In case of conflict between society's interests and the production interest of the farmer the extensionist has to function as a mediator and develop solutions (Hennies 2005). The advisor's influence on the decision making process of the farmer whether to adopt a certain management practice or enrol in an AECM can go into two directions: "advisors can encourage farmers to undertake environmentally ambitious agreements that build on intrinsic "green" motivations or, taking the opposite stance, draw on farmers' extrinsic motivations and produce agreements requiring minimal changes to on-farm practices primarily benefiting existing farm business arrangements" (Hejnowicz et al. 2016: 253).

Therefore the success of the extension service cannot only be measured by the satisfaction of the client with the service, but must also take into account to what extent political goals have been met (Hennies 2005).

Obviously, it is less likely that advice in the public interest is offered if farmers have to pay for the services themselves (Arnold 2007). While it is more and more difficult to argue why the public should fund extension services aiming at increasing farm income it is therefore evident that the state still has a role to play when it comes to information and extension services on issues like nature conservation, animal welfare or consumer protection (Hoffmann 2004).

Since 2007 all EU Member States are obliged to make sure that a Farm Advisory System (FAS) is in place that supports farmers to fulfil the cross compliance obligations. The use of this service by farmers can be subsidised with EAFRD funds. Also the setting up could be funded with Pillar Two funds. The implementation of this obligation in the EU Member States differed in respect to how the advisory bodies were selected (e. g. calls for tender or designation) and the range of topics covered: in 14 Member States the FAS focused strictly on cross compliance, while in the remaining countries the advice embraced broader issues, such as the competitiveness of the holdings, the environmental impact of farming practices and support for the implementation of rural development measures. Methods applied range from one-to-one advice and small group discussions on farms to IT-tools and checklists. Farmers had free access to one-to-one on-farm advice in five Member States, partially contributed to the costs (20 % to 50 % of the full cost), or entirely covered these costs in two Member States. An evaluation of the FAS published by the EU Commission showed that the FAS was seen in connection with the cross compliance rules and the related system of farm inspections by many farmers and therefore had a negative image, although the advisory system is separated from the control system (EC 2010).

As laid down in regulation (EU) No 1306/2013 the FAS has now also to comprise the greening obligations introduced with the latest CAP reform. In the 2014 – 2020 funding period a cross-cutting priority "Knowledge transfer and innovation in agriculture, forestry and rural areas" has been introduced in the EAFRD, which explicitly includes the purpose of improved environmental management and performance (Regulation (EU) No 1305/2013). Knowledge transfer and information measures (article 14) as well as advisory services (article 15), namely the use of the advisory service, the setting up of the services (including FAS) and the training



of advisors, can be supported if the Member States or regions choose to do so in their PRD. The service provider, which is the beneficiary of this measure, shall be chosen through calls for tenders.

Hart and Baldock (2011) argue that the availability of training and advice to land managers on environmental issues in connection with Pillar One of the CAP (cross compliance, greening) as well as in connection with Pillar Two (AECD) is especially important in those Member States with shorter histories of environmental integration into agriculture, a record of low environmental performance, or with specific environmental problems. In order to reach the goal of improved effectiveness of agri-environmental policies stronger extension services are needed in many Member States (ibid.).

4.6.2 Information policies and extension services in the case study regions

Austria

Compared to other EU Member States the Austrian agricultural knowledge and information system is rather compact and very much based on public support. Public research, vocational and adult education as well as extension bodies are well connected and in some cases even integrated (Opancar 2014).

The ministry in charge of agriculture supports advisory services through the provision of training material and the continued training of advisors in cooperation with the University of Agro and Environmental Pedagogy. Between 2008 and 2013 the ministry supported the extension work of the Chamber of Agriculture with around 8 million per year in the framework of the so-called “Beratervertrag” (“extension contract”). It also finances the work of several other organisations, for example the organic farming umbrella association Bio Austria. The ministry is responsible for strategic orientation, monitoring and control of the advisory services (Opancar 2014).

The major communication channel for information on agricultural policies is the Chamber of Agriculture. It is in charge (contract partner of BMLFWU) to administer the application processes and advice to farmers on CAP issues. However this can, according to the TALE country expert, create a conflict with the Chambers major role as farmer lobbying organisation.

Also extension is mainly provided by the Chamber of Agriculture. It runs the Rural Training Institute (“*Ländliches Fortbildungsinstitut*”, LFI), which was founded in 1972. It is one of the largest adult education institutions in rural areas and provides training on a wide range of topics (Opancar 2014). According to an impact analysis carried out in 2012 by the Austrian Institute for Adult Education the Chamber of Agriculture accounted for 78 % of all contact that farmers had with advisory organisations, while only 9 % of advice was provided by professionals, such as veterinarians, accountants or lawyers, and 6 % by agricultural input (e. g. seed, fertilisers, plant protection products) providers of. Farmers’ organisations, breeder and producer associations, organic farming organisations and research institutes accounted for the remaining 7 % of all contact (Opancar 2014). Private extension services play a limited role, but gain importance with increasing farm size. Individuals providing extension services on a commercial basis mainly advise their clients on specific production issues, such as horticulture or on topics like accounting or legal issues (Opancar 2014).



Funding is partially public (by the national ministry in charge of agriculture) and partially private (membership fees by the farmers as well as fees for individual services). Fees for individual advice are gaining importance due to lacking financial means of the Chamber of Agriculture after the “*Beratervertrag*” expired.

Austria makes use of the possibility to support agricultural extension (uptake and training of extensionists) via the EAERD, but support is also given within a nationally funded programme (cf. BMLFUW 2016).

Additionally to the Chamber of Agriculture bodies of the provincial government give advice on environmental issues, e. g. in the form of farmers’ discussion groups or events, mainly on nature protection and water protection.

Germany (Saxony)

The extension and advisory system in Germany is, historically grown and at present, characterised by a great heterogeneity among the federal states. This heterogeneity is seen as a considerable obstacle for horizontal knowledge flows. Due to the decentralised governance structures state organisations, such as ministries and public research bodies exist in each federal state. However, there are also national public research bodies providing knowledge for decision-makers, practitioners, and for actors in agricultural education. Research and experimental stations run by the federal states play an important role in bridging the gap between research and practice (Paul et al. 2014).

While in some federal states agricultural extension services are still mainly provided by agricultural authorities integrated in the administrative structure, this task is carried out by agricultural chambers (farmers’ organisations also fulfilling some state duties) or organised almost completely privately in other states. Overall, there is a tendency to privatise extension services due to diminishing state budgets (Hoffmann 2004, Thomas 2007). This trend was slowed down a bit with the introduction of the obligatory “Farm Advisory System” by the EU in 2007 (Paul et al. 2014).

The Saxon State Ministry of the Environment and Agriculture provides detailed information (for example in the form of fact sheets) on its website, especially on the RDP. Information on new policies is also provided by the farmers’ association and via farmers’ magazines. Also training courses, field days and seminars, organised for example by the Saxon State Office for the Environment, Agriculture and Geology serve as a platform to provide information on new policies. The lower agriculture administration bodies also inform farmers on issues related to the direct payments applications, e. g. cross compliance and greening obligations.

In Saxony agricultural extension has, for the most part, been privatised. However, farmers still receive advice free of charge on all issues regarding environmental and nature protection, EAERD in general and AECD in particular from the State Office.

Saxony does not support advisory services with EAERD funds, but makes use of the option to support knowledge transfer actions via its RDP. This includes measures relating specifically to environmental issues (e. g. information and demonstration measures regarding soil protection and advice on nature conservation for farmers).

The farmers’ association of Saxony offers advice on legal issues as well as on issues regarding subsidy programmes. Private companies, such as fertiliser trading companies, provide advice on inputs and technologies.



Spain (Castile and León)

In the process of transferring competences from the national to the regional level since the 1980s also the responsibility for the agricultural extension system was shifted to the regional level. Over time the service changed its focus from the development and demonstration of agronomic innovations to supporting farmers to fulfil CAP requirements. Farmers' associations and cooperatives gained importance as providers of agricultural extension and advice. Regional research centres, like the ITACYL in Castile and León, belonging to the system of the National Institute for Agricultural and Food Research and Technology (INIA) also play an important role in the knowledge system with regard to applied research and knowledge transfer via training systems (Esparcia et al. 2014).

Regarding environmental requirements in connection with CAP direct payments the Agricultural District Service, which also processes farmers' CAP-payments applications, is legally obliged to offer information to farmers. It does so via the CAP application form, where a section explains all management requirements and standards. Farmers can attend or call the Agricultural District Sections to gather additional information, but these district sections are not actively engaged in informing farmers.

The extension service supported by the EAFRD (funding period 2003 to 2013) and carried out by agricultural unions was, according to stakeholders interviewed, limited to a checklist testing whether cross compliance requirements were met. It also seems like this potential source of information on environmental issues and new challenges, such as climate change, was not well known amongst farmers.

Additionally to the agricultural unions there are private companies providing information to farmers, such as seed and phytosanitary companies giving free advice to farmers as a sales service, rural banks providing advice to their clients and commercial extension services (freelancers) providing advice on specific, mainly productive, issues.

In the new CAP funding period Castile and León is planning to constitute an integral advisory system including financial and environmental issues. In its RDP the three sub-measures use of advisory services, setting up of advisory services and training of advisors are programmed. As a consequence, extension freelancers have constituted an association in order to be eligible for this measure. Until now, Castile and León did not approve the eligibility requirements for this new period so free extension services are not yet in place for the new CAP period. Probably the regional government will issue the eligibility requirements in 2017. According to the RDP fact sheet on the EU Commission's homepage knowledge transfer is one of the main priorities of the new RDP. For instance, it is stated that it will be compulsory to use advisory services in order to access support under AECM, to make these more effective. However, as the advisory service is not yet in place it is unlikely that this has actually been implemented.

Moreover, several stakeholders interviewed for this project claimed that due to cultural norms farmers in Castile and León and other Spanish regions show no demand for extension services. Traditional farmers do not usually ask for help or for advice, but are more used to copy what "works" on their neighbours' fields.

The Netherlands (Province of Utrecht)

A particularity of the Dutch knowledge and innovation system is the strong research infrastructure in the fields of agriculture and food science and the intensive cooperation



between private companies, scientific institutes and the government. The Dutch system of extension services is characterised by multiple and diverse actors. The main actors are private firms and farmers' organisations, such as cooperatives, unions or study groups, and to a lesser extent also research institutions, NGOs and foundations. The market of agricultural extension is highly competitive and there is a trend towards internationalisation with advisors also operating outside The Netherlands. Dutch farmers are generally highly educated, show a high willingness to pay for advisory services, and are involved in processes of knowledge co-production and the peer to peer exchange of information (Caggiano 2014).

The decision to gradually privatise agricultural extension services was taken by the Dutch government already in the 1980s. One of the reasons for this transition was the more and more problematic double role of the public organisation DLV (*Dienst Landbouw Voorlichting*), which had to give advice to farmers as well as implement government objectives in the fields of natural conservation (ibid.) From the 1990s onwards, farmers became individually responsible to obtain new technical and socio-economic agricultural advice from different sources. Different sections of DLV are currently privatised as commercial agricultural extension services.

As already indicated above, a strong tradition of agricultural extension and information exchange exists in The Netherlands (Rozendaal 2015). Influential are so-called study groups, which are groups of farmers with similar interests or businesses that regularly share ideas and experiences. These study groups are often formed with a link to agricultural associations, such as the Dutch Federation of Agriculture and Horticulture or farmers' advocacy groups such as the Dutch Fruit Cultivation Association. Study groups often invite specific specialists, e. g. from one of the DLV companies or representatives from companies or products.

Different commercial extension services exist and provide business advice. Agricultural extension services (esp. financial services) are members of the Agricultural Extension Officers Association. A survey among animal husbandry farmers (van Zessen 2009) showed that most farmers use a mix of different sources of agricultural information, with feed representatives, accountants, partner/family and colleagues being most influential. Extension services provided by upstream or downstream industry are especially important in highly integrated production chains, such as pork production or in contract vegetable farming (Caggiano 2014).

Most of the agricultural extension services are private, which means that farmers have to pay for their services. Farmers associations, incl. related study groups, are membership based, fees depending on farm sizes and other factors. The Netherlands do not support advisory services with EAARD funds. Knowledge transfer and information actions are supported, but the measure is programmed solely under priority 2 (farm performance).

The Netherlands Enterprise Agency (RVO) is especially effective as information channel on new agricultural policies, as all farmers that apply for any form of subsidies have an individual online account at its website. Farmers' organisations, such as the Dutch Federation of Agriculture and Horticulture (LTO), also provide strong information channels, both on a national as well as the regional and thematic level.

In the Province of Utrecht, LaMi (*Landbouw en Milieu/Agriculture and Environment*) is an organisation that is supported by Province of Utrecht, *Programmabureau Utrecht-West* and the Area Cooperation O-gen, to provide information to farmers. They have a specific newsletter, which reaches all farmers in the province and discusses all relevant policy measures for the area, funding opportunities, as well as innovative farming practices, often



with an environmental focus. Other communication channels used by the province and LaMi include: information brochures, information websites, articles in agricultural journals and using a knowledge consultant.

Communication of specific policy measures, such as the local/regional communication of the new AECM system, is mainly done through the network of the local Agricultural Nature Organisations, associated NGOs, and the local chapter of the LTO. To reach individual farmers and activate participation, also presentations (e. g. at agricultural study clubs) and information evenings, advertisements in local newspapers and the LaMi newsletter are used. A specific example of innovative information provision targeted at AECM contracts is the use of “intake” meetings at local bars, in which farmers can get information and hand-on support in establishing AECM contracts (under the umbrella of a farmers’ collective). This support was provided by the NGO, which is responsible for support to the farmers’ collective Utrecht Oost (with financial support of the Province of Utrecht).

Advice on environmental aspects, beyond policy measures or regulations, is mainly provided by specific NGOs. In the Province of Utrecht, LaMi provides information on both production and environmental aspects and possibilities to all farmers. An NGO that is active in environmental communication is NMU (Nature and Environment Federation), which are supported by the province and different private funds. Until recently, they mainly focussed on communication about environmental regulations and impacts, but noticed a general negative response from farmers. Therefore, they switched focus to a more “positive” approach that includes setting examples of (and establishing a network among) sustainable farming pioneers in the province of Utrecht. *Landschap Ergoed Utrecht* (LEU) is a regional NGO that has taken a role in supporting farmer collectives by helping with organisational issues and networking (supported by the province and different private funds). In practice, farmers’ collectives use provincial funds to pay for “field coordination” by LEU, which means that they are responsible for all aspects of collective management (establishing the collective management plan, setting up contracts, control). LEU further focusses on landscape and (agricultural) heritage issues, e. g. by employing specific extension officers focussed on farmstead conservation, planning and management (landscape and heritage focussed).

Switzerland

An important organisation with regard to information and extension services in Switzerland is AGRIDEA, the Swiss Association of the Development of Agricultural and Rural Areas. Members of AGRIDEA are about forty organisations in the fields of farming and rural development, the Swiss cantons and the Principality of Liechtenstein as well as other collective members. Its activities are financed by a mandate of the Federal Office of Agriculture, the sale of products and services, special mandates by public or other bodies as well as membership fees (AGRIDEA 2016).

Agricultural extension is defined as an obligation of the state by law since 1958. AGRIDEA does not carry out agricultural extension on farm level itself, but trains disseminators on cantonal level. It carries out seminars for extension officers, develops fact sheets, database and web applications and organises networks and forums on specific topics in order to foster knowledge transfer.



Depending on the canton extension services are provided either by agricultural schools, cantonal employees or private bodies with official mandate. The latter is the case in the Canton Vaud. These extension services are publically funded, but farmers have to pay a small fee.

Private companies also offer free advice on production issues, such as fertilisation or pesticide application. However this form of advice also aims at selling the products of the specific firm.

Farmers mostly request advice on social, economic and production issues. Advice on environmental issues is mostly requested in connection with requirements for direct payment support or labelling programmes.

4.6.3 Conclusion on information and extension services

There is a wide variety of information and extension systems in the TALE case study regions. While some, such as the Austrian system, are compact and organised centrally others are rather fragmented and mirror the federal governance structures of the specific country (Spain, Germany). While in some countries agricultural extension is still mainly considered to be a task of the state, like in Austria or Switzerland, others have mainly (Saxony) or almost completely (The Netherlands) privatised agricultural extension. In most countries some advice on environmental issues, especially in connection with Pillar One and Two of the CAP, is offered by state organisations or supported with public funds, although not all countries or regions opt to do so via the EAFRD. While in some countries, like in Austria and Switzerland, advice on production and environmental issues is provided mostly by the same organisations, this is not the case in other case study regions (Saxony), where advice on environmental issues is offered by a state authority, but production issues are covered by private extension companies.

A special and very interesting case is the information and advisory system in The Netherlands that is characterised by strong networks, peer-to-peer-learning and highly engaged civil-society groups. It seems that the way agricultural extension is organised and taken up by farmers is very much dependent on the specific traditions of learning and knowledge transfer in the respective country, ranging from a strong tradition in innovation and knowledge transfer in The Netherlands to a more sceptical attitude towards advisory organisations in Spain. Advice on environmental issues is very often linked to CAP requirements. However, the intensity of advice seems to range from checklists, like in Spain, to intensive multi-channel communication like in The Netherlands, where innovative approaches (such as the collective management of AECM) require a different concept.

Due to the increasing pressure on public budgets the general trend to privatise agricultural extension services aiming at increased farm profitability is likely to continue. However, it is widely recognised that there is a need to publically support advice in society's interest and that advice is a suitable instrument to increase the effectiveness of agri-environmental policies. This becomes evident by the importance the EU places on innovation, advice and knowledge transfer in the current funding period of the CAP.

4.7 Other relevant policy instruments

The policy measures described above only constitute the most relevant and wide-spread instruments in agri-environmental policy. We are aware that this list is not complete. There are further support measures, that would fit in the framework of PES namely a number of



investment measures in the framework of Pillar Two of the CAP that might support environmentally friendly construction of slurry tanks, machinery or fences as a precondition to manage extensive grassland, further investments in biotope management, marketing of products connected to species-rich landscapes or advisory services or land use planning.

Such measures are also supported by funds outside of the CAP. E. g. in Lower Austria, the Lower Austrian Fund for Landscapes (*NÖ Landschaftsfond*) offers funding of landscape management and biodiversity projects. In 2014, 59 projects have been supported spending 3.16 Mio €. Projects include the maintenance and re-growth of orchard trees or projects dedicated to endangered species. Orchard meadows fulfil an important role in agricultural landscapes, such as for tourism. Farms traditionally produce cider and apple/pear juices. Although under pressure from reducing demand and increasing international competition, some farmers, marketing and processing initiatives pursue the use of orchard fruits today.

Also other public support payments or taxes could be linked to environmental issues (e. g. to raise prices for consumption of mineral fertilisers, pesticides or energy consumption). The following example from The Netherlands illustrates another approach:

The national law “*Natuurschoonwet*” had a large influence on landscapes, because of the specific criteria for country estates. Landscape aspects are taken into account in so far, that specific criteria are laid down for country estates (which are abundant in the Dutch case study region) to participate, and thus to profit from tax benefits. One of these criteria is that the area, and this also regards agricultural land, has to be surrounded from three sides by hedgerows or tree lines. An area can only be part of this scheme if it consists of at least 30 % of forest or nature on their land, hence also influencing the land use on estates.

An example how policies outside of the agricultural policy can influence environmental impacts of agricultural management has been highlighted by the Spanish case study region: Until 2014 there used to be a bonus applied to energy produced from slurry (Real Decreto 661/2007, de 25 de mayo) and subsidies to help companies to establish energy co-generation plants for the bio-digestion of slurry. These incentives led to the creation of a bio-digestion company in the case study region in an area with the highest concentration of pig farms. According to interviewed stakeholders this helped farmers to comply with legislation linked to the Nitrates Directive. The abolishment of this electricity bonus caused the closure of this plant, which has worsened the slurry situation again.

Planning policies in The Netherlands

We would like to highlight as a particularity among the case study regions the extensive and detailed planning policies in The Netherlands: Even the target areas for AECDM are subject to thorough planning at different administrative levels.

Spatial planning processes also affect agriculture in general, e. g. authorisation and enforcement of the spatial regulation (*Ruimtelijke Ordening*) in the municipal spatial zoning plan (*Bestemmingsplan*) is necessary for farm enlargement or other activities.

While all government levels, central, provincial and municipal, play a role in spatial planning process, spatial planning policies and their implementation are shaped at the municipal level, in the municipal spatial zoning plan (*Bestemmingsplan*). Such plans are based on land use plans and they set down where construction may take place, what may be built, the size of the structure and what it may be used for. The provinces focus on provincial interests, for example,



landscape management, urbanisation and the preservation of green spaces. Provincial interests are set out in the provincial spatial visions (e. g. provincial planning vision (*Provinciale Ruimtelijke Structuurvisie*)). The national interests are described in the Spatial Vision on Infrastructure & Spatial Planning.

A successful governance structure in the Province of Utrecht is the so-called Area Commission (*Gebiedscommissie*), which ensures the “voice of the region” in regional rural policy and has a mandate from the province for the execution of the Area Programme”. The Area Commission consists of members of the province, municipalities, different NGOs and farmers’ organisations. Many stakeholders consider this commission as a well-functioning instrument to balance interests of different stakeholders. However, unclear responsibilities and financing and sometimes differing standpoints of representatives of organisations and individual member or missing decisiveness illustrate also the problems of such structures, which mainly rely on voluntariness and communication.

The provincial planning vision (2013 – 2028) for the Province of Utrecht, for example, includes landscape management as one section. Conservation and enforcement of the central landscape qualities and geological values are an important provincial focus of landscape management. The province regulates and stimulates protection and conservation of the main landscape qualities by the municipalities and develops information materials as well as provides support for the development of the rural area maintaining the local character.

A policy experiment with a bottom-up focus is in the area called “*Eiland van Schalkwijk*”, which is an area with a mainly agricultural focus (predominantly fruit orchards). Here, the municipality has decided to focus on a future vision combining agriculture and recreation and has invited local inhabitants and entrepreneurs to submit plans for the area, which should focus on improving the quality of life and the attractiveness for the area for visitors, preferably using sustainable methods. The main focus of this experiment, so-called “invitation planning” in The Netherlands, is to conserve and develop the rural landscape, while simultaneously enforcing the economical link that the landscape has for the local farmers and entrepreneurs. Currently, the municipality has received over 30 plans ranging from plans to improve the hospitality industry to sustainable cowsheds and “wooden-shoes” hiking paths through cultural agricultural landscapes, sometimes incorporating the local cultural heritage.

It is envisaged to develop this planning processes even further: In 2018, an integral law for the surroundings will be established, which targets everything in the physical living environment. The idea is that this will enhance the cohesion between different plans and activities in one area and to provide more possibilities for tailored projects or implementations. The “surroundings law” (*Omgevingswet*) requires the provinces to have one vision for the physical environment, the so-called “surroundings vision” (*Omgevingsvisie*), which will combine all legislation (planning policy, water plan, environmental policy plan, transport plans and the spatial aspects of the nature conservation policy) into this vision.

The case study region Kromme Rijn is a pilot project of a “surroundings vision”, in which three municipalities collaborate with stakeholders to develop a stakeholder informed vision and policy for their rural area.



5 Governance structures for the implementation of policy measures (including identification and characterisation of actors) in the TALE case study regions

As part of the institutional and policy analysis described in chapter 1.3.1 the governance structures for design and implementation of policy measures were analysed, including the identification and characterisation of actors. The case study teams provided information on which actors at what administrative level are relevant for policy design, implementation and transposition. Moreover, their responsibilities and interests were analysed. The setup of governance structures in the case study regions and the respective countries is described and visually displayed in the following sections. Especially in connection with the classification of actors showing which actors influence policy design it has to be highlighted that is assessment is based on stakeholders' opinions and the case study team members' judgement and the result is, of course, worthy of discussion. The second part of the chapter looks more closely on issues connected to compliance assurance. Regarding the German case study region, governance aspects have only been analysed for Saxony.

5.1 General characterisation of governance structures and actors

5.1.1 Overview on governance and enforcement architecture in Austria

Austria is organised as a constitutional federal republican system with nine provinces. Depending on the policy field, the provinces are either implementing or adapting national framework legislation or set their own regulations. The federal states do not substantially influence the design of agricultural policies. Figure 10 gives an overview over the Austrian agricultural and environmental governance structure, related actors and actor groups as well as the organisational levels referring to the case study region.

Instruments of the CAP

The Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) is the dominant organisation for the definition, enforcement, monitoring, and evaluation of both Pillar One and Two policies and represents Austria on CAP affairs in Brussels. Also the Austrian Court of Audit (not shown) plays an important role, as it reviews performs financial audits of policies.

The agricultural policy programmes are administered and technically monitored by the public organisation AgrarMarkt Austria (AMA), which is the Austrian paying agency for agriculture and rural development. It receives tasks and responsibilities directly from the BMLFUW. It is in charge of the Integrated Administration and Control System (IACS) data management but is less involved in programming, i. e. the development of policy measures. The AMA further processes subsidy contracts and applications as well as subsidy spending and monitoring of farmers and other recipients, while the Chamber of Agriculture is in charge of supporting farmers with the subsidy application process as a contract partner of BMLFWU. A membership in the Chamber of Agriculture, which is a public corporation, is compulsory for farmers.



On a provincial level the Agriculture department of the Office of the Provincial Government of Lower Austria is responsible for designing agricultural and environmental policies unless issues are already regulated on EU and/or national level. Similar to the BMLFUW on a national level, the Agriculture departments of the Offices of the Provincial Governments are responsible for the evaluation of design and implementation of policies at provincial level. The district and municipal administration is in charge of regional land use planning and of on-the-spot controls of some cross compliance contents like restrictions on food and feed safety or animal diseases and animal welfare. All other contents of cross compliance as well as greening requirements are controlled by the AMA within the standardised CAP monitoring.

The current RDP 2014 – 2020 is based on a large stakeholder process. Relevant stakeholders participated in the STRAT.AT 2020 process to define the agreement for European funds between Austria and the European Commission (Partnership Agreement according to Regulation (EU) No 1303/2013).

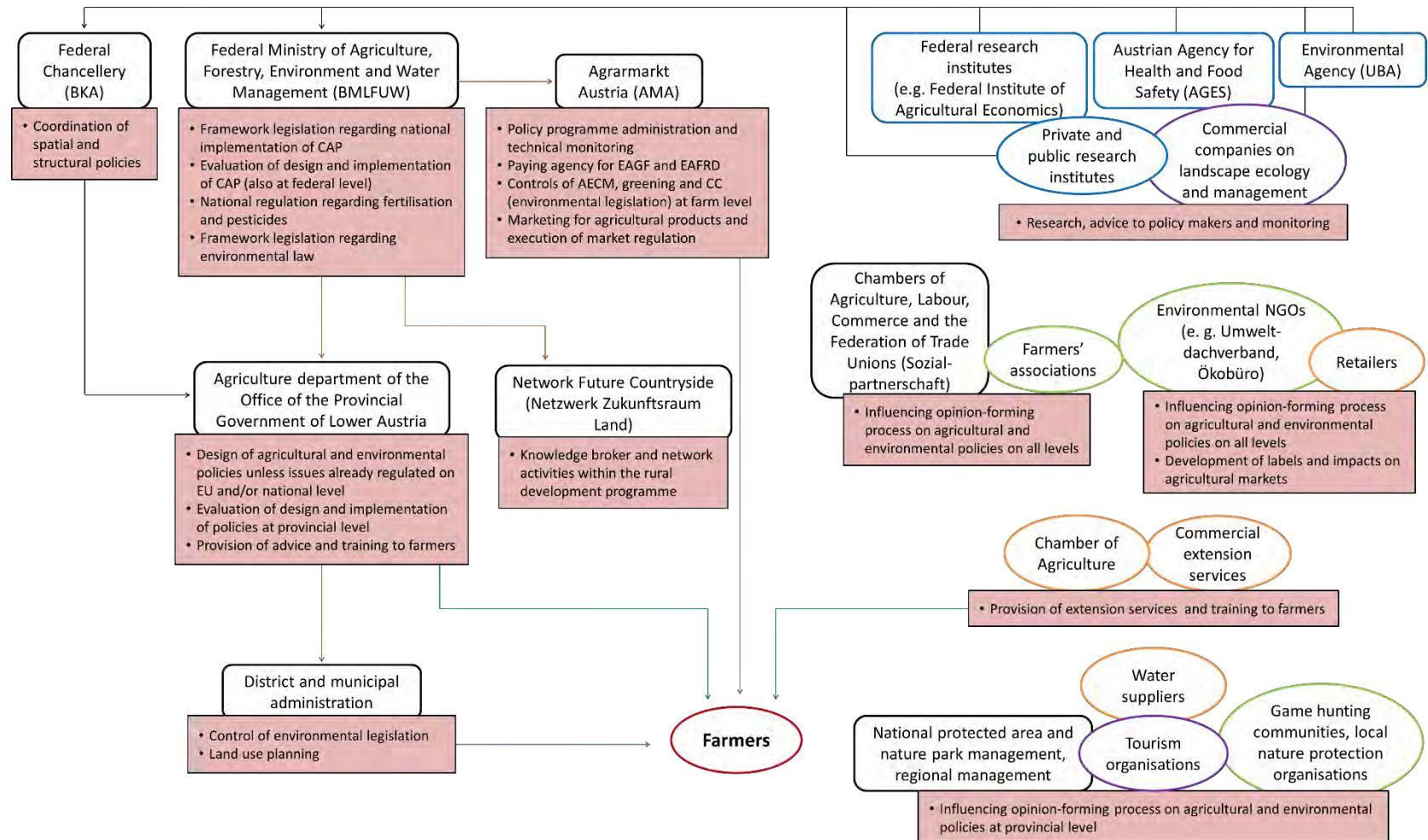
The EAFRD is administered by BMLFUW. Individual policies such as the agri-environmental programme are regulated by specific directives issued by BMLFUW. The BMLFUW implemented a network coordination unit (*Netzwerk Zukunftsraum Land*), which shall coordinate activities in the RDP programme from a stakeholder perspective and shall stimulate innovations.

In Austria, there is only one agri-environmental programme, the Austrian Programme for Environmentally Friendly Agriculture (*Österreichisches Programm zur Förderung einer umweltgerechten, extensiven und den natürlichen Lebensraum schützenden Landwirtschaft, ÖPUL*), which is part of the RDP. ÖPUL consists of 23 measures including organic farming, animal welfare and management of Natura 2000 areas. Most measures of the programme are available to farmers all over Austria although there is some regional targeting (e. g. measures on protection of water bodies). The measures are designed by the BMLFUW and controlled by the AMA.

The opinion-forming process on agricultural and environmental policies in Austria is influenced by a wide range of stakeholders, like the Chambers of Agriculture, Labour and Commerce as well as farmers' associations but also by a number of nationally and regionally operating environmental NGOs (e. g. *Umweltdachverband, Ökobüro*) and retailers. National protected area and nature park managements, regional managements, tourism organisations, game hunting communities and water suppliers are further local stakeholders influencing the opinion-forming process.

Environmental legislation concerning agricultural land use

The framework legislation regarding environmental law, e. g. national regulations regarding fertilisation and pesticides, is defined by the BMLFUW on a federal level. Some environmental policies are designed, implemented and evaluated by the provincial departments. The control of environmental legislation is conducted via cross compliance controls by AMA.



—> Authorised to issue instructions

—> On-the-spot controls

—> Advice to farmers

Figure 10: Governance structures and actors in Austria (Mostviertel, Lower Austria)



Research, policy advice, monitoring and extension

In Austria, agricultural and environmental research, policy advice and policy monitoring is located at federal (e. g. Federal Institute of Agricultural Economics), private (e. g. FiBL Österreich) and public (e. g. university based) research institutes. The Austrian Agency for Health and Food Safety (AGES) is related to the BMLFUW and focuses on the assessment, communication and recommendations in the fields of health risks, while the Environmental Agency (UBA) is responsible for thematic fields such as energy, climate and sustainability. Besides federal organisations there are also commercial companies on landscape ecology and management, conducting e. g. environmental impact assessments.

Advice to farmers is offered by the Chamber of Agriculture. Private extension services play a limited role (for further information on the extension and information system in Austria see chapter 4.6.2).

Classification of actors

Figure 11 presents a classification of actors in the agricultural policy arena. It displays whether actors are rather policy recipients or rather involved in policy design. Further the graph shows the level of impact of each actor.

The graph displays the dominant role of the BMLFUW in policy design at national level. At the provincial level the Agriculture department of the Office of the Provincial Government of Lower Austria mainly influences the policy design. Further policy influencing actors on a national level are the Chambers of Agriculture, Labour, Commerce and the Federation of Trade Unions (*Sozialpartnerschaft*) as well as farmers' associations. For example, the Austrian Law on Agriculture (i. e. *Landwirtschaftsgesetz*) dictates to maintain the §7 *Kommission*, a group of agricultural experts from these chambers, the political parties of the national parliament, and Austria's labour union, that advises the BMLFUW on agricultural policies.

Locally the provincial Chambers of Agriculture and the commercial extension services might have some influence on policy design. NGOs like Global 2000, WWF, Greenpeace and *Naturschutzbund* have more informal influence on policy designs but are nevertheless a strong player in the opinion-forming processes about those policies on national and local level. For example, the *Umweltdachverband* and the *Ökobüro* (both are umbrella organisations of environmental and nature protection organisations) are members in the monitoring committee of the Austrian RDP 2014 – 2020. Recipients of policies on a national level are the federal research institutes, the AGES, the UBA, retailers, the AMA, BKA and the network coordination unit *Netzwerk Zukunftsraum Land*. National protected area and nature park management, regional management, tourism organisations, game hunting communities, local nature protection organisations and water suppliers are policy recipients on a more local level, while commercial companies on landscape ecology and management and the district and municipal administrations might have a limited influence on policy design.

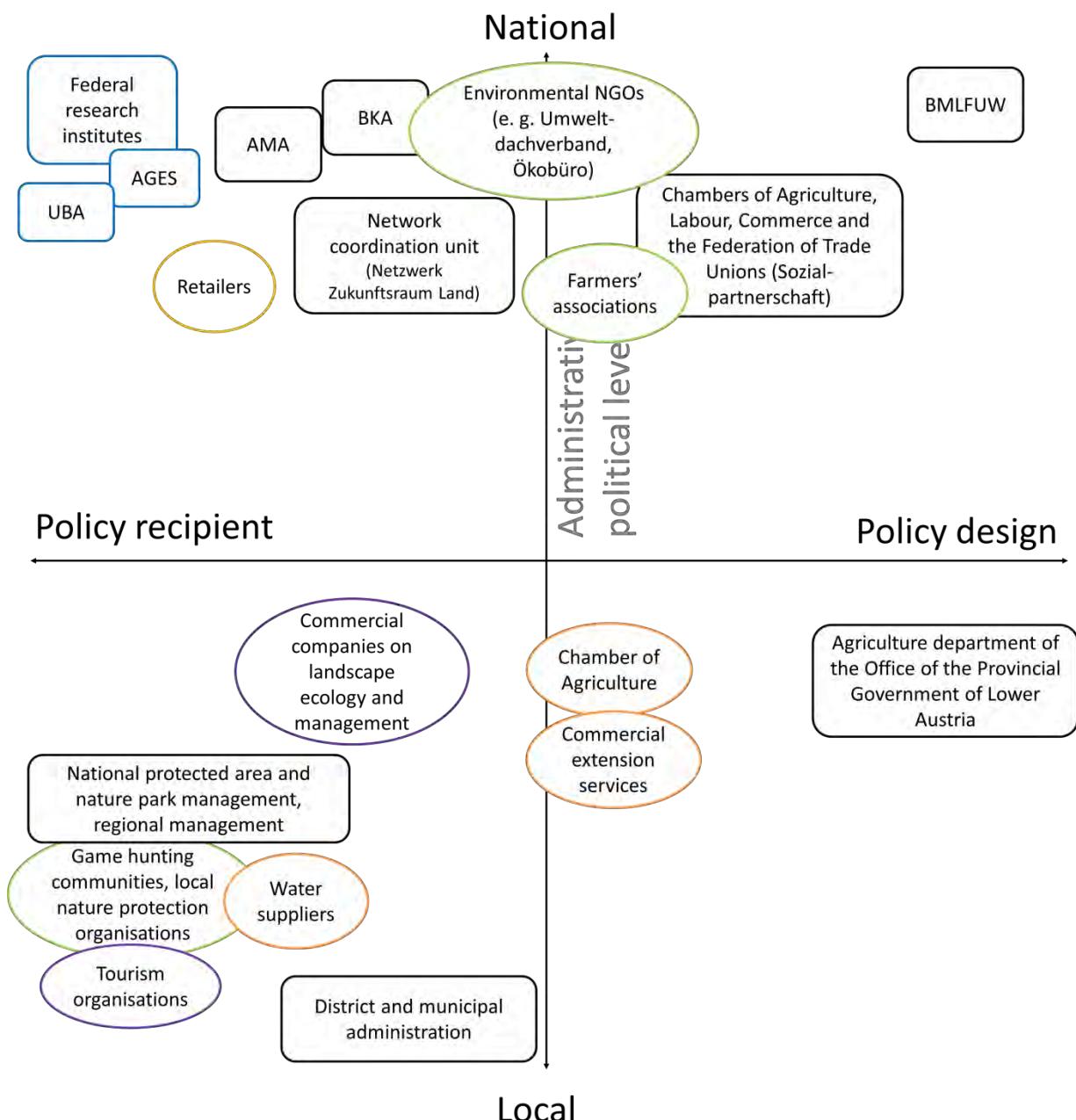


Figure 11: Classification of actors in Austria (Mostviertel, Lower Austria)

5.1.2 Overview on governance and enforcement architecture in Germany

Germany is a federal, parliamentary republic with sixteen federal states (*Bundesländer*) that have their own constitutional competences in specific policy fields. Depending on the policy field, the federal states are either authorised to adapt and specify national legislation to their state conditions (e.g. most regulations regarding nature conservation) or have to follow the national legislation (e.g. legislation on fertiliser and pesticide use). The transposition of



national and direct EU regulations regarding agriculture is mostly performed by the federal states. Policy fields like agriculture, environmental protection, nutrition, consumer protection and rural development may be combined within one ministry, but depending on the federal state those policy fields can also be administered in separate ministries.

Hereafter, the governance and enforcement structure of the federal state of Saxony is described. In Saxony, where the German TALE case study region is partly located, the main actor in policy design is the Saxon State Ministry of the Environment and Agriculture (SMUL). The SMUL is the administrative authority, while the Saxon State Office for the Environment, Agriculture and Geology (LfULG) forms the competent authority (*Fachbehörde*), which provides technical support to the Saxon parliament and the SMUL.

Figure 12 gives an overview over the Saxon agricultural and environmental governance structure embedded in the German federal system. It displays relevant actors as well as the organisational levels in the case study region.

Instruments of the CAP

In Germany, the framework regulation regarding the national implementation of the CAP directives are set by the German Federal Ministry of Food and Agriculture (BMEL) and are applicable in all federal states. While in most EU Member States national paying agencies are responsible for the distribution of agricultural payments, in Germany this task is met by each federal state separately but the agencies are coordinated on national level by the BMEL. In Saxony the paying agency for EAGF and EAFRD is located at the SMUL. Cross compliance, compliance to greening regulations and controls of the Fertiliser Ordinance are coordinated by the LfULG, which is also responsible for the selection of farms and the analysis of the controls. On-the-spot controls are conducted by the lower agricultural administration, except for cross compliance controls regarding the storage capacity of manure (according to the Fertiliser Ordinance), which is conducted by the lower water administration.

As described in chapter 4.4.2, each German Federal State sets up its own RDP within the limits of the European framework resulting in 13 regional programmes. Due to the German federal constitution, national competence in terms of rural development is limited (Dwyer et al. 2016). Specific measures are co-financed by the Federal Government through the Joint Task for the “Improvement of Agricultural Structures and Coastal Protection” (*Verbesserung der Agrarstruktur und des Küstenschutzes*, GAK) (*ibid.*). The BMEL sets the framework legislation regarding the GAK.

As required by the CPR (Regulation (EU) No 1303/2013) a monitoring committee supports the programming of regionally adapted RDP measures. The Saxon monitoring committee consists of representatives of the managing authority, the paying agency and the ministries involved. The committee further includes relevant economic, social and environmental partners and non-governmental organisations. The European Commission (DG Regio), the BMEL and the Networking Agency for Rural Areas (DVS) are consulting members. All members, except the consulting members, are entitled to vote.

AECM, as an obligatory part of the RDP, are designed at federal state level in Germany. Every federal state has the option to design measures specifically targeting regional or local conditions and target areas as long as they comply with EU regulations. On-the-spot checks regarding the compliance to AECM regulations is conducted directly by the LfULG, while the



lower agricultural administration is responsible for administering the remuneration of the AECM.

Environmental legislation concerning agricultural land use

The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) is responsible for the national framework legislation regarding environmental law, e. g. the water protection law or the implementation of the FFH-Directive. The Saxon Parliament supported by the SMUL specifies the national legislation and adapts the environmental legislation concerning agricultural land use for the State of Saxony (e. g. Saxon Nature Conservation Act, Saxon Water Law). National regulations regarding fertilisation and pesticides are defined at the national level under the lead-managed by the BMEL. Responsible enforcement and control bodies in Saxony are the LfULG (for agricultural law, pesticide application on farm level) and the lower nature administration (legislation on nature protection). A further actor group contributing to the maintenance of cultural landscapes with special importance for biodiversity are the landscape maintenance associations (*Landschaftserhaltungsverbände*, LEV). These associations consist of representatives of farmers, environmental NGOs and of lower administrations, offer regionally adapted extension services and aim at communicating and carrying out the practical implementation of maintenance measures (e. g. for extensive land use or for the setup of Natura 2000 management plans). The study region Mulde belongs to the river basin district of the Elbe river. The coordination of the Elbe river basin management according to the requirements of the WFD and the Flood Risk Management Directive are a task of the “River Basin District Elbe”, which is composed of representatives of the involved federal states and technical experts.

Research, policy advice, monitoring and extension

In Germany, most federal ministries have related departmental research institutes. Those federal research institutes provide technical information and advice to decision makers (e. g. by providing scientific evidence for certain land use related questions), inform the public about environmental risks and challenges, collect data and provide input for drafting legislation or are even responsible for the control of its correct implementation. The Federal Agency for Nature Conservation (BfN) and the Federal Environmental Agency (UBA) are related to the BMUB, while the Thünen-Institute and the Julius Kühn-Institute (amongst others) are relevant information sources for the BMEL. In addition to these institutes, there are further private and public research institutes (e. g. universities) and evaluation bodies, e. g. evaluating the design and the implementation of the EAERD and also providing policy advice if asked.

Information, advice and extension services are offered to farmers from a variety of stakeholders, such as the LfULG, private extension companies, agricultural trade businesses and associations (e. g. Raiffeisen association) or farmers' associations.

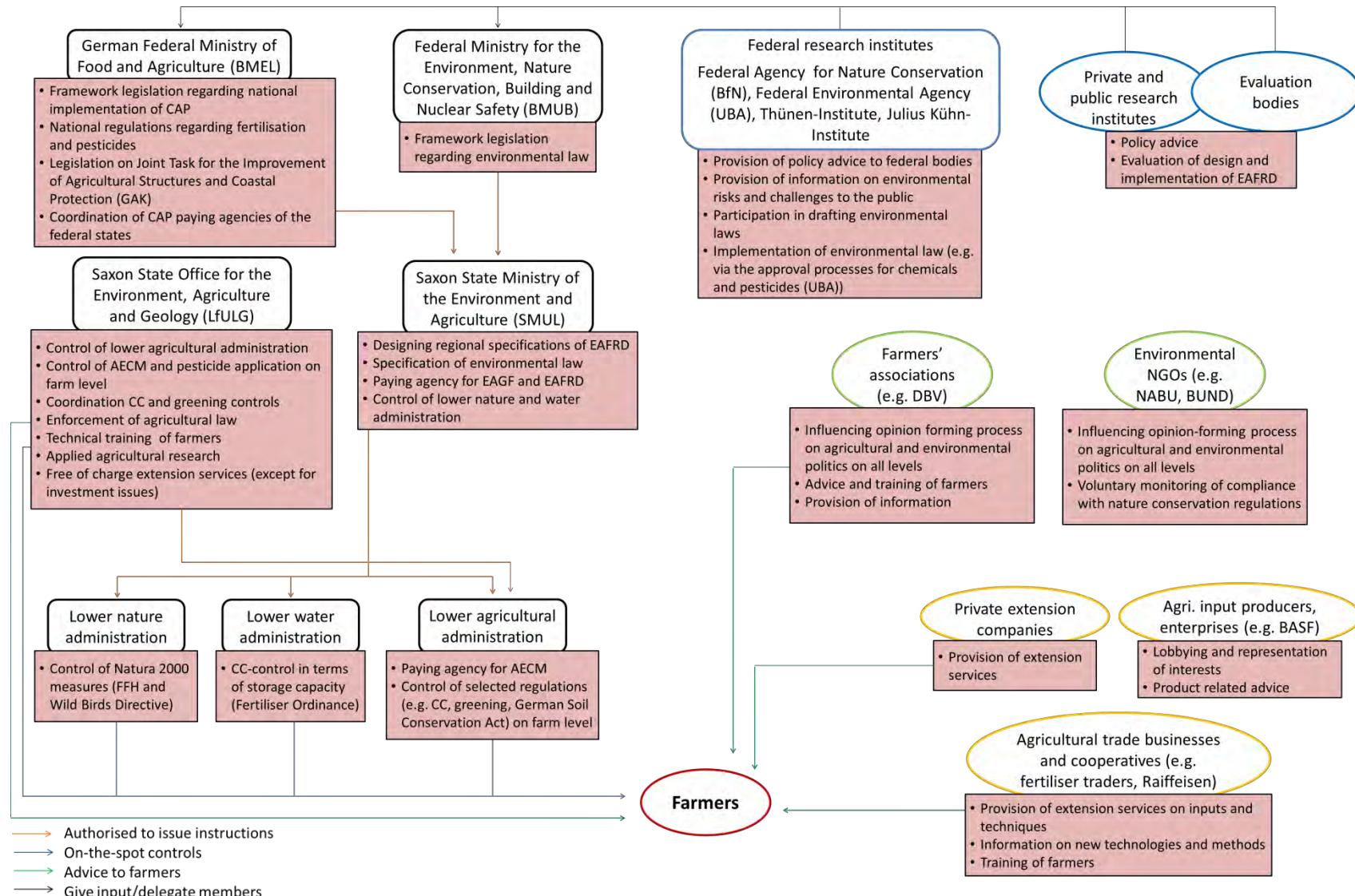


Figure 12: Governance structures and actors in Germany (Ilm/Mulde, Saxony)



Classification of actors

Figure 13 classifies the most relevant German agricultural and environmental governance actors according to their influence on policy design and administrative and political level. Main responsible bodies for the policy design on national level are the BMEL and the BMUB, while the SMUL fulfils that task on a federal state level (in this case at the level of the Federal State of Saxony). By providing advice to policy makers in decision making processes the federal research institutes and the UBA influence the design of agricultural and environmental policies indirectly. Public and private research institutes are mostly policy recipients, but might impact decisions on policy design through their research activities Agricultural trade businesses and associations (e. g. fertiliser traders or Raiffeisen associations) have a similar position, while evaluation bodies are mostly policy recipients. National farmers' associations such as the *Deutscher Bauernverband* (DBV) and environmental interest groups such as NABU or BUND are non-state actors shaping policy designs by influencing the decision-making and public opinion-forming processes on a national and regional level. (Supra-) National commercial agricultural input producers and enterprises (e. g. BASF) also articulate their interests have also some influencing power on the design of policies. On the federal state level there is a hierarchical structure of official administration bodies like the LfULG, the regional planning authority and the lower agricultural, nature and water administration, which may have some indirect influence on the design of policies. Private extension services operate as policy recipients on a local level.

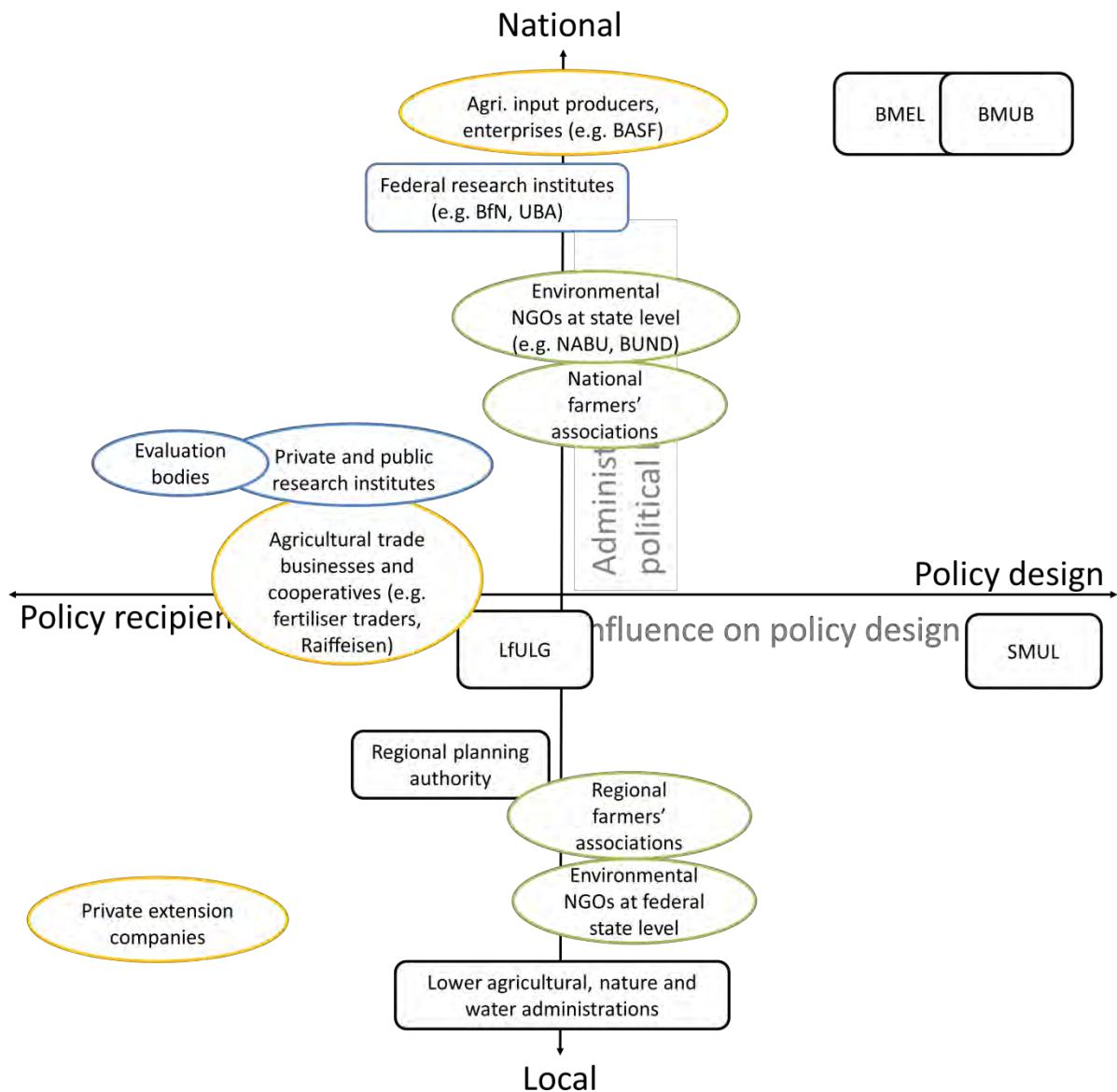


Figure 13: Classification of actors in Germany (Ilm/Mulde, Saxony)

5.1.3 Overview on governance and enforcement architecture in Spain

Spain is a decentralised, parliamentary monarchy subdivided into 17 autonomous communities. Each autonomous community has its autonomy statute which under the Spanish constitution establishes regional competences and basic regulations. Therefore, legislative competence is partly situated at national and partly at the level of the autonomous communities. Hereafter, the governance and enforcement structure of the Autonomous Community Castile and León, including the Spanish TALE case study Cega-Eresma-Adaja basin, is described and laid out in the figure 14. The graph displays the most relevant actors as well as the organisational levels in the case study region.



Instruments of the CAP

In Spain, the framework legislation regarding the national implementation of CAP requirements lies within the responsibility of the State Secretariat of Agriculture, Food and Environment, which is part of the National Ministry of Agriculture and Fish, Food and the Environment (MAPAMA).

The Spanish Agrarian Guarantee Fund (FEWA) is an autonomous organisation associated with MAPAMA. The FEWA coordinates the homogenous application of CAP payments over the autonomous communities, which are responsible for the administering the remuneration of the payments. FEWA also designs a control system for compliance controls (administrative and on-the-spot controls, i. e. cross compliance, greening and AECM controls) at national level. Following these guidelines the agricultural department of the regional government of Castile and León develops a regional control plan. The regional government can include requirements and standards that go beyond the FEWA guidelines and EU regulations, but must comply with the minimum requirements. The responsible bodies for the execution of the controls are the agricultural district section (on-the-spot and administrative checks of greening requirements) and the agricultural section (on-the-spot and administrative checks of cross compliance and AECM), both are part of the territorial services. The agricultural district sections (*Secciones Agrarias Comarcales*) are institutions grouping several municipalities and are in charge of processing farmers' applications and issuing payments at local level.

The State Secretariat of Agriculture, Food and Environment designs general national specifications of the EAFRD. From these general measures, each autonomous community needs to formulate their own RDP by choosing among measures of the national RDP, including AECM.

Environmental legislation concerning agricultural land use

The State Secretariat of the Environment is also part of the MAPAMA and is responsible for the framework legislation regarding environmental law. The State Secretariat of the Environment is in charge of environmental legislations when several Autonomous Communities are affected. For environmental issues involving only one autonomous community regional governments must deliver own laws and regulations within the basic national framework regulations. Further, most environmental management competences lie in the hands of regional governments.

With respect to water-related policies, The Spanish national government legislates diverse documents for satisfying water demands and assuring the good state of water bodies (e. g. Water Law, National Hydrological Water Plan). Further, it designates responsibilities for water management and monitoring to basin authorities (i. e. hydrographic confederations when the basin covers more than one autonomous community). These basin authorities are autonomous bodies attached to the MAPAMA for administrative purposes. Basin authorities draft basin management plans containing measures which implement requirements of the WFD. To control compliance to water related legislations the basin authorities have a water police. Moreover, SEPRONA, a military police, controls water law compliance. In general, SEPRONA conducts on-the-spot checks of farms related to legislation at all levels (municipal to national). In case of non-compliance, SEPRONA claims charges against the farmer at the municipal administration.

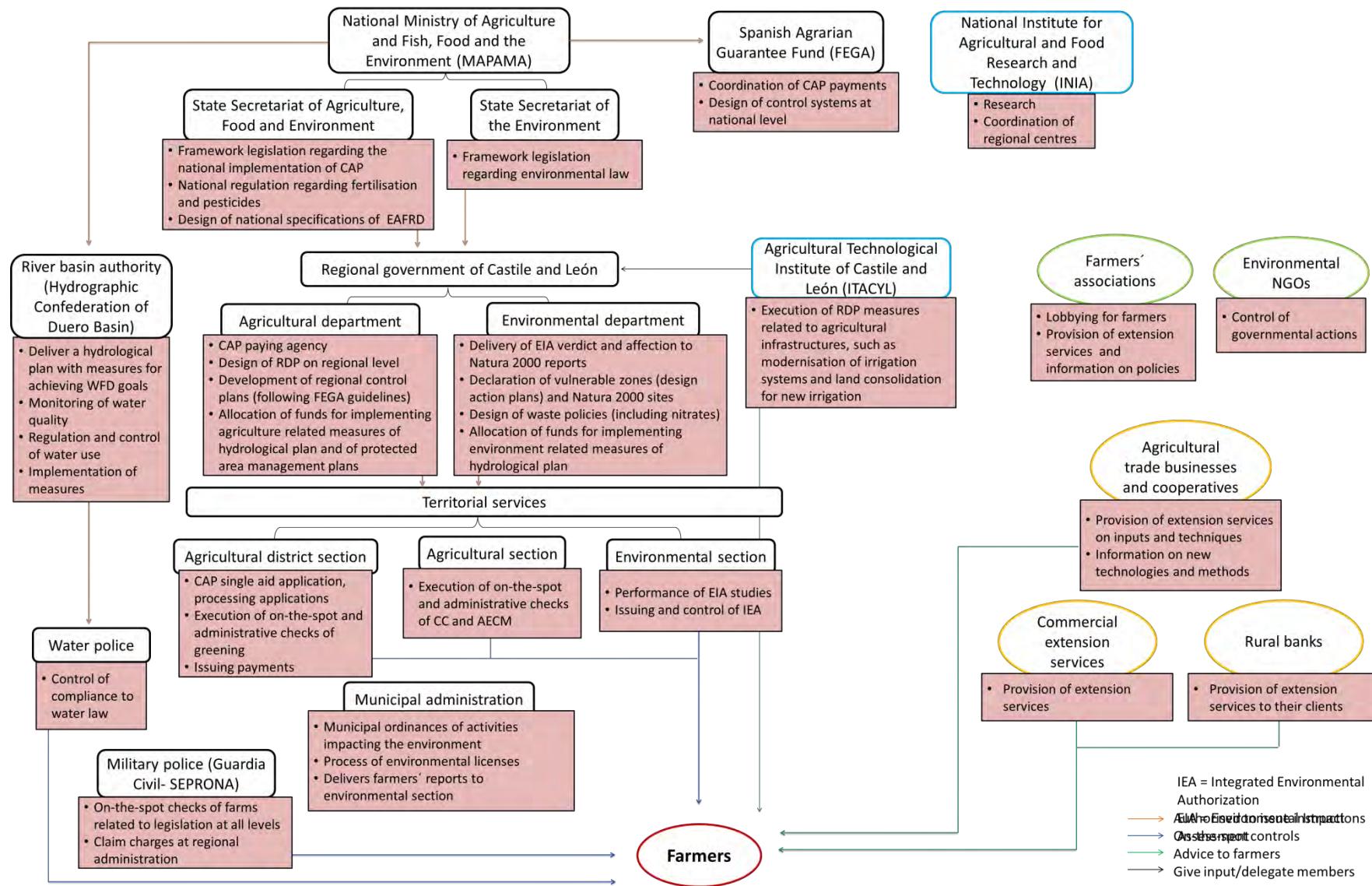


Figure 14: Governance structures and actors in Spain (Cega-Eresma-Adaja basin, Castile and León)



Legislation and implementation duties of nitrate-related regulations are shared between national, regional and local governments. The transposition of the Nitrate Directive into a Code of Good Agricultural Practices must be done by the regional government, particularly by the environmental department.

Regarding protected areas, autonomous communities are responsible for the declaration (national and natural parks or Natura 2000 areas), as well as drafting the main instruments for their management. Currently, only preventive legislation is implemented for the protection of these areas (e. g. Environmental Impact Assessment, conducted by the environmental section of the territorial services). Drafting management plans for each site lies within the responsibility of the environmental department of the regional government (protected areas section), but funding for their implementation is granted by the agricultural department, which manages Pillar Two funds. Controls are done via the environmental department and the SEPRONA guards.

Municipal ordinances regulate activities impacting the environment in the field of water provision, sanitation and sewage or waste recycling (e. g. ordinances for slurry management). These activities require an environmental license which is processed by the municipal administration. The municipal administration delivers farmers' reports to the environmental section territorial services, which performs, issues and controls the Integrated Environmental Authorisation and Environmental Impact Assessment.

Research, policy advice, monitoring and extension

In Spain the main organisation for agricultural research and the main actor in the Spanish agricultural knowledge and innovation system is the National Institute for Agricultural and Food Research and Technology (INIA). The autonomous regions have due to the decentralised administrative system own regional research centres with own independent and regionally adapted agricultural research, but belong to the general INIA system (Esparcia et al. 2014). The Agrarian Technological Institute (ITACYL) is the regional research centre in Castile and León. Main task of the ITACYL is the design and setup of agricultural infrastructures, such as modernisation of irrigation systems and land consolidation for new irrigation.

Environmental NGOs such as SEO/BirdLife or WWF control the governmental actions and claim charges at the Court of Justice against the local and regional government in case of non-compliance to environmental laws. Spanish farmers' organisations such as *La Coordinadora de Organizaciones de Agricultores y Ganaderos* (COAG) are lobbying for farmers and are providing information on cross compliance to farmers via the advisory systems funds of the CAP Pillar Two.

Classification of actors

In figure 15 the most relevant Spanish agricultural and environmental governance actors are classified according to their influence on policy design and their administrative and political position. Policies regarding agriculture and environment are designed on national level mainly by the MAPAMA, the State Secretariat of the Environment, respectively, while FEGA is in charge of the national control plan design. The regional government of Castile and León with its agricultural and environmental department implements national framework legislation but also designs policies addressing regional conditions. The river basin authority, the territorial services and the municipal administration may have a certain influence on the regional



government and therefore some indirect influence on policy design. There are a number of farmers' associations and environmental NGOs at the national and regional level with a limited influence on policy design. However, the influence of farmers' organisations on a regional level is perceived somewhat stronger. The federal research institute INIA and its regional counterpart ITACYL may have an indirect influence on policy design through their research outcomes and consultative function. Public and private research institutes are perceived less influential. Policy recipients on a national level are the military police SEPRONA as well as agricultural trade businesses and cooperatives but also rural banks, commercial extension services and irrigation communities, which work rather regionally.

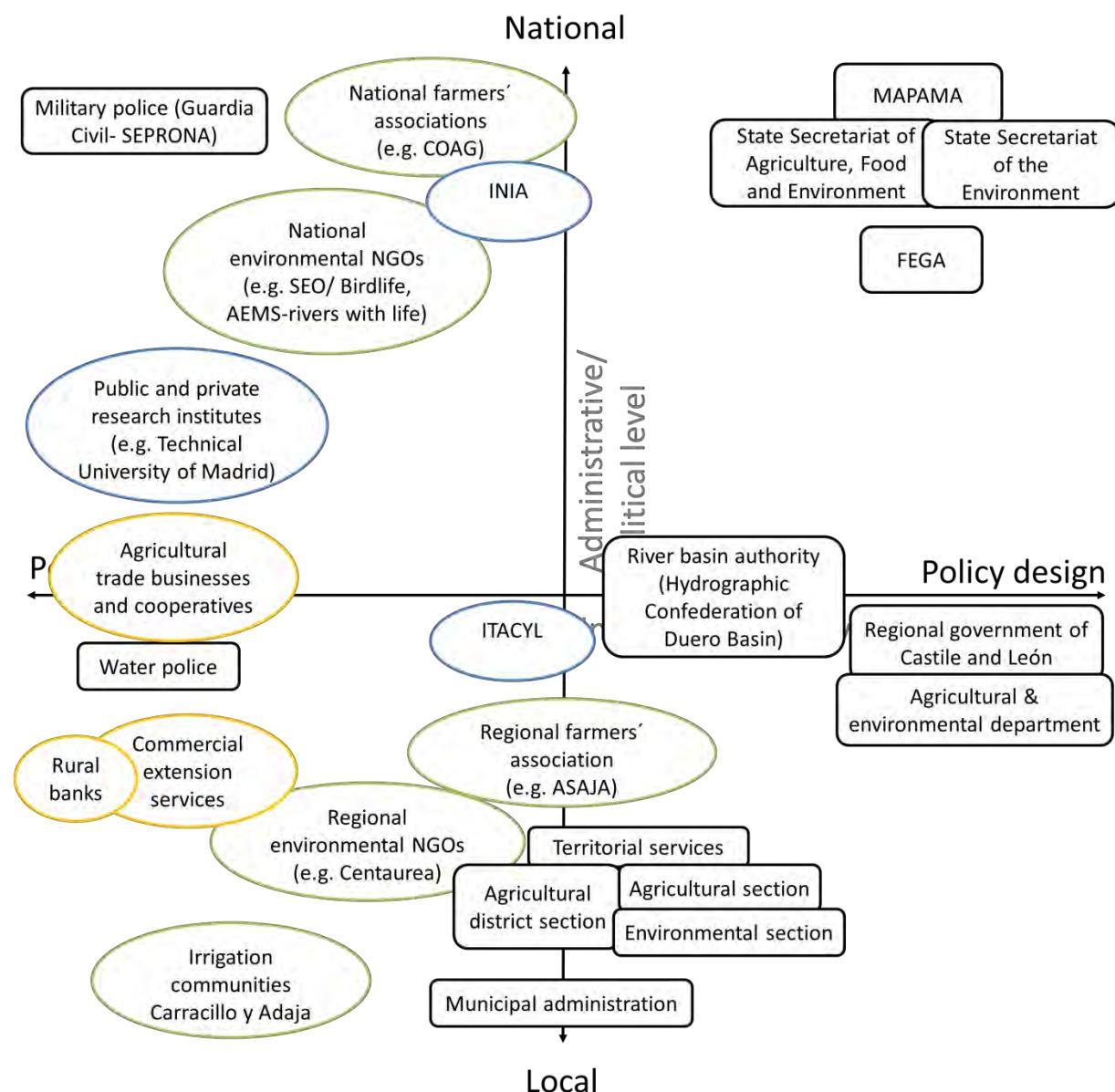


Figure 15: Classification of actors in Spain (Cega-Eresma-Adaja basin, Castile and León)



5.1.4 Overview on governance and enforcement architecture in The Netherlands

The Netherlands is a constitutional monarchy subdivided into twelve provinces. Those provinces have an intermediate function between the central government and the municipalities. They have a number of responsibilities such as environmental, water and infrastructure management as well as economic and agricultural matters. The provinces have their own representative and executive organs. The third political administration level consists of the municipalities (NIMD 2008).

In order to enhance collaboration between all provinces, especially during the developing phase of new policies, the Inter-provincial consultation (*Interprovinciaal Overleg*, IPO) was established. The IPO facilitates information exchange and is involved in the development of new provincial policies. The board of IPO consists of representatives of all twelve provinces with an independent chairperson. All relevant governance actors are presented in figure 16.

Instruments of the CAP

The Dutch national agricultural policies are coordinated by the Ministry of Economic Affairs (ME). The ministry coordinates all sections of the CAP including the RDP and designs a framework legalisation regarding the national implementation of the CAP, which is then implemented at provincial level. There are different independent agencies that support the ME. An important agency is RVO, The Netherlands Enterprise Agency. This agency is responsible for the execution of the CAP (incl. the payments of AECMs to collectives) and all other agricultural subsidies. It is the paying agency for compensation subsidies as well as for calculating sanctions (reported by the NVWA). Another independent agency under the ME is the NVWA, The Netherlands Food and Consumer Product Safety Authority. It is responsible for a range of controls such as the control of compliance to different nature and environmental policies at individual farmers' level, the control of cross compliance requirements and other controls focussing on human and animal health and welfare. The NVWA also checks all farmer collectives in The Netherlands (administrative as well as on-the-spot checks).

The national Dutch RDP (*Plattelandontwikkelingsprogramma POP3 2013 – 2020*) lies also in the responsibility of the ME. On the national level, POP3 consists of different sections: 1) an Entrepreneurship and Innovation Programme, paid for by Pillar Two as well as by Horizon 2020³⁴, 2) the agri-environmental programme ANLb, 3) subsidies for improved water management, co-financed by the Water Boards, and 4) LEADER, in which projects are 50 % co-financed by provinces or municipalities, especially for measures that fit the provincial agricultural policies well.

Rural development is one of the shared tasks of municipalities with other actors such as the province. Municipalities therefore often collaborate in larger networks with different partners (such as the Area Commission or inter-municipality cooperation) on rural development issues. The Agenda for a Vital Countryside (*Agenda Vitaal Platteland*, AVP) is an important instrument for local rural development in the Dutch case study region. The AVP focusses on rural development from an economic, ecological and socio-cultural perspective. It summarises all policy goals and financial means necessary for the desired development (from the EU, national

³⁴ The EU Framework Programme for Research and Innovation



government, province and specific regions). The national government defines the outline of the AVP, while the implementation is the responsibility of the provinces. In order to implement the agenda, so called area programmes are established (*Gebiedsprogramma*). In the Dutch case study region, the area programme *Vallei – Heuvelrug – Kromme Rijnstreek* 2012 – 2015 is now applied. With the different area programmes, the Province of Utrecht aims at targeting local conditions with an integrated area focus. Area Commissions, have the mandate of the province for the execution of the area programme. They further provide regional information and input for regional rural policies and plans to the provinces and therefore consist of relevant regional stakeholders. The Area Commission of the Kromme Rijn area, for example, is comprised of representatives of municipalities, the local LEADER group, the Agricultural Nature Association (ANV) Kromme Rijn, the landowners association (*Utrechts Particulier Grondbezit*), a representative of the Dutch Federation of Agriculture and Horticulture (LTO-Noord), a foundation focused on region marketing and cooperation (*stichting Terecht Anders*) and several environmental NGOs (e. g. *Natuur- en Milieufederatie Utrecht, Utrechts Landschap*).

While The Netherlands have only one RDP for the whole country, AECM are managed by each province separately: For all these measures, “Nature management plans” of the provinces defining the boundaries of the areas eligible for subsidies are renewed yearly. The nature management plans are cross-checked with the provincial planning vision (*Provinciale Ruimtelijke Structuurvisie*, PRS) and the provincial spatial regulations (*Provinciale Ruimtelijke Verondering*, PRV). Since 2016 only certified farmers’ collectives can apply for subsidies in the new ANLb scheme. Those collectives are responsible for the management and distribution of the payments, which they receive from the RVO, and for contracts with each individual farmer in the scheme. They are further in charge of a collective management plan defining where and how the individual measures are implemented. Further, they conduct internal controls of compliance to the defined AECM in addition to the controls conducted by the NVWA. It is common to hire a “field coordinator” (in the Province of Utrecht from the environmental NGO *Landschap Erfgoed Utrecht*) to support those tasks. Environmental organisations advise farmers also on the available measures and on the best nature conservation and water protection options.

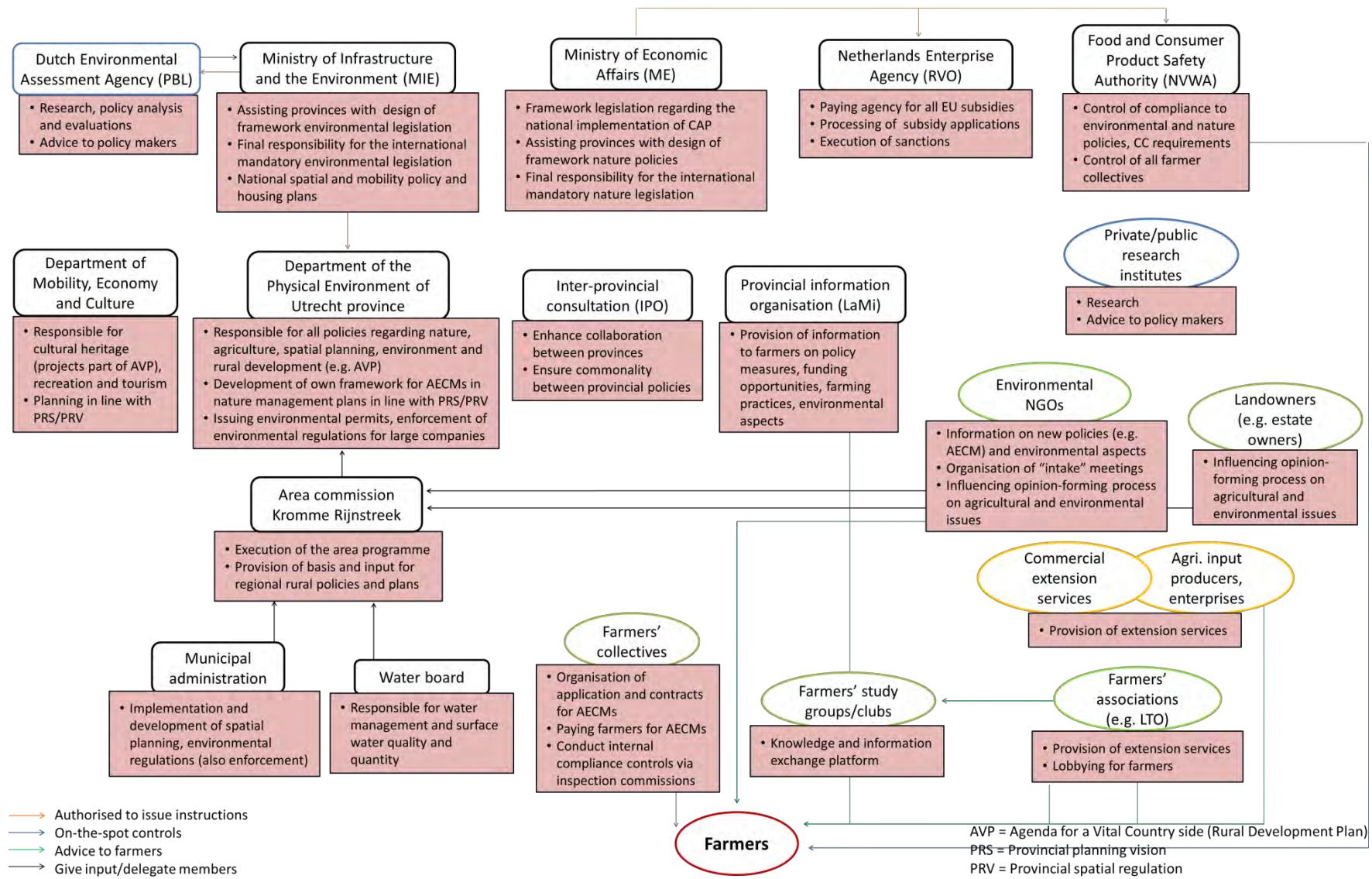


Figure 16: Governance structures and actors in The Netherlands (Kromme Rijn, Province of Utrecht)



Environmental legislation concerning agricultural land use

Due to a decentralisation of responsibilities, the Dutch provinces are now in charge of all nature and environmental policies. Therefore, yearly environmental management plans are developed summarising environmental strategies and goals. The provinces receive assistance from the Ministry of Infrastructure and the Environment MIE (environmental policies) and the Ministry of Economic Affairs (nature policies). Nevertheless, the MIE still has the responsibility for the international mandatory environmental legislation and policies in the national context, such as the Habitat and Birds directive and the WFD, and the ME for nature legislation. In the Province of Utrecht the Department of Physical Environment designs and implements the regionally adapted policies regarding nature, agriculture, spatial planning and environment following the national guidelines. Provinces control compliance of environmental laws on air, soil and water as well as any source of pollution or contamination. The municipal administration prepares regulations for the implementation and enforcement of the regulations set in the national Environmental Management Act and other environmental regulations. Cooperation with public authorities such as water boards on water quality and wastewater treatment exists. Since the Dutch water boards are in charge of managing and maintaining surface water quantity and quality throughout the country they play a key role in environmental management in The Netherlands. They are independent from other governmental bodies and are, together with the provinces and the national government, responsible for the implementation of the WFD. The water boards are monitored by the provinces.

Legislation regarding fertilisers is set at national level. Compliance to the different laws regarding nitrogen is controlled nationwide by the NVWA. Regarding the main pieces of legislation on nature conservation – the Nature Conservancy Act, the Flora and Fauna Act and the Forestry Act – the RVO is in charge of sanctions.

Since the decentralisation of nature policies, each province can decide whether and in which form it will continue with previous target areas for new nature development. In the Province of Utrecht, the project “Groene contour” aimed at the development of 3000 ha new nature as a provincially driven continuation of a former national nature policy.

Research, policy advice, monitoring and extension

The PBL, Netherlands Environmental Assessment Agency, is an autonomous research institute that falls under the MIE and is the national institute for strategic policy analysis and monitoring in the fields of the environment, nature and spatial planning. The extension service system in the NL is described in detail in chapter 4.6.2.

Classification of actors

Main actors at national level for the design of environmental and agricultural policies are the MIE and the ME as shown in figure 17. But due to the decentralisation the provincial (i. e. the Department of the Physical Environment of the Province of Utrecht) and municipal level (i. e. municipal administration) have a big freedom in the design of policies. The IPO has often also a leadership position in the development of new provincial policies to ensure commonality between provincial policies. It works in close contact with the national parliament, the ministries and the EU.



Different NGOs that are active in the province of Utrecht are important stakeholders at provincial level regarding environmental, agricultural and nature issues. Among others, these NGOs will check and respond to proposed new policies at both provincial and municipal level.

Farmers' study groups and clubs as well as farmers' collectives are as such policy recipients at local level. Via the nationally and locally operating farmers' associations policy design can be influenced informally.

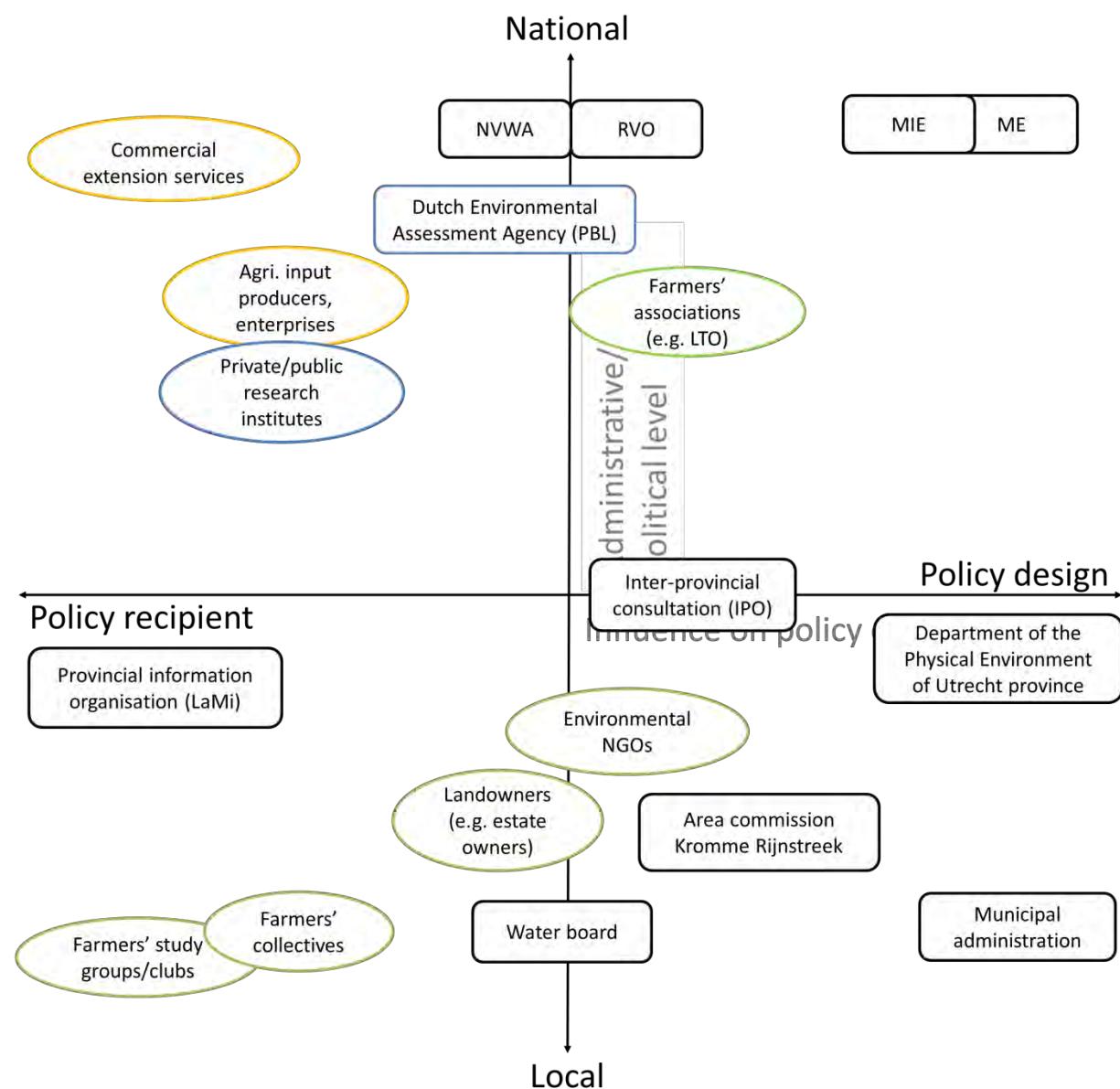


Figure 17: Classification of actors in The Netherlands (Kromme Rijn, Province of Utrecht)



5.1.5 Overview on governance and enforcement architecture in Switzerland

Switzerland is organised as a federal state composed of 26 cantons with own constitutions, own parliaments and governments. Further characteristics are a (partly) direct democracy and a high autonomy of the regional communities. However, agricultural and environmental politics are planned on federal level, while the cantons are responsible for implementation, as shown in figure 18.

On the national level, the Federal Office of Agriculture (BLW), which is part of the Federal Department of Economic Affairs, Education and Research (WBF), is the main authority programming agricultural policies. It implements decisions taken by the electorate, the Swiss parliament and the government. It works closely together with the cantonal authorities and the farmers' associations (BLW 2016b). The BLW is e. g. responsible for the design of the direct paying system.

Direct payments (DZV)

The Swiss direct payments are composed of seven different payment schemes which are mostly available without further programming all over Switzerland (except for the Landscape quality payments and the Interconnectedness payments, which are both related to regional projects of the cantons and which also require 10 % cantonal co-financing). The cantonal offices for agriculture are the responsible bodies for the processing and management of direct payment applications, transferring the payments and the coordination of controls. The cantonal offices can either conduct the compliance controls themselves or delegate this task to accredited private control bodies. The monitoring of regulations regarding environmental legislation in connection with the direct payments falls within the remit of the Federal Office for the Environment (BAFU).

The BLW is further responsible for wider rural development. The main support instrument is investment promotion. The Swiss association for rural development (Suissemelio) is composed of members of institutions and bodies of the cantonal and the national level responsible for payments related to the agricultural structure or social issues. The members develop strategies and solutions for rural development and seek to ensure the financial support for agriculture and rural development (Suissemelio 2010).

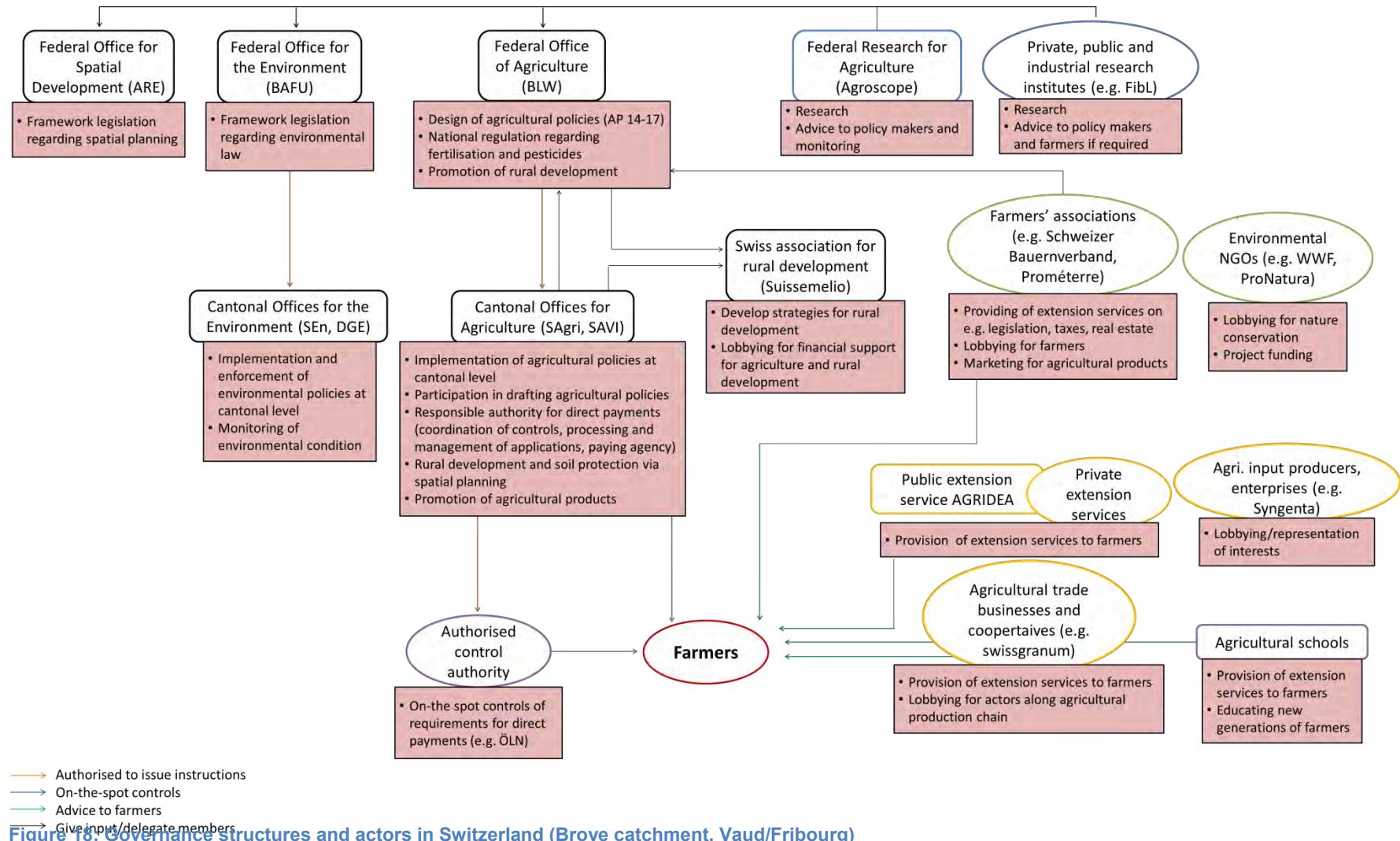


Figure 18: Governance structures and actors in Switzerland (Broye catchment, Vaud/Fribourg)



Environmental legislation concerning agricultural land use

Regulations regarding fertilisation and pesticides are determined by the BLW on national level. The BAFU provides the framework legislation regarding environmental law and controls the execution of the law by the cantonal authorities, while the Federal Office for Spatial Development (ARE) frames the legislation regarding spatial planning. On a cantonal level, the cantonal offices for agriculture (*Service de l'agriculture* (SAgri) in Fribourg, *Le Service de l'agriculture et de la viticulture* (SAVI) in Vaud) and the environmental (*Service de l'environnement* (SEn) in Fribourg, *Direction générale de l'environnement* (DGE) in Vaud) are in most cases responsible for the execution and the enforcement of the agricultural and environmental policies including environmental legislation, the monitoring of the environmental condition (e. g. via soil and water analyses) and the provision of information to relevant authorities and the public. Besides national statutory regulations, cantons are allowed to define own measures regarding agricultural and environmental legislation and can also refer to specific issues such as soil protection, nutrients and biodiversity (e. g. air protection legislation in order to reduce ammonia emissions in the Canton Luzern). In order to facilitate the implementation of environmental and agricultural legislation the Swiss Federation offers guidelines e. g. for environmental protection in agriculture for cantonal authorities.

Research, policy advice, monitoring and extension

The Swiss centre of excellence for agricultural research, Agroscope, conducts research and development on behalf of the BLW and provides advice to policy makers. It is further responsible for a range of legal monitoring tasks such as testing of plant protection products of the structural water protection in agriculture (Agroscope without year). Additionally, there are further public, private and industrial research institutes contributing to knowledge generation and transfer. An important organisation with regard to information and extension services in Switzerland is AGRIDEA, the Swiss Association of the Development of Agricultural and Rural Areas.

Classification of actors

The BAFU, BLW and ARE are the main policy designing authorities on federal level (see figure 19). The cantonal equivalents to those institutions are the cantonal Offices for the Environment and Agriculture. Combining national and cantonal actors in the policy field of rural development the association SuisseMELIO is situated in between those levels. Agroscope works as a federal research institute and influences policy design indirectly by advising policy makers. Private, public and industrial research institutes in contrary are rather policy recipients.

Farmer's associations (e. g. Schweizer Bauernverband, Prométerre) and environmental NGOs (e. g. WWF, ProNatura) are contributing to the decision-making process and the public opinion-forming process on environmental and agricultural policies on national and regional level. (Supra-) National commercial agricultural input producers and enterprises (e. g. Syngenta) and sectorial associations such as Swissgranol, an inter-trade organisation of Swiss grain growers, articulate their interests.

The disseminators of the extension service AGRIDEA and private extension services as well as the agricultural schools operate on the local level as policy recipients.

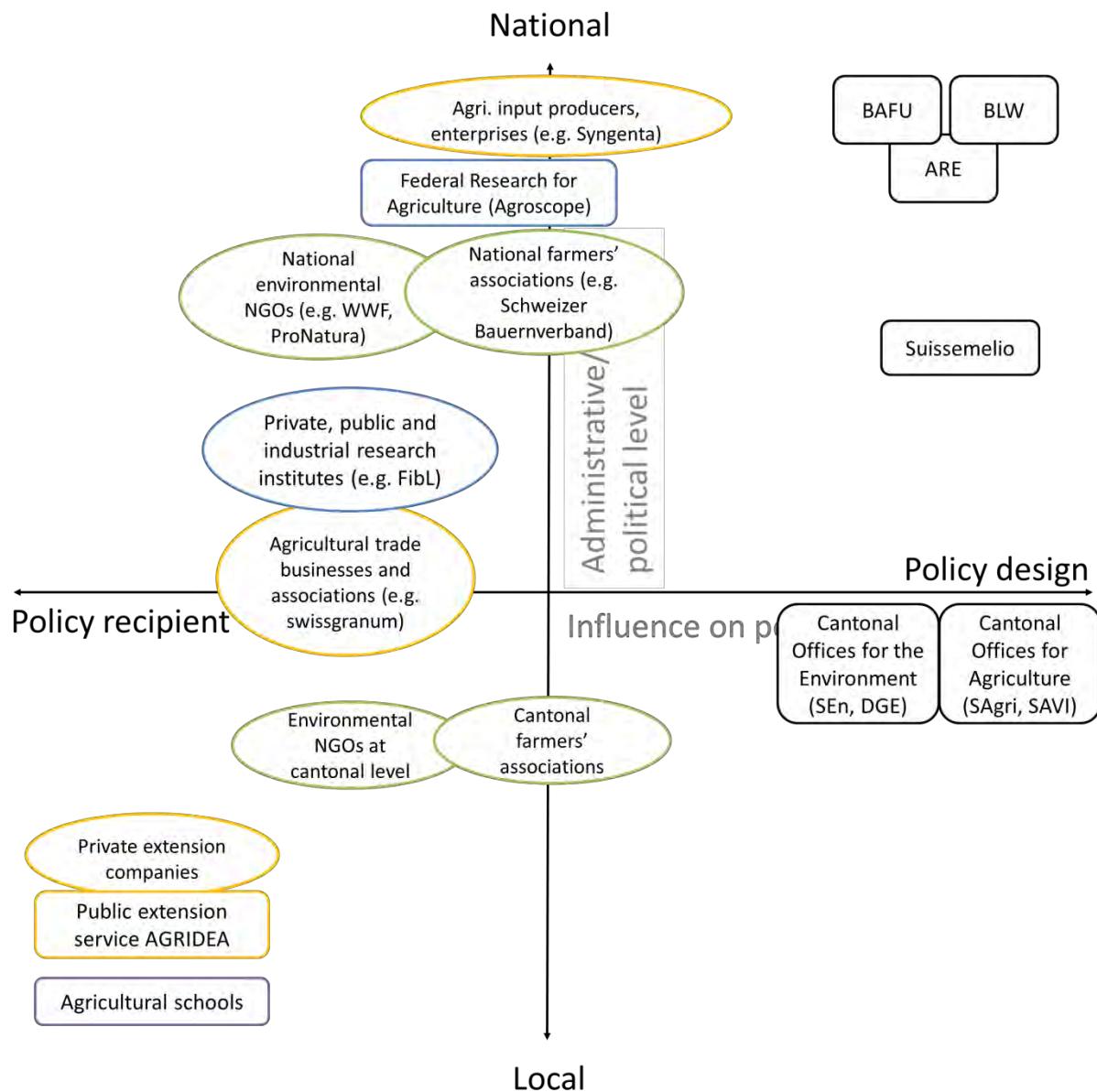


Figure 19: Classification of actors in Switzerland (Broye catchment, Vaud/Fribourg)

5.1.6 Comparison of governmental and enforcement architectures in the TALE case study regions

The attempt to classify the main actors that have a stake in agri-environmental policies in the case study countries and regions according to their level of influence on policy design was part of the policy analysis in TALE. As this step of the analysis is of a rather subjective nature and the influence also depends on the general setup of governance structures in the countries, e.g. in respect to decentralisation processes, it is difficult to draw general conclusions. However, the range of actors involved in policy design is similar in all case study regions, including political and administrative entities on national, regional and municipal level, farmers' associations, environmental NGOs, public and private research institutes as well as private



companies of the upstream and downstream industries related to agriculture. Not surprisingly, in all cases, the ministries/state departments that are responsible for agriculture on national and regional level are the most influential actors in the field of agri-environmental policies. In some countries the same ministry is responsible for agriculture and environmental issues in general (Austria, in Saxony on federal state level, Spain on national level), while in others these policy fields are divided (Germany on national level, Castile and León on regional level, Switzerland). In The Netherlands the Ministry of Economic Affairs is responsible for agricultural policies, while the Ministry of Infrastructure and the Environment deals with environmental issues. Regarding the implementation of the EAFRD, Germany and Spain not only have regionally programmed RDP, but also paying agencies on the regional level.

For some case studies the influence of certain stakeholders is highlighted or there are actors that do not exist in the same way in other case study regions. In Austria, the Chambers of Agriculture, Labour and Commerce have a special status as public corporations with mandatory membership and therefore also a rather strong influence on agricultural policies. Federal research institutes, like the Thünen-Institute in Germany or Agroscope in Switzerland, indirectly influence policy design by providing policy advice. In Germany, the influence of large private companies, e. g. in the pesticide and fertiliser industry, is perceived as rather strong on the national level by interviewed stakeholders. In Spain farmers' organisations are especially influential actors on a regional level. Regarding The Netherlands the large freedom of design at the provincial level and the actively engaged NGOs on a regional level can be highlighted. The importance of planning policies in the Netherlands and the related governance structures are described in chapter 4.7. A specific Swiss feature is the Swiss association for rural development (Suissemelio) which is composed of members of institutions and bodies of the cantonal and the national level responsible for payments related to the agricultural structure or social issues. Water boards in The Netherlands and the river basin authorities in Spain are actors that are of specific importance in countries where the management of water quantity is a major issue.

5.2 Compliance Assurance: Control and enforcement of agri-environmental policies

5.2.1 Introduction

Agri-environmental policies, be it measures based on voluntary contracts or binding legislation, can only be effective if compliance of the policy recipients with the policies is ensured. In order to do so appropriate mechanisms must be in place. In the context of the “Make it work” project (an initiative of the Dutch Ministry of Infrastructure and the Environment, the UK Department for Environment, Food & Rural Affairs and the German Federal Ministry of Environment, Nature Conservation, Building and Nuclear Safety to improve EU environmental law) “compliance assurance” is defined as encompassing

- “Compliance promotion: helping the regulated community understand its obligations,
- Compliance monitoring, including inspections, surveillance, etc. and
- Enforcement: actions taken when non-compliant activities are identified” (IEEP 2015: 3).



Which balance of these activities is appropriate varies across policy areas, across Member States and over time (*ibid.*).

According to IEEP et al. (2013: 7) the “control chain” is “a holistic approach to understanding compliance assurance, consisting of inspection/surveillance, enforcement and compliance promotion”.

- **Compliance** meaning that the entities (in case of the policies analysed in the context of TALE mostly farmers) subject to the legal requirements meet their duties.
- **Inspection/surveillance** meaning any sort of activities carried out by the relevant authorities in order to determine whether farmers are compliant, including on-site checks, document checks and IT-based checks, both routine inspections and incident-based inspections.
- **Enforcement** meaning the response to non-compliance, such as warnings, fines, reduction of payments or imprisonment. Please note that the term is regularly more loosely used to apply to regulatory activity more broadly. For example, if a national regulator is described as being responsible for enforcement of a Directive, this could imply also the inspection and investigative functions as well as responding to non-compliance.
- **Compliance promotion** (“awareness raising”) meaning all proactive actions that aim to raise the understanding of the farmers of the obligations they have to fulfil in order to ensure they are compliant with agri-environmental policies.

Aspects influencing the effectiveness of the control chain, amongst other things, are the way in which inspection and enforcement actions are planned, co-ordinated and followed up as well as the capacity of the involved organisations (IEEP et al. 2013).

In this context it is important to note that the classical economic approach to explain why people obey to rules, namely in the case that they consider the net utility of compliance to be higher than the net utility of an offence (taking the probability to be detected and the height of the punishment into account) is important, but insufficient to realistically explain human behaviour (Herzfeld and Jongeneel 2012). Non-economic factors, like the farmers’ personal attitude towards environmental issues, the wish to be considered a “good farmer” by society, the village community or the farming peer group also have to been taken into account. Also the perceived institutional quality influences the willingness to comply with rules (*ibid.*). Compliance with standards is also expected to be higher when the rules are believed to be legitimate and fairly applied (cf. Cohen 1998, Winter and May 2001).

The following table summarises the factors that have been identified in different strands of literature to influence compliance.

**Table 16: Determinants of compliant behaviour according to different strands of the literature**

Theory/literature strand	Determinants
Expected utility theory	<ul style="list-style-type: none"> - Chance of getting caught/penalised - Size of penalty - Individual's degree of risk aversion - Gains and losses with respect to subjectively chosen reference point - Risk-averse behaviour in the case of potential gains and risk-seeking behaviour in the case of potential losses
Prospect theory	<ul style="list-style-type: none"> - Underestimation of high probability events and overestimation of low probability events - Framing effect (preferences over prospects are not independent on how they are presented) - Internalised attitudes
Psychological literature	<ul style="list-style-type: none"> - Personal moral beliefs - Pro-social behaviour
Sociological literature	<ul style="list-style-type: none"> - Reciprocity with principal's action - Conformity with peer group
Institutions	<ul style="list-style-type: none"> - Trust in institutions in general - Satisfaction with institutional framework

Source: adapted from Herzfeld and Jongeneel (2012: 259)

As it was not feasible to analyse all of these factors within the TALE project, the control mechanisms in place in the case study regions and the aspects influencing the effectiveness of the control chain mentioned above were the main subject of the information gathering process. As in the EU Member States rules on compliance assurance regarding the CAP are to a large extend set on EU Level the major rules on the control and enforcement of First Pillar instruments (cross compliance, greening) and Second Pillar instruments (esp. AECM) are described in the following paragraphs.

5.2.2 Selected rules for enforcement regarding cross compliance, greening and measures according to the EAFRD

In order to ensure compliance to the various policy measures influencing land use change and the uniformity of control and sanction standards relevant European framework directives specify control and sanctions mechanisms.

Overall, the rules on compliance assurance and enforcement set centrally by the EU are less specific in the fields of the environmental legislation analysed in the TALE project compared to the rules regarding the CAP instruments. To give an example the Habitats Directive defines general provisions regarding inspections and compliance assurance, such as the duty to check compliance with management requirements for Natura 2000 areas in accordance with respective management plans and designation acts. However, neither the Birds nor the Habitats Directive contain detailed inspection provision (IEEP et al. 2013). Against this background the introduction of cross compliance and the related control regimes were an



important step towards minimum requirements for the enforcement of EU environmental legislation.

The following section summarises selected rules for enforcement set by the EU regarding cross compliance, greening and measures according to the EAFRD.

5.2.3 General information

Generally, in relation to the CAP, the paying agencies (at national level and, where applicable, at regional level) are responsible for the management and control of expenditures in the EU Member States. Through these paying agencies or the bodies delegated by them, Member States carry out administrative checks on all aid applications and payment claims and cover all elements that are possible and appropriate to control by means of administrative checks, i.e. cross-checks on information such as general eligibility for the aid scheme or support measures, avoidance of double financing, completeness and submission of relevant documents in a timely manner. Those checks are supplemented by on-the-spot checks. Both, administrative and on-the-spot checks, shall verify compliance with all eligibility criteria, commitments and other obligations of those aid schemes or support measures for which a beneficiary has been selected.

For the purpose of on-the-spot checks Member States draw up a sampling plan of agricultural holdings. The control sample is drawn from the entire population of applicants for the CAP-payments that are to be controlled and includes a random part in order to obtain a representative rate of non-compliance and a risk-based part, which targets the areas or farms with high risk of non-compliance. Depending on the granted aid or support the percentage of risk-based and random controls varies. Where appropriate, all on-the-spot checks regarding agricultural aid and rural development support shall be carried out at the same time. However this depends on the number of responsible control authorities and is becoming more difficult the more different control samples have to be drawn. A minimum level of on-the-spot checks needed shall be ensured by the Member States. Specific control rates are defined for each aid scheme and related group of recipients for an effective management of the risks. Where necessary, the control rates can be increased or reduced where the management and control systems function properly and rates of non-compliance remain at an acceptable level. If non-compliance is high control rates might have to be increased. On-the-spot checks may be announced ensuring it does not interfere with their purpose or effectiveness. Any announcement can be made maximum 14 days in advance, but needs to be strictly limited to the minimum time period necessary. Remote sensing and Global Navigation Satellite System techniques may be used as a means of carrying out on-the-spot checks on agricultural parcels. Every on-the-spot check needs to be documented via control report. All relevant findings made in the framework of the checks on compliance need be cross-notified to other relevant competent authorities.

In case of non-compliance with eligibility criteria, commitments or other obligations relating to the conditions for the aid or support, the payment is not granted or is withdrawn fully or partly. The administrative penalties may take one of the following forms:

- Reduction in the amount of aid or support to be paid in relation to the aid application or payment claim affected.



- Payment of an amount calculated on the basis of the quantity and/or period concerned by the non-compliance.
- Suspension or withdrawal of an approval, recognition or authorisation.
- Exclusion from the right to participate in or benefit from the aid scheme, support measures or other measures concerned.

The administrative penalties are graduated according to the severity, extent, duration and reoccurrence of the non-compliance found with a maximum reduction of 200 % of the amount of the aid application or payment claim (in case of rural development measures 100 %). e. g. In some cases no penalty is imposed, namely in case of *force majeure*, if the non-compliance is due to an error of an authority or not the fault of the beneficiary, or in case of minor non-compliance.

Where sectoral agricultural and environmental legislation so provides, Member States impose additional criminal administrative penalties.

5.2.4 Cross compliance

For the control of the rules on cross compliance Member States may make use of their existing administration and control systems and may decide to carry out administrative checks. On-the-spot checks are carried on at least 1 % of the total number of the beneficiaries. The control sample is based on a risk analysis, which may take into account a beneficiary's participation in the farm advisory system or in a relevant certification system. Controls are carried out by the competent control authorities designated by the Member States with regard to the requirements and standards for which they are each responsible. Cross compliance on-the-spot checks need to be structured as follows:

- The risk analysis may be based on the level of an individual farm or on the level of categories of farms or geographical zones.
- As a general rule, the checks shall be carried out as part of one visit.
- In general, each beneficiary selected for an on-the-spot check needs to be controlled at a time when most requirements and standards for which he was selected may be checked. However, Member States have to ensure an appropriate level of controls for all requirements and standards during the year.
- On-the-spot checks shall, where applicable, cover all the agricultural land of the holding. Nevertheless, the actual inspection in the field may be limited to a sample of at least half of the agricultural parcels concerned by the requirement or standard on the holding, if such sample is representative.
- On-the-spot checks at farm level may be replaced by administrative checks, provided they are at least as effective as on-the-spot checks (Regulation (EU) No 809/2014).

In case of non-compliance with the rules on cross compliance, an administrative penalty is imposed on that beneficiary by means of reduction or exclusion of the total amount of the payments granted. The calculation of reductions and exclusions is based on the severity, extent, permanence and reoccurrence of the detected non-compliance. Table 17 lists the calculation scheme for payment reduction.



Table 17: Calculation scheme for payment reduction depending on type of non-compliance to cross compliance requirements

Reduction factors	Type of non-compliance	Percentage of reduction
Severity Extent Permanence Reoccurrence	<ul style="list-style-type: none"> - Non-compliance due to negligence - Reoccurrence of non-compliance due to negligence - Determination of same non-compliance due to negligence reaching the maximum reduction percentage of 15 % - Determination of more than one case of non-compliance with regard to various acts or standards of the same area of cross compliance - Determination of more than one negligent non-compliance with regard to different areas of cross compliance - Determination of a reoccurrence together with another non-compliance or another reoccurrence 	<ul style="list-style-type: none"> - 3 % of the total amount resulting from the payments. The paying agency may decide either to reduce that percentage to 1 % or to increase it to 5 %. - The multiplication factor three shall be applied each time to the result of the previous sanction. The maximum reduction shall not exceed 15 %. - In case of reoccurrence of same non-compliance, the non-compliance is considered intentionally, implying a reduction of not less than 20 %. The paying agency may decide to reduce that percentage to no less than 15 % or to increase that percentage to up to 100 %. - Those cases are considered as one non-compliance. - The procedure for the fixing of the reduction shall be applied individually to each non-compliance. The resulting percentages of reductions id summarised. The maximum reduction shall not exceed 5 % of the total amount. - The resulting percentage reductions shall be summarised. The maximum reduction shall not exceed 15 % of the total amount.

Source: Own compilation based on Commission Implementing Regulation (EU) No 809/2014

Member States may decide not to apply an administrative penalty per beneficiary and per calendar year when the amount of the penalty is 100 € or less. Since 2015 Member States have to set up an early warning system that applies to cases of non-compliance occurring despite due diligence (BMEL 2016). These cases of non-compliance, given their minor severity, extent and duration, do not lead to a reduction or exclusion of payments, if the determined non-compliance is rectified and the same minor non-compliance does not occur again in the following three years (BMEL 2015b). Beneficiaries who have received for the first time an early warning may be given priority access to the farm advisory system. In case a subsequent check establishes that the minor non-compliance has not been remedied after the beneficiary had been noticed, a reduction of 1 % is applied retroactively and additionally a 3 % reduction of the payments for the year of reoccurrence of the non-compliance. In case of a third repetition of the same minor non-compliance a sanction of a 9 % reduction is applied (*ibid.*). This rule has led to quite significant sanctions in case of repeated minor non-compliance, e. g. in the case of identification and registration of livestock. Intensive discussions of the Member States with the European Commission have resulted in a relaxation of the system in so far that minor non-



compliance due to errors despite of carefulness from the farmers' side can remain without a sanction (BMEL 2016).

5.2.5 Greening

For the control of the requirements for greening payments, the control sample for on-the-spot checks carried out each year shall cover at least:

- 5 % of all beneficiaries who are not exempted from the crop diversification and the ecological focus areas (EFA) obligations or are using national or regional environmental certification schemes; this sample needs also to cover at least 5 % of all beneficiaries having areas covered with permanent grasslands which are environmentally sensitive in areas covered by the Habitat or Birds Directive.
- 3 % of all beneficiaries who are exempted from both the crop diversification and the EFA obligations.
- 5 % of all beneficiaries required to observe the greening practices and using national or regional environmental certification schemes.
- 5 % of all beneficiaries participating in a regional implementation and 5 % of the collective implementation.
- 100 % of the contiguous structures of adjacent EFA (in case of regional or collective implementation)
- 100 % of all beneficiaries with an obligation to re-convert land into land under permanent grassland which are environmentally sensitive in areas covered by the Habitat and/or Birds Directive.
- 20 % of all beneficiaries with an obligation to re-convert land into land under permanent grassland (in case of an exceeded compulsory ratio of permanent grassland decrease beyond 5 %).
- The following groups are not included in the control groups: Beneficiaries observing the greening practices through equivalent practices, participants of the small farmers' scheme, holdings complying with organic farming requirements.

On-the-spot checks related to greening practices shall cover all obligations to be respected by the beneficiary. Where additional visits relating to land laying fallow, field margins, buffer strips, strips of eligible hectares along forest edges, catch crops and/or green cover declared as EFA are required, the number of those additional visits shall for 50 % of the cases concern the same beneficiary, selected on a risk based basis, and for the remaining 50 % of the cases different additionally selected beneficiaries. The different additional beneficiaries are selected randomly from all beneficiaries having land laying fallow, field margins, buffer strips, strips of eligible hectares along forest edges, catch crops and/or green cover declared as EFA and such visits may be limited to the areas declared as land laying fallow, field margins, buffer strips, strips of eligible hectares along forest edges, catch crops and/or green cover. For the control sample 1 to 1.25 % of all beneficiaries applying for the basic payment scheme or the single area payment scheme are selected randomly while the remaining number of beneficiaries in the control sample follows a risk-based selection. Between 1 and 1.25 % of the control population for greening is selected randomly from all selected beneficiaries applying for the previous mentioned schemes. Penalties are imposed depending on whether permanent grassland



requirements, crop diversification requirements or the requirements for EFA are not complied with or are not met. Table 18 summarises the calculation of the payment reduction depending on the type of non-compliance.

Table 18: Calculation scheme for payment reduction depending on type of non-compliance to greening requirements

Detection of non-compliance in	Type of non-compliance	Reduction of the area used for the calculation of the greening payment by
Permanent grassland requirements	- Non-compliance concerning the prohibition of transformation or ploughing of permanent grassland	<ul style="list-style-type: none"> - the area determined as non-compliant
Crop diversification requirements	- Non-compliance with the prescribed maximum allowed percentages	<ul style="list-style-type: none"> - 50 % of the total area of arable land determined multiplied by the ratio of difference (e. g. share of the area of the main crop group that goes beyond 75 %; share of the area of the two main crop groups that goes beyond 95 % of the total area of arable land)
Requirements for EFA	<ul style="list-style-type: none"> - EFA small as required - Non-compliance with EFA requirements for three years 	<ul style="list-style-type: none"> - 50 % of the total arable land multiplied by the ratio of difference - the total area of arable land multiplied by the ratio of difference

Source: Own compilation based on Commission Implementing Regulation (EU) No 809/2014

For the maximum reduction of the greening payment the sum of the reductions expressed in hectares shall not exceed the total number of hectares of arable land determined. Further, the total reduction shall not exceed the calculated greening payment.

Additional administrative penalties regarding the greening payment (not to be applied in claim years 2015 and 2016) may be established:

- If the original area to be used for the calculation of the greening payment differs from the area to be used for the calculation after reduction, the payment shall be calculated on this later area reduced by twice the difference established if that difference is more than either 3 % or two hectares, but no more than 20 % of the area to be used for the calculation of the greening payment after reduction.
- If the difference is more than 20 %, no aid shall be granted.
- If the difference is more than 50 %, no aid shall be granted and an additional penalty applies equal to the amount of aid corresponding to the difference between the original area to be used for the calculation of the greening payment and the area to be used for calculation after reduction.
- If the beneficiary does not declare all his area under arable land with the result that he would have been exempted from the general obligations, and/or he does not declare all his permanent grassland which is environmentally sensitive and the non-declared area is more than 0.1 ha, the area to be used for the calculation of the greening payment after reduction shall be further reduced by 10 %.



5.2.6 EAFRD

For the control of measures according to the EAFRD the control sample for on-the-spot checks carried out each year shall cover at least:

- 5 % of all beneficiaries applying for rural development measures
- For the measures provided for in Articles 28 (AECM) and 29 (Organic farming) of Regulation (EU) No 1305/2013, the control rate of 5 % shall be achieved at the level of the individual measure.
- For beneficiaries of multi-annual support granted involving payments exceeding five years, the Member States may, after the fifth year of payment, check at least 2.5 % of those beneficiaries.

In case of non-compliance with the requirements of the measures according to the EAFRD the competent authority examines the payment claim received from the beneficiary and establishes the amounts that are eligible for support. If the amount that is payable to the beneficiary based on the payment claim and the grant decision exceeds the amount eligible for support by more than 10 %, an administrative penalty is applied (the amount of the penalty is the difference between those two amounts but shall not go beyond full withdrawal of the support) (Regulation (EU) No 809/2014).

Where irregularities or negligence are detected in rural development operations or programmes, Member States make financial adjustments by totally or partially cancelling the Union financing concerned. Member States take into consideration the nature and gravity of the irregularities detected and the level of the financial loss to the EAFRD (Regulation (EU) No. 640/2014).

In case of a serious non-compliance or if a beneficiary provided false evidence for the purpose of receiving the support or failed to provide the necessary information, the support is refused or withdrawn in full and the beneficiary is excluded from the same measure or type of operation for the calendar year of the finding and for the following calendar year.

5.2.7 Control and enforcement mechanisms in the case study regions

Which administrative bodies are responsible for which control functions related to the CAP and also related to environmental legislation in the case study regions is described and illustrated in chapter 5.1.

As presented in section 5.2.2 there are various requirements on control and enforcement mechanisms in relation to CAP instruments set by the EU. In the following paragraphs the focus lies on selected information on good practice examples or problems in connection with control and enforcement issues provided by the case study teams and on special approaches to compliance assurance in The Netherlands and Switzerland. It has to be noted that a more detailed description of control-related problems in some of the case study regions does not necessarily mean that the control and enforcement systems in those regions are of worse quality than in others. The level of detail was rather dependent on the focus applied by the case study teams and the sources available to them, including stakeholder interviews.

Complaints about the extent of administrative and control expenses and bureaucracy, especially in connection with the EAFRD, were reported from several case study regions, for example **Saxony**.



Another problem mentioned was that some requirements are difficult to control. This was, for example, highlighted in the **Spanish** case study: Some requirements can only be controlled at a very specific time of the year or cannot be checked if farmers are not actually engaging in that activity at the time when controls are carried out. This problem is aggravated if the capacities of the control bodies are insufficient. Again the **Spanish** case study reports a lack of human resources and funding: Cross compliance controls are done by few officials that have to visit many farms in a day to comply with required control periods. A consequence is that many of the requirements and standards are controlled via the “farm book” in which the farmer must register his or her agricultural practices (phytosanitary and fertiliser application etc.). This method relies strongly on the farmer’s own statement. For example, nitrogen content in soils is only monitored at farms participating in AECM.

Sometimes the strong focus on the controllability of measures leads to a change in programming. From **Austria** it is reported that in the process of strengthening the RDP towards better monitoring and control some ÖPUL measures such as reduction of nitrogen fertilisation were even ceased due to lacking monitoring options, although they can be a valuable measure with respect to environmental protection.

A problem connected to the sanction system regarding cross compliance that it also known from other Member States was described for the **Spanish** case study: Farmers must have all livestock identified with ear-tags. However, cattle ear-tags fall very easily, and every farm controlled will have at least one cow without one ear-tag. This is subject to a sanction, which increases the probability of receiving a control for the next year (due to the risk analysis). Sometimes farmers are part of the sample of the controlled beneficiaries several years in a row, which reduces their CAP payment considerably, because of the multiplying effect of reoccurrences. The campaign 2016 will be the first year that this type of minor sanctions will be included in the early warning system (see above).

As the enforcement of regulations regarding water use is of specific importance for the **Spanish** case study region, examples of good practice and problems related to that issue were reported from there. They are summarised in the following box.



Control of water use for irrigation is a competency of the Water Authority, but it is barely enforced, and there are many cases of illegal water use. The reason is that water for irrigation mainly comes from groundwater and wells are traditionally perceived as private property, because some years ago no authorisation was needed.

Controls of compliance with the National Water Law and the Plan Normative of the Duero Basin are not systematic, but are carried out on a random basis. Until now the establishment of water meters has only realised by big users, accounting for only 5 % of total users, because it is not a popular measure and the administration does not want to cause problems.

Irrigation of the Cega, Eresma and Adaja basins is mainly based on groundwater and difficult to control due to the large area covered. Superficial water uses are easier to control, because only the surroundings of the riverbed need to be controlled.

The remote system by which the Water Authority can check whether the irrigation communities of Carracillo and Adaja are complying with their authorised water volumes can be considered a good practice example as irrigation communities manage their water use between farmers so Water Authorities do not have to control the specific farms, which make the enforcement system more cost-effective.

Box 1: Control issues connected to the regulation of water use from the Spanish case study region

As mentioned above, Switzerland and The Netherlands take a different approach to some control and enforcement issues. These peculiarities are described in the following paragraphs.

The **Swiss** system of control and enforcement, like shortly described in chapter 5.1.5, differs in some aspects from the systems in place in EU Member States. The controls of the Proof of ecological performance in connection to direct payments are carried out by accredited private control bodies which have been assigned this task by the cantons. The frequency in which controls have to take place and the sanctions for non-compliance are laid down centrally and the cantons have to make sure that these requirements are fulfilled. Inspectors working for these control bodies are farmers themselves, who work part-time for the control body. Farmers are free to choose an accredited control body. Currently different control bodies dominate the market in certain regions, but this might change if more farmers make use of the opportunity to change their control body.

Private labels, such as IP Suisse (integrated production) and Bio Suisse (organic farming) play an important role in Switzerland. The controls connected to these labels are well coordinated with the controls connected to direct payments, e. g. control of both the private and the state standards in one control visit.

As described in chapter 4.4.2 farmers in **The Netherlands** can only participate in AECM as part of a farmers' collective. All farmers that have a management contract with such a collective are internally checked by the regional farmers' collective. Also in the case study region a special inspection commission is established for this purpose, which randomly checks 10 % of the areas under AECM per year. The inspection commission includes seven people (two agricultural members, one member representing landowners, three field coordinators and one representative of an NGO focussed on landscape management and heritage conservation).



Every control is carried out by two members of the inspection commission, usually the local field coordinator in combination with another member. The specific focus points of the inspection are described in the quality handbook of the regional collective. The main focus lies on the correct management conform to the contract and on the quality of the management. If problems are detected, appropriate advice will be provided. The board of the collective is responsible for sanctions in case of problematic or absent management. No other environmental standards are checked during those control visits in order to keep up support from farmers and the agricultural representatives for the AECM.

The Netherlands Food and Consumer Product Safety Authority (NVWA), which is part of the Ministry of Economic Affairs, checks all farmers' collectives in The Netherlands. This control consists of an administrative check of the collective as well as random field checks to see if the management requirements laid down in the management contracts are correctly applied in the field. If irregularities are found by the NVWA, a control report is established (which often includes a response of the individual farmer), based on which The Netherlands Enterprise Agency (RVO) can impose a sanction. The sanctions are targeted at the collective, not the individual farmers. How this is managed financially within the collective is up to the management of the collective itself. The experience in the Kromme Rijn area is that the field checks of the NVWA are very specifically targeted at specific management regulations within management packages. According to EU-requirements the NVWA is responsible to check 5 % of all management activities (and 100 % administrative checks of collectives). In practice, the NVWA does field controls at 5-8 agricultural collectives yearly. Per collective, a minimum of 50 % of area under AECM is checked. A minimum of 25 % of all management activities is also checked.

As the current AECM system was first implemented in 2016, there is not much experience regarding the enforcement mechanisms. However, an experienced problem was connected to the collective-focussed administrative fines. As the system was newly established, the setup at the end of 2015 was challenging. In the Kromme Rijn area, the province was too late with providing the maps on which the suitable management packages could be based, which led to a late establishment of individual management contracts by the farmers' collective. Therefore, the RVO was planning to fine the collective. This led to agitation by the farmers' collective, as they were hampered by the late information/communication.

5.2.8 Comparative analysis and conclusion

The description of the EU requirements on control and enforcement and the examples from the case study regions show that issues connected to compliance assurance play a prominent role in agri-environmental policy. Inspections issues, like the capacity of control bodies, the appropriate application of risk-analysis, coordination of different control visits and the appropriate selection of control dates are of importance and dominate the discussion. This is justified in the sense that policies are only effective if they are implemented on the ground. Environmental legislation must be controlled and enforced. For many of the case study countries it can be generally stated that there are hardly any systematic controls, but only non-routine incident-driven checks, of environmental legislation beyond cross compliance. The introduction of cross compliance therefore was an important step for the establishment of



minimum requirements for the control and enforcement of environmental legislation in agriculture.

However, with more and more mandatory requirements being attached to the direct payments the control effort linked to the receipt of those payments is increasing and getting more complex. This concerns particularly the payments of Pillar One of the CAP: More and more different control samples have to be considered regarding the various elements of the direct payments in addition to specific control requirements regarding cross compliance and greening (see section 5.2.5). This not only means high pressure on control authorities to carry out controls during a certain period of time (see the example reported by the Spanish case study above), but makes it also more difficult to combine different control visits on farms.

Also the implementation of voluntary measures must be monitored as tax payers' money is spent on them. However, it seems like proportionality is not always considered as a guiding principle for the design of control systems.

Despite the often proclaimed ambition to reduce the bureaucratic burden connected to the implementation and enforcement of the CAP it seems like little, as if at all any, progress has been made in this respect. In a much-noticed paper (EAFRD-RESET) the Saxon State Ministry of the Environment and Agriculture concludes that "the second pillar of the Common Agricultural Policy has run into a bureaucratic dead-end", because "the problems of the past funding periods have regularly been answered with more rules, more controls, more administrative bodies" (SMUL 2016a: 3 of the summary). Apart from programming a lot of the critique and suggestions of improvement formulated in the position paper concern the EU requirements for control and enforcement (sanctions). The inflexible control requirements and the high control intensity have, according to the SMUL, led to a situation, in which "the relation between administrative and control costs on the one hand and the benefit achieved on the other hand is increasingly shifting towards bureaucratic" (p. 2). While the SMUL acknowledges that the proper and efficient use of EU funds must be ensured, it criticizes that most irregularities detected by the exhaustive control system are related to errors in connection with the complex procedure requirements and not connected to the improper use of funds or even fraud. Higher control efforts aiming at a reduction of error rates have not led to success or even better results with regard to the policy objectives, but, on the contrary to a situation in which the control system's economic viability must be questioned. A very concrete point of criticism refers to the proportionality of sanctions for unintentional minor errors in the funding procedure, for example regarding the eligibility of expenditures in investment support. Disproportionate sanctions for unintentional errors discourage potential applicants, which is counterproductive as the applicants action is desired in order to reach EU policy objectives.

The need to comply with formal requirements and the focus on outflow of funds has led to a situation in which Member States or regions responsible for RDP programming are stimulated to programme measures that are easily implemented rather than the most effective or most needed measures (see the above paragraph on Austria as an example).

The SMUL claims that the current complex, multi-level audit and monitoring system should be replaced by a system relying on binding minimum requirements set by the EU and a single-audit principle following the notion of subsidiarity. A paradigm shift "away from mistrust as the current underlying principle (more and deeper controls) towards trust" is demanded.



The approaches taken to compliance assurance in Switzerland and in The Netherlands might be an impulse in that respect.

The Swiss system for the control of environmental standards in connection with direct payments is organised similarly to the control system for organic farming in many EU Member States. Formulating quality standards for controls and setting up an accreditation system for private control bodies that compete against each other offers an incentive for efficiency. As the possibility for farmers to choose from a list of control bodies creates the danger that "less strict" control bodies are preferred to "stricter" ones it is important that the quality standards are rigidly enforced. Allowing EU Member States to contract compliance assurance to non-governmental actors if appropriate is also one of the recommendations formulated by the "Make it work" initiative (IEEP 2015).

An interesting feature of the Swiss control system is that control bodies employ farmers as inspectors. Although there is a danger of inspecting farmers being too sympathetic with a non-compliant colleague, this system also offers the chance of increasing the acceptance for controls amongst farmers. Inspectors with a farming background understand how farming works in practice and therefore might be more suited to come to a good judgement.

The Dutch system of collective implementation of AECM is not only interesting because of its potential to increase the environmental benefit, but also from a governance perspective. It clearly strengthens the self-responsibility of the involved farmers and their local cooperation partners as they have to organise the contractual arrangements, the internal control process and even the way sanctions are "distributed" between the members. Self-responsibility can be more motivating and rewarding than just being the object of an external control process.

Control respectively certification systems based on internal control processes alongside external control of the internal control procedures in combination with additional external checks on a random basis are successfully established both in fair trade certification as well as, in some countries outside the EU, in organic certification. Arguments in favour of such processes, especially in respect to smallholders, are the reduced costs per individual farm, the strengthening of social and market connections between farms and the facilitation of knowledge and technology transfer (Munteanu 2014). While these arguments are of more relevance for developing countries with not so well established governance structures, such a system can also be advantageous in a EU setting. For example, a system of internal control can be helpful in a situation in which control capacities are limited, e. g. if many farms should be checked in a certain time period like harvesting time (*ibid.*). Of course standards for the control procedures must be designed and implemented carefully in order to ensure a high quality of control, but as discussed in the introduction to this chapter the probability of detection and the height of the potential fine are not the only factors influencing compliance levels. Peer pressure and social control can play an important role. It will be interesting to evaluate the experiences made in The Netherlands with the new system, also in respect to compliance levels and possible conflicts within the farmers' collectives.



6 Summary and overall conclusion

Within the project TALE, WP1 aimed at delivering insights into the characteristics, design and application of agri-environmental policy instruments and measures considering different land use types, targeted policy fields, mechanisms of supporting or prescribing certain ways of land management and with regard to governance structures. WP1 thus provides background information and a reference point for TALE regarding the development of scenarios and future land use options and related policies.

With the help of project partners, information was gathered on strategies concerning agricultural land use and its environmental impacts (in particular the protection of biodiversity and water), implementation and specifications of the EU and of the Swiss agricultural policy, relevant environmental regulation, additional measures and on actors and governance.

The main findings are summarised in the following.

6.1 Agri-environmental strategies

Strategies and officially proclaimed targets represent main commitments of governments, justify the need for action and are part of the setting in which policy measures are developed. With regard to environmental impacts of agriculture in particular the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity and the Sustainable Development Goals, are prominent. The two latter are calling e. g. for significant action to reduce the degradation of natural habitats and halt the loss of biodiversity, to manage areas under agriculture sustainably including to restrict levels of pollution from excess nutrients by 2020 and to integrate ecosystem and biodiversity values into other policies.

These goals are taken up by the EU in the EU Biodiversity Strategy or the 2020 EU Climate & Energy package. All case study regions also have adopted strategies with regard to biodiversity and to climate change, also addressing agricultural land use, some of them including concrete targets regarding agriculture.

However, while the strategies illustrate urgent need for action in particular in the areas of biodiversity, climate change and water protection, overall binding targets or quantitative objectives for the environmental impact of agriculture are rare. If they are in place this is mainly due to obligations stemming from binding EU legislation. It can also be observed that objectives formulated in strategies are frequently not met, which shows that policy makers do not yet sufficiently keep track of politically agreed goals and do often not take the actions appropriate to adjust insufficient policy instruments.

6.2 Types of agri-environmental policy instruments

Agri-environmental policy instruments can be roughly classified as either “regulatory”, “economic” or “advisory and institutional”:

- Under regulatory measures so-called “command and control” or mandatory measures are subsumed. Examples are specialised legislation such as the EU Nitrates Directive or the Habitats Directive and derived national or regional law. Applying mandatory regulation has the advantage of reaching all farmers (in the area where the legislation



is valid) and securing obligations in the long-term. Property rights are considerably restricted by mandatory standards and cost of compliance is borne to a large extent by the farmers. The effectiveness of direct regulation depends on clear definitions of obligations and of sanctions in case of non-compliance as well as on effective control procedures.

- Payments for ecosystem services (PES), the most prominent example being agri-environment-climate measures (AECM) of the EU Common Agricultural Policy (CAP) and comparable Swiss measures, are generally much more accepted by farmers than mandatory measures. PES also have a great potential to be implemented in a targeted way and adapted to regional conditions. On the other hand the voluntary character of such payments entails their effectiveness being dependent on sufficient attractiveness for farmers. Thus they are less suited if the supported management should be implemented area-wide. Securing of standards in the long term solely through voluntary measures is questionable. As farmers receive transfer payments that cover their opportunity, management and partly transaction costs, public cost may be high. Also public transaction costs have to be considered.
- Information instruments are non-binding measures to change the perception and preferences of actors and include appeals, knowledge transfer and (social) sanctions. Providing information and advice is also suited to situations where synergies can be achieved between farm economic and environmental considerations.

The analysis within TALE focuses on instruments and measures that directly influence agricultural land use and land management in the TALE case study areas:

- Instruments within the reformed EU CAP and the Swiss Agricultural Policy (AP 14 – 17) (direct payments with attached environmental conditions, AECM, support of organic farming and payments for disadvantaged areas and comparable payments in Switzerland)
- Regulatory instruments: Sectoral legislation for agricultural land use with a focus on fertilisation (water protection) and biodiversity
- Information policies and extension services regarding agri-environmental aspects

Further instruments are only included in more detail, in case they are identified as specific regional approaches in single case study regions.

6.2.1 Instruments of the agricultural policies

Direct payments and environmental eligibility conditions

The CAP in the EU consists of two “pillars”:

- Pillar One contains payments concerning market and price policy with its main instrument, the direct payments to farmers.
- Pillar Two supports the development of rural areas. The rural development policy is implemented through national and/or regional development programmes and is co-financed by national and/or regional funds.

The latest CAP reform has split up the payments of Pillar One into several compulsory components, among them the greening payment, linked to minimum environmental basic



practices, which aimed to strengthen the environmental performance of Pillar One and came into effect in 2015.

The Swiss agricultural policy has also undergone major changes and since 2014 is based on five different pillars of payments to farmers, the Cultivated landscape payments, the Food security payments, the Biodiversity payments, the Landscape quality payments and the Production system payments. There are additional payments for resource efficiency and Single crop payments.

Eligibility conditions for direct payments which are of particular relevance for environmental aspects of land use are the standards for cross compliance and greening in the EU and the Proof of ecological performance in Switzerland. They serve as basic requirements for all farmers receiving those payments and set or improve enforcement of minimum standards for land management. Due to a common framework these instruments are comparable across the EU. The Swiss approach for cross compliance covers similar standards. However, the effect of those measures is ultimately dependent on the ongoing existence of the support payments they are connected to.

A comparison of standards for good agricultural and ecological conditions (GAEC) under cross compliance in the TALE Member States shows that they are an important instrument for soil conservation. While farmers should have a self-interest in maintaining soil quality such standards are not obligatory outside cross compliance. Other GAEC-obligations partly cover already existing mandatory standards (e. g. regarding buffer strips, irrigation or the maintenance of landscape elements), although in single cases additional requirements have been defined.

Regarding greening-standards in the TALE Member States the following aspects can be summarised:

- Crop rotation: the TALE Member States stick to the EU prescriptions, to cultivate, depending on the size of their arable area, two or three different crop types on their arable land, the main crop covering not more than 75 % of the arable area.
- Permanent grassland: Apart from Germany, the TALE Member States have decided on the most flexible way to comply with the requirements to keep the ratio of permanent grassland by requiring action only when a decline of more than 5 % (in Austria 4 %) at the national level is present. Germany has a stricter approach, calculating the ratio at the federal states level and demanding approval of grassland conversion from the beginning and as a rule a replacements of the converted area. While in The Netherlands and in Spain all permanent grassland in Natura 2000 areas is defined as environmentally sensitive grassland and may thus not be converted at all, in Germany it is 64 % and in Austria only 6 %. None of the countries has included grassland outside of Natura 2000 areas.
- Ecological focus areas (EFA): The Netherlands and Spain allow for four, Austria and Germany offer more than 10 different types of EFA. Member States have some freedom to determine e. g. lists of allowed species for cover crops, legumes and short rotation coppice, for widths of strips, sowing dates and standing times, or for the use of fertiliser and pesticides. The choice of EFA and the concrete management rules influence the environmental performance.



The Swiss Proof of ecological performance covers more or less similar environmental aspects. However, the Swiss requirements are stricter in several fields such as fertiliser and pesticides use, requirements for crop rotation and buffer strips. On the other hand, regarding standards beyond further legislation, there is no Swiss equivalent to the maintenance of the ratio of permanent pasture. EFA (in Switzerland “biodiversity promotion areas”) they relate to all agricultural land, not only arable land as in the EU.

Payments to farmers in areas facing natural or other specific constraints

The Natural handicap payments, granted in the EU in the framework of Pillar Two, aim at securing agricultural activities and compensating for permanent natural and economic disadvantages, thus supporting the continuation of agricultural land management in mountain and other less favoured areas. The areas have to be delimited by Member States on the basis of biophysical criteria (e. g. low temperature, dryness or slope). Comparable payments in Switzerland are the Zone payments for preservation/maintenance of the cultural landscape. Saxony excludes some crops such as maize, wheat, wine and other intensively cultivated crops from those payments; also in Switzerland certain permanent crops can't receive those payments. The Netherlands abolished these payments altogether.

Additional payments for the cultivation of grassland on steep slopes also exist under AECM or similar Swiss measures.

Support of organic farming

In all TALE case study regions, apart from The Netherlands, farmers who convert to or maintain organic farming practices are supported with payments per hectare, in order to compensate, completely or partly, for the additional costs and income foregone that is connected to this production system. Differences in premia heights exist with regard to payments height and differentiations by land use type. While some regions pay the same amount for arable land and for grassland, like Saxony and Thuringia in Germany, Switzerland and Austria pay a higher amount for arable land. The premia paid for permanent crops is higher in most case study regions. In Spain, the height of the premia also depends on whether the crops are irrigated or rain-fed.

Whereas the Austrian case study region and the two German states require the whole farm to operate organically, in Switzerland and Spain the support is also granted for single fields. Only Thuringia pays a higher amount during the time of conversion.

The share of organic farming depends, of course, not only on policy support, but also on market conditions and prevailing production systems, the availability of extension services. The anticipated development of demand and prices also play a big role.

Agri-environment climate measures (and comparable Swiss measures)

Under Pillar Two of the CAP agricultural management practices that exceed standards set by legislation, cross compliance and greening may be eligible for support payments. Farmers are being paid a fixed amount, mostly per hectare, for a specific farming practice such as no tillage for enhancing ecosystem functions of soils or buffer strips for the provision of certain ecosystem services such as species richness and clean water. The annual payments have to be calculated in a way that they cover expenses and income foregone; the EU does not allow



for including additional financial incentives for participants. In Switzerland comparable measures exist.

In the TALE case study regions such measures are of different importance regarding **area coverage**. Austria offers a broad AECM-programme with a high variety of measures and a high acceptance, which reached in 2014 about 2/3 of the utilised agricultural area (UAA) and the vast majority of permanent grassland was covered. In the German federal states Saxony and Thuringia about a third of the UAA were under agri-environmental contracts in 2013, while in Castile and León about 20 % of the UAA were reached. In the Dutch case study region AECM cover only a small proportion of land, as the AECM considered here focus on linear landscape elements.

Regarding addressed **land use types**, the highest number of single measures in the case study regions is directed at arable land only. Second are measures for permanent grassland. In Austria and Switzerland several measures cover a broad set of land use types. In the Dutch case study region the measures mainly address different landscape features. For most measures across the case studies the participation with single plots is possible. However, some measures, in particular in Austria, oblige the farmers to participate with their whole area or the whole targeted land use type.

Main goals and target areas of the measures offered in the case study regions were the following:

- The most often named priority environmental objective of the AECM is biodiversity protection (more often on permanent grassland than on arable land, although the German case study regions offer measures specifically for biodiversity on arable land, and most of the respective measures in Switzerland, and partly also in Austria, are not restricted to one single land use type). More than half of those measures is only applicable in defined target areas e. g. certain biotope grassland, habitat types, steep slopes or alpine meadows:
 - The measure "Nature conservation" in Austria aims at the management of sensible areas and valuable agricultural habitats. "Mountain grazing and herding" and the "Cultivation of mowed mountain grassland" are apparently targeting defined grasslands only.
 - The German case study regions offer several measures for permanent grassland that are predominantly directed to certain biotopes. In Thuringia, the integration of a wide variety of structural elements such as field strips, buffer and erosion strips is partly restricted to target areas for nature conservation.
 - The measures in the Dutch case study region are all linked to specific habitat types. A yearly renewed "Nature management plan" of the province provides the boundaries of the areas for which it is possible to request subsidies.
 - In Switzerland several measures are specified for certain geographic zones (e. g. valley, hill or mountain zone). Project based funding e. g. via the Landscape quality payments and the Interconnectedness payments requires local concepts with locally adapted set of measures.
- Abiotic goals most often relate to water protection, partly also to soil protection. The relevant measures concentrate on arable land. While most measures are available



area wide, in some cases support is restricted to defined target areas corresponding to water protection (e. g. regions prone to high nitrate concentration in water), in one case also to areas prone to erosion:

- Diverse Austrian measures on water protection are targeted towards erosion and leakage prone areas.
- In Thuringia support of erosion control is limited to designated areas prone to erosion and leaves the farmers flexibility of how to achieve the objective.
- In Switzerland the Resource efficiency payments can be attached to specific projects.
- Climate protection is mainly a side-effect of measures that aim primarily at water or soil protection (e. g. limiting emissions from fertilisation or increasing C-sequestration).

Generally AECM support certain **technical measures**, land management practices in the field, which are linked to the envisaged environmental outcomes:

- Most frequently, AECM prohibit or regulate the application of inputs:
 - Measures supporting extensive grassland management often ban the use of plant protection products; those products are also banned on land managed or set-aside for biodiversity or water protection on arable land or on supported cover crops. In other measures, the application of plant protection products is limited in another way or biological pest control is supported.
 - Omitting fertilisation (mainly referring to N-fertilisation) is also frequently required in such measures.
- Many measures on permanent grassland are characterised by a type of cutting or grazing regime. This can encompass requirements to carry out mowing or cutting either for a specified number of times (including restricted periods) or in a specific way (e. g. phased mowing). Stocking densities and the dates at which livestock are allowed to graze may be limited. Grazing may also be banned on certain grassland. Also techniques for grassland improvement may be prohibited.
- Diverse crop rotation is also a common technical measure (e. g. at least 5 main crops, including legumes, each on a minimum of 10 % of the arable land of a farm and cereals not covering more than 66 %).
- Various measures include improved soil cover on arable land up to converting arable land to grassland.
- A number of measures are dealing with creating or maintaining landscape features, or setting aside or managing single plots or part of plots for biodiversity (e. g. management for arable herbs, sowing flowering mixtures on set-aside arable land, or other specific management requirements depending on local conditions and goals).

A different approach are **result-oriented measures**, that are not based on defined management requirements farmers must follow in order to receive the premia (e. g. restrictions for fertilising, mowing or grazing) but farmers agree to achieve a concrete result, measured e. g. by proving the existence of defined indicator plant species or further result indicators that might suit the particular conditions. The higher flexibility of farmers is among the main arguments for result-oriented measures. A further benefit is that farmers are getting more



actively involved with the actual objective that is to be supported. From the farmers' side of view the biggest weakness of result-oriented schemes is their exposure to a greater level of risk than in case of action-based approaches, as results are often not entirely within the control of a land manager.

Result-oriented measures are not wide-spread, but in the TALE case study regions there are several examples. In the German case study region and in Switzerland result-oriented measures for permanent grassland are offered, the quality of which has to be proven by the existence of a minimum number of species from a defined list of indicator plant species. In Switzerland also other land use types are included with additional indicators such as traditional orchards, species-rich vineyards and some landscape elements³⁵. In the Dutch case study region the measure "Managing breeding birds on arable land or grassland" has been offered to farmers' collectives. Nests of breeding birds have to be present and disturbances around the nests through agricultural activities omitted. The most elaborate measure is a farm specific pilot scheme that has been introduced in Austria. Individual goals for nature protection on areas with high value for nature conservation and related indicators (e. g. habitat structure and quality, landscape elements or indicator species) are defined by an advisor together with the farmer. Regarding abiotic goals, in the Thuringian measure on erosion control farmers have to achieve a 20 % reduction of soil erosion yearly on their arable land in the designated areas prone to erosion.

A particularity are also **cooperative measures**. Agri-environmental policies mainly focus on individual farms. However, for example, maintaining a landscape requires a coordinated approach.

There are some traditional ways of collective action such as alpine grazing cooperatives, but examples in the wider agricultural landscape are rare. However, some approaches enabling or promoting collective action in the TALE case study regions can be termed innovative:

- The Swiss Interconnectedness payments as well as the Landscape quality payments are related to regional projects with the aim of involving several farmers in the targeted area. Still, farmers apply individually, but they are integrated into a broader concept.
- The Netherlands seem to have undertaken the biggest step towards collective action. Regarding AECM, the individual grant scheme for farmers who adopted nature-friendly management practices has been changed to be eligible for collectives only from 2016 on. The collective arranges the individual contracts and payments with the farmers. Improved consistency in management is expected from this approach.
- Also regarding EFA Dutch farmers' collectives can decide to register connected EFA, and Swiss farmers can decide to fulfil the Proof of ecological performance or parts of it in cooperation with other farms.

6.2.2 Legislation

Regarding central environmental goals, the EU sets a legislative framework, which Member States are obliged to implement on their territory. The following directives were of particular interest in TALE:

³⁵ Certain management requirements have also to be met as a precondition, thus, the measure is not purely result-oriented.



- The Water Framework Directive does not set concrete requirements for agricultural land management directly but creates a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. The EU Member States have to reach goals set by this directive and establish a programme of measures for each river basin district, or for the part of an international river basin district within its territory.
- The Nitrates Directive aims at preventing and reducing water pollution caused by nitrates from agricultural sources. Member States have to set up an action programme for vulnerable zones (which may also cover the whole area of a country) specifying mandatory requirements for farmers regarding fertilisation (e. g. periods when the land application of certain types of fertiliser is prohibited, limitation of the land application of fertilisers, a maximum amount of 170 kg N/ha that may be applied with farmyard manure every year at farm level).
- The Birds and the Habitats Directives represent the central legal basis for nature conservation in the EU. An important aim is setting up a coherent European ecological network (Natura 2000), related to the defined natural habitat types and habitats of species and areas protected under the Birds Directive. For those areas the necessary conservation measures and appropriate statutory, administrative or contractual measures have to be established. For defined animal species a strict protection regime has to be established.

There is further legislation e. g. on plant protection, sewage sludge or emission control.

Similar legislation exists in Switzerland.

Regulation of fertilisation

In all case study regions national and/or region legislation exists that regulates fertiliser application on agricultural land, mainly regarding nitrogen. The respective legislation and standards are set at national level and apply area-wide, only in Spain³⁶ the different Autonomous Regions have defined specific nitrate vulnerable zones. In Austria and Germany mandatory standards for farmers restricting fertilisation are also formulated in water law.

The types of standards directly affecting land management are comparable in all the case study regions. Maximum yearly input of N per hectare is restricted in any case for organic fertiliser, in some cases also for total N (depending on crop and soil characteristics). Partly requirements for a nutrient-saldo are defined. Time limits for the application of fertiliser with a significant content of N usually exist in winter and also under soil conditions, where an uptake of fertiliser is not guaranteed. Detailed restrictions exist in vulnerable locations such as along water courses or other target areas (e. g. flooding areas, drinking water protection areas), and partly on hilly land. Further restrictions might exist in areas protected under nature conservation law. Also the application of pesticides and conversion of permanent grassland to arable land might be regulated in such locations. Some countries have defined additional mandatory

³⁶ However, in addition municipal ordinances can specify norms for slurry management and application, and large farms covered under emission regulation have to comply with some rules also outside the nitrate vulnerable zones (e. g. maximum limits for the yearly application, maximum nutrient saldo for N). Also, in case an aquifer is in bad chemical status, farmers have to comply with good agricultural practice and the requirements of the action programmes regarding the EU Nitrates Directive.



standards such as low-emission application or further restrictions on fertilisation after harvest of the main crop. In Switzerland the application of fertiliser along hedges and field woods is banned. A particularity in The Netherlands is the prohibition on converting grassland in certain periods (depending on soil type and subsequent crop) and to prescribe the cultivation of catch crops under certain conditions.

Legislation regarding biodiversity

Mandatory restrictions for agricultural land management regarding biodiversity are more or less limited to various types of protected areas. Such restrictions may be issued as general obligations for defined habitat types at national or regional level, but are most often laid down in local ordinances for the protection of single areas, in which e. g. fertilisation and pesticides use may be forbidden or limited, and certain land use or land use change prohibited. Also, plans and projects which might negatively affect species and habitats connected to Natura 2000 areas have to be subject to an impact assessment.

Area-wide standards for agricultural land use under nature conservation are rare: In German nature conservation legislation principles of good practice are stipulated for farming, however non-compliance is not directly subject to fines. For Spain the management of communal grazing land is regulated (see below).

Further regulation

Due to the problems with N-pollution in the Spanish case study region, mainly due to intensive livestock keeping, legislation on emission control is of high importance.

Legislation on planning has been highlighted in the Dutch case study: Spatial planning processes at different administrative levels also affect agriculture, e. g. authorisation and compliance with the spatial regulation in the municipal spatial zoning plan is necessary for farm enlargement or other activities. The provincial planning vision for the Province of Utrecht includes landscape management. It is planned to integrate this planning processes even further: In 2018, an integral law for the surroundings will be established, which requires the provinces to develop a so-called "surroundings vision" integrating all legislation for the physical environment (planning policy, water plan, environmental policy plan, transport plans and the spatial aspects of the nature conservation policy).

As well in Spain there is legislation on agricultural territorial planning. The respective legislation in the case study region regulates a minimum level of maintenance of agricultural land and the management of communal grassland and stubbles (e. g. harvest periods, grazing intensity).

6.2.3 Information and advice

In the context of TALE, the general setup and structure of the extension system in the case study areas was characterised focusing on the way farmers are informed about agri-environmental policies and how advice and extension services can support the implementation of such policies or serve as an independent instrument applied.

Advice and extension services can help to reach environmental objectives in agriculture for example by increasing the acceptance of AECM and other policy measures and/or implementing them more efficiently and more effectively. Information is especially important



for more complex and knowledge intensive measures, such as result-oriented AECM, but advisory services can also play an important role complementing environmental legislation.

The information and extension systems in the TALE case study areas are characterised by a broad range in terms of the organisations providing the services and in terms of funding. While some systems, like the Austrian system, are compact and organised centrally others are rather fragmented and mirror the federal governance structures of the specific country (Spain, Germany). While in some countries agricultural extension is still mainly considered to be a task of the state, like in Austria or Switzerland, others have mainly (Saxony) or almost completely (Netherlands) privatised agricultural extension. In most countries some advice on environmental issues, especially in connection with Pillar One and Two of the CAP, is offered by state organisations or supported with public funds.

It seems that the way agricultural extension is organised and taken up by farmers is also very much dependent on the specific traditions of learning and knowledge transfer in the respective country.

Due to the increasing pressure on public budgets the general trend to privatise agricultural extension services aiming at increased farm profitability is likely to continue. However, it is widely recognised that there is a need to publically support advice in society's interest and that advice is a suitable instrument to increase the effectiveness of agri-environmental policies.

6.3 Actors and governance

The way agri-environmental policies are designed and who influences this process and the way they are implemented on the ground certainly affect their effectiveness and efficiency. The governance structures in the TALE case study regions vary and mainly depend on the overall state structures in the specific countries, especially regarding the division of power between the central government and the regions.

Environmental legislation and also environmental eligibility criteria for direct payments (Cross compliance, Greening) are mostly designed on a national level as to ensure a level playing field for all producers. Some issues, like the designation of nature conservation areas and the relevant management requirements, are mostly decided on a regional level, in order to better take the local conditions into account.

While some countries have one national Rural Development Plan (RDP), the RDP are programmed by the regions in Germany (in Spain in addition to a national RDP). A national approach might make it easier to streamline and focus the measures on the most important goals, while a regional approach offers the possibility to address the specific local situations in a more targeted way. The EU tries to combine the advantages of the two approaches by allowing Member States to programme regional RDP, but obliges Member States and regions to focus their programmes on EU wide priorities. Generally, this system is sensible, but in practice the system of subsidiarity is counteracted by numerous EU requirements in the fields of programming and enforcement. In some cases, the need to comply with formal requirements and the focus on outflow of funds has led to a situation in which Member States or regions responsible for RDP programming are stimulated to programme measures that are easily implemented rather than the most effective or most needed measures. It is obvious that the implementation of such voluntary measures must be monitored as tax payers' money is spent



on them. However, it seems like proportionality is not always considered as a guiding principle for the design of control systems.

Also environmental legislation must be controlled and enforced. For many of the case study countries it can be generally stated that there are hardly any systematic controls of environmental legislation beyond cross compliance. The introduction of cross compliance therefore was an important step for the establishment of minimum requirements for the control and enforcement of environmental legislation in agriculture. However, with more and more mandatory requirements being attached to the direct payments the control effort linked to the receipt of those payments is increasing and getting more complex.

The Swiss and the Dutch examples of organising controls are interesting against this background. In Switzerland, controls of the Proof of Ecological Performance in connection to direct payments are carried out by accredited private control bodies which have been assigned this task by the cantons. The frequency in which controls have to take place and the sanctions for non-compliance are laid down centrally and the cantons have to make sure that these requirements are fulfilled. If done properly formulating quality standards for controls and setting up an accreditation system for private control bodies that compete against each other offers an incentive for efficiency, while ensuring a good control standard at the same time. The Dutch system of collective implementation of AECM is not only interesting because of its potential to increase the environmental benefit, but also from a governance perspective. It clearly strengthens the self-responsibility of the involved farmers and their local cooperation partners as they have to organise the contractual arrangements and the internal control process.

6.4 Overall conclusions

6.4.1 Fields of application of different policy instruments

As presented in this report, a bundle of measures exist for steering agricultural land use in consideration of environmental objectives. Usually a mixture of different types of policy instruments is employed to address agri-environmental issues: e. g. farmers are faced with a maximum allowed amount of N-input or time limits for fertilisation defined by fertiliser law, a further reduction of N-fertilisation might be reached through incentives set by voluntary measures by information and advice to farmers e. g. regarding efficient fertilisation. As applying mandatory regulation, if properly enforced, has the advantage of reaching all farmers (in the area where the legislation is valid) and securing obligations in the long-term, environmental legislation constitutes the baseline for environmentally sound agricultural land management. PES represent a cooperative approach. However they are limited by budgetary constraints and dependent on voluntary participation. In which cases which type of instrument is applied is a question of defining the boundaries of property rights, which is – finally – a societal decision.

Minimum standards for fertilisation (mainly concerning nitrogen) exist in all case study regions, in Spain with differentiation between in- and outside nitrate vulnerable zones. In certain areas such as along water courses, flooding areas, drinking water or nature protection areas or on hilly land further restrictions on the use of fertiliser, pesticides and/or land use type might exist.



Mandatory restrictions for agricultural land management regarding biodiversity are more or less limited to various types of protected. Area-wide standards for agricultural land use under nature conservation are rare.

Environmental requirements linked to direct payments for farmers serve also as basic obligations for all farmers receiving those payments and include standards beyond the mandatory baseline. Cross compliance and greening (or the Swiss Proof of Ecological Performance) thus supplement mandatory standards from sectoral legislation in particular in respect to standards for soil protection, crop rotation, area-wide ecological focus/biodiversity promotion areas (in the EU only on arable land) and in the EU also the protection of permanent grassland. The Swiss requirements are also important in the fields of fertiliser and pesticides use. Cross compliance also improves the enforcement of mandatory standards that are part of this instrument. However, the effect of those measures is ultimately dependent on the ongoing existence of the support payments they are connected to.

Voluntary measures address a broad spectrum of more ambitious environmental objectives and cover a wide variety of technical measures. Also payments for areas facing natural and other specific constraints are granted in all case study regions, besides The Netherlands. Such measures do not set high environmental standards for the management of these areas. However, they provide basic payments as an incentive to keep such land, which is often linked to comparably higher biodiversity, under agricultural management. Organic farming as a measure with multiple environmental impacts is supported in all case study regions with area payments, again with the exception of The Netherlands.

The most often named priority environmental objective of AECM (and comparable Swiss measures) is biodiversity protection (more often on permanent grassland than on arable land). More than half of those measures is only applicable in defined target areas e. g. certain biotope grassland, habitat types, steep slopes or alpine meadows. The measures in the Dutch case study region are all focussed on biotic objectives.

Abiotic goals most often relate to water protection, partly also to soil protection. The relevant measures concentrate on arable land. Most frequently, AECM prohibit or regulate the application of inputs. Many measures on permanent grassland are characterised by a type of cutting or grazing regime. Further common technical measures supported via AECM are e. g. diverse crop rotation, improved soil cover on arable land up to converting arable land to grassland, creating or maintaining landscape features, or setting aside or managing single plots or part of plots for biodiversity. Also result-oriented approaches without pre-defined management requirements are applied. The area relevance of AECM differs widely between the case study regions with high distribution in Austria and a rather small share of land enrolled in the Dutch case study region.

6.4.2 Land-sharing and targeting of measures

Europe's countryside and cultural landscape has been shaped by farming over centuries, with the agricultural area covering about half of the total area of the EU. The long co-development of species, ecosystems, and cultivation resulted in a high number of wild species relying on agricultural habitats (EEA 2006). Especially extensively used grasslands are "hotspots" of biodiversity. Thus, agriculture has a key role to play in protecting biodiversity. The concept of



multipurpose agriculture, which provides, besides the production of crops, regulating and supporting services has therefore become a guiding principle of agricultural policy.

The instruments of the agri-environmental policies of the EU and of Switzerland support, to a stronger or lesser degree, such a land-sharing approach. Environmental standards linked to direct payments address the wider agricultural landscape, as do, where existing, the support of organic farming and payments for areas facing natural and other constraints. AECM (and similar Swiss measures) are linked to farming activities.

While legislation on nature protection rather focuses on obligations in protected areas, also in such areas or biotopes agricultural management is allowed or even supported (with restrictions and certain management requirements). Even in case of taking land out of production via AECM or ecological focus/biodiversity promotion areas this refers generally to small areas. Such segregation at a small scale (intensive production on one side, field strips or single set-aside plots on the other) are still a way of integrating land with a primary focus on biodiversity into a productive agricultural landscape.

However, while the presented measures can all be subsumed under “land-sharing”, various target areas are regulated or supported with a different intensity. Measures come to effect or may be offered area wide or be limited to certain geographical regions or land characteristics, where benefits are expected to be highest. This kind of targeting is also a way to increase their effectiveness. As said above, certain protected or vulnerable areas are facing additional constraints regarding inputs and land use. Also, AECM are often, in particular in the case of biodiversity protection, restricted to certain target areas such as biotope grassland or steep slopes.

As well, measures can be targeted to areas or farmers, where the cost of compliance with a desired management can be expected to be low. For example, if land is of low productivity, a limitation of management intensity or abandon agricultural production altogether and focus on nature conservation, this entails lower opportunity cost than on more fertile land. Differentiation of operational objectives or prescribed management practices is also a way of spatial targeting.

Regionally targeted measures, be they designed in a way that leaves scope for an adaptation at regional level (e. g. project-based funding in the Swiss Landscape quality payments or the Interconnectedness payments) or allowing farmers to adapt their management flexibly by offering a whole menu of measures (e. g. several sub-measures for grassland management in Thuringia) or by setting up or negotiating single contracts or focus on results, have the advantage of reacting on regional (or local) characteristics. Thus higher efficiency achieving environmental goals and higher acceptance by farmers can be expected. The case study regions show several examples of such measures. Especially AECM have a great potential to be implemented in a targeted way. They could also be steered towards locally designed projects (as is the case with the Swiss Landscape Quality and the Interconnectedness Payments). Land use planning, as is particularly noticeable in the Dutch case study, can support such approaches. However, such measures have to be balanced with a comparably high administrative effort.

6.4.3 Cooperation and commitment

In line with the polluter-pays-principle mandatory baselines are essential to limit negative impacts from agriculture on the environment, especially regarding abiotic aspects and



protected areas for nature conservation or further vulnerable areas. However, if active management is required, e.g. regarding conservation measures for biodiversity, forcing farmers to carry out such measures through mandatory rules may be counterproductive as it might discourage them to raise the conservation value of their property in order to avoid restrictions on the way they are allowed to use their land. Therefore voluntary measures, strengthening farmers' property rights and responsibility, are often applied in those cases and can, if designed well, be very effective.

The success of regulatory measures as well as measures connected to transfer payments is dependent on effective monitoring and enforcement. However complaints about the extent of administrative and control expenses and bureaucracy, especially in connection with CAP measures, are rising. The need to comply with formal requirements and the focus on outflow of funds has led to a situation in which Member States or regions responsible for RDP programming are stimulated to programme measures that are easily implemented rather than the most effective or most needed measures. Also disproportionate sanctions for unintentional errors discourage potential applicants, which is counterproductive as the applicants action is desired in order to reach EU policy objectives. These developments are not supporting an active engagement of farmers with the environment. Self-responsibility can be more motivating and rewarding than just being the object of an external control process. A paradigm shift away from mistrust towards trust is demanded by more and more stakeholders.

Some innovative examples towards more cooperative approaches could be identified in the case study regions:

- The approaches taken to compliance assurance in Switzerland (frequent controls with personnel close to farming) and in The Netherlands (internal control process within farmers' cooperatives) might be an impulse in that respect.
- While there is a general trend to privatise agricultural extension services aiming at increased farm profitability, it is widely recognised that there is a need to publically support advice in society's interest and that advice is a suitable instrument to increase the effectiveness of agri-environmental policies. This becomes evident by the importance the EU places on innovation, advice and knowledge transfer in the current funding period of the CAP.
- Especially result-oriented measures, collective action or further measures that need communication and engagement with how to reach certain environmental objectives are bound to have lasting effects on environmental awareness. Both, collective actions and result-oriented schemes require high commitment from farmers and willingness to communicate and to learn. Both approaches also have the potential to lower the administrative effort for enforcement.
 - Regarding result-oriented measures there are several examples in the case study regions. Switzerland already has a comparably long tradition of such measures and involves several land use types. Austria is testing a rather ambitious approach with its pilot project on the result-oriented nature conservation plan at farm level. In result-oriented measures not only farmers' commitment is activated by requiring more responsibility for the desired result but also by providing more flexibility. As well controllability can be increased compared to action-oriented management prescriptions that might be difficult to control (e.g. time of fertilisation or mowing) or



can only be checked indirectly via documentation (e. g. amount of applied fertiliser), and the result is “automatically” monitored by administration, and also prescriptions for management practices do not have to be adapted to regional or local conditions in detail by administrations where this might be desirable. However, a high effort may be connected to the establishment of suitable indicators. Also sufficient information and advice have to be provided to farmers in order to support them in their active role.

- Collective measures that involve several farmers in one area have the benefit of coordinating land management on a larger geographical scale, to enable economies of scale and to pool resources. However, additional transaction costs e. g. for establishing collectives and for communication and bargaining must be considered. While some traditional examples on collaborative action regarding alpine grazing in Austria and Switzerland and communal grazing in Spain are continued, The Netherlands exhibiting a major shift towards collective action. Although building on a certain tradition of cooperation between farmers' and environmental organisation, it will be interesting to evaluate the experiences made with the new collective system regarding AECM, also in respect to compliance levels and possible conflicts within the farmers' collectives. Also the Dutch land use planning is further developing towards a stakeholder informed vision and policy for their rural area.

It is such developments that are in particularly interesting for scenarios on agri-environmental policies. Overall, the analysis shows that the EU and Switzerland have developed elaborate systems of policy instruments aiming at making agricultural land use more environmentally friendly. In order to increase their effectiveness and also their efficiency, good practice examples, like the approaches described above, should be shared and adopted more frequently.



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Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91

Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006.

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Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive).

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Orden MAM/2348/2009, de 30 de diciembre, por la que se aprueba el programa de actuación de las zonas vulnerables a la contaminación por nitratos procedentes de fuentes de origen agrícola y ganadero designadas de Castilla y León por el Decreto 40/2009, de 25 de junio (MAM Order 2348/2009, of 30th December, that approves the action programme for vulnerable zones of nitrates pollution issued from agriculture and livestock designated by Castilla y Leon via the Decree 40/2009 of 25th June).

Ley 5/2013, de 11 de junio, por la que se modifican la Ley 16/2002, de 1 de julio, de prevención y control integrados de la contaminación y la Ley 22/2011, de 28 de julio, de residuos y suelos contaminados.

Verordnung über die Direktzahlungen an die Landwirtschaft (Direktzahlungsverordnung, DZV) vom 23. Oktober 2013 (Stand am 1. Januar 2016).

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Annex I: Strategies with potential relevance for the environmental aspects of agricultural land use in the EU and on a global level

1. Strategies with potential relevance for the environmental aspects of agricultural land use in the EU

Status as of December 2015

Listed are targets with potential relevance to environmental impacts of agricultural land use.

1.1. EU Biodiversity Strategy (from 2011)

- **Headline target:** Halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.
- **Target 1:** Halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status so that, by 2020, compared with current assessments:
 - (i) 100 % (34 %) more habitat assessments and 50 % (25.5 %) more species assessments under the Habitats Directive show an improved conservation status.
 - (ii) 50 % (78 %) more species assessments under the Birds Directive show a secure or improved status.
- **Target 2:** By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems.
- **Target 3:** Increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity.
 - **Target 3A — Agriculture:** By 2020, maximize areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU 2010 Baseline, thus contributing to enhance sustainable management.

1.2. EU Water Framework Directive (from 2000)

- **Main target:** Protection of inland surface waters, transitional waters, coastal waters and groundwater, so that all waters meet a “good ecological status” by 2015.
- Progressive reduction of pollution of priority substances and phase-out of priority hazardous substances in surface waters as well as the prevention and limitation of input of pollutants in groundwater.
- Reversal of any significant, upward trend of pollutants in groundwater.



1.3. 2020 EU Climate & Energy package (from 2007)

- **Target 1 until 2020:** 20 % cut in greenhouse gas emissions (from 1990 levels).
 - Effort Sharing Decision: reduction of around 10 % in total EU emissions from the non-ETS sectors including agriculture (from 2005 levels).
- **Target 2 until 2020:** 20 % of EU energy from renewables.

1.4. EU Soil Thematic Strategy (from 2012)

- **Main objective:** To define a common and comprehensive approach, focusing on the preservation of soil functions, based on the following principles:
 - Preventing further soil degradation and preserving its functions by acting on soil use and management patterns, when soil is used and its functions are exploited.

1.5. The 7th Environment Action Programme (from 2014)

- **Key objective 1:** To protect, conserve and enhance the Union's natural capital.
 - **Priority objective:** The 7th EAP shall ensure that by 2020.
 - a) The loss of biodiversity and the degradation of ecosystem services, including pollination, are halted, ecosystems and their services are maintained and at least 15 % of degraded ecosystems have been restored.
 - b) The impact of pressures on transitional, coastal and fresh waters (including surface and ground waters) is significantly reduced to achieve, maintain or enhance good status, as defined by the Water Framework Directive.
 - c) Land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway.
 - d) The nutrient cycle (nitrogen and phosphorus) is managed in a more sustainable and resource-efficient way.

1.6. Europe 2020 Strategy (from 2010)

- **2nd priority:** Sustainable growth – promoting a more resource efficient, greener and more competitive economy.
- **Main target 3:** Reduce greenhouse gas emissions by at least 20 % compared to 1990 levels or by 30 %, if the conditions are right; increase the share of renewable energy sources in our final energy consumption to 20 %; and a 20 % increase in energy efficiency.

1.7. EU Bioeconomy Strategy (from 2012)

- **Challenge 1:** Sustainable Management of Natural Resources.
 - Particular examples include: minimizing soil compaction and maximizing cropping area via the use of new technologies such as controlled traffic and lighter machines; novel plant varieties adapted to a range of stresses will maintain yields, provide greater soil coverage under poor growing conditions and reduce irrigation needs. Productivity will be optimized and soil erosion and salinization reduced.



- **Challenge 2:** Sustainable Production.
- Specific opportunities include: biotechnology and other modern technologies, including long-term selection programmes, give new ways to improve productivity, efficiency and robustness in the arable, livestock and aquaculture sectors, while at the same time reducing their environmental footprints.

2. Strategies with potential relevance for the environmental aspects of agricultural land use on a global level

Listed are targets with potential relevance to environmental impacts of agricultural land use.

2.1. Convention on Biological Diversity (from 1993 / Aichi Targets from 2010)

- **Aichi Biodiversity Target 7:** By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
- **Aichi Biodiversity Target 8:** By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
- **Aichi Biodiversity Target 12:** By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.
- **Aichi Biodiversity Target 13:** By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.
- **Aichi Biodiversity Target 14:** By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.
- **Aichi Biodiversity Target 15:** By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 % of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

2.2. United Nations Framework Convention on Climate Change (from 1994)

- **Ultimate objective:** is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.



- **Strategic objective 2:** To improve the condition of affected ecosystems.
 - **Expected impact 2.1.** Land productivity and other ecosystem goods and services in affected areas are enhanced in a sustainable manner contributing to improved livelihoods.
 - **Expected impact 2.2.** The vulnerability of affected ecosystems to climate change, climate variability and drought is reduced.
- **Strategic objective 3:** To generate global benefits through effective implementation of the UNCCD.
 - **Expected impact 3.1.** Sustainable land management and combating desertification/land degradation contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change.

2.3. Ramsar Convention on Wetlands (from 1975)

- **Priority Areas of focus:** Preventing, stopping and reversing the loss and degradation of wetlands - The largest changes in loss of wetlands continue to be from unsustainable agriculture, forestry and extractive industries, especially oil, gas and mining, the impacts of population growth (including migration and urbanization) and changes in land use that override environmental considerations. Addressing and engaging the drivers behind these pressures on wetlands is a condition for limiting, adapting to, and mitigating their impacts. Realization of this fact and its consideration in planning and decision-making requires that wetland resources and wetland ecosystem benefits are measured, valued and understood widely within societies.
- **Goal 1:** Addressing the drivers of wetland loss and degradation.
 - **Target 1:** Wetland benefits are featured in national/local policy strategies and plans relating to key sectors such as water, energy, mining, agriculture, tourism, urban development, infrastructure, industry, forestry, aquaculture, fisheries at the national and local level.
 - **Target 3:** The public and private sectors have increased their efforts to apply guidelines and good practices for the wise use of water and wetlands.
- **Goal 3:** Wisely using all wetlands.
 - **Target 13:** Enhanced sustainability of key sectors such as water, energy, mining, agriculture, tourism, urban development, infrastructure, industry, forestry, aquaculture and fisheries, when they affect wetlands, contributing to biodiversity conservation and human livelihoods.

2.4. Sustainable Development Goals (2016)

Adopted by the United Nations General Assembly on 25.9.2015, coming into effect 2016.

- **Goal 2:** Zero Hunger – End hunger, achieve food security and improved nutrition and promote sustainable agriculture.



- **Targets:** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
- **Goal 6:** Clean Water and Sanitation
 - **Targets:** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally, by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity, by 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
- **Goal 15:** Life on Land – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
 - **Targets:** Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity, by 2020, protect and prevent the extinction of threatened species; by 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.

Further Information

EU Biodiversity Strategy:

<http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm>

EU Water Framework Directive:

<http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32000L0060>

2020 EU Climate & Energy package:

http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm

Effort Sharing Decision:

http://ec.europa.eu/clima/policies/effort/index_en.htm

EU Soil Thematic Strategy:

http://ec.europa.eu/environment/soil/three_en.htm

The 7th Environment Action Programme:

<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013D1386>

Europe 2020 Strategy:

http://ec.europa.eu/europe2020/index_en.htm

EU Bioeconomy Strategy:

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<http://ec.europa.eu/research/bioeconomy/index.cfm?pg=policy&lib=strategy>

Convention on Biological Diversity:

<https://www.cbd.int/sp/targets/>

United Nations Framework Convention on Climate Change:

<http://unfccc.int/2860.php>

Ramsar Convention on Wetlands:

<http://www.ramsar.org/>

Sustainable Development Goals:

<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Annex II: Comparative table on Good agricultural and environmental conditions (GAEC) under cross compliance

Table 19: EU requirements, standards and national implementations in the TALE case study region Member States³⁷

Main issue	Requirements and standards according to Annex II Reg. (EU) No 1306/2013	AT	DE	ES	NL
Water	GAEC 1: Establishment of buffer strips along water courses³⁸	Riparian buffer strips: - Soil management is prohibited within 10 m distance from lakes >1 ha and 5 m from rivers >5 m breadth - Permanent grassland must not be converted to arable land within 20 m distance from lakes >1 ha and 10 m from rivers >5 m breadth	Avoidance of runoff of fertilisers into water courses through: - Limits to fertiliser application along water courses (fertiliser with high N content, within 3 m, reduction to 1 m in case of certain spreading machinery) - Further restrictions on slopes > 10 % along water courses: immediate incorporation of fertiliser (e. g. within 20 m immediate incorporation of fertiliser – apart from farm yard manure - on bare soil)	Avoidance of runoff of fertilisers into water courses through: - Limits to fertiliser application along water courses (fertiliser with high N content) indicated in CGAP ³⁹ - Riparian buffer strip (2 m strip without agricultural production) - Limits to chem.-synth. plant protection products along water courses (not allowed in a 5 m strip along water courses)	Buffer strips exist according to the Nitrates Directive: Avoidance of runoff of fertilisers into water courses through: - Buffer zones with no production and reduced/prohibited fertiliser application along water courses (0 – 900 cm, based on crops and spreading machinery). - Strict limits to fertiliser application in situations where infiltration is hampered (e.g. frost, snow) or when there is direct contact with the water table (water logged soil, application during

³⁷ GAEC 3 on protection of ground water against pollution is not covered as it relates directly to Dir. 80/68/EEC and focuses on handling and storage of substances such as fuel and pesticides, but does not set obligations directly related to land use.

³⁸ The GAEC buffer strips must respect, both within and outside vulnerable zones designated pursuant to Article 3(2) of Directive 91/676/EEC, at least the requirements relating to the conditions for land application of fertiliser near water courses, referred to in point A.4 of Annex II to Directive 91/676/EEC to be applied in accordance with the action programmes of Member States established under Article 5(4) of Directive 91/676/EEC.

³⁹ Code of Good Agricultural Practices (CGAP): Established by each Autonomous Community. In Castilla y León Autonomous Community, the last revision on CGAP was in 2009. The CGAP of 2009 is not legally binding. It is only a recommendation to farmers to maintain a buffer strip between 2 and 10m along water courses.

				irrigation/watering). Also regulations regarding N fertilisation on slopes (> 7 %, without cover or with erosion gullies), to avoid run-off. - Riparian buffer strips (minimum 5 m) along natural streams.
	Covered also by national or regional legislation	X	X	X
	GAEC 2: Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures	Limits to water abstraction: Water abstraction for irrigation has to be authorised if the amount is above existing threshold	Limits to water abstraction: Water abstraction for irrigation has to be authorised	Limits to water abstraction: Water abstraction for irrigation has to be authorised
	Covered also by national or regional legislation	X	X	X
Soil and carbon stock	GAEC 4: Minimum soil cover	<ul style="list-style-type: none"> - Green or vegetative cover on set-aside arable land - Grass cover on soils under regeneration for permanent crops - Maintenance of set-aside land 	<ul style="list-style-type: none"> - Green or vegetative cover on set-aside arable land: Upcoming of spontaneous vegetation has to be enabled or green cover to be sown - Set-aside arable and permanent grassland: Maintenance of set-aside land and no application of plant protection products - Catch crops in relation to ecological focus areas: crops have to remain on the field until 15.2. 	<ul style="list-style-type: none"> - Winter herbaceous crops: Restricted dates for mechanical maintenance of arable crops (no ploughing between harvest and 01.09.) - Maintenance of set-aside land
				Green or vegetative cover on set-aside arable land (min. from 31.5. to 31.8.)



	Covered also by national or regional legislation			
GAEC 5: Minimum land management reflecting site specific conditions to limit erosion	Restricted soil management on frozen, waterlogged or snow covered soils	Depending on category ⁴⁰ : <ul style="list-style-type: none">- Restricted dates for mechanical maintenance (here ploughing) of arable crops- Alternatively: tillage regime or erosion prevention strips in maize and sugar beets	<ul style="list-style-type: none">- Tillage regime in terrains with > 15 % slope⁴¹: Abstaining from ploughing in the direction of the maximum slope	Restrictions for cultivation for certain crops on slopes ⁴² : <ul style="list-style-type: none">- Fruit cultivation is not allowed on slopes > 2 %, areas with slopes of >18 % can only be used as grasslands <p>Tillage regime:</p> <ul style="list-style-type: none">- Tillage of min. 15 cm depth directly after harvest, removal of tractor tracks <p>For areas with slopes ≥2 % and field length ≥ 50 meter:</p> <ul style="list-style-type: none">- e. g. only shallow tillage (up to 12 cm) and mulching system allowed <p>Tillage regime</p>
	Covered also by national or regional legislation			
GAEC 6: Maintenance of soil organic matter level	No burning of straw, stubble or cut residue (no further requirements to the EU standard)	No burning of straw, stubble or cut residue (no further requirements to the EU standard)	No burning of straw, stubble or cut residue (no further requirements to the EU standard)	No burning of straw, stubble or cut residue (no further requirements to the EU standard)

⁴⁰ Arable land plots are rated regarding its sensitivity to erosion (2 levels of sensitivity for water, 1 for wind). Plots under certain agri-environmental measures preventing erosion do not have to comply with the management standards of GAEC 5.

⁴¹ Requirements do not apply for small-scale holdings (< 1 ha).

⁴² GAEC 5 applies only to farmers in the hilly parts of the province of Limburg (South of the Netherlands), as soil erosion is a minimal concern in the rest of the Netherlands. Farmers are required to report the applied measures to the ministry yearly.



	through appropriate practices⁴³			
	Covered also by national or regional legislation	X	X	X
Landscape, minimum level of maintenance	GAEC 7: Retention of landscape features including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species	<ul style="list-style-type: none"> - Retention of non-aquatic landscape features, e. g.: Single large trees of rare species, stone walls, pools, ditches, banks - Seasonal ban of hedge and tree cutting (no cutting during the bird breeding season) 	<ul style="list-style-type: none"> - Retention of non-aquatic landscape features with defined sizes: Terraces, hedges, tree rows, field woods, wetlands, single trees, grassy field edges (<i>Feldrainen</i>), stone walls, stones and rocks - Seasonal ban of hedge and tree cutting (no cutting from 1.3. to 30.9.) 	<ul style="list-style-type: none"> - Retention of non-aquatic landscape features with defined sizes: Terraces, hedges, single trees or tree rows, field woods, wetlands, grassy field edges, stone walls, stones and rocks - Seasonal ban of hedge and tree cutting⁴⁴
	Covered also by national or regional legislation	(X) ⁴⁵	(X) ⁴⁶	(X) X

Source: Description by project partners, additionally: AMA (2015) (for AT), BMEL (2015) (for DE)

⁴³ The requirement can be limited to a general ban on burning arable stubble, but a Member State may decide to prescribe further requirements.

⁴⁴ All points mentioned above do not apply for works necessary for converting land into irrigated agriculture.

⁴⁵ Some landscape elements – already protected by nature protection laws – are covered once again (*Naturdenkmäler*).

⁴⁶ Some landscape elements are partly protected already under nature conservation legislation.



Annex III: Greening obligations for the maintenance of permanent grassland and for ecological focus areas

Table 20: Maintenance of permanent grassland under the greening regulations (EU prescriptions and specifications in the TALE case study Member States)

EU	AT	DE	ES	NL
1. Environmentally sensitive permanent grassland (ESPG) Member States have to define areas of environmentally sensitive permanent grassland in Natura 2000 areas (including peat and wetlands) with need of strict protection, where any ploughing or conversion is prohibited. In addition, Member States may add further environmentally valuable grassland outside Natura 2000 areas.	Ban on converting sensitive grassland (target areas for nature conservation: 15 grassland ecosystem types within Natura 2000 areas)	Ban on converting sensitive grassland (target areas for nature conservation: permanent grassland in special areas of conservation according to the Habitats Directive)	Ban on converting sensitive grassland (target areas for nature conservation: permanent grassland in special areas of conservation according to the Habitats Directive)	Ban on converting sensitive grassland (target areas for nature conservation: permanent grassland in Natura 2000 areas)
2. Maintenance of the ratio of permanent grassland to the total agricultural area declared Member States ensure, that the share of permanent grassland related to the total UAA does not decline at the national, regional or sub-regional scale by more than 5 % compared to this share existing in 2015 (based on permanent grassland declared in 2012 plus additional areas declared in 2015).	- Conversion of permanent grassland only after approval if ratio decreased by 4 % - Re-conversion of converted areas into permanent grassland if ratio decrease >5 % (Ratio is calculated nationally)	- Conversion of permanent grassland only after approval and with creation of compensation areas (exceptions possible) (Ratio is calculated at federal state level)	- Re-conversion of converted areas into permanent grassland if ratio decrease >5 % (Ratio is calculated nationally)	- Re-conversion of converted areas into permanent grassland if ratio decrease >5 % (Ratio is calculated nationally)

Source: Description by project partners, additionally: AMA (2015) (for AT), BMEL (2015) (for DE)

Table 21: Maintenance of ecological focus areas (EFA) under the greening regulations (EU prescriptions and specifications in the TALE case study Member States)

EU	AT	DE	ES	NL
Maintaining ecological focus areas (EFA) At least 5 % of the arable land on farms with > 15 ha arable land must be declared as EFA. Ecological focus areas may be e. g. terraces, field margins, hedges, trees, set-aside land, landscape features, biotopes, buffer strips, agro-forestry, afforested land, short-rotation coppice, areas with catch crops or nitrogen-fixing crops. A weighting factor (in brackets) is attributed to each type of EFA reflecting its environmental value. Farms where more than 75 % of the arable land is used for the production of grass or other herbaceous forage, for legumes or lying fallow, and farms whose UAA is to more than 75 % permanent grassland, are exempted, if their remaining arable land is not larger than 30 ha. There are further specific cases, where exemption is possible. It remains up to Member States to define their precise rules that will apply to EFA, notably what crops can be grown and if fertiliser or pesticides may be applied, on conditions benefits of the EFA to biodiversity remain. The percentage of EFA may rise to 7 % after 2017.	Areas eligible for EFA: <ul style="list-style-type: none"> - Set-aside areas (1.0) - Landscape features according to GEAC 7 (1.0) - Catch crops or cover crops (0.3) - Short rotation coppice (0.3) - Nitrogen-fixing crops (0.7) 	All area categories of EFA are applicable in Germany: <ul style="list-style-type: none"> - Set-aside areas (1.0) - Terraces according to GAEC 7 (1.0) - Landscape features according to GEAC 7 and field margins (1.0 - 2.0 depending on type of feature) - Buffer strips (1.5) - Strips along forest edges without production (1.5) - Agro-forestry under Rural Development Schemes (1.0)⁴⁷ - Short rotation coppice (0.3) - Afforested areas under Rural Development Schemes (1.0) - Catch crops or cover crops (0.3) - Nitrogen-fixing crops (0.7) 	Areas eligible for EFA: <ul style="list-style-type: none"> - Set-aside areas - Nitrogen-fixing crops (0.7) - Afforested areas under Rural Development Schemes - Agro-forestry areas under Rural Development Schemes 	Areas eligible for EFA: <ul style="list-style-type: none"> - Unmanaged grass margins - Nitrogen-fixing crops (0.7) - Cover crops (0.3) - Willow short rotation coppice (0.3) <p>Collective use: Farmer collectives can decide to register a common EFA. A maximum of 50 % of an individual EFA requirement can be fulfilled by other farmers within the collective. Collective use is only allowed in case a connected EFA is realized.</p>

Sources: Description by project partners, additionally: EC (2015d), AMA (2016) (for AT), BMEL (2015) (for DE)

⁴⁷ Included but no Federal State offers the necessary Rural Development support.

Annex IV: Support of organic farming

Table 22: Characteristics of support measures for organic farming in the TALE case study regions within Pillar Two of the CAP and comparable measures in CH⁴⁸

	AT	DE (Saxony)	DE (Thuringia)	ES	CH
Targeted type of land use	All agriculturally used land	All agriculturally used land	All agriculturally used land	All agriculturally used land	All agriculturally used land
Scope of measure	Whole farm	Whole farm	Whole farm	Single field(s)	Single field(s)
Target area	Offered area wide	Offered area wide	Offered area wide ⁴⁹	Offered area wide, but Natura 2000 areas are prioritised	Offered area wide
Cooperative approach	no	no	no	yes ⁵⁰	no
Premia (per ha)	Grassland: 70 € (225 €) ⁵¹ Arable land: 230 € Vegetable production and strawberries: 450 € Flowering plants, medical plants and herbs: 350 € Permanent crops: 700 € Organic bees: 25 €/hive	Arable land/grassland: 230 € Vegetable production: 413 € Permanent or nursery crops: 890 € Grant for control fee: 40 €	Arable land/grassland: 210 € (280 €) ⁵² Vegetable production: 360 € (590 €) Permanent or nursery crops: 750 € (950 €) Grant for control fee: 50 € Minimum funding: 500 €	Rainfed herbaceous crops: 190 – 228 € Irrigated herbaceous crops: 250 – 300 € Vegetables: 350 – 420 € Vineyards: 240 – 288 € Rainfed fruit trees: 175 – 210 € Irrigated fruit trees: 300 – 456 € Permanent grasslands: 120 – 144 €	Grassland: 200 Fr. (183 €) Arable crops: 800 Fr. (732 €) Permanent cultures and horticulture: 1,600 Fr.(1,464 €)

⁴⁸ The Netherlands provide no targeted measures for organic farming under their new RDP.

⁴⁹ First priority is given to farms with animal husbandry, second priority to fruit and vegetable farms and third priority to cash crop farms.

⁵⁰ Farmers located at the same village are prioritized in order to incentivize synergistic effects.

⁵¹ Amount in brackets is paid to farms with ≥0.5 roughage consuming animal units/ha.

⁵² Amounts in brackets are paid in the introductory phase.



Source: Description by project partners, additionally: EC (2014, 2015e), AMA (2016) (for AT), BLW (2016) (for CH)



Annex V: List of AECM (and comparable Swiss measures) offered to farmers for different land use types

Table 23: Measures regarding SEVERAL TYPES OF AGRICULTURALLY USED LAND in the TALE case study regions

AT (Mostviertel, Lower Austria)	DE (Ilm/Mulde catchment, Saxony)	DE (Ilm/Mulde catchment, Thuringia)	ES (Cega-Eresma-Adaja basin, Castile and León)	NL (Kromme Rijn, Utrecht)	CH (Broye catchment, Vaud/Fribourg)
<ul style="list-style-type: none"> - Environmentally friendly and biodiversity promoting management - Limitation of yield increasing inputs - Preventative groundwater protection (regional) - Nature conservation - Surface-near spreading of liquid farmyard manure (arable land and grassland) 			<ul style="list-style-type: none"> - Integrated production (winter cereals, vegetables, vineyards and fruit trees) 	<ul style="list-style-type: none"> - Managing breeding birds on arable land or grassland 	<ul style="list-style-type: none"> - Quality payments - Interconnectedness payments - Landscape quality payments - Slope payments - Steep slope payments - Payment for low-emission application

Table 24: Measures regarding ONLY ARABLE LAND in the TALE case study regions

AT (Mostviertel, Lower Austria)	DE (Ilm/Mulde catchment, Saxony)	DE (Ilm/Mulde catchment, Thuringia)	ES (Cega-Eresma-Adaja basin, Castile and León)	NL (Kromme Rijn, Utrecht)	CH (Broye catchment, Vaud/Fribourg)
<ul style="list-style-type: none"> - Greening of arable land/cover crops - Greening of arable land/system „Evergreen“ - Direct seeding and seeding on mulch 	<ul style="list-style-type: none"> - Grass strips - Strip and direct seeding - Environmentally friendly production methods of fodder and legume cultivation 	<ul style="list-style-type: none"> - Diverse crop rotation - Erosion control - Integration of structural elements (several sub-measures: annual or perennial flower strips, 	<ul style="list-style-type: none"> - Sustainable agroindustrial crops: extensification of sugar beet production 		<ul style="list-style-type: none"> - Extensive production system (Extenso) - Payment for conserving soil management



- Management of arable areas particularly threatened by leaching	- Cover crops - Fallow management (4 sub-measures: Self-greening of annual/perennial fallow, annual/perennial flower mixture)	field margins, field strips, water and erosion protection strips; partly within target areas for nature conservation)
- Preventative surface water protection on arable land (regional)	- Use of arable land as grassland	
- Renouncement of fungicides and growth regulators	- Conservation oriented cultivation of arable land for wild herbs and field birds (2 sub-measures) - Late stubble cultivation (Wintering stubble)	- Red Kite protection

Table 25: Measures regarding ONLY PERMANENT GRASSLAND including traditional orchards in the TALE case study regions

AT (Mostviertel, Lower Austria)	DE (Ilm/Mulde catchment, Saxony)	DE (Ilm/Mulde catchment, Thuringia)	ES (Cega-Eresma-Adaja basin, Castile and León)	NL (Kromme Rijn, Utrecht)	CH (Broye catchment, Vaud/Fribourg)
- Mountain grazing and herding - Cultivation of mowed mountain grassland - Renouncement of silage (permanent & temporary grassland)	- Species-rich grassland (3 sub-measures: annual proof of at least four/six/eight indicator species) - Biotope mowing once or twice a year according to various degrees of difficulty (10 sub-measures) - Fallows and fallow strips in grassland - Specific species conservation oriented	- Species rich grassland (2 sub-measures: annual proof of at least four/six indicator species) - Maintenance of biotope grassland (several sub-measures: within/outside of protected areas, mowing or grazing with cattle/horses or sheep/goats and various options for upgrading)	- Sustainable management of grasslands and support of traditional transhumant systems	- Bird zones on herb-rich grassland - Botanical meadow - Botanical pasture margin	- Transhumance/Alpine farming payments - Summer grazing payments - Payments for grassland-based milk- and meat production



-
- grassland use
(5 sub-measures: one or two uses per year, minimum two mowing actions annually, phased mowing)
- Conservation oriented herding and grazing (2 sub-measures: sheep or goats, cattle or horses or mixed herds of listed animals)
-

Table 26: Measures regarding ONLY PERMANENT CROPS such as vineyards or olive groves in the TALE case study regions

AT (Mostviertel, Lower Austria)	DE (Ilm/Mulde catchment, Saxony)	DE (Ilm/Mulde catchment, Thuringia)	ES (Cega-Eresma-Adaja basin, Castile and León)	NL (Kromme Rijn, Utrecht)	CH (Broye catchment, Vaud/Fribourg)
<ul style="list-style-type: none"> - Erosion protection in vineyards, fruits and hops - Pesticide renouncement in vineyards and hops 			<ul style="list-style-type: none"> - Permanent crops at unique landscapes 		<ul style="list-style-type: none"> - Slope payments for vineyards

**Table 27: Measures regarding OTHER LAND USE TYPES in the TALE case study regions**

AT (Mostviertel, Lower Austria)	DE (Ilm/Mulde catchment, Saxony)	DE (Ilm/Mulde catchment, Thuringia)	ES (Cega-Eresma-Adaja basin, Castile and León)	NL (Kromme Rijn, Utrecht)	CH (Broye catchment, Vaud/Fribourg)
- Use of beneficial organisms in greenhouses	- Open land conservation (Eligible are only open space areas that are not in the direct payments system and where at least 50 % is arable used land)		- Forage and stubble exploitation through grazing activities with goat and/or sheep (grasslands and stubble land)		

Table 28: Measures for RARE BREEDS AND TRADITIONAL CROPS in the TALE case study regions

AT (Mostviertel, Lower Austria)	DE (Ilm/Mulde catchment, Saxony)	DE (Ilm/Mulde catchment, Thuringia)	ES (Cega-Eresma-Adaja basin, Castile and León)	NL (Kromme Rijn, Utrecht)	CH (Broye catchment, Vaud/Fribourg)
- Cultivation of rare agricultural plants - Maintenance of endangered livestock breeds	- Endangered indigenous livestock breeds		- Maintenance of endangered native breeds		

Source: Description by project partners, additionally: EC (2015c), AMA (2016) (for AT), BLW (2016) (for CH), BMEL (2015) (for DE)

Annex VI: Comparison of AECM (and comparable measures in Switzerland)

Table 29: Comparison of measures regarding SEVERAL TYPES OF AGRICULTURALLY USED LAND targeting primarily abiotic goals in the TALE case study regions

Case study region	Name of measure	Land use types (specification)	Required technical measures	Support of spec. farming systems	Scope of measure at farm level	Target area
AT (Mostviertel, Lower Austria)	Limitation of yield increasing inputs	Arable land, permanent grassland, permanent crops	<ul style="list-style-type: none"> - No N-fertiliser application - No chem.-synth. plant protection products (treatment of single plants allowed) (unless products permitted in organic farming) 	no	Whole farm	Offered area wide
	Preventative groundwater protection (regional)	Arable land, permanent grassland	<p>Arable land:</p> <ul style="list-style-type: none"> - Limits to the amounts of fertiliser - Banned periods of fertiliser application <p>Grassland:</p> <ul style="list-style-type: none"> - Limits to the amounts of fertiliser - Ban on converting sensitive grassland (water protection) 	no	Single field(s)	Only dedicated areas according to the ÖPUL regulation ⁵³
ES (Cega-Eresma-Adaja basin, Castile and León)	Integrated production	Winter cereals, vegetables, vineyards, fruit trees	<p>For winter cereals:</p> <ul style="list-style-type: none"> - Diverse crop rotation - Limits to the amounts of applied fertiliser <p>For vegetables:</p> <ul style="list-style-type: none"> - Diverse crop rotation <p>Vineyard or fruit trees:</p> <ul style="list-style-type: none"> - Incorporation of crop residues and use of organic manure 	Integrated farming	Single field(s)	Offered area wide

⁵³ Includes regions prone to high nitrate concentration in water.



Table 30: Comparison of measures regarding SEVERAL TYPES OF AGRICULTURALLY USED LAND targeting primarily biodiversity or landscape issues in the TALE case study regions

Case study region	Name of measure	Land use types (specification)	Required technical measures	Support of spec. farming systems	Scope of measure at farm level	Target area
AT (Mostviertel, Lower Austria)	Environmentally friendly and biodiversity promoting management		<ul style="list-style-type: none"> - Maintenance of permanent grassland area on the farm - Management of non-aquatic landscape features - Patches for biodiversity (min. 5 % of arable and grassland) - Diverse crop rotation 	no	Whole farm	Offered area wide
	Nature conservation		<ul style="list-style-type: none"> - Management of sensible areas according to specific obligations (includes, as a minimum, grazing and cutting regimes for grassland, limits to fertiliser application) 	no	Single field(s)	Offered area wide
NL (Kromme Rijn, Utrecht)	Managing breeding birds on arable land or grassland		Cutting regime (wildlife friendly mowing)(result-oriented)	no	Single field(s)	Restricted to areas listed for "optimisation of breeding" in combination with certain land use clusters
CH (Broye catchment, Vaud/Fribourg)	Quality payments (3 sub-measures)		<p>For quality stage 1:</p> <ul style="list-style-type: none"> - Grazing and cutting regime - Limits to the amounts of applied fertiliser - Limits to chem.-synth. plant protection products or specified regimes <p>For arable land:</p> <ul style="list-style-type: none"> - Take land out of production OR: 	no	Single field(s)	Offered area wide (quality stage 3 only in biotopes of national importance ("Inventarflächen"))



		<ul style="list-style-type: none"> - Field strips (or patches) for biodiversity <p>For specific areas and also for areas under quality stage 3:</p> <ul style="list-style-type: none"> - Management of sensible areas according to specific obligations 		
Interconnectedness payments		<ul style="list-style-type: none"> - No fertiliser application - No chem.-synth. plant protection products - Management of sensible areas according to specific obligations 	no	Single field(s) Defined "Biodiversity promotion areas"
Landscape quality payments		<ul style="list-style-type: none"> - Project-based definition of regional measures 	no	Single field(s) Defined within cantonal projects
Slope payments	Excluding permanent pastures, vineyards, hedges, field and riparian woods	<p>For permanent grassland:</p> <ul style="list-style-type: none"> - Cutting regime 	no	Single field(s) Areas with slopes 18-35 % (if covering at least 50 ares per farm)
Steep slope payment	Excluding permanent pastures, vineyards, hedges, field and riparian woods	<p>For permanent grassland:</p> <ul style="list-style-type: none"> - Cutting regime 	no	Single field(s) Areas with slopes >35 % (if covering at least 50 ares per farm)

Table 31: Comparison of measures regarding ONLY ARABLE LAND targeting primarily abiotic goals in the TALE case study regions

Case study region	Name of measure	Limited to certain crops	Required technical measures	Support of spec. farming systems	Scope of measure at farm level	Target area
AT (Mostviertel, Lower Austria)	Greening of arable land/cover crops	no	<ul style="list-style-type: none"> - Green or vegetative cover on arable land (min. 10 % of arable land) - No N-fertiliser application - No chem.-synth. plant protection products in cover crops 	no	Single field(s): farmers participate with min. 10 % of arable fields	Offered area wide
	Greening of arable land/system „Evergreen“	no	<ul style="list-style-type: none"> - Green or vegetative cover on arable land (min. 85 % of arable land) - No N-fertiliser application - No chem.-synth. plant protection products in cover crops 	no	All arable land	Offered area wide
	Direct seeding and seeding on mulch	Limited to crops prone to erosion such as sugar beet, maize, potatoes	<ul style="list-style-type: none"> - Condition: participation in measure "Greening of arable land" - Erosion reducing sowing regime (mulch-seeding, direct-seeding, strip-till) 	no	Single field(s)	Offered area wide
	Management of arable areas particularly threatened by leaching	no	<ul style="list-style-type: none"> - Green or vegetative cover on arable land on areas particularly threatened by leaching - No N-fertiliser application - No chem.-synth. plant protection products - No grazing 	no	Single field(s)	Only dedicated areas according to the ÖPUL regulation ⁵⁴ ; only arable land with low soil quality
	Preventative surface water protection on arable land (regional)	no	<ul style="list-style-type: none"> - Riparian buffer strip - No N-fertiliser application 	no	Single field(s)	Only for arable land in defined landscape sceneries with a 50 m

⁵⁴ Includes regions prone to high nitrate concentrations in water.



			- No chem.-synth. plant protection products - No grazing			distance to open water bodies
DE (Ilm/Mulde catchment, Saxony)	Grass strips	no	- Erosion prevention strips (with grass or other fodder crops) - No fertiliser application - No chem.-synth. plant protection products	no	Single field(s)	Offered area wide
	Strip and direct seeding	no	- Erosion reducing sowing regime	no	Single field(s)	Offered area wide
	Environmentally friendly production methods of fodder and legume cultivation	no	- Diverse crop rotation (fodder crops and legumes required)	no	Single field(s)	Offered area wide
	Cover crops	no	- Green or vegetative cover on arable land (min. 5 % of arable land) - Mechanical or manual weed control	no	Single field(s)	Only outside of water protection areas
DE (Ilm/Mulde catchment, Thuringia)	Erosion control	no	At least one of the following measures to be applied: - Diverse crop rotation - Green or vegetative cover on arable land - Erosion reducing sowing regime - Erosion prevention strips (field partition) - Greening of runoff furrows - Riparian buffer strips	no	All arable land in designated areas prone to erosion	Restricted to arable land in designated areas prone to erosion
	Integration of structural elements (several sub-measures: annual or perennial flower strips, field margins, field strips, water and erosion protection strips; partly	no	- Field strips (or patches) for biodiversity - No N-fertiliser application - No chem.-synth. plant protection products Additional for field margins: - Restricted dates for mechanical maintenance of arable crops	no	Single field(s)	Offered area wide (some sub-measures are restricted to

	within target areas for nature conservation)	- No irrigation Erosion prevention strips			target areas for nature conservation) ⁵⁵
	Use of arable land as grassland	no	- Conversion of arable land to permanent grassland - No application of chem.-synth. plant protection products - Restricted mechanical maintenance of permanent grassland (no ploughing) - Cutting or grazing regime	no	Single field(s) Offered area wide ⁵⁶
ES (Cega-Eresma- Adaja basin, Castile and León)	Sustainable agroindustrial crops: extensification of sugar beet production	Limited to irrigated sugar beet	- Diverse crop rotation (including legumes or cruciferous plants, crop varieties with lower water requirements) - Limits to chem.-synth. plant protection products At vulnerable areas: - Green or vegetative cover on arable land before sugar beet cultivation (with legumes)	no	Single field(s) Offered area wide (higher premia for locations in vulnerable areas)
CH (Broye catchment, Vaud/Fribourg)	Extensive production system (Extenso)	Limited to cereals, sunflower seeds, protein peas, field beans and rape	- Limits to chem.-synth. plant protection products (no fungicides and insecticides) - No growth regulators	Extensive production of protein-rich arable crops	All concerned crops Offered area wide
	Payment for conserving soil management	Not for grass, cover crops or wheat after maize	- Erosion reducing sowing regime - Mechanical or manual weed control (as top-up)	no	Single field(s) Offered area-wide

⁵⁵ For field margins priority is given to margins with (very) valuable wildflowers of arable fields (Segetalflora) and surfaces outside of field blocks. For field strips priority is given to target areas for lapwing and hamster, and to target areas for partridge and corn bunting, strips related to Natura 2000.

⁵⁶ Priority is given to areas with grassland birds, floodplains and other sensitive areas.

Table 32: Comparison of measures regarding ONLY ARABLE LAND targeting primarily biodiversity or landscape issues in the TALE case study regions

Case study region	Name of measure	Limited to certain crops	Required technical measures	Support of spec. farming systems	Scope of measure at farm level	Target area
DE (Ilm/Mulde catchment, Saxony)	Fallow management (4 sub-measures: Self-greening of annual/perennial fallow, annual/perennial flower mixture)	no	<ul style="list-style-type: none"> - Take land out of production (self-greening, grass or flowering fallow) (annual/perennial); - No fertiliser application - No chem.-synth. plant protection products 	no	Single field(s)	Offered area wide
	Conservation oriented cultivation of arable land for wild herbs and field birds (2 sub-measures)	Depending on sub-measure no maize, rape seed, sunflowers or millet	<ul style="list-style-type: none"> - Extensive management of arable plots for wildlife and arable herbs - No fertiliser application - No chem.-synth. plant protection products - Restricted dates for mechanical maintenance of arable crops 	No	Single field(s)	Offered area wide
	Late stubble (Wintering stubble) cultivation	no maize or millet allowed	<ul style="list-style-type: none"> - Over winter stubble - Diverse crop rotation - Banned periods of fertiliser application - Limits on chem.-synth. plant protection products (dates) - Restricted dates for mechanical maintenance of arable crops 	no	Single field(s)	Offered area wide



DE (Ilm/Mulde catchment, Thuringia)	Diverse crop rotation	no	- Diverse crop rotation (legumes required)	no ⁵⁷	All arable land	Offered area wide
	Red Kite protection	Lucerne, clover or grass-clover mixture	- Harvesting regime - Limits to chem.-synth. plant protection products or specified regimes (no rodenticides)	no	Single field(s)	Offered area wide ⁵⁸

⁵⁷ Priority is given to farming systems with roughage consuming animal species.

⁵⁸ Priority is given to bird protection areas.

Table 33: Comparison of measures regarding ONLY PERMANENT GRASSLAND targeting primarily biodiversity or landscape issues in the TALE case study regions

Case study region	Name of measure	Limited to certain types of grassland	Required technical measures	Support of spec. farming systems	Scope of measure at farm level	Target area
AT (Mostviertel, Lower Austria)	Mountain grazing and herding	Limited to alpine meadows and pastures ⁵⁹	- Grazing regime - No N-fertiliser application - No chem.-synth. plant protection products (unless products permitted in organic farming)	Alpine farms	Measure is independent from those at the rest of the farm; farmers participate with the whole area, but premium is dependent on livestock grazing	Only on alpine meadows and pastures, which are part of the so-called "Almkataster" (inventory on Austrian alpine meadows and pastures)
	Cultivation of mowed mountain grassland	no	- Cutting regime for steep slopes >50 % Mowed mountain grassland (>1.200m altitude): - Cutting regime - No N-fertiliser application - No chem.-synth. plant protection products (dung allowed)	Alpine farms	Single field(s)	Offered area wide, but only on slopes > 50 % and mountain grassland > 1,200 m
	Renouncement of silage	no	- Hay making	Livestock farms	All grassland ⁶⁰	Offered area wide
DE (Ilm/Mulde catchment, Saxony)	Species-rich grassland (3 sub-measures: annual proof of at least four/six/eight indicator species)	no	- Grazing and cutting regimes (result-oriented) - Limits to the amounts of applied fertiliser (result-oriented)	no	Single field(s)	Offered area wide

⁵⁹ Alpine meadows and pastures independent from the rest of the farm, ownership of those areas can be: private but independent from farmers who own the grazed livestock, members of a cooperative who own livestock, members of a cooperative who partly own livestock.

⁶⁰ Offered for permanent and temporary grassland.



Biotope mowing once or twice a year according to various degrees of difficulty (10 sub-measures)	no	<ul style="list-style-type: none"> - Cutting regime - No N-fertiliser application - No chem.-synth. plant protection products (treatment of single plants in individual cases allowed) - No grazing - No additional seeding on permanent grassland 	no	Single field(s)	Offered area-wide (but targeted in particular to biotope grassland and certain grassland ecosystem types)
	no	<ul style="list-style-type: none"> - Take land out of production (self-greening or grass cover) (annual/perennial) - Cutting regime (every second year) - No N-fertiliser application - No chem.-synth. plant protection products (treatment of single plants allowed) - No grazing 	no	Single field(s)	Offered area wide
Fallows and fallow strips in grassland	no	<ul style="list-style-type: none"> - Sub-measure one or two uses per year: - Cutting regime - No N-fertiliser application - No chem.-synth. plant protection products (treatment of single plants in individual cases allowed) - No additional seeding on permanent grassland 	no	Single field(s)	Offered area wide (but targeted in particular to certain grassland ecosystem types)
	no	<ul style="list-style-type: none"> - Sub-measure minimum two mowing actions annually: - Cutting regime - No grazing - No N-fertiliser application 			



		<ul style="list-style-type: none"> - No chem.-synth. plant protection products (treatment of single plants in individual cases allowed) - No additional seeding on permanent grassland <p>Sub-measure phased mowing:</p> <ul style="list-style-type: none"> - Cutting regime (wildlife friendly mowing) 			
DE (Ilm/Mulde catchment, Thuringia)	Species rich grassland (2 sub-measures: annual proof of at least four/six indicator species)	no	<ul style="list-style-type: none"> - Grazing and cutting regimes (result-oriented) - Limits to the amounts of applied fertiliser (result-oriented) 	no ⁶¹	Single field(s) Offered area wide
	Maintenance of biotope grassland (several sub-measures: within/outside of protected areas, mowing or grazing with cattle/horses or sheep/goats and various options for upgrading)	no	<ul style="list-style-type: none"> - Cutting and grazing regime - No fertiliser application - No chem.-synth. plant protection products - Restricted mechanical maintenance of permanent grassland (no ploughing) - No irrigation 	no	Single field(s) Biotope grassland (some sub-measures are restricted to target areas for nature conservation)
ES (Cega-Eresma-Adaja basin, Castile and León)	Sustainable management of grasslands and support of traditional transhumant systems	no	<ul style="list-style-type: none"> - Grazing regime - Management of non-aquatic landscape features 	Extensive farming	Single field(s) Offered area wide only if native livestock species are used, otherwise restricted to Natura 2000 areas and ANCs
NL (Kromme Rijn, Utrecht)	Bird zones on herb-rich grassland	no	<ul style="list-style-type: none"> - No chem.-synth. plant protection products (treatment of single plants allowed) - No fertiliser application (except farm yard manure) - Banned periods of fertiliser application 	no	Single field(s) Restricted to areas listed for "creating foraging area" or "management to reduce fertilisation of grassland" in

⁶¹ Priority is given to organic farming areas.



		- No additional seeding on permanent grassland - Cutting regime			combination with certain land use cluster
	Botanical meadow	no	- No chem.-synth. plant protection products (treatment of single plants allowed) - No fertiliser application - Grazing regime (limits for dates) - Cutting regime - No additional seeding on permanent grassland	no	Single field(s) Restricted to areas listed for "creating foraging area", "management to reduce fertilisation of grassland", or "optimisation of breeding" in combination with certain land use clusters
	Botanical pasture margin	no	- No chem.-synth. plant protection products (treatment of single plants allowed) - No fertiliser application - No additional seeding on permanent grassland	no	Single field(s) Restricted to areas listed for "creating foraging area", "management to reduce fertilisation of grassland", or "optimisation of breeding" in combination with certain land use clusters
CH (Broye catchment, Vaud/Fribourg)	Transhumance/Alpine farming payment	Limited to alpine pastures	- Grazing regime ⁶²	no	Payment per summered roughage consuming livestock unit Only for recognised alpine summering or cooperative grazing areas
	Summer grazing payment	Limited to alpine pastures	- Grazing regime ⁵⁹	Recognised summering or cooperative grazing farms	Payment per summered roughage consuming livestock unit Only for recognised alpine summering or cooperative grazing areas

⁶² Summering farms also have to comply with limitations regarding fertiliser and pesticides use on the alpine summering areas.

Table 34: Comparison of measures regarding OTHER LAND USE TYPES (including PERMANENT CROPS) targeting primarily biodiversity or landscape issues in the TALE case study regions

Case study region	Name of measure	Land use type	Required technical measures	Support of spec. farming systems	Scope of measure	Target area
DE (Ilm/Mulde catchment, Thuringia)	Open land conservation	Only open space areas that are not in the direct payments system and where at least 50 % is arable used land	- Cutting and grazing regime - Mechanical scrub or invasive species control (other than grazing or mowing)	no	Single field(s)	Offered area wide (priority is given to Natura 2000 areas and green belt areas)
ES (Cega-Eresma-Adaja basin, Castile and León)	Permanent crops at unique landscapes	Only permanent crops	- No chem.-synth. plant protection products - No grazing - Tillage regime - Management of non-aquatic landscape features - Grass cover in permanent crops (legumes are also permitted)	no	Single field(s)	Areas located in natural parks, terraced or steep slopes
	Forage and stubble exploitation through grazing activities with goats and/or sheep	Communal grassland and arable stubble	- Grazing regime	Extensive farming	⁶³	Offered area wide

⁶³ Each farmer is paid for an eligible number of ha (which equals half of the heads of owned livestock).

Annex VII: Description of technical measures and rating of their environmental impact

Table 35: Description of technical measures applied in the TALE case study region

Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
Management of grass and semi- natural forage	Maintenance of the permanent grassland area on the farm	This action describes the requirement to maintain the existing area size (ha) of permanent grassland on the supported farm.	AECM: AT (1)
	Ban on converting sensitive grassland (nature conservation)	This action describes the prohibition to convert sensitive grassland in target areas of nature conservation (e. g. in Natura 2000 areas and further nature conservation areas). Ploughing is banned as well.	Greening: AT, DE, ES, NL
	Ban on converting sensitive grassland⁶⁵ (water protection)	This action describes the prohibition to convert sensitive grassland (e. g. in target areas for groundwater protection, in water protection areas, in flooding areas etc.) ⁶⁶ .	AECM: AT (1)
	Conversion of permanent grassland only after approval (and with creation of compensation areas)	This action describes the requirement to obtain approval for the conversion of permanent grassland. In Germany the conversion has to be further compensated for by the creation of compensation areas as big as the converted area and located in the same region.	Greening: AT, DE
	Restricted mechanical maintenance of permanent grassland (no ploughing)	This action describes the restriction of tillage of permanent grassland on supported plots e. g. for grassland renewal. Only care measures like rolling or the use of following harrows are allowed.	AECM: DE_TH (2)

⁶⁴ AECM for NL not included

⁶⁵ Means: grassland in locations sensitive for water protection issues (e. g. in water protection areas or on buffer strips along water courses).

⁶⁶ Buffer strips along water courses are considered as a separate technical measure.



Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
	No additional seeding on permanent grassland	This action describes the restriction of additional seeding of grassland species on permanent grassland on supported plots.	AECM: DE_SN (3)
	Grazing regime (limits for livestock density and/or dates)	This action describes the range of different requirements and limitations on the management of livestock and the vegetation on which they graze. These actions principally include limits to stocking densities (which may apply all over the farm or only to specific plots) and the dates at which livestock are allowed to graze on the supported or regulated plots or areas.	AECM: AT (1), DE_SN (1), DE_TH (4), ES (2), CH (3)
	No grazing	This action describes management actions that exclude livestock grazing from certain areas of land.	AECM: AT (2), DE_SN (3), ES (1)
	Mechanical scrub or invasive species control (other than grazing or mowing)	This action describes the management of scrub vegetation (usually woody species) as well as preventing the spread of some invasive species (usually non woody) using mechanical means other than regular mowing.	AECM: DE_TH (1)
	Hay making	This action describes the requirement to carry out haymaking in meadows and grassed areas on the farm instead of silage production.	AECM: AT (1)
	Cutting regime (e. g. number of cuts, allowed times, wildlife friendly mowing, obligation to remove cut vegetation)	This action describes the requirement to carry out mowing or cutting either for a specified number of times or in a specific way (e. g. phased mowing).	AECM: AT (2), DE_SN (7), DE_TH (4), CH (3)
	No (N-) fertiliser application	This action describes where farmers are prohibited from using (N-) fertilisers on certain areas of their holding or in defined sensitive areas (e. g. water protection areas).	AECM: AT (7), DE_SN (7), DE_TH (2), CH (1)



Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
Input management & non-chemical crop protection	Limits to the amounts of applied fertiliser	<p>This action describes general limitations to the amount of fertiliser that may be applied per hectare and year (this may be applied to all or certain fertiliser types and may differ depending on land use, crops and/or soil type) or to the obligation to comply with limitation regarding the nutrient saldo.</p> <p>For AECM rules for maximum amounts apply for the supported plots.</p>	AECM: AT (2), DE_SN (1), DE_TH (1), ES (1), CH (1)
	Low emission application or precision farming	<p>This action describes the obligation to apply fertiliser in a manner that limits emissions (e. g. via low emission application, precision farming, immediate incorporation of fertiliser, use of certain spreading equipment) (this might differ depending on land use and/or fertiliser type).</p>	PEP: CH
	Banned periods of fertiliser application	<p>This action describes the ban of fertiliser application during a certain period of the year (this might differ depending on land use and /or fertiliser type).</p>	AECM: AT (1), DE_SN (1)
	Limits to fertiliser application along water courses	<p>The action describes the prohibition of fertiliser application with a significant amount of N and / or immediate incorporation in defined zones along water courses (might be stricter on sloping land).</p>	GAEC: DE_SN, DE_TH, ES
	Limits to fertiliser application in sensitive areas (water protection)	<p>The action describes limitations to the application to fertiliser (amount, fertiliser type, banned periods) in defined sensitive areas in the field of water protection other than buffer strips (e. g. in target areas for groundwater protection, in water protection areas, in flooding areas etc.).</p>	
	Limits to fertiliser application in sensitive areas (nature protection)	<p>The action describes limitations to the application to fertiliser (amount, fertiliser type, banned periods) in defined sensitive areas in the field of nature conservation (e. g. in Natura 2000 areas and further nature conservation areas).</p>	



Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
	No fertiliser application on frozen, water logged- or snow-covered ground	The action describes the prohibition to apply fertiliser (in particular N-fertiliser) on soil that is frozen, water logged or covered with snow.	
	No growth regulators	This action describes where farmers are prohibited from using growth regulators on their crops.	AECM: CH (1)
	No chem.-synth. plant protection products (treatment of single plants allowed)	This action refers to the ban for the application of chem.-synth. plant products. In some cases the treatment of single plants is allowed, which usually needs to be approved by the authorities.	AECM: AT (7), DE_SN (7), DE_TH (3), ES (1), CH (1)
	Limits to chem.-synth. plant protection products or specified regimes	This action describes where farmers are allowed to use PPPs on their holding but these are limited in application and scope.	AECM: DE_SN (1), DE_TH (1), ES (1), CH (2)
	Limits to chem.-synth. plant protection products along water courses	This action describes where farmers are allowed to use PPPs along water courses but these are limited in application and scope.	GAEC: ES
	Mechanical or manual weed control	This action describes the control of weeds or unwanted vegetation manually (for example hand cutting or pulling) or mechanically (for example machine pulling of weeds).	AECM: DE_SN (1), CH (1)
Soil cover	Grass cover in permanent crops	This action describes the requirement to maintain grass cover under and between permanent crops.	AECM: ES (1) GAEC: AT
	Green or vegetative cover on arable land (e. g. winter catch crops, undersown crops)	This action describes the requirement to maintain a green cover crop on arable land, usually over winter, or undersown crops in arable land, sometimes observing a minimum share of dedicated arable land. GAEC: Upcoming of spontaneous vegetation has to be enabled or green cover to be sown on set-aside arable land.	AECM: AT (3), DE_SN (1), DE_TH (1), ES (1)



Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
			GAEC/PEP: AT, CH ⁶⁷ , DE, NL
	Over winter stubbles	This action describes the requirement to maintain stubbles on arable land, usually over winter (as opposed to being ploughed in immediately following harvest).	AECM: DE_SN (1)
	Erosion prevention strips	This action describes where farmers are required to create vegetated (usually grass) strips in-field for the purposes of preventing soil erosion and run off. Erosion prevention strips are also created by the partition of fields, e. g. by shortening the slope length or the division of field blocks into smaller units.	AECM: DE_SN (1), DE_TH (2) GAEC: DE
Soil management	Tillage regime (e. g. parallel to slope)	This action describes where farmers are required to carry out tillage (ploughing etc.) in line with certain requirements which commonly include the orientation (in relation to the slope of the land), depth of tillage or the dates.	AECM: ES (1) GAEC: DE, ES, NL
	Erosion reducing sowing regime (mulch-seeding, direct-seeding, strip-till)	This action requires specific seeding regimes in order to reduce soil erosion.	AECM: AT (1), DE_SN (1), DE_TH (1), CH (1)
	Greening of runoff furrows	This action describes where farmers are required to green furrows or channels to prevent water running directly down sloping land and thus helping to prevent soil erosion.	AECM: DE_TH (1)

⁶⁷ In addition within the PEP the farmer has to ensure that no significant erosion takes place; concrete measures for this result-oriented approach are not defined (could include e. g. erosion reducing sowing regime, specific tillage regimes or erosion prevention strips).



Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
	Incorporation of crop residues and use of organic manure	This action describes the burying of crop residues after they have been harvested or after the harvested stalks or cover has been left over winter and the use of organic manure in order to improve soil quality.	AECM: ES (1)
	Restricted soil management on frozen, waterlogged or snow covered soils	This action describes the ban of soil management on frozen, waterlogged or snow covered soils.	GAEC: AT
	Restrictions for cultivation for certain crops on slopes	This action describes the regulation of certain crops on defined slopes. In The Netherlands e. g. areas with slopes >18 % can only be used as grassland.	GAEC: NL
Buffer strips	Riparian buffer strip	This action describes the requirement on farmers to create or maintain a strip of land at the edge of a field, including prescription of prohibition of certain land use, providing a buffer to adjacent aquatic features such as natural watercourses or ditches.	AECM: AT (1), DE_TH (1) GAEC/PEP: AT, CH, ES
Crop management	Diverse crop rotation (also restrictions, e. g. no maize)	Rotation This action describes where farmers are required to have a certain number or types of crop in rotation, observing minimum and/or maximum shares, or to cultivate crop varieties with lower water requirements. Certain crops may be banned. Rotation with legumes This action describes where farmers are required to have leguminous (nitrogen fixing) crops as part of their crop rotation.	AECM: AT (1), DE_SN (2), DE_TH (2), ES (3) Greening/PEP: AT, CH, DE, ES, NL
	Restricted dates for mechanical maintenance of arable crops	This action describes practices that restrict the periods and times of year over which certain management actions can take place on arable land in main crops.	AECM: DE_SN (2), DE_TH (2) GAEC: DE,ES



Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
	Harvesting regime (arable land)	This action describes the requirement to carry out harvesting in a specific way (for example limiting the cutting height for certain crops or phased harvesting).	AECM: DE_TH (1)
	No burning of straw, stubble or cut residue	This action prohibits the burning of cut residue, straw or stubble usually following harvest.	GAEC: AT, DE, ES, NL
	Maintenance of set-aside land	This action describes the requirement to maintain set-aside land e. g. by yearly mowing, prevention of succession partly including periods where such actions are prohibited.	GAEC: AT, DE, ES
Landscape feature management	Management of non-aquatic landscape features (e. g. hedges, trees, stonewalls, fix field boundaries)	This action describes the requirement to manage non-aquatic landscape features such as hedgerows, individual trees and stonewalls.	AECM: AT (1), ES (2)
	Retention of non-aquatic landscape features	This action describes the requirement to conserve non-aquatic landscape features but does not necessarily include management requirements. In Germany and Spain those landscape features are defined by size.	GAEC: AT, DE, ES, NL
	Seasonal ban of hedge and tree cutting	This action describes the ban on cutting hedges and trees during the bird breeding and rearing season.	GAEC: AT, DE, ES, NL



Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
Management for biodiversity	Management of sensible areas according to specific obligations	This action describes the management of certain sensible areas related to biodiversity conservation. Specific management requirements are defined depending on local conditions and goals.	AECM: AT (1), CH (2) PEP: CH
	Field strips (or patches) for biodiversity (e. g. flowering plant mixtures)	This action describes the creation of areas for biodiversity, especially wildlife. These are usually found at the edge of arable fields but can include areas that protrude into the crop or where field corners are taken out of management.	AECM: AT (1), DE_TH (1), CH (1)
	Extensive management of arable plots for wildlife and/or arable herbs	The action describes management aiming at the conservation and development of arable plots for wildlife and/or arable herbs in order to increase biodiversity. This may involve time limits or bans for certain management actions, limitations or ban of fertiliser and pesticides applications, requirements to cultivate (or abstain from) certain crops etc.	AECM: DE_SN (1)
	Take land out of production (self-greening, grass cover or flowering fallow) (annual/perennial)	This action describes where farmers are required to take areas of currently farmed land out of the productive cycle for more than one year.	AECM: DE_SN (2), CH (1)
	Minimum share of ecological focus areas/biodiversity promotion areas on arable or all agriculturally used land	This action describes the obligation of EU Member States to ensure, that the share of permanent grassland related to the total UAA does not decline at the national, regional or sub-regional scale by more than 5 % compared to this share existing in 2015 (based on permanent grassland declared in 2012 plus additional areas declared in 2015). Accordingly, in Switzerland an appropriate share (minimum 3.5 % of special crops area and 7 % of other agricultural land) of biodiversity promotion areas has to be ensured.	Greening/PEP: AT, CH, DE, ES, NL



Category of management action	Technical measures	Description of technical measures	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁴
Water management	Limits to water abstraction	This action describes the obligation to acquire authorisation water abstraction for irrigation. In Austria, authorization is required if existing abstraction thresholds are exceeded.	GAEC: AT, DE, ES, NL
	No irrigation	This action refers to the prohibition of irrigation.	AECM: DE_TH (2)
Arable to grassland	Conversion of arable land to permanent grassland	This action refers to the conversion of arable land into permanent grassland in certain areas (e. g. related to water protection or biodiversity conservation). In Austrian, Dutch and Spanish farmers are obligated to re-convert converted areas into permanent grassland if the ratio of permanent grassland has decreased by more than 5 % under greening requirements.	AECM: DE_TH (1) Greening: AT, NL, ES (if decrease of ratio > 5 %)
Organic farming	Converting to or maintaining organic farming practices	The action describes the conversion or maintenance of organic farming practices and methods as defined in official regulations on organic farming (for the EU: Regulation (EC) No 834/2007).	

Project acronym: TALE

Short title: Review on agricultural policies

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Regarding the impact of the technical measures, cause-effect relations in ecosystems are extremely complex and dependent on regional and local conditions and the specific details of the technical measures, thus a high degree of generalisation can't be avoided.

For the rating (see table below) we considered intensive agricultural management as the counterfactual condition (e.g. a trend to convert permanent grassland into arable land, high livestock density or high level of fertiliser and pesticides input). We are aware that agriculturally used land may also be at risk of being abandoned. In such a case support measures e.g. for grassland management have the main effect to ensure continued management of this area while there would be no additional impacts on abiotic subjects of protection.

We are also aware that extensification of land management in one place (with the related decrease of pressures on the environment) might be compensated again by intensification in another region. However, here we only take into account the impacts on the plot of land concerned by the particular technical measure.

As the focus of WP1 is the general functioning of policy measures and not a detailed discussion and evaluation of environmental impacts of technical measures, we condone with these inaccuracies. The exercise is meant to highlight main management options to address various environmental aspects and to illustrate the multiple effects of many measures.

This assessment result is a matrix that links the technical measures to environmental objectives, indicating the potential direction (**positive, neutral, negative**) and the **strength of the impact**.

The environmental impacts have been rated according to the expertise by the WP1-team.

Table 36: Matrix for rating impacts of technical measures applied in the TALE case study regions

(++ = potential strong/significant contribution, + = potential weak or indirect contribution, 0 = no potential contribution, - = potentially detrimental)

Category of management action	Technical measures	Farmland bio-diversity	Agricultural landscapes	Water quality (N)	Water availability	Soil functionality ⁶⁸	Climate change mitigation	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁹
Management of grass and semi- natural forage	Maintenance of the permanent grassland area on the farm	+	+	+	+	+	+	AECM: AT (1)
	Ban on converting sensitive grassland (nature conservation)	++	++	+	+	+	+	Greening: AT, DE, ES, NL
	Ban on converting sensitive grassland ⁷⁰ (water protection)	+	+	++	+	+	+	AECM: AT (1)
	Conversion of permanent grassland only after approval (and with creation of compensation areas)	+	+	+	+	+	+	Greening: AT, DE
	Restricted mechanical maintenance of permanent grassland (no ploughing)	+	+	+	+	+	+	AECM: DE_TH (2)

⁶⁸ Soil functionality includes the proportion of organic matter, the level of susceptibility to erosion by wind and water, the soil's structure and capacity for infiltration, the health of its biota and its level of contamination (JRC, 2009).

⁶⁹ AECM for NL not included

⁷⁰ Means: grassland in locations sensitive for water protection issues (e. g. in water protection areas or on buffer strips along water courses).



Category of management action	Technical measures	Farmland bio-diversity	Agricultural landscapes	Water quality (N)	Water availability	Soil functionality ⁶⁸	Climate change mitigation	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁹
	No additional seeding on permanent grassland	+	+	0	0	0	0	AECM: DE_SN (3)
	Grazing regime (limits for livestock density and/or dates)	++	+	++	0	+	+	AECM: AT (1), DE_SN (1), DE_TH (4), ES (2), CH (3)
	No grazing	+	+	+	0	+	++	AECM: AT (2), DE_SN (3), ES (1)
	Mechanical scrub or invasive species control (other than grazing or mowing ⁷¹)	++	+	0	0	0	0	AECM: DE_TH (1)
	Hay making	++	++	0	0	0	0	AECM: AT (1)
	Cutting regime (e. g. number of cuts, allowed times, wildlife friendly mowing, obligation to remove cut vegetation)	++	+	0	0	0	0	AECM: AT (2), DE_SN (7), DE_TH (4), CH (3)
	Input management	No (N-) fertiliser application	++	+	++	0	+	++
AECM: AT (7), DE_SN (7), DE_TH (2), ES (1), CH (1)								

⁷¹ This measure is rated in comparison to land abandonment as is only applied in case of succession being apparent.

Category of management action	Technical measures	Farmland bio-diversity	Agricultural landscapes	Water quality (N)	Water availability	Soil functionality ⁶⁸	Climate change mitigation	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁹
& Non-chemical crop protection	Limits to the amounts of applied fertiliser	++	+	++	0	+	++	AECM: AT (2), DE_SN (1), DE_TH (1), ES (1), CH (1) PEP: CH
	Low emission application or precision farming	0	0	++	0	0	++	
	Banned periods of fertiliser application	0	0	++	0	0	0	AECM: AT (1), DE_SN (1)
	Limits to fertiliser application along water courses	+	+	++	0	0	+	GAEC: DE, ES, NL
	Limits to fertiliser application in sensitive areas (water protection)	+	+	++	0	0	+	
	Limits to fertiliser application in sensitive areas (nature protection)	++	++	+	0	0	+	
	No fertiliser application on frozen, water logged- or snow-covered ground	0	0	++	0	0	0	GAEC: NL
	No growth regulators	0	0	++	0	++	0	AECM: CH (1)
	No chem.-synth. plant protection products	++	+	++	0	++	0	AECM: AT (7), DE_SN (7), DE_TH (3), ES (1), CH (1)

Category of management action	Technical measures	Farmland bio-diversity	Agricultural landscapes	Water quality (N)	Water availability	Soil functionality ⁶⁸	Climate change mitigation	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁹
	(treatment of single plants allowed)							
	Limits to chem.-synth. plant protection products or specified regimes	++	+	++	0	++	0	AECM: DE_SN (1), DE_TH (1), ES (1), CH (2))
	Limits to chem.-synth. plant protection products along water courses	+	+	++	0	+	0	GAEC: ES
	Mechanical or manual weed control	++	+	++	0	+	0	AECM: DE_SN (1), CH (1)
Soil cover	Grass cover in permanent crops	+	++	++	++	++	++	AECM: ES (1) GAEC: AT
	Green or vegetative cover on arable land (e. g. winter catch crops, undersown crops)	+	+	++	++	++	++	AECM: AT (3), DE_SN (1), DE_TH (1), ES (1) GAEC/PEP: AT, CH, DE, NL
	Over winter stubbles	++	++	++	+	++	+	AECM: DE_SN (1)
Soil management	Erosion prevention strips	+	+	++	+	++	+	AECM: DE_SN (1), DE_TH (2) GAEC: DE

Category of management action	Technical measures	Farmland bio-diversity	Agricultural landscapes	Water quality (N)	Water availability	Soil functionality ⁶⁸	Climate change mitigation	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁹
	Tillage regime (e. g. parallel to slope)	0	0	++	0	++	0	AECM: ES (1) GAEC: DE, ES, NL
	Erosion reducing sowing regime (mulch-seeding, direct-seeding, strip-till)	0	0	++	+	++	+	AECM: AT (1), DE_SN (1), DE_TH (1), CH (1)
	Greening of runoff furrows	+	+	+	0	+	+	AECM: DE_TH (1)
	Incorporation of crop residues	0	0	0	+	++	+	AECM: ES (1)
	Restricted soil management on frozen, waterlogged or snow covered soils	0	0	++	0	+	0	GAEC: AT
	Restrictions for cultivation for certain crops on slopes	0	0	++	+	++	+	GAEC: NL
Buffer strips	Riparian buffer strip	+	+	++	0	+	+	AECM: AT (1), DE_TH (1) GAEC/PEP: AT, CH, ES, NL
Crop management	Diverse crop rotation (also restrictions, e. g. no maize)	+	+	+	0	+	+	AECM: AT (1), DE_SN (2), DE_TH (2), ES (3) Greening/PEP: AT, CH, DE, ES, NL



Category of management action	Technical measures	Farmland bio-diversity	Agricultural landscapes	Water quality (N)	Water availability	Soil functionality ⁶⁸	Climate change mitigation	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁹
	Restricted dates for mechanical maintenance of arable crops	++	0	+	0	++	0	AECM: DE_SN (2), DE_TH (2) GAEC: DE, ES
	Harvesting regime (arable land)	+	+	0	0	0	0	AECM: DE_TH (1)
	No burning of straw, stubble or cut residue	+	0	0	0	+	++	GAEC: AT, DE, ES, NL
	Maintenance of set-aside land	+	+	0	0	0	0	GAEC: AT, DE, ES
Landscape feature management	Management of non-aquatic landscape features (e. g. hedges, trees, stone walls, fix field boundaries)	++	++	0	0	+	+	AECM: AT (1), ES (2)
	Retention of non-aquatic landscape features	++	++	+	0	+	+	GAEC: AT, DE, ES, NL
	Seasonal ban of hedge and tree cutting	++	+	0	0	0	0	GAEC: AT, DE, ES, NL
	Management of sensible areas according to specific obligations	++	++	++	0	+	+	AECM: AT (1), CH (2) PEP: CH

Category of management action	Technical measures	Farmland bio-diversity	Agricultural landscapes	Water quality (N)	Water availability	Soil functionality ⁶⁸	Climate change mitigation	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁹
Management for biodiversity	Field strips (or patches) for biodiversity (e. g. flowering plant mixtures)	++	++	+	0	+	+	AECM: AT (1), DE_TH (1), CH (1)
	Extensive management of arable plots for wildlife and/or arable herbs	++	++	++	0	+	+	AECM: DE_SN (1)
	Take land out of production (self-greening, grass cover or flowering fallow) (annual/perennial)	++	++	++	++	++	++	AECM: DE_SN (2), CH (1)
	Minimum share of ecological focus areas/ biodiversity promotion areas on arable or all agriculturally used land	++	++	+	0	+	+	Greening/PEP: AT, CH, DE, ES, NL
Water management	Limits to water abstraction	+	+	+	++	+	0	GAEC: AT, DE, ES, NL
	No irrigation	+	+	+	++	+	0	AECM: DE_TH (2)
Arable to grassland	Conversion of arable land to permanent grassland	+	+	++	+	++	++	AECM: DE_TH (1) Greening: AT, NL, ES (if decrease of ratio > 5 %)



Category of management action	Technical measures	Farmland bio-diversity	Agricultural landscapes	Water quality (N)	Water availability	Soil functionality ⁶⁸	Climate change mitigation	Countries where measure is supported or regulated by GAEC, greening or the proof of ecol. performance (and frequency of supported technical measures in case of AECM) ⁶⁹
Organic farming	Converting to or maintaining organic farming practices	+	+	+	+	++	++	

Annex VIII: Regulation restricting fertilisation

Table 37: Types of mandatory standards regarding fertilisation in sectoral legislation in the TALE cast study countries

	AT	DE (SN + TH)	ES	NL	CH
Maximum limits for the yearly application of N	<ul style="list-style-type: none"> - Limitations subject to crop and yield potential (according to national guidelines) - Max. 170 kg N/ha for organic livestock fertiliser (authorisation required for higher amount up to 210 kg under certain conditions) 	<ul style="list-style-type: none"> - Max. 170 kg N/ha for organic livestock fertiliser (authorisation required for higher amount up to 230 kg under certain conditions) 	<ul style="list-style-type: none"> - Maximum limits for the yearly application of N by types of fertilisers 	<ul style="list-style-type: none"> - Maximum limits for N (and P) from total fertilisation (for N depending on crop and soil type, for P on the P-content of the soil) - Max. 170 kg N/ha for organic livestock fertiliser (authorisation required for higher amount up to 250 kg under certain conditions) 	Maximum limits for organic livestock fertiliser
Maximum nutrient saldo		<ul style="list-style-type: none"> - Defined, but not directly mandatory 	<ul style="list-style-type: none"> - Maximum nutrient saldo for N 		<ul style="list-style-type: none"> - Balanced nutrient saldo
Time limits for application	<ul style="list-style-type: none"> - No application during winter (dates subject to crops, weather conditions and type of fertiliser) - No application of slurry on frozen, water-saturated and snow-covered ground 	<ul style="list-style-type: none"> - Time limits in winter for different types of organic fertiliser - No application of slurry on frozen, water-saturated and snow-covered ground 	<ul style="list-style-type: none"> - Depending on type of crop 	<ul style="list-style-type: none"> - Depending on type of fertiliser, land use, crop type and soil type - No application of slurry on frozen, water-saturated and snow-covered ground 	<ul style="list-style-type: none"> - Application of N-fertiliser only when take-up by crop is possible - No application of slurry on frozen, water-saturated and snow-covered ground

Further restrictions for N-fertiliser application in certain areas	<ul style="list-style-type: none"> - No application close to water bodies - Restrictions on hilly land - Further restrictions might exist in drinking water protection areas or flooding areas - Further restrictions might exist in areas protected under nature conservation law 	<ul style="list-style-type: none"> - Restrictions near water bodies (depending on distance) - Further restrictions might exist in drinking water protection areas or flooding areas - Further restrictions might exist in areas protected under nature conservation law 	<ul style="list-style-type: none"> - Further restrictions for fertiliser application in certain areas (e. g. flooding areas, buffer strips, and cities) 	<ul style="list-style-type: none"> - No fertilisation in buffer zones along water courses (width depends on the cultivated crop and also on sensitivity of the water course) - Restrictions for the application of farmyard manure on areas primarily attributed to nature conservation - Further restrictions for fertiliser application in certain areas: on hilly land (specific rules depend on e. g. fertiliser type, land use, steepness and vulnerability to erosion) - Further restrictions possible in areas protected under nature conservation law 	<ul style="list-style-type: none"> - No fertiliser application in buffer zones and within 3 along hedges and field woods. - Further restrictions might exist in drinking water protection areas - No applications in certain areas protected under nature conservation law
Other mandatory requirements for land management	<ul style="list-style-type: none"> - Restrictions on fertilisation after harvest - Immediate incorporation of slurry if applied to bare soil 			<ul style="list-style-type: none"> - Periods, when conversion of permanent grassland is not allowed depending on soil type and subsequent crop - Low-emission application of farmyard manure (with few exceptions e. g. for solid manure on grassland) - Even application of organic farmyard manure on the plot - Directly after harvesting maize on sandy and loamy 	



soils catch crops have to be
sown and remain on the
field over winter

