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1.0. Introduction: report's background and objectives

This report is an overview of the current situation of water policy in France. It collects and analyses information regarding the economic and institutional context of public aid to farmers. The goal of its aid is to support farmers towards a change in farming practices that are more environmentally friendly. The report aims to examine this aid in order to provide a basic evaluation to set up Payments for Ecosystem Services (PES). A similar analysis conducted in England improves this baseline to inform the development of future approaches to PES design. PES mechanisms will be tested in several local territories in France (Normandy, Brittany) and analysed through comparative studies of the different drainage basins. This baseline, serving as a reference, will allow an assessment of the effectiveness of the implementation of concrete PES at the end of the project. This evaluation is part of the CPES (Channel Payments for Ecosystem Services) project funded by the Interreg programme. It is a collaboration between English and French partners as well as the European Union, focused on improving water quality.

The following aspects will be examined in the report:

- State of water resources and French agriculture (summary and key figures);
- Analysis of the French national water policy framework
- Description of public aid, economic incentives, and other financial mechanisms allocated to farmers to help them move from a conventional agriculture to an agriculture which is compatible with the water quality (conditions for granting aid, compliance rate among farmers, effects on the water quality objectives, type of contract, etc.)
- Institutional analysis: organisation of the aid allocation process, frequency, contractual conditions, and evaluation of transaction costs.
- Economic analysis: estimate of the programme cost, per-hectare granted value, cost-effectiveness of the aid schemes.

2.0. Water and agriculture: summary

2.1. State of water resources and key figures on French agriculture

Establishing an assessment of the state of the resource is essential to justify the project's relevance, by means of key figures regarding the state of water which is strongly affected by agricultural practices, in France and in certain specific regions (General Commissioner for Sustainable Development, Environment & Agriculture [Commissariat général au développement durable, Environnement & agriculture] the key figures - 2018 edition).

- **Water use for agriculture:**

The volume of freshwater withdrawn in France is estimated at 33.5 billion m³ in 2013. 83% of the water is withdrawn from the surface (rivers, lakes, etc.) and the rest from underground (groundwater). Withdrawals to produce drinking water and for agriculture and other uses, mainly industrial, represented 11 billion m³ in 2013.

Those mainly intended for agricultural uses amount to 2.7 billion m³, that is 1,700 m³ /ha irrigated, of which 37% come from groundwater, the rest is essentially withdrawn from surface water. 80% of water withdrawals by agriculture are intended for irrigation, even if it involves only 5% of the agricultural area used on a national scale.

- **Agricultural surface area:**

The utilised agricultural area (UAA) irrigated in 2013 was 1.4 million hectares (ha) for 134,620 farms. Between 1970 and 2000, irrigated areas tripled from 0.54 million ha to 1.57 million ha. Since 2000, this trend has slowed down and the volume of irrigated land has stagnated. In France, the irrigated surface area rate in relation to the UAA is moderate (5% in 2013) compared to the European average but it shows wide spatial disparity.

- **Phytosanitary products :**

The development of intensive agriculture from the 1960s onwards resulted in a sharp increase in the consumption of chemical fertilisers and phytosanitary products. Agricultural pollution has intensified since farmers have been using herbicides, insecticides and other phytosanitary products to improve crop yields.

- **Fertilisation:**

According to the Observatory for Mineral and Organic Fertilisation (Observatoire pour la fertilisation minérale et organique), in 2015, 18 million tonnes of mineral and organic fertilisers were marketed in metropolitan France, including 12 million tonnes (Mt) of mineral origin and 6 Mt of organic origin. Between 1972 and 2015, the quantities of mineral nitrogen delivered increased by a third, from 1.6 Mt to 2.2 Mt, while the area available for fertilisation decreased by 11% (25.8 million in 2015). About 85 kg of nitrogen are sold per fertilisable hectare. At the same time, phosphorus deliveries fell by nearly 80% to about 440,000 tonnes in 2015, that is 7.5 kg of phosphorus sold per fertilisable hectare.

2.2. Impacts on Water and Soil Quality

In 2015, more than 312,000 water withdrawals and more than 16 million were used to monitor the quality of the water supplied. Between 2007 and 2015, 573 drinking water abstraction points were abandoned due to non-compliance related to nitrates and/or pesticides, that is 11% of abandonments. Other reasons are network efficiency, low flows or dilapidated state. Among the abandonments related to pesticides and nitrates, 44% are due to excess nitrates, 31% to pesticide threshold exceedances and 25% to both. Rivers are directly exposed, therefore very vulnerable to this pollution from soil contamination through agricultural or non-agricultural use of pesticides, which have sometimes been banned for decades.

- **Pesticides:**

Pesticides in surface waters: 90% of the monitored area shows the presence of at least one pesticide, while 63% exceeds the drinking water standard of 0.1 µg/l.

Pesticides in groundwater: In 2014, 698 phytopharmaceutical active substances were investigated in groundwater. Among these substances, 266 were found at least once.

- **Soil erosion:**

Soil water erosion is estimated at 1.5 tonne per hectare per year (t/ha/year) on average in France, with strong spatial heterogeneity. Thus, the Normandy and Brittany regions present risks of soil losses of more than 5 t/ha/year on more than 10% of their territory.

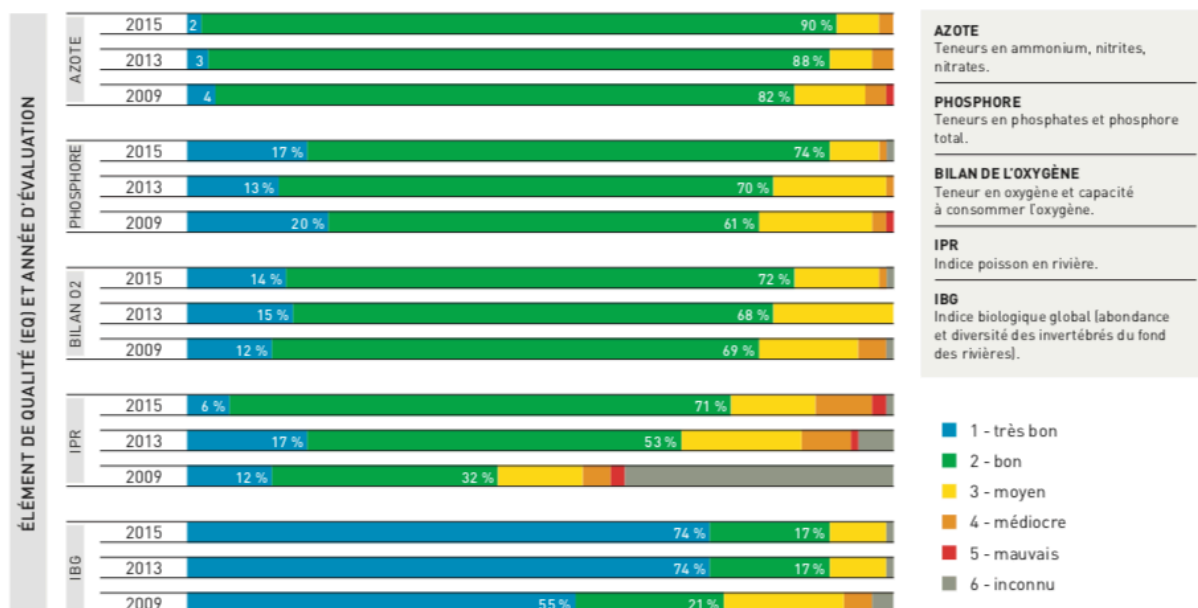


Figure 1 : Evolution of 5 quality elements at river monitoring stations - Seine-Normandy Water Agency [Agence de l'eau Seine Normandie] (AESN) - Report on water quality in the Seine-Normandy basin - 2017

The AESN report, state of play on water quality in the Seine-Normandy basin (2017), shows that the quality of the basin's water has significantly improved: "in six years, from 2009 to 2015, the ecological status of the bodies of water has moved from 23% to 39%, including by taking into account the improvement of knowledge". When studying water quality, a special attention needs to be given to elements such as nitrogen, phosphorus, and oxygen level. Nevertheless, the pressure on the resource exerted by the agricultural sector remains very high and further progress is needed to achieve the good status goals set by the European Water Framework Directive (WFD).

The box below establishes a balance of water resources in several territories in terms of quantity of inputs (nitrogen and phosphorus).

Nitrogen Balance: In 2015, Brittany and the Pays de la Loire had the highest nitrogen surpluses, with more than 100 kg per ha of nitrogen surplus.

Phosphorus Balance: In 2015, in Brittany, the surplus reached 20 kg/ha. Indeed, in intensive pig and poultry farming areas, total phosphorus inputs (mineral and organic) are sometimes too high in relation to crop needs.

3.0. French national water policy framework

3.1. Overview

Water quality is an important concern in the European Union policy. Thus, **the Water Framework Directive (WFD)** of 23 October 2000 (Directive 2000/60) provides a consistent legislative framework for water management and protection with a comprehensive Community water policy to encourage sustainable development. As a result, in France, current water management is based on both French legislation and specific European directives. In compliance with the principles of the WFD and the

legislation on water, the **Master Plan for Water Development and Management [schéma directeur d'aménagement et de gestion des eaux]** (SDAGE) has been implemented. It is a planning instrument that sets out for each river basin the fundamental orientations for a balanced management of water resources in accordance with the environmental objectives for each water body (water bodies, river sections, estuaries, coastal waters, groundwater). The objective of this planning document is to improve water quality: by 2027, all rivers, lakes, coastal waters and groundwater must achieve a good status.

As part of the local operations of Regulation (2078/92), issues relating to the preservation of biodiversity and in particular water quality were identified prior to the implementation of the **agri-environment-climate measures [mesures agro-environnementales et climatiques]** (MAECs), through the production of regional summaries. The result is the delimitation of areas affected by intensive agriculture that have been identified as priority areas due to agronomic and environmental damage. Water quality is a priority issue among the other stated regional issues, with nearly 10% of drinking water abstraction points exceeding the potability limit in nitrates.

3.2. Issues and principles of French water policy

The major challenges faced by French water policy are the prevention of water-related risks, preservation of water resources and aquatic environments, prevention of permanent and accidental pollution, sustainable development of water-related activities (industry, leisure, transport, etc.), ensuring agri-food production with limited impacts on the environment and resources, etc.

The main principles of this French water policy are as follows (Eaufrance) :

- **Decentralised management of river basins** : nationally coordinated and a water management of river basins that is adapted to the management of water resources and ecologically coherent ;
- **Integrated (or global) approach** which takes into account the different water uses and the physical, chemical and biological balances of aquatic ecosystems;
- **Joint management with the participation of all water stakeholders** and stakeholders at all scales;
- **Scientific and technical expertise** to support the design, implementation and evaluation of public water policies, coordinated by the National Office for Water and Aquatic Environments [Office national de l'eau et des milieux aquatiques], which has integrated on 1 January 2017 the French Biodiversity Agency [Agence française de la biodiversité];
- Economic incentive instruments: according to the "user pays" and "polluter pays" principles. Royalties are collected by the water agencies [agences de l'eau] and redistributed in the form of aid. This last point provides an understanding of the MAEC logic.

4.0. Financial mechanisms allocated to farmers: Agri-environmental and climate measures (MAECs)

4.1. Description of the MAECs

The notion of agri-environment-climate measures (MAECs), defined in article 28 of the **Rural Development Regulation** (RDR3 - No. 1305/2013 of 17 December 2013), covers

all measures implemented in the European Union within the framework of the **Common Agricultural Policy**. (CAP) The 2014-2020 CAP consists of two pillars:

- the **first pillar**, comprising direct payments to farmers and the common market organisation (financed by the European Union). Four types of direct payments are available: young farmer payments, redistributive payments, basic payments and green payments. They represent the main instrument of the CAP (about 70% of the budget). These direct aids are supplemented by export subsidies, production aid, quotas, etc.
- The **second pillar** dedicated to rural development measures (co-funded by the EU and the Member States), represents around 25% of the CAP budget for farm modernisation, farmer training, settlement support and organic farming.

The MAECs are part of the support provided under this second pillar of the CAP. These are economic instruments used to respond to the environmental challenges facing the territories. In particular, **the MAECs with "water issues"** are part of a determination to preserve water quality and biodiversity despite a diffuse pollution of agricultural origin. This public aid is granted to farmers to move from conventional agriculture to agriculture compatible with water quality (conversion) or also to maintain agriculture compatible with water quality (maintenance). Farmers voluntarily undertake, for a 5-year minimum period, to adopt environmentally friendly agricultural techniques that go beyond legal obligations. In return, they receive financial assistance to offset the additional costs and income losses resulting from the adoption of these practices, as foreseen in the agri-environmental contracts. If the farmer undertakes these measures, he must comply with a number of obligations, in particular: the conditionality of aid, the eligibility criteria and commitments defined in the specifications, monitoring and controls, etc. Governance includes the duration of the commitment, flexibility in the choice of specified plots, the monitoring system, penalties and contract renegotiation terms (Dupraz, 2008).

In order to facilitate the conduct of operating diagnoses prior to the contractualisation of MAECs, **DREAL** (Regional Directorates for the Environment, Development and Housing [directions régionales de l'environnement, de l'aménagement et du logement]) and the **DRAAF** (Regional Directorate of Agriculture, Food, and Forests [directions régionales de l'alimentation, de l'agriculture et de la forêt]) with the support of the association for protection of nature areas [Conservatoire d'espaces naturels] have collaborated to produce a diagnostic tool for the **Biodiversity Priority Action Area [Zone prioritaire pour la biodiversité]**. This diagnosis is carried out in order to validate the commitment in MAEC wetlands. This is not an obligation for other MAECs. Once this diagnosis has been made, voluntary farmers with farms in priority areas can decide to engage in this type of incentive measures.

Many measures are proposed to operators based on the results of the various diagnoses on the state of resources (water, air, soil, etc.) and biodiversity. These measures can be grouped as follows:

- o **system measurements:** the specifications apply on all or substantially all the exploitation. The goal is to adopt a global approach to exploitation. These may be grassland and pastoral systems, polyculture-livestock systems or field crops;
- o **localised measures:** like the former territorialised MAEs (MAETs), these measures are made up of commitments made on the parcels where the issues are located;
- o **measures to protect genetic resources:** protection of endangered breeds [protection des races menacées de disparition] (PRM), preservation of plant resources [préservation des ressources végétales] (PRV), improvement of the pollinating potential of honeybees for the preservation of biodiversity [amélioration

du potentiel pollinisateur des abeilles domestiques pour la préservation de la biodiversité] (API).

Among all the MAECs, practices more specifically related to water quality preservation are listed in the table below. It also includes the impact of practices, benchmarks and indicators describing the general characteristics and condition of the resource in relation to environmental issues and implementation indicators showing the number of beneficiaries and the areas covered by contracts.

Table1: Typology of practices regarding the preservation of water quality and biodiversity, practices analysed and impacts - Source: Oréade-Brèche

Typology of practices - preservation of water quality	Details of the practices analysed	Impacts on the resource	Benchmarks/Implementation Indicators
Reduction in inputs	Reduction of nitrogenous or phosphate fertilisers, herbicides	Improving water quality for human or animal consumption Improving water quality for aquatic habitats	Gross nutrient balance → Nitrogen/phosphorus surplus in kg/ha
Reduction of pesticides to waters and good management of nitrogen fertilisation			Pollution by nitrates/pesticides → annual evolution of nitrates/pesticides concentrations in groundwater and surface waters
Creation or maintenance of ecological infrastructures	Installation of a herbaceous cover in winter, an intermediate crop, hedges, slopes, groves, etc.		Total specified area in ha
Diversification of rotations, maintenance of grasslands	Conversion of arable land to grassland, maintenance of grassland		Surface at risk of soil erosion (T/ha/year)

For instance, the following measures have been identified as the most effective in Brittany and Normandy territories, after studies on the effectiveness of the measures have been carried out:

Table2: the most effective measures in Brittany and Normandy territories - Source: SMGBO (Syndicat Mixte du Grand Bassin de l'Oust), SERPN (Syndicat d'eau du Roumois et du plateau du Neubourg) and Eau de Paris interviews.

Territory	Brittany	Normandy
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Most effective types of measures	Groves, hedges, embankments: effective against water runoff	Permanent soil cover (grassland or semi-direct crop): effective against water runoff and erosion, reduction in phosphorus transfer to the hydrographic network (streams, water-channelling ditches, etc.);
	MAEC Systems (grassland and pastoral, field crops, etc.)	Change in the system of polyculture-bovine livestock farming: reduction in the maize share in farms, increase in the grassland share and other crops without inputs, reduction in the use of phytosanitary treatments.

The level of aid fixed varies significantly from one EU Member State to another. These differences reflect political trade-offs regarding the UAA's share and the budgets to be allocated to MAECs. Technically, the payment amounts, which are submitted to the EC for validation, must be calculated in accordance with the rule on additional costs and shortfalls established by the WTO and included in the CAP. In France, the hectare-based remuneration is between €50 and €900, depending on the environmental requirement of the measures and the cover targeted.. Financial support for organic farmers and MAECs may be subject to a financial limit, setting a maximum number of hectares (or number of elements for some MAECs) that may benefit from the aid.

4.2. Institutional Analysis and Allocation Mechanism

The territorialisation of public action questions both the characteristics of the territories of action and the relationships between the different scales of intervention for the implementation of aid: the national level represented by the government and its decentralised services, and the local level represented by a great diversity of local actors (water unions, intermunicipalities, departmental chambers of agriculture, farmers, elected officials, associations, etc.). The implementation in France of the 2014-2020 CAP, with significant intervention by government departments and the transfer of management authority to the regions, has resulted in an intertwining of the various actors and great complexity in the management of CAP funds.

The EAFRD (**European Agricultural Fund for Rural Development**); finances rural development policy, which is the second pillar of the CAP. The EAFRD's intervention, within the framework of the Europe 2020 strategy, contributes to the development of rural areas and agricultural activities that are more respectful of ecosystems, more competitive and more innovative. To serve these cross-cutting objectives, the Rural Development Regulation (RDR) defines rural development priorities.

The government and the water agencies are co-funders of the aid granted to farmers. The French Ministry of Agriculture ensures the application of the CAP in France, supported by decentralised services. At the regional level, these are the DRAAF (**Regional Directorate of Agriculture, Food, and Forests [Directions Régionales de l'Alimentation, de l'Agriculture et de la Forêt]**) and at the departmental level, the

DDT(M) (Departmental Directorate of Territories **and the Sea** [**Directions Départementales des Territoires et de la Mer**])

The implementation of rural development policy is under the responsibility of the regions for the 2014-2020 programming period. Indeed, the CAP reform has made it possible to give the regions a role as managing authorities of the EAFRD, with the **European Commission** (EC) allocating a budgetary envelope to each authority. In France, each region can build its own **Rural Development Program** (PDR). The region decides on the content of this programme, the measures to be implemented in their territories and is responsible for the effective, efficient, effective and correct management and implementation of the programme and its monitoring. The management authorities prepare their PDRR (**Regional Rural Development Programme**) in consultation with local stakeholders, and in particular carry out:

- a diagnosis of the needs to be covered in the territory of the programme;
- the justification for choosing the measures open in the PDRR to meet EU priorities and the territory needs;
- a description of the content of the measures in the local context, in accordance with the European regulation and the national framework where applicable.

Nevertheless, the regions may decide to delegate part of the management (in particular the examination of files requests for assistance, as well as monitoring) to other organisations (DDT, DRAAF). The instructing and monitoring services are responsible for managing requests within the framework set by the managing authority.

The chain of agricultural aid allocation is carried out by the **Agency for Services and Payment** [**Agence de Services et de Paiement**] (ASP), the main paying agency of the CAP in France (from the realtype to the **European Agricultural Guarantee Fund** (EAGF) and the EAFRD). As such, it pays farmers the coupled and decoupled aid under the first pillar, as well as rural development aid under the second pillar (including MAEC). The management of agricultural aids to the ASP is entrusted to the **Rural, Agricultural and Fisheries Intervention Directorate** [**direction des interventions rurales, agricoles et pêche**] (DIRAP). The DIRAP is divided into two parts: on the one hand, Directorate-General for Agriculture and Rural Development [Direction des soutiens directs agricoles] (DSDA), in charge of "surface aid" and on the other hand, the Directorate General for Sustainable Fisheries [Direction du développement rural et de la pêche] (DDRP), in charge of "non-surface aid" of the second pillar. The ASP has a network of 17 regional delegations, separate from that of the Ministry of Agriculture. This network is responsible for carrying out controls and monitoring rural development programmes (RDPs). In the management of the allocation of aid, a triangular relationship is established between:

- the paying agency (the ASP);
- decentralised services (DDT(M)), under the hierarchical control of the Ministry of Agriculture and to which the ASP delegates in particular the examination of requests;
- the Ministry of Agriculture, which is both the supervisor of the ASP and the hierarchical authority of the DDT(M).

The theoretical timetable for allocating aid¹ is as follows. In May of year n, aid applications shall be submitted by farmers, assisted in their approach by agricultural technical advisors and the water unions of local authorities. The ASP is responsible for the operational implementation of the measures but delegates to DDT(M) the receipt and processing of requests. The files are imported into the computer software at the end of June (more than 300,000 files) to be processed at the end of the year

¹ France is subject to refusal of clearance for aid granted between 2007 and 2017. In addition to the regulatory changes in the allocation of 2nd pillar support, the ASP is experiencing delays in the last three years of payments to farmers.

The ASP then takes care of the payment to the quarter of year n+1. In 2017, including all aid, it paid €9 billion to 360,000 agricultural holdings, about 70,000 of which are for organic MAECs.

The ASP is responsible for the implementation of the payment chain, but it delegates to DDT(M) the processing, on the one hand, and the monitoring, on the other hand:

- the administrative monitoring (including on-site visits) by DDT(M), i.e. those related to compliance with eligibility conditions
- the selection of files subject to on-the-spot checks by the DDT(M) (assessments carried out by the **regional delegations of the ASP**)
- re-audit controls, carried out by regional delegations.

Broadly speaking, the simplified logic for granting aid is as follows.

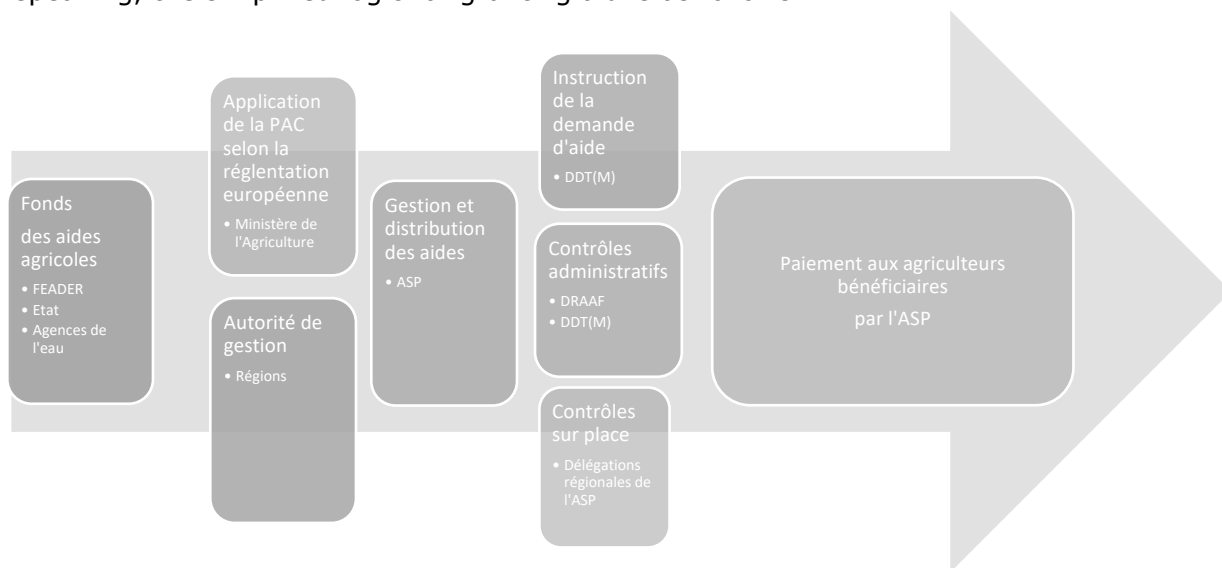


Figure2 : Simplified help management circuit - Source: interview with the ASP

4.3. Funding of the aid

France is the first country to receive aid from the Common Agricultural Policy (CAP). In the current programme, covering the years 2014 to 2020, agricultural aid for France amounts to:

- 52.3 billion (about €7.5 billion per year) under the so-called first pillar EAGF, which funds direct payments to farmers, measures governing or supporting agricultural markets and other expenditures including information and promotion actions for agricultural products;
- 11.4 billion (about €1.6 billion per year) under the EAFRD, the "second pillar", which contributes to rural development programmes. The EAFRD envelope for France is the largest in the European Union (source: Commissariat Général à l'Egalité des Territoires, 2014).

The MAECs are 75% funded by the EAFRD (European support), and 25% by national co-financing (the government, the **French Ministry of Ecological and Solidarity Transition [ministère de la Transition écologique et solidaire]** (MTES) and the **French Ministry of Agriculture and Food [ministère de l'agriculture, de l'agroalimentaire et de la forêt]** (MAAF), water agencies or local authorities (mainly Regions, Regional Councils). A minimum of 30% of the EAFRD amounts must be allocated to measures dedicated to environmental protection and nationally defined commitments

must be adapted according to the environmental challenges identified in each region. Measure 10 (the one specifically concerning MAECs) alone represents €1,826,083,192, or 18% of total public funding. France is now the Member State that targets the higher MAECs while its budget is only the 5th, behind Germany, the United Kingdom, Italy, and Austria. There is a strong determination to develop agricultural aid, despite the difficulties it faces, since « the total public aid for MAECs over the period 2014/2020 is doubled compared to the period 2007/2013" (MAAF). In 2018, €82 million were added to pay for previous commitments.

5.0. Economic, social, environmental impact

5.1. Overall summary of the impacts of MAEC about water quality

The assessment of the impact of the measures on the specific resource makes it possible to report on their overall effectiveness. What is at stakes here is the reduction of water pollution (surface and groundwater) by fertilisers and treatment products used in agriculture.

Member States such as France have defined areas with a "water quality" stake based on pollution levels or the environment's sensitivity. The problems to be treated differ depending on the area: pollution by nitrates, phosphates and/or pesticides, etc. The MAECs make it possible to limit nitrogen fertilisation on grasslands classified as wetlands as well as good management of nitrogen fertilisation in the MAEC livestock system.

Overall, the scientific studies conducted in France first show that the measures have effectively reduced inputs, although some studies conclude that the differences with non-MAE plots are not significant. This reduction in inputs and transfers has rather positive effects on the resource, that is an improvement in water quality. More specifically, the beneficial effects related to the practices implemented are the reduction of inputs as well as the reduction of transfers of agricultural pollutants. Regulatory measures such as strips of grass have proven to be effective in the trapping and degradation of fertilisers and pesticides. Fallows are also good traps for nitrates and other elements when they are sown. However, their impact must be qualified since in water abstraction areas with rapid transfers of surface water to the groundwater, strips of grass have no interest except to limit spray drift. The conversion of arable land to grassland and winter land cover measures have significant effects on nitrate reduction. Finally, organic farming, which uses fewer inputs, also has an effect on the water quality of the plots where it is practised. The studies carried out also show the influence of the extent of the areas covered by contracts on overall efficiency. However, in some experiments, the absence of effects is also observed, which may mean a lack of effectiveness of the systems put in place or the slowness of the improvement processes.

Agri-environmental indicators are used to report on the environmental effectiveness of MAEs; this effectiveness compares what has been done to what was initially planned, in other words, it compares actual achievements, results and impacts to those expected or estimated. There are several types of indicators (in addition to the reference and implementation indicators previously filled in):

- Results indicators: quantify the results achieved in relation to the expected goals. They focus on the surface used for successful actions with regard to environmental issues (biodiversity, water quality, climate change, etc.).

- Impact indicators: aim to report changes in the state of the environment (for example, to improve water quality through changes in the balance of inputs).

The results given by the indicators must be treated with caution because it is difficult to determine an estimate of MAECs own efforts on the resource. However, the effectiveness of measures on the quality of the resource has demonstrated a low territorial impact, in particular due to an insufficient number of member farmers, or a visible effect in the longer term. As a result, measures are not effective if the costs of financing them are too high compared to the environmental benefits.

In the territory of La Vigne, the fairly frequent monitoring of water has shown a trend towards improvement in an abstraction area where there has been 40% of the specific surface area in MAE. The consequences of this are a stabilisation of nitrate levels and, for an equivalent climatic context, a reduction of a few mg/L of the average in 2011 compared to 2000-2001 and no detections above the standard for the amount of pesticides since 2011 (excluding banned pesticides).

5.2. Can we move towards a cost-effectiveness analysis of the allocation of aid?

The cost-effectiveness analysis proposes to compare the economic costs associated with MAECs with its physical efficiency. Generally speaking, the problem of this cost-effectiveness analysis consists in verifying whether the (physical) results obtained are consistent with the economic resources used. For the application of such a method, it is therefore necessary to define in advance the notion of efficiency retained and the nature of the costs to be taken into account. In the case of agri-environmental policies, the costs (budget envelope) are fixed, in which case the aim is to maximise the effectiveness of the project, considering the available budget envelope.

The implementation of environmental policies and the allocation of subsidies to farmers entails direct and indirect public and private costs. However, there are no cost references to be taken into account in a cost-effectiveness approach.

It is important to take into account the share of **transaction costs** (TC) in estimating the total costs associated with the implementation of the MAECs. Depending on their degree of involvement in agri-environmental policy, each of the identified agents bears costs that can be divided into two categories: public transaction costs, for public or parastatal agents, and private transaction costs for trade unions, associations, companies, and farmers.

Public transaction costs:

According to the classification proposed by the OECD (2007), three main types of transaction costs are linked to agricultural policies: costs related to design (administrative costs), implementation (execution, follow-up) and evaluation-monitoring. In the case of the MAECs, co-funded at several levels (European, national), it is necessary to add the "institutional transaction costs" and coordination costs (between levels).

The Court of Auditors' report "The agricultural aid payment chain (2014-2017): a failing management, a reform to be carried out" (June 2018), points out that the estimated cost of managing European agricultural aid of €343 million for the two pillars in 2017 is not exhaustive because "it does not include either the cost of refusals to discharge the government budget or the cost borne by the regions that have recruited additional staff".

The same report provides an estimate of the costs incurred by the government, the ASP and the regions and shows that the system related to aid payments is costly. According to the Ministry, in 2016, the management costs incurred by it and the paying agencies represent 2.72% of the total aid distributed for the first pillar (€226.3 million) and 5.80% for the second pillar (€116.6 million). The costs of managing the payment system for agricultural aid by the ASP vary widely; they are calculated per file processed or paid (indicators).

Management costs include:

- The very high IT expenditure of the ASP, reflecting the importance of the information system in the management of agricultural aid and European funds, the Integrated Administration and Control System (IACS), through two IT tools (ISIS and OSIRIS) ;
- Staff costs, which have risen sharply for the regions since the CAP reform, must now be reduced to manage and supervise the management of EAFRD grants. It is difficult to make an overall estimate of these additional costs for the managing authority regions. An estimate of the human resources (FTE: full-time equivalent) mobilised or financed by the regions managing authorities in order to manage the EAFRD was carried out in 2016 by Regions of France (Table 3 below).

Table3 : resources used by the regions for the implementation of the EAFRD according to Regions of France (in FTEs) - Source Régions de France, 2016

	2015	2016	2017	Evolution 2015-2017
Pilotage- suivi-évaluation (hors instrumentation mais avec RAMO et élaboration - suivi des procédures)				
Effectif total réel (en nombre ETP/an)	69,6	85,7	98,3	41,3%
dont ETP réellement transférés ou compensés	27,2	22,8	21,6	-20,8%
Assistance externe (coût annuel en k€)	0,0	0,0	315,0	
Instrumentation (paramétrage DDMO+tests+ mises à jour +feuilles de calcul+)				
Effectif total réel (en nombre ETP/an)	11,6	23,7	22,7	95,7%
dont ETP réellement transférés ou compensés	1,0	0,0	0,8	-20,0%
Assistance externe (coût annuel en k€)	0,0	250,0	975,0	
Instruction pour l'ensemble du périmètre du PDR				
Effectif total réel Région (en nombre ETP/an)	74,8	104,9	154,1	106,0%
dont LEADER	17,9	29,1	54,9	206,7%
Effectif total réel Région mis à disposition en DDT (en nombre ETP/an)	1,5	13,0	21,0	1300,0%
dont ETP réellement transférés ou compensés	7,0	4,0	3,0	-57,1%
Autres (Responsabilité budgétaire/coordination des contrôles, valorisation temps dédié aux missions interfonds)				
Effectif total	14,5	18,0	34,8	139,9%
dont ETP réellement transférés ou compensés	2,0	3,0	5,8	190,0%
Total Régions PDR hexagone (ETP/an)				
dont mise à disposition en DDT	1,5	13,0	21,0	1300,0%
dont ETP réellement transférés ou compensés	37,2	29,8	31,2	-16,3%
dont LEADER	17,9	29,1	54,9	206,7%
Assistance externe (coût annuel en k€)	0,0	250,0	1290,0	

According to this estimate, the regions have doubled their FTEs compared to 2015, from 172 FTEs to 331 FTEs used to manage the EAFRD. The increase is particularly visible in the "processing" field, the highest number of agents (154, or 46% in 2017), followed by "monitoring" (98, or 30%) (Court of Auditors and personal communication with members of the national ASP). One of the reasons given in the argument for appraisal costs is the complexity of the measures and agronomic and territorial situations that must be put in place to benefit from the payment.

Local authorities also face transaction costs, since they have to submit the agri-environmental development project (PAECs), build the specifications and monitor them.

Private transaction costs:

The implementation of the MAECs also entails costs for the farmer himself. Costs are estimated on the basis of the opportunity cost specific to each operator. Indeed, the time spent drawing up the contract (searching for information on agri-environmental policy, attending meetings, etc.) competes with the time spent by the farmer on agricultural production. The farmer will make a decision based on what he earns and what he loses by using this time either for the application of the agri-environmental policy or for another paid activity. Exchanges with farmers (La Vigne territory) made it possible to list 3 main types of transaction costs related to the implementation of new practices: training time (4 days/year), time to research new sectors and experiment new crops (8 days/year) and time to fill out indicators (5 days/year).

Other transaction costs exist for farmers in the event of late payments. These delays weigh on farms, some of which are already weakened, resulting in the payment of interest and ancillary costs, even though a repayable cash contribution scheme (ATR) has been set up to deal with these delays. In view of the delays observed over the past two years, the government has set up these ATRs on a temporary basis. Field surveys and participatory workshops with farmers can provide an estimate of these costs (INRA for Lac au Duc, SHC and SERPN for Tremblay-Omonville).

The high transaction costs, both public and private, show a failure in the current system for allocating aid. Moreover, these costs seem difficult to quantify and the lack of data prevent from running a cost-effectiveness analysis. The use of efficiency indicators could lead to a reduction in transaction costs and thus to a more cost-effective management.

5.3. Limitations and potential difficulties of the MAECs

In terms of concrete implementation, the MAECs face many challenges.

The years 2015, 2016 and 2017 were marked in France by major difficulties in implementing the Common Agricultural Policy (CAP). The 350,000 farmers receiving CAP aid have been delayed in the payment of European Agricultural Guarantee Fund (EAGF) aid and even more so in the payment of European Agricultural Fund for Rural Development (EAFRD) aid for the 2014-2020 programming period. Furthermore, the government had to face a sharp increase in refusals to clear European aid, due to shortcomings in its management, which weighed €1.89 billion on the 2015, 2016 and 2017 budgets.

In addition, the MAECs are based on certain characteristics that may be difficult to implement in its application. First, the conditionality criterion, which is based on the fact that remuneration is paid if the measure is actually implemented. This principle involves monitoring to verify compliance with the agreement and a sanction in the event of non-compliance. However, in practice, monitoring, and even more so, sanctions, are rarely carried out. These implementation difficulties are linked in particular to the complexity of verifications (indicators, sampling) and transaction costs. The work on the evaluation of the environmental efficiency often mentions the lack of guarantees provided by MAEC, since it is often based on an obligation of means and not of results.

The second criterion is the one of additionality: the implementation of these measures must go beyond the regulatory obligations of public environmental policies and must guarantee an improvement in the ecological functions of the service measured not in relation to a scenario without aid but rather in relation to the initial state of the resource. The MAECs performance is considered to be reserved on environmental effects.

Concerning the economic and social effects, these evaluation indicators are to be constructed and measured. Indeed, there is no evidence that the paid measures improve

farmers' incomes, knowing that the payment is purely compensatory (up to the amount of the loss of income). A study on the economic impact of MAETs over the 2008-2013 period was conducted by Eau de Paris (2014) on La Vigne farms. It emphasised the fact that these measures compensate for yield losses but do not improve farmers' margins. Other cost categories (opportunity cost) are omitted in the payment system. Regarding social indicators, there is little consideration given to them. It is not clear whether participating in a water resource conservation program has mitigating effects on the social crisis experienced by some farmers this type of payment could lead to. Table 2 below presents the simplified intervention logic of the MAECs and the possible difficulties that these measures may face.

Table 2: Simplified MAEC intervention logic and main potential problems - Source: Oréade-Brèche

Level	European Union	Member States	Farmer	Environment
Logic	Regulation Budget	Programme Budget	Changing practices	Effects on soil, water, biodiversity, landscape, etc.
Potential difficulties	Inadequate regulation Insufficient budget	Inadequate programme Insufficient budget Inadequate level of aid Low targeting of measures Poorly effective institutions	Insufficient commitment Ineffective measures Low targeting of measures Poor implementation Insufficient aid income	Limited effects Overlooked priority areas Difficulty in measuring effects Often has a long-term effect

The main limitations on the EU and MS sides are based on an allocated budget that is too low in relation to the costs of the measures, as well as inadequate regulation and a strict legal framework.

On the farmers' side, engagement is one of the major problems. There is a very low level of acceptance from farmers for this type of measure. However, their acceptance is the main factor in the success of projects for a real impact on the specific resource. The challenge is to get more farmers to join so that the collective effort has a significant impact on the environment. The specifications drawn up by the MAAF are very complex in reality.

At the level of the environment studied, the difficulty lies in the ineffectiveness of certain measures and sometimes in the impossibility of measuring the effects of the MAECs, due to long-term impacts. Depending on the territory where the measure has been implemented, the effects on improving the state of the aquatic environment are negligible.

In addition to these limitations, there are further institutional problems: the absence of a specific legal framework for the payment system and uncertainty and lack of clarity on the viability of the support mechanism.