MEF4CAP

Monitoring and Evaluation Frameworks for the Common Agricultural Policy

**Deliverable D1.1:** Evolution of the CAP and related policies (the emerging sustainability agenda)

# Evolution of the CAP and related policies (the emerging sustainability agenda)

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## Executive Summary

This paper examines the evolution of the Common Agricultural Policy (CAP), in particular the recent widening of its objectives to better reflect the agricultural sustainability agenda. It then examines the themes that are relevant for future monitoring and evaluation of the CAP.

Global policy and societal demands have influenced the development of the EU's vision for its future. The result has been the European Green Deal and its companion The EU Farm to Fork Strategy.

It is clear that the future CAP will have a stronger environmental focus. The diverse range of environmental concerns that have been identified are detailed in this text. Reform of the CAP will include a shift from a compliance to a performance focus, which will mean that reliable data to indicate the performance of agriculture will become even more important than previously.

Previous research, notably the FLINT FP7 project, has done much to identify relevant sustainability themes that could become part of the data collection process for future CAP monitoring and evaluation. The FLINT project was ahead of its time in the sense that EU policy had not yet evolved to create the demand for such data. However, it is evident that, even in the short few years since FLINT concluded, policy at EU level has advanced rapidly to embrace sustainability as a core objective.

This paper uses a review of various published documents, from policy makers, farm and food industry representative organisations and civil society organisations, along with insights from a dedicated stakeholder workshop, to identify the most relevant economic, social and environmental themes, which should determine the types of indicators that are needed for monitoring and evaluation of the future CAP. The paper finds that, with a few exceptions, data collection for economic indicators is already relatively well covered and that data collection for social indicators will require some further development. However, the greatest effort that will be required is to gather data to develop environmental indicators. Developments in remote sensing and in data sharing technologies, mean that data collection should be more feasible than in the past.

This conclusion should not be surprising. It is largely a reflection of the historical emphasis of the CAP on economic and social objectives, and the fact that the CAP has only recently been broadened to more comprehensively address environmental objectives.

# 1. Introduction

This is the first deliverable of the MEF4CAP project. The aim of MEF4CAP is to deliver an **innovation agenda and roadmap for future monitoring of EU agriculture**. In particular the project seeks to identify the monitoring needs of the Common Agricultural Policy (CAP) 2023-2027 and beyond. Furthermore, the project will show how these monitoring needs could be better addressed using efficiencies created by technical developments, in data collection, data management and data integration. Such progress will minimise the cost of data collection and the associated administrative burden.

In this first deliverable the objective is to reflect the changing needs of the CAP and the broad policy landscape influencing it to elicit what this means for the type of economic, social and environmental indicators that will need to be monitored and evaluated in the coming years to ensure that the CAP delivers on its objectives.

**Section 1** provides a context for Deliverable 1.1 and its purpose within the wider project. Output from WP1 will provide guidance for some of the work undertaken in WP 2 and WP 3.

**Section 2** summarises the development of the CAP in recent years, detailing the changing/widening range of objectives that the policy now encompasses. This section also details the influence of the wider global policy agenda, such as the Paris Climate Agreement and the UN Sustainable Development Goals (SDGs), has had on the development of EU policy.

Some specific criticisms of the CAP's objectives are discussed, including where these fit in the context of the UN SDGs. Looking to the future, this section discusses the European Green Deal and EU Farm to Fork Strategy in particular, since these EU political commitments shall drive changes in policy affecting agriculture in the short to medium term.

Perspectives on the appropriateness of the CAP from policy makers, farming, the food industry, environmental NGOs, academics and other researchers are provided. Details of a stakeholder engagement workshop, specific to the aims of WP 1, are also reported.

**Section 3** provides a summary of indictor themes used in the Common Monitoring and Evaluation Framework (CMEF). It also describes the indicator themes identified in the FLINT FP7 project.

**Section 4, Section 5 and Section 6** profile the three key strands of agricultural sustainability, namely, the economic (profit), environmental (planet), and social (people) dimensions. These later sections detail the range of indicator themes that are desirable in the context of policy developments and stakeholders' concerns. **Section 7** presents conclusions.

Later in WP 1, Deliverable 1.2 will refine these indicator themes into more precise indicator requirements. The final output of WP 1 is a shopping list of policy goals and associated indicators. This deliverable does not discuss the feasibility of obtaining data to develop reliable indicators or the technical approach that would be used to obtain such data, as these issues are for consideration later in the project.

## 1.1. Context

Sustainability was first defined by the World Commission on Environment and Development in its so called Bruntland Report (WCED, 1987). In the report a definition of sustainability was produced that is still in use today.

> Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, Bruntland Report, 1987; 16).

The history of sustainability indicators goes back to the turn of the 1990s. The OECD first produced indicators for agriculture in 1997 (OECD 1999). Influential papers in this area were produced by O' Brien (1999) and Krajnc and Glavič (2003). O' Brien suggested that sustainability would become a driving force in industry in the 21st century. He said it would require political will in combination with a substantial research and development effort. In particular, he also noted that metrics would be required to address sustainability. Kranjnc and Glavič called for the development of indicators across all economic sectors to measure their impact, set targets and record improvements towards the achievement of those targets. While their paper was focused on environmental concerns, it did recognise that sustainability also had important economic and social strands.

The interaction between agriculture and the environment is substantial, given that agriculture is the principal economic use of land globally. Agriculture is now required to find a future path which addresses all three forms of sustainability. This requires that policy makers set policy with specific measurable objectives.

Outside of the CAP there are other EU policy influences which also have implications for the agricultural sector. A number of these are outlined below.

**EU Circular Economy Action Plan** (European Commission, 2020a) aims to:

- promote the circular economy by reducing food waste, more sustainable food consumption, and more eco-friendly packaging;
- reduce the negative impact of resource extraction;
- encourage a circular approach to water reuse;
- achieve a more sustainable application of nutrients;
- review the directive on waste water treatment and sewage sludge;
- introduce the use of nutrient management tools to deliver more sustainable nutrient balances.

**EU Climate Law** (European Commission, 2020b) requires, among other things, that agriculture:

- reduce emissions and increase sequestration in soils and produce more renewable energy.

**EU Biodiversity Strategy** (European Commission, 2020c) includes commitments for:

- a 10% target for high-diversity landscape features in agricultural areas;
- the planting of 3 billion trees across the EU;
- reductions in the use and harmfulness of pesticides by 50%.

**EU Methane Strategy** (European Commission, 2020d)

One of the priorities of the strategy is to improve measurement and reporting of methane emissions across EU Member States (MS) where the level of monitoring currently varies.

Within agriculture, in conjunction with the CAP, a key aim will be improved data collection to measure emissions, and the promotion of opportunities for reductions. The main focus will be on best practice sharing for innovative methane-reducing technologies, animal diets, and breeding management. Targeted research on technology, nature based solutions and dietary shifts will also contribute. Exploration of where non-recyclable organic human and agricultural waste and residue streams can be utilised to produce biogas, bio-materials and bio-chemicals will also be conducted.

The EU's Copernicus satellite programme will also improve surveillance and help to detect global super-emitters and identify major methane leaks.

**EU Strategy on Adaptation to Climate Change** (European Commission, 2021a)

The strategy sets out how the EU can adapt to the unavoidable impacts of climate change and become climate resilient by 2050.

It has four principle objectives: to make adaptation smarter, swifter and more systemic, and to step up international action on adaptation to climate change.

The strategy therefore focuses on developing and rolling out adaptation solutions to help reduce climate-related risk, increase climate protection and safeguard the availability of fresh water. Additional and improved data on climate-related risks and losses will thus be required.

**Sustainable Finance Taxonomy** (European Commission, 2021b)

Investment in sustainable projects and activities is fundamental to meet the EU's climate and energy targets for 2030 and achieve the objectives of the European Green Deal.

To this end, a common language and a clear definition of what is 'sustainable' is needed. As such, a common classification system for sustainable economic activities, or an 'EU taxonomy' has been proposed which establishes a list of environmentally sustainable economic activities.

The Taxonomy Regulation establishes six environmental objectives

1. Climate change mitigation;
2. Climate change adaptation;
3. The sustainable use and protection of water and marine resources;
4. The transition to a circular economy;

5. Pollution prevention and control;
6. The protection and restoration of biodiversity and ecosystems.

Similarly, in terms of the overall objective of climate neutrality, which is at the heart of the European Green Deal and the EU's commitment to global climate action under the Paris Agreement, as well as other policy documents, the role of the land use sector, agriculture and forests in the absorption of GHG emissions is acknowledged.

Likewise, The EU's zero pollution ambition aims to strengthen the links between environmental protection, sustainable development and human well-being. Indeed, The European Green Deal announced headline actions on zero pollution with an action plan for water, air and soil - to better prevent, remedy, monitor and report on pollution.

Indicators are necessary in order to monitor policy objectives, since it is vital that we understand the current circumstances in arriving at future targets for improvement. Indicators can then be used in order to monitor progress in achieving these objectives. Furthermore, indicators relating to different objectives can be assessed collectively to assess the synergies and trade-offs that occur in meeting particular objectives (Latruffe et al, 2016).

Reflecting these concerns, the European Green Deal (European Commission, 2019a) and Farm to Fork strategy (European Commission, 2020e) set out an agenda for change that will need to be addressed by the agricultural sector. The Farm to Fork strategy indicated the main targets concerning various agricultural practices, which are to be achieved by 2030, namely: reduction in the use of pesticides; reduction in excess nutrient use; reduction in antimicrobial use as well as popularisation of organic farming. Policy objectives will evolve, and research and innovation is ongoing to develop relevant new technologies and new ways of farming sustainably. Agricultural education and agricultural advisory programmes will be modified so that farmers can learn how to adopt new way of operating. Achieving change will ultimately require actions at farm level on the part of the EU's 10 million farmers.

Understanding whether agriculture has become more sustainable will therefore require indicators to demonstrate that progress. The range of indicators will need to reflect the widening range of societal objectives that have emerged in recent years. It can be expected that the number of indictors will become more numerous in the future. Some of these indicators will be used to assess whether policy is effective in delivering desired outcomes. As well as monitoring progress in agriculture, these indicators can be used to assist the development of agriculture, thereby supplying farmers with a direct benefit and a motivation to participate in survey data collection and other methods such as photo geotagging, allowing access to machine data etc. (Vrolijk, 2016).

## 1.2. Common Monitoring and Evaluation Framework

The EU developed the Common Monitoring and Evaluation Framework (CMEF) as a means to track both the implementation of policy (monitoring) and the achievement of its objectives (evaluation). The CMEF is described in detail in an associated Technical Handbook (European Commission, 2017a).

The CMEF had two distinct elements reflecting the division on the CAP into Pillar I and Pillar II policies. The CMEF operates differently under each of the two pillars. Currently, the

Commission manages the evaluation of Pillar I policies, whereas Pillar II policy evaluations are carried out by the MS. The system is not perfect and ways in which it can be improved have been identified (European Commission, 2018a). The plan from here forward is to transform the CMEF to the Performance Monitoring and Evaluation Framework (PMEF).

This reflects a general change in the operation of the CAP with the emphasis shifting from compliance with regulations or required actions, towards the performance or achievement of specific objectives in the form of targets or goals.

The CMEF CAP Performance Report (European Commission, 2018a) is produced twice during the seven year CAP cycle. It relies on data from MS', Eurostat and the European Environment Agency. The report examines the performance of the CAP in four broad areas:

1. Viable food production,
    - Market orientation and price stability,
    - Agricultural income,
    - Agricultural productivity,
2. Sustainable management of natural resources and climate action,
3. Balanced territorial development,
4. Knowledge transfer and innovation.

**Pillar I:** For Pillar I policies the CMEF relies on the following data sources:

- Information System for Agricultural Market Management and Monitoring (ISAMM),
- Clearance Audit Trail System (CATS),
- Information System for Agriculture Refund Expenditure (AGREX).

The CMEF report (European Commission, 2018a) found a number of concerns with respect to the Pillar I data it relies upon. It found that there were **too many indicators** and sub indicators which means that it is not possible to obtain a concise impression of the effectiveness of the CAP. It was also found that **some indictors require improvement** because they are produced too infrequently, while other indicators have not been clearly linked to the CAP. It was also found **that some indictors are lacking in the necessary detail.**

**Pillar II:** For Pillar II policies CMEF data is obtained from:

- Annual Implementation Reports submitted by MS',
- Enhanced Annual Implementation Reports,
- Declaration of Expenditure for European Agricultural Fund for Rural Development.

The same CMEF report also found a number of concerns with respect to the Pillar II data. In particular it was noted that **some MS' struggle to report the correct data.**

Concern was also expressed about the difficulty of attributing outcomes to policy, in the sense that background factors need to be isolated. The CMEF report found that there were issues in isolating the **net impact of policy which is normally done through evaluations.**

The CMEF report noted that MS'

were only required to report when actions were completed, when it might be more useful to at least also report that they are ongoing. However, the implementing rules were since changed to allow reporting of partial completion. A further concern is that issues were identified with

several indicators, due to a lack of comparable data for some MS (European Commission, 2018a).

The CMEF will be replaced by a PMEF which will be used to assess the CAP 2023-27.

# 2. The Developing CAP

This section explores the development of the CAP, the broader policy influences (external and internal to the EU) that are motivating change in the CAP, criticisms of the CAP in aligning with global policy objectives, perspectives on the CAP from various stakeholders, and a summary of a MEF4CAP WP1 stakeholder workshop on the evolving CAP and future data requirements, which was organised by the project team.

The section provides context for the description of data needs discussed in Section 3, Section 4 and Section 5.

## 2.1. Evolution in the CAP's Objectives

When the CAP was created in 1962 its core objectives largely reflected concerns associated with the promotion of food supply, the income level of farmers and the management of prices in a way that balanced the interests of producers and consumers, all to be achieved within an integrated policy across the MS' (Ludlow, 2005). These were concerns that had emerged from the post-World War II period, in particular the shortage of food in Europe that had been experienced, along with an awareness that particularly in the US, agriculture was developing rapidly and that agriculture in Europe needed to modernise (Yates, 1960).

The five objectives of the CAP as stated in Article 39 of the Treaty of Rome in 1957 and restated in the Treaty of Functioning of the European Union (European Union, 2009) were to:

i. increase agricultural productivity;
ii. thus to ensure a fair standard of living for the agricultural community;
iii. stabilise markets;
iv. provide certainty of food supplies;
v. ensure that those supplies reached consumers at reasonable prices.

While the CAP has been reformed on numerous occasions since its inception in the 1960s, these reforms tended to focus on addressing unintended consequences that emerged from some of the policies that were pursued. The CAP was particularly criticised for the nature of its support structures for farmers, which resulted in excessive food production in the European Economic Community (EEC). The operation of the CAP had consequences for international trade and adverse implications for farmers in other parts of the world.

Therefore, in the 1990s, the CAP began a modernisation programme that would make it more market oriented. Support was increasingly delivered through a system of payments rather than through the maintenance of high product prices. Some of these reforms were motivated by demands made by the MS', while others were driven by international criticism of the trade distorting aspects of the CAP. In spite of these reforms, the objectives of the CAP, remained largely unaltered for about 40 years.

The 2013 reform of the CAP began to introduce a stronger environmental emphasis, with the incorporation of a so called 'greening' dimension. The ambition for this greening dimension in the original Commission reform proposals were not matched by the greening policy that formed part of the final agreement, as it proved difficult to formulate a policy that MS could agree upon (Erjavec and Lovec, 2015).

The most recent developments in reforming the CAP for the period 2023-27 reflect demands that it should deliver on a greater range of objectives. International considerations such as the Paris Climate Agreement (United Nations, 2015a) and the United Nations SDGs (United Nations, 2015b) have provided some of the motivation for the revision of the CAP's objectives.

A further consideration is the EU Biodiversity Strategy for 2030, which aims to establish a larger EU-wide network of protected areas on land and at sea, launch an EU nature restoration plan, introduce measures to enable the necessary transformative change and tackle the global biodiversity challenge. Targets of 30% have been identified for protected areas on land and sea with stricter protection for established forests. Specific objectives include the following:

- increasing organic farming and biodiversity-rich landscape features on agricultural land;
- halting and reversing the decline of pollinators;
- restoring at least 25,000 km of EU rivers to a free-flowing state;
- reducing the use and risk of pesticides by 50% by 2030;
- planting 3 billion trees by 2030.

Likewise, the global effort to increase biodiversity will be shaped by the forthcoming UN Global Biodiversity Framework which is currently in development. This UN Global Biodiversity Strategy will be complementary to the 2030 Agenda for Sustainable Development, identifying and addressing threats to biodiversity and developing a pathway of measurable action targets to 2050. The creation of such targets will reinforce the requirement for monitoring and evaluation in EU agriculture in a sustainability context.

Civil society has also become increasingly concerned about the role of the CAP, particularly with respect to its impact on agriculture and in turn agriculture's impact on the environment and climate change. Given the important influence which agriculture has on the environment and climate change, it is logical therefore that a revision of the CAP's objectives would incorporate the environment and climate change. The private sector also has demonstrated concern with regard to the relationship between agriculture, the environment and climate change, with the food industry particularly prominent.

Therefore, the CAP's core objectives have been re-examined, beginning in the European Commission Communication - *The Future of Farming and Food* (European Commission, 2017b). It involved a public consultation which identified that there are a growing range of concerns relating to agriculture and the CAP and that the policy addressed this wide range of concerns to only a limited degree, with particular concern that environmental challenges were not embedded in the CAP (European Commission, 2017c). In aggregate, this criticism reflected a lack of focus within the CAP on sustainability in the broader sense.

This has now resulted in a reformulation of the CAP's original objectives, with the creation of additional objectives which largely relate to the environment. The revised objectives therefore aim to balance the need to produce food with the need to also protect the environment.

**Table 1: CAP Objectives and associated sustainability themes**

| Objective | Sustainability Theme |
|---|---|
| to ensure a fair income to farmers; | economic/social |
| to increase competitiveness | economic/social |
| to rebalance the power in the food chain | economic/social |
| climate change action; | environmental/climate |
| environmental care | environmental/climate |
| to preserve landscapes and biodiversity | environmental/biodiversity |
| to support generational renewal; | economic/social |
| vibrant rural areas | economic/social |
| to protect food and health quality | economic/social |

The modified CAP objectives reflect a widening of the CAP's focus to better reflect the core concerns of economic, social and environmental sustainability in farming (European Commission, 2018b). This extension of the CAP's objectives was particularly a reflection of the recognition that the CAP needed to do more in the area of environment and sustainability generally.

## 2.2. Criticisms of the CAP

While the CAP delivers benefits to EU farmers and EU citizens generally, numerous criticisms of the policy have been offered. Specifically it has been argued that the CAP:

- **Hinders the growth modernisation of agriculture in developing countries.** Coupled payments and export subsidies were among the policies criticised (Matthews, 2011). The EU has acted to address this criticism by radically reducing the use of these policy instruments.
- Contributes to the **oversupply of agricultural products in the EU**, relative to a free market outcome. The EU has acted to address this criticism, through a series of reforms of the CAP which have aimed to make it more market oriented. This has resulted in a reduction in EU commodity prices for a number of commodities to world price levels. However, anomalies continue to exist, notably for the EU price of beef, which far exceeds that in other parts of the world.
- **Artificially inflates food prices.** In the presence of international trade**,** higher farm prices in the EU are only possible if the volume of lower priced imports is restricted. This is largely achieved through a system of tariffs on imports. In the absence of these tariffs EU farm prices would be lower, as would consumer food prices. The EU has addressed this criticism to some extent through a series of bilateral trade deals, which has reduced the overall level of protection afforded to EU agriculture.
- **Promotes a diet that is unhealthy.** Support for particular parts of agriculture (dairy and red meat in particular) affects the relative price of agricultural goods which in turn influences consumer prices and consumers' food choices. It has therefore been argued that historically the CAP has been incompatible with the EU's efforts to address human

health through the promotion of healthier diets (Birt et al, 2007). The EU has recently begun to address this concern, with health now recognised as a CAP objective.

- **Provides too much support to larger farms** at the expense of providing additional support to smaller farms. It has been observed that across the EU, 80% of the CAP expenditure goes to 20% of the farms, with larger farms typically receiving much more support than smaller farms (Massot, 2018). This is a reflection of the fact that larger farms tend to produce more food than smaller farms. Close to 80% of the food is produced by 20% of the farms. This allocation of support is a legacy of the coupled system of support which linked the provision of support to the production of farm output. The EU has addressed this concern to some extent by insisting that support should be largely decoupled from production. However, the provision of support remains linked to land. A further complication is that there is a wide range in the level of support provided per hectare across and within the MS'. Again, this is a legacy of the now largely defunct coupled payment system. In its most recent reform, the EU has begun to address the differential in the level of payments per hectare with MS' through a process known as internal convergence. However, solutions are not simple, as in some cases high levels of payments per hectare can be associated with farms with a small area (and vice versa), meaning that unintended consequences of measures designed to provide greater equity need to be considered.
- **Exacerbates a range of environmental concerns** relating to agriculture. Criticism of agriculture in this regard is diverse. In the context of climate change, agricultural production is a significant source of greenhouse gas emissions (GHGs). Agriculture is the principle source of the EU's ammonia emissions which has adverse implications for human health and the natural environment. Agriculture is a significant user of water, and agricultural activity can contribute to water pollution. Intensive agriculture can have adverse implications for biodiversity. It is only relatively recently that the EU has integrated these environmental concerns into the objectives of the CAP. This is perhaps the area which policy makers will need to give greatest consideration in future CAP reforms.
- **Hinders a more equitable distribution of the EU budget**. This is because a large share of the overall EU budget is spent on agriculture, while the size of the agricultural sector within the economies of the MS' is not uniform. The implication is that the amount of the CAP budget allocated to individual MS' reflects the size of their agricultural sector. Ultimately, this then hinders a more equitable distribution of the overall EU budget. Separately, the level of decoupled support available to agriculture in MS' who have joined the EU since 2004 (the so called EU-13 MS') is lower than that available to MS' who were already part of the EU (EU-15 MS'). The EU has begun to address this concern in the most recent CAP reform, through a process known as external convergence, which introduces measures to reduce the differential in the average level of payments received per hectare across the EU-27.
- **Does not well reflect the UN SDGs**. In the literature much is also made of the fact that the CAP seems to align with only a small number of the 17 UN SDGs, although there are differing views (held by researchers and the European Commission) as to the extent to which some of these are currently addressed in the CAP. Some have argued that there is a very poor level of alignment between the CAP's objectives and the SDGs (Schwoob et al, 2018; Pe'er et al, 2019; Schown and Nicholson, 2020; Matthews, 2020). Furthermore the European Court of Auditors has been critical of the European

Commission's reporting on sustainability and the SDGs (European Court of Auditors, 2019). It has proposed that the EU should develop a strategy on SDGs and sustainability and integrate them into the EU budget and the performance network.

The EU's reaction to these criticisms is evident in the fact that the SDGs are specifically mentioned in the opening paragraph of the Farm to Fork Strategy (European Commission, 2020e), its specific strategy for the EU agri-food sector in the context of the European Green Deal.

## 2.3. European Green Deal, Farm to Fork and the CAP

Climate change has now emerged as a key concern for the EU. The role of the agri-food sector in generating GHGs, means that climate change policy has to consider agriculture. And if climate actions have been identified in the CAP, the policy needs to demonstrate impact for the funds received. Other environmental concerns related to air, water and biodiversity have also become more prominent and all also have a strong connection to agriculture. Therefore, environmental efficiency in agricultural production along with carbon sequestration though forestry and other means are now vital. It should be emphasised that one of the results of these activities will be the inclusion of the agricultural land use, land use change and forestry sector (LULUCF) in the effort to meet the EU target of reducing GHGs by 2030 and 2050 (European Commission, 2020f)

Low incomes in agriculture remain an issue and there is concern that farmers have weak market power, relative to other stages of the chain which are more concentrated. Farmers typically have a small share of the value added in the agri-food chain (McCorriston, 2002). However, the European Court of Auditors concluded that the Commission's system for measuring the performance of the CAP in relation to farm incomes could be improved and that the current system for analysing farmers' incomes has limitations (European Court of Auditors, 2016).

There are emerging opportunities, in the form of hard core technologies, digital solutions and innovation processes, which will need to be adopted by EU agriculture. These will help to ensure that it remains internationally competitive and assist in making agricultural production more sustainable and in adding value. Examples include so called Farming 4.0, short supply chains, adoption of agro-ecological practices, digtitalisation, internet of things (IOT) and precision farming techniques.

Both the Farm to Fork strategy (European Commission, 2020e) and the European Green Deal (European Commission, 2019a) can be seen as a reaction to these concerns. While the CAP has been modernising since the 1990s, the integration of economic, social and environmental sustainability is the issue which it now needs to address in future reforms. Ultimately, this involves a widening of the CAP's objectives.

Previous reforms did not focus on sustainability in the broad sense, the issue primarily coming to the fore with the increased intensification of agriculture and the resulting environmental constraints to growth. Instead reforms addressed other fundamental challenges for the CAP, relating to EU agriculture's international competiveness, concerns relating to excess farm income volatility and ensuring agriculture continues to have a positive multiplier impact on the wider rural economy.

The most recent CAP reform suffered heavy criticism for it attempts to grapple with environmental concerns. So called 'greening' measures were introduced into the CAP, but the CAP negotiation process rendered the policies that were eventually agreed quite limited in scope. The need to find policies that were acceptable to all MS' contributed to green measures which were quite benign in nature, which ultimately contributed to their limited effectiveness (European Court of Auditors, 2018).

There is also an acceptance that the experience of delivery of policy objectives through compliance with regulations has not always been successful. This in turn motivates another major change envisaged in this CAP reform – the switch from a compliance based model to a so called performance based model based on the achievement of specific results. The move to this measurable results based approach within the CAP, reinforces the need to establish indicators to allow progress to be measured over time.

It is envisaged that the new CAP 2023-27 will contain enhanced conditionality (to replace existing cross compliance and greening payment requirements), a new eco scheme under Pillar I and other schemes to address climate and environmental objectives would continue under Pillar II.

The European Green Deal objectives include measures such as precision agriculture, organic farming, agro-ecology, afforestation, agro-forestry systems and stricter animal welfare standards. It calls for a shift in emphasis in terms of agricultural policy so that farmers are rewarded for outcomes that demonstrate an improvement in environmental and climate performance. Among the actions that would be included are managing and storing carbon in the soil, improved nutrient use to reduce the impact on water quality and lower emissions of greenhouse gases and ammonia (European Commission, 2019b).

In the context of the CAP 2023-27 it is envisaged that it would include three major initiatives, with so called enhanced conditionality, optional eco-schemes under Pillar I and enhanced environmental schemes under Pillar II (European Commission, 2020g), together sometimes described as the 'green architecture'.

The European Commission proposal for the revised form of cross compliance known as **enhanced conditionality** would include measures such as

- crop rotation,
- soil protection,
- maintaining permanent grassland,
- protecting wetlands and peatlands,
- Natura 2000 Directives,
- protect existing landscape features or
- devote an area on each farm to "non-productive" features.

The **establishment of eco-schemes** would be mandatory for the MS', with farmer participation in such schemes being optional. Such eco-schemes could support precision farming, organic farming, agro-ecology and agro-forestry. Importantly, from a monitoring point of view, eco-schemes will have to be benchmarked which will required data and monitoring (precise data). The contracts under these eco-schemes will generally be annual, although some may be longer.

Under Pillar II rural development environmental and climate schemes would continue. There would be structured as multi-annual contracts and include:

- biodiversity,
- high nature value farmland,
- extensive permanent pastures.

It is notable in the context of monitoring and evaluation that result-based payments schemes for specific species protection are envisaged. There are also commitments to animal welfare.

**Carbon sequestration** has also been identified as an action that could attract payments. However, measurement of carbon removals can sometimes be challenging (Smith et al, 2019). It is even envisaged that the private sector could finance carbon sequestration outside of the CAP benefits structure.

Support for the **production of biogas** from output of the agriculture sector is also foreseen. In the context of **integrated pest management**, more sophisticated and targeted forms of control of pests and pathogens are envisaged. Environmental and health related concerns also require a **reduction in the use of nutrients and antimicrobials.**

Turning specifically to the Farm to Fork Strategy, specific objectives to be achieved by 2030 include:

Reductions in the use of pesticides

- reduce by 50% the use and risk of chemical pesticides;
- reduce by 50% the use of more hazardous pesticides.

Reduction in excess nutrient use

- reduce nutrient losses by at least 50%, while ensuring no deterioration on soil fertility;
- reduce fertiliser use by at least 20%.

Reductions in antimicrobial use

- reduce by 50% the sales of antimicrobials for farmed animals and in aquaculture.

Promotion of organic production and consumption

- achieve 25% of total farmland under organic farming.

Reduction of GHGs

- reduction of GHGs by 50-55% compared to 1990.

Reduce food waste

- 50% reduction in food waste

The Farm to Fork Strategy argues that this higher climate and environmental ambition should provide for higher added value in the sector.

## 2.4. CAP and Member State Strategic Plans

MS Strategic plans are a new mechanism within the CAP 2023-27. These were first described in the European Commission Communication *The Future of Farming and Food* (European Commission, 2017b). The communication recognised the need to continue to pursue the established CAP objectives, but to also add additional objectives largely relating to the environment. It also called for a new delivery model for the CAP and greater subsidiarity to the MS', through the creation of CAP Strategic Plans. The end goal is a simplified CAP, that is more coherent and which is results based, so that its effectiveness can be more easily monitored.

The CAP Strategic Plans envisaged in the CAP 2023-27 are in some ways an acceptance that it is challenging to agree to common objectives and to design a one size fits all set of policies to address the differences in the environmental priorities across the MS'. The diversity of EU agriculture along with differences in terms of the MS' environmental priorities, provides the motivation for a more bespoke approach to policy design that better fits with MS' requirements. The idea is to allow increased flexibility in policy design to reflect local conditions, while at the same time delivering on the broad overall CAP objectives.

It seems therefore that the MS level Strategic Plans under the CAP could in principle set specific MS level CAP objectives that might in turn require specific MS level data collection for indicator purposes. However, at present it is still envisaged that the indicator set to measure performance would remain common across the MS'. This perhaps reflects concerns about the challenges involved in managing and verifying performance across the MS when indicators lack a common definition.

However, it could be argued that having a lot of detailed indicator data (beyond what is required for reporting to the Commission) could assist policy makers at MS level in the design of effective interventions within their Strategic Plans, or it could assist MS policy makers in formulating corrections to their Strategic Plan, if it is found that particular interventions are not delivering the required performance.

It is envisaged that the CAP Strategic Plans will be linked to 12 EU Directives in total relating to the environment. This is to ensure that MS' adopt a greater coherence with respect to these Directives.

Under Pillar I, for example direct payments can be incorporated into eco-schemes using conditionality to address objectives within the environmental directives as a condition of receipt of payments.

Pillar II will continue to support actions for the environment and climate, with 30% of Pillar II payments ring fenced for environment and climate. Payments for areas of national constraint (ANC payments) would not qualify as part of this 30% figure, in order to ensure that MS' demonstrate greater environment and climate ambition in modifying their Pillar II scheme. There is also the potential for results based environmental schemes, or group based schemes involving farmer co-operation.

The list of 12 relevant environmental Directives in Annex XI to the CAP Regulations (European Commission, 2018b) is as follows:

- Directive 2009/147/EC on the conservation of wild birds;

- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora;
- Directive 2000/60/EC establishing a framework for Community action in the field of water policy;
- Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources;
- Directive 2008/50/EC on ambient air quality and cleaner air for Europe;
- Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants;
- Regulation (EU) 2018/841 on the inclusion of GHGs and removals from land use, land use change and forestry in the 2030 climate and energy framework;
- Regulation (EU) 2018/842 on binding annual GHGs reductions by MS' from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement;
- Directive 2009/28/EC on the promotion of the use of energy from renewable sources;
- Directive (EU) 2018/2002 on energy efficiency;
- Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action;
- Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use of pesticides.

The European Commission Staff Working Document (European Commission, 2018) identified some areas where the final CAP agreement could improve on the proposals. Notably:

- to ring fence the budget for eco schemes,
- to include measures on animal welfare and antimicrobial resistance.

Even if not addressed as part of the current CAP, it is reasonable to consider that these two concerns are areas which could be prioritised in the future.

## 2.5. CAP and Common Performance and Evaluation Framework

Aside from the broadening of the CAP's objectives, and the creation of MS specific CAP Strategic Plans, another feature of the CAP reform which may motivate data collection is the change in the nature of the support model.

- The current so called compliance model requires that support is provided for particular activities that have to be engaged in by farmers, with a view to achieving a particular objective.
- The new CAP model aims for a performance/results based model where evidence has to be provided for the achievement of particular objectives.

The PMEF includes a range of elements:

- a common set objectives for both CAP Pillars,
- a common set of indicators to be used across the MS',
- quantified targets to be achieved,
- data management and reporting activities, and
- performance based payment to encourage the delivery of desired outcomes.

A concern with respect to evaluation in particular is the timeliness and the frequency of data collection. The lag in the provision of data for a particular year is a concern. The most recent data can sometimes be two or even three years old. This is an impediment when it comes to both monitoring and evaluation, as the time period from implementation of a policy, to obtaining data to indicate whether it is having the intended effect can be quite long. This has negative consequences in that it limits the capacity to redesign policies which are not having their intended impact. Hence there is a need for more timely data provision in support of both the monitoring and evaluation process.

Some data is also collected at a low frequency, e.g. every three years rather than every year, due to the cost involved or due to the fact that data may not change very much in the space of one year. However, the CAP 2023-27 and the Farm to Fork Strategy require an accelerated pace of change if the targets set for 2030 are to be realised. This may therefore imply more rapid adjustment in variables that would otherwise change slowly, creating a need to re-evaluate the frequency of collection of such data. Otherwise policy makers and evaluators may have to wait for an inordinate amount of time to assess the effectiveness of policy, limiting the time scale over which any required adjustments to policy could be made.

The ARC 2020 platform, a collection of affiliated civil society groups, has compiled a critique of the PMEF. It argues that in trying to simplify the operation of policy this will produce a lack of consistency in terms of the intervention logic associated with policy interventions across the MS'. ARC2020 points out that the indicators that will need to be reported are generally output indictors. It also notes that MS' have expressed concern with regard to the level of clarity in the definition of indicators. It is also noted that some MS' could be seeking to remove indicators entirely from the process on the grounds of the need for simplification. ARC2020 argues for greater utilisation of digital solutions, including satellites and drones in data collection for monitoring and evaluation purposes. It further argues that these solutions could increase the volume and the resolution of such data and how quickly it could be made available (ARC2020, 2020).

## 2.6. Member State Level Policy Initiatives

In this section a selection of national level policy initiatives for agriculture and the agri-food sector generally are detailed.

**Ireland**

The **Teagasc Sustainability Report** is based on Farm Accountancy Data Network (FADN) type data. However, while the report relies on the FADN sampling frame for its data, the range of data collected extends well beyond FADN requirements, particularly in the context of social and environmental data and associated indicators. The report is produced annually and details a range of farm-level economic, social and environmental indicators, including nutrient balances, greenhouse gas and ammonia emission. A feature of the report is that environmental variables are examined in terms of the correlation with economic and social variables so that synergies and trade-offs in respect of the various strands of sustainability can be identified (Buckley and Donnellan, 2020).

Bord Bia (the Irish Food Promotion Board) has developed **Origin Green**. This is a national level sustainability programme for the entire food and drink production chain in Ireland. It enables the farm and food industry to set measurable and verifiable targets for particular sustainability

objectives. It includes a farm audit to establish a range of metrics, including GHGs per unit of product measures (Bord Bia 2019).

Every five years the Irish government produces a ten year forward looking strategy for the agriculture sector. The most recent strategy **Foodwise 2025** (DAFM, 2015) included economic growth targets for the sector as well as ambitions in respect of broader sustainably objectives, including for the environment. However, these targets are not quantified, within the report, which instead relies on a long list of actions intended to deliver change. Reports are produced annually to measure progress in the achievement of these actions. The focus of the actions include sustainability, in particular, agriculture's GHGs, renewable energy, measurement of agriculture's sustainability credentials and improvement of the environmental footprint of the wider agri-food sector.

**Spain**

The Ministry of Agriculture have in recent years deployed a number of sustainability related initiatives. Those actions run in parallel with some minor actions from the private sector, mainly from food business associations encouraging their partners to commit themselves to the UN SDGs, reduced packaging etc. In the area of food processing, businesses have the possibility to check its sustainability situation with the tool eSIAB, included within the overall action REDSOSTAL, a network for sustainability in the agro-food sector. Both initiatives are specially focused to reduce food waste.

The Spanish Climate Change Bureau also facilitates food businesses to measure their commitments with regard to the carbon footprint of products. Participating businesses can use an official label across three sustainability categories - calculation, reduction or compensation.

The main proposals for the improved environmental performance of Spanish farms are currently under stakeholder review prior to incorporation into the Spanish CAP Strategic Plan. The Spanish government supports a strong payment scheme with between 20-25% of the total spend in CAP Pillar I to be used for eco-schemes. Besides the environmental ambition, in its proposal, Spanish authorities have taken account of the difficultly in controlling certain environmental good practices and the need for performance to be based on strong indicators.

The principles guiding the design of eco-schemes are:

1. Setting priority needs (recommendations from COM);
2. Heterogeneity of Spanish agriculture: access to different production systems (sustainable production);
3. Simplification for farmers and administration (control);
4. Keeping (most) eco-schemes as annual commitments;
5. Provide room for agro-enviromental measures in EAFRD (reserved for specific actions at regional level and multiannual commitments);
6. Achieve a high uptake by farmers.

The Spanish government has proposed up to nine different eco-schemes, grouped across the following objectives:

Goal 1: Practices for increasing soil carbon sink capacity and fire prevention

- Improving grassland sustainability, increasing soil carbon sink capacity and fire prevention through extensive livestock farming;
- Proper pasture management: mowing of meadows and unmowed borders.

Goal 2: Practices for the improvement of organic carbon, fertility and soil quality on arable land

- Promotion of crop rotation with improving species.

Goal 3: Precision farming and emission reduction practices

- Rational fertilisation and nutrient management plans;
- Alternative practices to open burning or improper handling of harvest and pruning residues, inert plant cover, energy recovery from plant biomass and composting;
- Promoting the application of individual plans for the sustainable use of plant-protection products.

Goal 4: Practices for improving soil conservation

- Practices for improving soil conservation through living plant covers in permanent crops;
- Conservation agriculture: direct seeding (restricted to eroded areas or areas at high risk of erosion).

Goal 5: Practices for improving biodiversity

- Establishment of multifunctional margins and islands of biodiversity and non-harvesting and maintenance of crop areas for birds shelter and feeding.

The NEXT GENERATION funding scheme will bring several opportunities to Spain and assist in the dealing with the massive impact of the COVID crisis on an economy too reliant on tourism and the services sector. Guided by sustainable finance rules, it is expected that such new funding opportunities will arise to support the farm and food sector. Besides the large deployment of renewable energies at farm scale, the uptake of the circular bioeconomy in taking advantage of residues or underutilised sub-products, such as manure, slurry, algae, insects, olive an wine pomace, etc. will be encouraged.

**Netherlands**

The Dutch Ministry of Agriculture, Nature and Food Quality, has envisioned the **future of agriculture to be circular** (Schouten, 2019). A societal transition is necessary to reach a circular system in which space, (raw) materials, products and nutrients are (re)used and produced as efficiently as possible. The goal of the transition to circular agriculture is to minimise waste and GHGs, to recover biodiversity and to create a healthy ecosystem (De Boer en Van Ittersum, 2018).

This overarching vision by the Dutch ministry is currently in the process of being translated to real practices in the sector. The monitoring of circular agriculture is important in the evaluation of the transition, to identify weaknesses and opportunities and give policymakers, businesses, consumers and farmers the information necessary to realise the transition to circular agriculture (Berkhout et al., 2019). Furthermore, a good monitoring system of circular

agriculture provides insights in the trade-offs of the practices and goals of circular agriculture (Berkhout et al., 2019).

This study contributes to the translation of the vision of Schouten (2019) by identifying and listing indicators relevant for the monitoring of circular agriculture at farm-level. Of the collected indicators, an assessment is made whether they are (or can be) measured with existing Dutch farm-level data (part of the FADN) collected by Wageningen Economic Research. Possibly, a proposal will be made for the extension of farm-level data collection in order to monitor circular agriculture. The main focus of the study is on the dairy and arable sectors, the two biggest agricultural sectors in the Netherlands with the most potential for operating land-based *(grondgebondenheid)*.

No blueprint exists for what a 'circular farm' would look like, and there are many uncertainties on which practices are most efficient in reaching the goals as stated in the vision of Schouten (2019). This is likely very context dependent, for example based on soil, farm type, the wishes of the agricultural entrepreneur and/or different positive or negative externalities of measures on the environment and economic situation of the farmer.

The formulation of indicators is based on the benchmark introduced in the vision of Schouten (2019). The benchmark provides the following factors to take into consideration for actions towards a circular agriculture:

1. do they help to close cycles, to reduce emissions and to reduce biomass wastage throughout the food system?
2. do they strengthen the socio-economic position of the farmer in the supply chain?
3. do they contribute to the climate task for agriculture and land use?
4. do they benefit ecosystems, biodiversity and the natural value of the landscape?
5. has animal welfare been considered?
6. do they contribute to the recognition of the value of food and to strengthening the relationship between farmers and citizens?
7. do they strengthen the position of the Netherlands as a developer and exporter of integrated solutions for climate-smart and ecologically sustainable food systems?

The study furthermore builds on the research of Berkhout et al. (2019), Elberson et al., (2019), Erisman and Verhoeven (2020) and other studies related to monitoring sustainability and biodiversity at farm-level. An analysis of these studies combined with the benchmark provided in the vision of Schouten results in themes in which indicators are identified. In the following section, the translation of the goals of circular agriculture for the theme is shortly described and a first glimpse on possible indicators that can **already** be measured with FADN data is given.

Further research is done to give an insight in performance of Dutch farmers on these indicators with Dutch FADN data and to identify other indicators which will become more relevant with the transition towards circular agriculture by more farmers.

**Goals and Indicator themes**

**Manure**

- *Goal: optimal use of nutrients from mostly animal manure and rest products from their own farm or in the region. To minimise nutrient surpluses, GHG emissions and for a better quality of soil and water (Berkhout et al., 2019).*
- Measurable indicators: Nitrogen (N) from own farm, use of fertilisers (N, $P_2O_5$, $k_2O$ or chalk), farm surpluses of nutrients, composition and use of organic manure and waste as fertiliser, solid manure

**Animal nutrition** (with circular materials)

- *Goal: Livestock is fed as much as possible with roughage from crops not suitable for human consumption and is obtained from their own farm or the region. Compound feed is derived from raw materials not suitable for human consumption, like by-products from food consumption, alternative proteins, etc.*
- Measurable indicators: share of protein from own farm, protein in purchased concentrates, efficiency of animal feed to the production of milk and the production of manure, and the composition of animal feed.

**Soil and water quality and management**

- *Goal: All Dutch soil and water bodies are of good quality in 2030 and are sustainably managed. Soils contain more organic matter and life, less compaction and more water holding capacity.*
- Measurable indicators: the usage and environmental impact of crop protection products on soil and water, share of rest-crops in rotation, share of permanent grassland, the organic matter supply and balance, water usage and ground coverage.

**Energy and climate**

- *Goal: by 2030 we are on track to achieve the climate ambition for 2050, inevitable GHG emissions, the sequestration of GHG emissions and the production of renewable energy and biomass are balanced.*
- Measurable indicators: farm-level GHG emissions (LCA), usage of fuel, share of clean energy and own clean energy production.

**Nature management and biodiversity**

- *Goal: biodiversity is fully recovered and the ecosystem is healthy and rich in plant and animal life.*
- Measurable indicators: income from subsidies connected to the management of nature, types of nature management.

**Animal welfare**

- *Goal: increase in animal welfare standards*

- Measurable indicators: grazing, animal density, antibiotics usage, somatic cell count, animal health costs, transport movements and average age at disposal.

**The socio-economic position of the farmers**

- *Goal: farmers get rewarded for their contribution to the ecosystem and a fair price for their products. Additionally, farmers participate more in short supply chains and consumers are in closer contact with farmers.*
- Measurable indicators: participation of farmer in other activities, share of wage from other activities and allowances for sustainability.

**Poland**

Poland has at least seven policy oriented documents which are relevant to the current/future CAP

The **Strategy for Responsible Development for the period up to 2020** sets out a range of economic, social and environmental objectives. Economic objectives include an increase in organic agriculture and greater mobile connectivity in rural area. Social objectives include greater farm diversification of farmers' income and the provision of better social services. Environmental objectives include the need for technical steps to address climate change, innovative solutions to protect the natural environment and interventions to address soil degradation (Ministry of Development Funds and Regional Policy, 2017).

The polish document **Common Agricultural Policy after 2020** reflects many of the broader EU aims for the CAP. Objectives include, simplification, addressing the bargaining power of producers, targeted support for smaller and medium sized farms and the option to retain some coupled support (Ministry of Agriculture and Rural Development, 2017). The **Strategy for the Sustainable Development of Rural Areas, Agriculture and Fisheries 2030** targets a sustainable increase in income in rural areas, while protecting the natural environment. It seeks to reduce the gap between rural and urban incomes, decrease rural poverty and increase the amount of processed agricultural products in agri-food exports (Ministry of Agriculture and Rural Development, 2019a).

The **Framework Action Plan for Food and Organic Farming in Poland for 2014-2020** aims to develop both the supply of organic agriculture by increasing its competitiveness, developing the processing organic products and diversifying the distribution channels for organics. On the demand side the strategy seeks to increase consumer awareness of organics (Ministry of Agriculture and Rural Development, 2018).

**The Plan for the countryside - protection, support and development of Polish agriculture** includes objectives relating to an increase in direct sales by farmers to consumers, support for the production of healthier food, measures for more efficient fertiliser and water use, support for the production of animal crops and measures to improve animal health (Ministry of Agriculture and Rural Development, 2019b).

The **National Network of Rural Areas** supports the work of a network to improve the quality of life and promote innovation in rural areas (Polish Rural Network, 2020).

The **National Strategic Research Agendas on sustainable agriculture and sustainable development of rural areas in Poland** includes measures to promote forward contracting for commodities, a support too to optimise fertiliser use and address water pollution, development of farm insurance products and a bio-informatics systems for genetics.

**Greece**

The **Development Plan for the Greek Economy** includes objectives for the agriculture sector. These objectives include the enlargement of farm holding and promotion of co-operatives, the modernisation of farms using new technology with additional training to support this. These measures are intended to increase the added value of the agriculture sector, along with additional marketing measures to further develop product brands and product standards (Pissaridis, 2020).

There are also a number of relevant **digital initiatives** relating to the agri-food sector is Greece. These projects aim to:

- increase the efficiency of management mechanisms, reducing the administrative burden and offering better services to traders, through the use of innovative tools;
- assist in decision-making and effective control, utilising state-of-the-art remote sensing applications as well as big data and artificial intelligence technologies;
- create data infrastructure and consulting services that will lead to the development of a long-term sustainable, efficient, transparent and sustainable agri-food system;
- enhance the traceability of Greek food products (Ministry of Digital Governance, 2020).

The policy report **Green Growth: The Response to the Environmental Crisis** is a Greek response to the European Green Deal, which outlines business transformation plans, reforms and investments (diaNEOis, 2020).

The ultimate goal is to transform the Greek economy into an endogenous circular economy, producing innovative internationally competitive products and services, new jobs and a strong welfare state, while taking advantage of European funds and private investments through public private partnerships.

It presents 10 business plans, which vary from energy saving to mineral resources exploitation and from smart farming to the exploitation of areas of the Natura 2000 network, and are expected to contribute to the new sustainable productive model. Each business plan has a cost estimation, a proposal for its implementation methodology and has an assessment of the jobs created.

In Greece, with 85% of the total water consumption by agriculture and with the uncontrolled use of pesticides and fertilisers, the application of smart farming in water, energy and digital applications is vital and the only sustainable solution for the sector that will create jobs and increase the income of professional farmers.

With the application of the principles of the European Green Deal's Farm to Fork Strategy and by utilising smart and sustainable methods of water use (reduction by 80%), installing of decentralized renewable energy sources for significant reduction of energy costs (up to 60%) and using of broadband networks, remote sensing technologies, geographic Information systems (GIS), artificial Intelligence (AI) and IOT, the Greek primary sector aims to follow the

examples of the Netherlands and Israel (at least doubling productivity and pioneering in product quality and biological purity). The aim is to produce more with less by

- placing a special focus on the efficient use of water, Improving water quality;
- improving resource efficiency, selective use of pesticides and fertilisers;
- greater renewable energy utilisation (biomass, wind, solar, geothermal) and energy netting (net metering);
- application of modern/innovative technologies (broadband networks, remote sensing technologies, global positioning systems, GIS, AI, and the IOT;
- application of precision agriculture, smart farming;
- increasing the use of land for biodiversity purposes, including agricultural areas with high diversity landscape features.

Finally, **ELGO-DIMITRA** is a Greek agricultural organisation dedicated for the development and support of actions for the modernisation and development of the country's agricultural sector, the improvement of production processes, the strengthening of competitiveness, the certification of quality agri-food products, the establishment and certification of good agricultural practices and controls in the production chain for the market for milk and meat in Greece.

## 2.7. Future of the CAP: Perspectives of Farming and Food Industry Organisations

Farming and food industry representative organisations have provided their view on CAP reform and the European Green Deal in the context of the EU Farm to Fork Strategy. In a broad sense, the views expressed reflect an acceptance that agriculture (and food processing) needs to do more to address environmental and climate issues.

However, concerns exist that the targets that the sector has been presented with may not be achievable, particularly given the relatively short time scale (in the context of agriculture) of 2030. There are also concerns about:

- the implications of such reforms for the overall productive capacity of EU agriculture (CEJA, 2020; Global Food Forum, 2019).
- the position of the EU as a major food exporter (Global Food Forum, 2019).
- the maintenance of the integrity of the single market in the context of a level playing field between the agri-food sectors of the various MS' (Food Drink Europe, 2019).
- Implications for the wider competitiveness of EU agriculture relative to agriculture in the rest of the world. This reflects a concern that cheaper imported products would be produced with less regard for the impact on the environment and climate.
- Implications for land prices and access to land for young farmers, in the context of policies that aim to spare land for use in non-agricultural purposes and also reduce the productivity of land within agriculture such as through the envisaged large increase in organic land area (CEJA, 2020).
- the need to measure both economic and social impacts in addition to the environmental impacts of CAP reform/the EU Farm to Fork Strategy in a way that goes beyond "the collection of statistics" (Global Food Forum, 2019).

- CAP reform will not recognise that individual farmers differ due to their farm circumstances in their ability to deliver the various components of sustainability (CEJA, 2020).
- a green investment scheme should be provided to facilitate private co-investment by farmers in making a green transition (Global Food Forum, 2019).

Broadly, it can be said that the approach of the farming and food industry representative organisations is to adopt a defensive position. This is understandable as these changes in policy stand to impact on them to a greater extent than the rest of society. They perceive the direct benefits of greater environmental and climate efforts on the part of the agri-food sector in the EU to be unclear, especially when it has yet to be established whether the policy changes being made at EU level will be reflected in a global effort of similar magnitude.

The concern with respect to the time scale envisaged by the environmental and climate targets is also understandable given that previous reforms of EU policy that relate to agriculture have tended to be very gradual to allow time for farmers to adjust to the new policy circumstances.

The most positive perspective is offered by CEJA. It points to the fact that younger farmers are willing to do things differently, but they express concern that the reforms could have implications for generational renewal if the environmental targets are too ambitious. Their general position on the CAP post-2020 and the EU Farm to Fork Strategy is summarised below.

**COPA and COGECA position on the CAP post-2020 (2018)**

- Cognisance of the UN SDGs and Paris Agreement on climate change in the context of CAP reform.
- The maintenance and stabilisation of the CAP budget is important.
- A simplified CAP model is welcomed, with the safeguarding of communality but also flexibility for MS.
- CAP Strategic Plans must guarantee synergies and coherence between policies.
- EU and National level supports are important for the delivery of the nine CAP objectives. The prominence given to all three pillars of sustainability is acknowledged.
- The focus on technology, digitalisation and the bio-economy is particularly welcome and the importance of fostering knowledge, innovation and digitalisation is reiterated.
- CAP support must target active farmers, producing food, feed, fibre and renewable energy, who contribute to a sustainable sector and provide public goods and growth.
- The organisation is In favour of external convergence and opposed to the mandatory capping of payments.
- The rural development policy must provide enough financial tools for the agriculture and forestry sector to maintain and create jobs in rural areas. These tools must also foster growth as well as sustainable and competitive businesses.

- Measures which provide support for investments, ANCs, risk management, producer organisations (POs), advisory services and for the further development of the bio-economy should play an even greater role in the future.
- The importance of ANCs for the environment and in avoiding land abandonment is highlighted.
- The new green architecture and especially enhanced conditionality, must allow some degree of variability across the EU in a manner that does not jeopardise uniform implementation.
- Greater clarity regarding the agricultural practices to be included under the eco-schemes is required.
- How farmers can be rewarded for good practice in the context of a smaller CAP budget must also be clarified.
- With regards to the design of new, enhanced conditionality and the eco-schemes, reliable and workable indicators are needed for the European agriculture sector to measure its progress and improve its resource efficiency, which is central to reducing emissions.
- The role of agricultural and forestry cooperatives and POs in improving farmers' position in the supply chain is of fundamental importance as is the inclusion of risk management tools.
- The priority given to young farmers is welcome, particularly given the current aging structure of EU farmers. Issues around land access and mobility for young farmers must be confronted, and assistance in starting and developing their businesses must be forthcoming.
- The crisis reserve should provide sufficient assistance to the sector when facing market disruption, extreme weather events and the impact of political decisions. Such a reserve should function outside of the scope of the MFF with a substantially larger financial envelope and a clear activation mechanism.

**COPA and COGECA position on the EU Farm to Fork Strategy (2020)**

- The EU Farm to Fork Strategy for sustainable food production must take into account all three pillars of sustainability (economic, social and environmental).
- As this initiative will have significant economic, social or environmental impacts, it is imperative that the Commission carry out impact assessments before taking any political or regulatory decision on establishing targets such as to reduce the use of pesticides, or the use of fertilisers and antibiotics.

A synopsis of a number of relevant issues is provided below:

- **Reduction in use of pesticides** - sustainable alternatives to chemical inputs must be identified that will assure safe and effective production, through a science-based decision-making process. Research and innovation must aim to find new tools and practices that are directly available and applicable on field for farmers.

- **Reduction in the use of fertilisers** - precision and digital farming benefit agricultural activities by optimising the application of fertilisers and plant protection products. Decision-support and precision-farming tools make it possible to improve the efficiency of crop fertilisation and provide both environmental and economic benefits, and thus should be encouraged.
- **Reduction in use of antimicrobials** - it is necessary to harmonise collection and monitoring systems of antimicrobials in MS, in order to have reliable and comparable data. It is clear that a 'One Health' approach is important for all health stakeholders in the EU (both for humans and animals) and everyone must play their role in controlling and reducing antimicrobial resistance in Europe.
- **Animal welfare** - investments and long-term commitment are required from farmers. However, these costs are often not recovered from the market.
- **Labelling** - A mandatory 'place of farming' origin labelling at EU level should be envisioned for fresh and processed products, as well as for catering services.
- **Research and innovation** is crucial to develop and provide innovative tools and solutions for European farmers, their co-operatives and forestry owners to improve their productivity and adapt to climate change while reducing the impact on the environment.
- **Biodiversity** – it is crucial that all targets in the Biodiversity Strategy 2030, while ambitious, are realistic.
- **Circular economy** - The updated EU Bioeconomy strategy and the implementation of its action plan must therefore be a key component of the European Green Deal. A coherent legislative framework, tailored economic support and science-based political will is required.
- **Improving farmers' position along the food supply chain** - cooperation between farmers needs to be supported. A supportive legislative environment is requiredto further develop innovative business models that can deliver on the objectives of the Farm to Fork Strategy and contribute to the achievement of the UN SDGs.

## 2.8. Future of the CAP: Perspectives of Environmental Organisations

Much of what is contained in the EU Farm to Fork Strategy can be observed in the policy positions set out in the last decade by organisations such as the European Greens and the Institute for European Environmental Policy (IEEP).

In a report in 2012 the European Greens called for policy action in respect of agro-ecology, energy efficiency and the production of renewable energy, waste reduction, short supply chains, organic production, the rewarding of positive externalities, price transparency, biodiversity, GHGs, animal welfare standards, soil fertility, resource efficiency (nutrient, pesticides, water), genetic diversity, farm production diversity and afforestation (European Greens, 2012).

In its *Think 2030* report on the future of EU agriculture, IEEP called for greater policy coherence so that EU agricultural policy is aligned with broader EU policy objectives and the removal of all CAP subsidies that are harmful to the environment. It called for a "full transition" towards rewarding farmers for the provision of public goods within a results based payment system. IEEP expressed concern about the subsidiarity granted to MS' in the CAP Strategic Plan model

and therefore called for what it refers to as "strong accountability and robust monitoring". The report also called for a more integrated policy strategy linking the supply side and demand side. This would involve pricing products to reflect their sustainability with a view to raising the price of product produced unsustainably and thereby reducing demand for such products in favour of products produced more sustainably (IEEP, 2018). Ultimately, such taxes would require an understanding of the scale of the environmental bads being generated by each product and such taxes would need to be adjusted over time as performance improves. Such a policy would require reliable indicator data.

In its more recent review of the Green Deal and the CAP, a report published by IEEP details a range of concerns. It notes a lack of binding target within the CAP reform. It also note that the experience of the past tends to suggest that CAP reforms are watered down before the final agreement is reached. It expresses concern at the continuing dominance of direct payments within the CAP and some scepticism as to be level of ambition that will be contained in the Member State Strategic Plans. It also questions the capacity of the Commission to adequately evaluate such plans so that they can be approved. It also noted that some Member States lack enthusiasm for the shift from a compliance to a performance based CAP model (Maréchal, 2020). Key priorities it identifies include:

- air pollution
    - ammonia emissions, excessive use of nitrogen, ammonia and nitrogen deposition.
- pollution of waters and soils
    - nutrients, pesticides and soil sediment.
- biodiversity
    - decline in habitats, decline in birds, decline in pollinators.
- GHG emissions reductions including those in food processing
    - noting that 70% of EU agricultural GHGs come from livestock and beyond the primary sector a further 10% come from food processing.
- removing carbon/
    - grass, crops, trees.
- renewable energy

Birdlife International's response to the EU Biodiversity Strategy and the EU Farm to Fork Strategy was generally positive (Birdlife International, 2020). It welcomed many of the actions and targets specified, including those relating to pesticide use, organic farming, food waste, production of renewable energy, increase in the area under strict protection including forests, targets for the restoration of degraded eco-systems including action to increase the carbon storage and restoration of rivers. It did however, also argue that the budget for eco-schemes under Pillar I needed to be increased to half of the Pillar I budget, with an increase in the environmental standards required for the receipt of payment.

In a 2020 report on CAP reform and the EU Farm to Fork Strategy, the Corporate Europe Observatory issued a very strong attack on existing EU agricultural policy and the way agricultural policy is developing. The report is highly critical of what it perceives as a low level of ambition within the objectives/targets that have been set for agriculture over the current decade. It argues that stakeholders, including politicians, policymakers, farmer and food

industry representative organisations, have acted to try to limit these reforms, by seeking to reduce the EU's ambition (Corporate Europe Observatory, 2020).

## 2.9. Private sector initiatives to promote sustainability

**UN Global Compact** https://www.unglobalcompact.org/

The UN Global Compact is a corporate sustainability initiative. It describes itself as the "world's largest corporate sustainability initiative". It aims to co-ordinate business internationally so that it takes strategic action towards the achievement of societal goals. Three of its guiding principles relate to the environment.

**Global Reporting Initiative** https://www.globalreporting.org/

The Global Reporting Initiative promotes transparency in the way businesses report their impacts along a wide ranges of themes, including priority areas of sustainability, such as biodiversity, water and emissions.

**Global G.A.P** http://www.globalgap.org/uk_en/

Global G.A.P is an international trademark initiative for good agricultural practices. It operates a set of voluntary certification standards for agricultural products and provides a benchmarking process that facilitates the international alignment of product standards. It allows farmers to achieve farm assurance standards for sustainably produced products and then connects them to markets which demand sustainable products.

**Bord Bia Quality Assurance Schemes**
http://www.bordbia.ie/industry/farmers/quality/pages/qualityassuranceschemes.aspx

The Bord Bia Quality Assurance Scheme develops and maintains standards for Irish food production. It verifies the achievement of these standards through an auditing process.

**Sustainable Agriculture Initiative (SAI) Platform** http://www.saiplatform.org/

The Sustainable Agriculture Initiative Platform is an international network of agri-food stakeholders which aims to advance sustainable agricultural practices. It includes farmer co-operatives, processors, food manufacturers, wholesalers and retailers, but also has affiliate members in the wider agri-food economy. It provide a mechanism for members to collaborate on projects with a sustainability objectives.

**Dairy Sustainability Framework (DSF)** http://dairysustainabilityframework.org/

The Dairy Sustainability Framework aims to align the international dairy sector's sustainability actions globally. It provides a mechanism for the sharing of knowledge with a view to finding and implementing sustainability solutions more quickly.

**Global Dairy Agenda for Action (GDAA)**

The Global Dairy Agenda for Action was established in 2009 with the aim of reducing GHGs throughout the value chain. Its membership includes international dairy representative organisations and other international organisations with a dairy focus. It develops tools to

support emission reductions strategies that are economically, socially and environmentally sustainable.

## 2.10. Findings from Workpackage 1 Stakeholder Engagement Workshop

Stakeholder engagement is an essential element of the MEF4CAP project. Within the project, the process of including and engaging relevant actors working with CAP monitoring and evaluation began with a workshop on January 14th 2021. Due to COVID-19 restrictions the workshop took place online.

The broad aims of the overall MEF4CAP project were explained to workshop participants. A more detailed explanation of the objectives of WP1 was also provided for the stakeholders. The workshop was part of the MEF4CAP project's aim of identifying the policy modelling data gaps that already exist and those that could emerge as policy changes in the future.

The workshop included three presentations by invited stakeholders, affording them the opportunity to provide their views on the important elements of sustainability and the data needs created by ongoing policy reform. Keynote presentations were delivered by representatives of the World Wildlife Fund (WWF) Europe, the European Council of Young Farmers (CEJA) and the European Commission. The keynote presentations were delivered by Jannes Maes, President of the CEJA, followed by Jabier Ruiz, food and agriculture expert from WWF Europe, and, finally, Doris Marquardt from the European Commission's Directorate for Agriculture and Rural Development. The presentations provided valuable inputs for the project team and set the stage for the subsequent open discussions of the necessary indicators for monitoring environmental and socio-economic sustainability.

A key aim of the workshop was to gain insights from stakeholders that would be relevant to the crucial task of identifying new data needs to evaluate the CAP's sustainability impacts. Ultimately, the aim is to provide a roadmap for future data needs to support policy developments, harnessing innovations in information and communication technology (ICT).

A common theme across the keynote presentations was a recognition of the increasing importance of environmental sustainability, highlighting the need to recognise the strong interdependence between environmental, economic and social sustainability in agriculture.

The need to empower farmers to be successful, enabling them to adequately address each dimension of sustainability, was highlighted. Also emphasised were the importance of integrating farmers into the decision making process and the need to design data collection systems whose benefits are clear to farmers.

Attention was drawn to the importance of recognising the achievements that have and continue to be made by farmers in addressing environmental sustainability. It was also pointed out that farms are extremely diverse and therefore have differing capacities and motivations to deliver on each sustainability dimension.

It was emphasised that there is a need for all EU MS' to support data gathering to assist policy design and evaluation. Concern was expressed that, without a strengthened data capacity, the EU would lack a governance mechanism to effectively monitor the future CAP.

It was also argued that a broader definition of sustainability should be embraced, going beyond agriculture to consider sustainable food systems in general. It was recognised that the

European Green Deal and the EU Farm to Fork Strategy are set to progress the CAP towards objectives that require the more explicit achievement of defined quantitative targets.

During the workshop, a series of polls allowed stakeholder participants to provide their perspective on a range of statements associated with agricultural sustainability. While the organisers invited a broad body of interests to participate, there is no suggestion that the stakeholders were representative, in a statistical sense, of the wider population. The polls are nevertheless useful in identifying areas where agreement between stakeholders is likely to exist and areas where disagreement can be found.

The polls covered themes such as the relative importance of environmental, economic and social aspects of sustainability, the need for new data, perspectives on the appropriate level of data gathering and whether farmers should have an obligation to report data to assist sustainability measurement. The polling also addressed the question of how to balance usability and feasibility (cost and time) in data collection activities.

While there was no evident consensus in some of the polls, the polling did allow the identification of areas where there was a general level of agreement across the participant stakeholders. Broadly, there was support for greater data collection to ensure that sustainability is more effectively measured, even if that requires more input on the part of farmers.

Other polling outcomes indicated a recognition that the objective of improved data provision has to take into account the feasibility of data collection, with an emphasis on collecting data that has a strong degree of usability, to maximise the value of the data collection process. Polling outcomes also indicated a belief that environmental objectives would strongly influence the future direction of policy. There was a majority view that more data is needed to describe the social sustainability of agriculture. With respect to the economic sustainability, the consideration of other aspects besides farm income was deemed to be important.

## 2.11. Conclusion

The various elements of the workshop, including the keynote presentations, participant discussions and poll responses combined with the detailed document analysis of publications produced by a diverse range of stakeholders, provide an understanding of how agriculture-related policies in the EU may develop in the medium term. This in turn allows for the development of a wish list of sustainability metrics relating to the monitoring and evaluation of agricultural sustainability in the EU in Section 4, Section 5 and Section 6.

The wish list of sustainability metrics developed in this early stage of the project will be used as a guide for work in subsequent stages of the project. Deliverable 1.2 will look at more precise data requirements arising from the themes identified in Deliverable 1.1. Meanwhile WP 2 and WP 3 will determine whether data can be collected and by what means it should be collected. Subsequently, a roadmap will emerge with proposals for how data collection can be enhanced to better measure agricultural sustainability.

In the end, this will contribute to an outcome where new data can support the development of more targeted policies and help to refine its objectives and evaluate its implementation.

# 3. Data Coverage

In this section the Environmental, Social and Economic themes for data currently collected under the CMEF is detailed. Then the indicator themes identified in the FLINT project are described.

## 3.1. Common Monitoring and Evaluation Framework

The CAP is currently assessed through the CMEF. It provides key information on the implementation of the policy (monitoring), as well as on its results and impacts (evaluation). It quantifies the actions in MS' (output) and verifies how well objectives were reached. The CMEF assesses the performance of the current CAP in terms of its three general objectives; i.e. (i) viable food production, (ii) sustainable management of natural resources and climate action, and (iii) balanced territorial development and, in the case of Pillar II, in relation to the thematic objectives and rural development priorities for the Europe 2020 strategy.

Broadly speaking, the main areas evaluated using the framework relate to the following:

**Table 2: Common Monitoring and Evaluation Framework Thematic indicators**

| | |
|---|---|
| Financing the CAP | Water Quality and Availability |
| Environment and Climate Action | Market Orientation |
| Climate Change and Air Quality | Soil Quality |
| Farming Income Support | Biodiversity |
| Organic Production | Adding Value |
| Productivity | Jobs growth in Rural Areas |

Source: https://agridata.ec.europa.eu/extensions/DataPortal/cmef_indicators.html

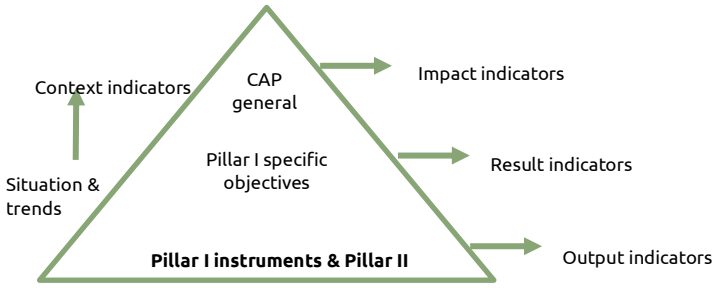
These thematic areas are assessed using a number of indicator types. These are detailed below:

- 45 context indicators describing the general operational environment of the policy;
- 84 output indicators measuring activities directly related to policy interventions;
- 41 result indicators: 16 result indicators for the Pillar I measuring the direct and immediate effects of interventions and 25 result indicators for Pillar II (of which 19 correspond to target indicators);
- 24 target indicators (of which 19 correspond to result indicators) used to set quantified objectives at the beginning of the programming period;
- 16 impact indicators measuring the impact of policy interventions at longer term and beyond immediate effects (of which 13 are also included in the context indicator set);
- Sub-indicators were included when a split was considered necessary e.g. per sector or category. In total, the current framework has more than 900 sub-indicators.

Figure 1 illustrates the CMEF indicator hierarchy, i.e. at the base of the pyramid, the output indicators are illustrative of the policy intervention, which leads to specific results and in turn expected positive impacts. The context indicators reflect the fact that outputs, results and impacts are influenced by a range of factors. These indicators are illustrated in Figure 2.

## Figure 1: Common Monitoring & Evaluation Framework Indicator Hierarchy




Source: European Commission (2017a)

## Figure 2: Common Monitoring & Evaluation Framework Context Indicators

| Socio-economic indicators | Sectorial indicators | Environment indicators |
|---|---|---|
|  |  |  |
| C.01 Population | C.13 Employment by economic activity | C.31 Land cover |
| C.02 Age structure | C.14 Labour productivity in agriculture | C.32 Areas facing natural and other specific constraints (ANCs)17 |
| C.03 Territory | C.15 Labour productivity in forestry | C.33 Farming intensity |
| C.04 Population density | C.16 Labour productivity in the food industry | C.34 Natura 2000 areas |
| C.05 Employment rate (*) | C.17 Agricultural holdings (farms) | C.35 Farmland birds index (FBI) (*) |
| C.06 Self-employment rate | C.18 Agricultural area | C.36 Conservation status of agricultural habitats (grassland) |
| C.07 Unemployment rate | C.19 Agricultural area under organic farming | C.37 HNV (high nature value) farming (*) |
| C.08 GDP per capita (*) | C.20 Irrigated land | C.38 Protected forest |
| C.09 Poverty rate (*) | C.21 Livestock units | C.39 Water abstraction in agriculture (*) |
| C.10 Structure of the economy | C.22 Farm labour force | C.40 Water quality (*) |
| C.11 Structure of the employment | C.23 Age structure of farm managers | C.41 Soil organic matter in arable land (*) |
| C.12 Labour productivity by economic sector | C.24 Agricultural training of farm managers | C.42 Soil erosion by water (*) |
| | C.25 Agricultural factor income (*) | C.43 Production of renewable energy from agriculture &forestry |
| | C.26 Agricultural entrepreneurial income (*) | C.44 Energy use in agriculture, forestry and food industry |
| | C.27 Total factor productivity in agriculture (*) | C.45 Emissions from agriculture (*) |
| | C.28 Gross fixed capital formation in agriculture | |
| | C.29 Forest and other wooded land (FOWL) | |
| | C.30 Tourism infrastructure | |

Source: European Commission (2017a)

### CMEF Data sources

Where possible, CMEF indicators are defined to utilise existing data channels to avoid creating any additional administrative burden for beneficiaries and MS'. Agricultural statistics utilised from Eurostat data include: the economic accounts for agriculture (EAA), agricultural price indices (API) and the Farm Structure Survey (FSS). Agri-environmental indicators (AEIs) developed by the Commission are also used to track the integration of environmental concerns into the CAP at EU, national and regional levels. These track farm management practices, agricultural production systems, pressures and risks to the environment and the state of natural resources.

Although the utilisation of existing data sources is advantageous, the level of detail required for certain indicators has an impact on the timing and frequency of data availability. For example, FSS data are collected every three years and are available 1.5 years after the reference year. Similarly, some environmental indicators are based on periodical surveys. Some such concerns were highlighted in the recent CMEF report (European Commission, 2018a) which also concluded that there were too many indicators and sub-indicators. Furthermore, the report found that some indictors are lacking in necessary detail and that some MS' struggle to report the correct data. The existence of different delivery models across the two pillars of the CAP is also problematic. A further criticism of existing CMEF indicators is that they are not easily related to existing farm level metrics. As many are only representative at a national or regional level, more detailed micro-level data will be required within the new PMEF.

There are also a number of annual farm level datasets which are used in the context of the CMEF. These include the IACS (Integrated Administration and Control System database), which manages CAP payments to farmers and the Land Parcel Identification System (LPIS) a spatial database, which is part of IACS and monitors land parcels and land use at the farm level.

The adapted PMEF will require the collection of additional data through the FADN database, the database most suited to the integration of additional sustainability metrics. Indeed, the recent Farm to Fork strategy has reiterated this in its proposal to create an updated Farm Sustainability Data Network (FSDN).

## 3.2. Available FADN sustainability data

The FADN is a harmonised farm-level database of more than 1,000 variables collected on 80,000 farms across Europe. The FADN database is already widely used for analytical and evaluation purposes, with several countries already having extended their national data collection to take account of sustainability issues. A key advantage of using farm-level data in this way is its ability to examine the interaction between economic, social and environmental indicators. This has already been undertaken within the recent FLINT project, which established a pilot network of 1,000 farms across nine EU countries (Poppe and Vrolijk, 2016).

The suitability of using individual (farm) level data in sustainability assessments has been cited by Kelly et al. (2018) who suggest that it is the most important spatial unit in terms of the implementation of sustainable actions, as farmers operate at this scale, and management decisions can be directly influenced through interventions for improved implementation. Furthermore, the farm level approach increases the spatial accuracy of indicators, and as the

farm is the legal unit for legislative purposes and the economic unit that generally receives payments for externalities, it is the level at which most policies are directed.

The FLINT project identified 33 key farm level sustainability indicators across environmental, economic and social dimensions, and these are listed in Table 3, Table 4 and Table 5.

**Table 3: FLINT farm level environmental indicators**

| **Environmental Indicator Themes** |
|---|
| Greening permanent grassland |
| Greening existing/created areas of EFA |
| Semi-natural farmland areas |
| Pesticide usage (pesticide risk score) |
| Nutrient balance (N,P farm-gate balance) |
| Soil organic matter in arable land |
| Indirect energy usage |
| Direct energy usage |
| On-farm RE production |
| Farm management to reduce nitrate leaching |
| Farm management to reduce soil erosion |
| Use of legumes |
| GHG emissions per product |
| GHG emissions per hectare |
| Carbon sequestration |
| Water usage and storage |
| Irrigation practices |

Source: Kelly et al. (2016)

**Table 4: FLINT farm level social indicators**

| **Social Indicator Themes** |
|---|
| Advisory services provided to the farm |
| Education and training |
| Ownership/management |
| Social engagement/participation |
| Employment and working conditions |
| Quality of life/decision making |
| Social diversification: improving the image of farmers/agriculture in local communities |

Source: Kelly et al. (2016)

**Table 5: FLINT farm level economic indicators**

| **Economic Indicator Themes** |
|---|
| Innovation |
| Producing under a label or brand |
| Types of market outlet |
| Past/future duration in farming (survival propensity) |
| Efficiency field parcel |
| Modernisation of the farm investment |
| Insurance personal/farm |
| Share of output under contract with fixed price delivery contracts |
| Risk exposure (non-agricultural activities) |

Source: Kelly et al. (2016)

# 4. Economic Data Requirements

In this section the Economic themes that are relevant in the context of the European Green Deal, the Farm to Fork Strategy, other EU policies and CAP reform are described. Economic concerns are covered in Objectives 1, 2 and 3 of the CAP.

## 4.1. Broad Economic Themes

**CAP Objective 1: Ensuring Viable Farm Income**

**Motivation:** Increased price and production risk have emerged as the EU has moved towards a more market oriented CAP. This market orientation has reduced the protection offered to EU agriculture. This has led to a convergence of EU and world price levels. There has also been the emergence of increased climate change related production risks and subsequent input and output price volatility.

**Some issues that arise under this theme:**

1. Do we have the data to capture the diverse risk profiles of farmers across different systems and in different MS'?
2. Do we have data to show the extent to which farmers may require or have access to investment aid, so that they don't have to finance investment from their farm income?
3. Digitalisation could be one of the technologies that drives the agricultural sector forwards (lower input use and lower cost) but adoption of such technology requires investment. Can we track the investment spend on digitalisation? This might also provide guidance on the extent to which labour outflow from the sector as technology is adopted?
4. Do we have enough data on the value of farm assets and liabilities, the price of land, the quality of land and the rental price and quality of land?
5. There is strong agreement across the EU (CAP public consultation) that farm incomes should increase, but disagreement about the way in which support should be provided, particularly the distribution of that support. Support as a share of income varies a lot across the EU and by sector. Do we have sufficient detail on that?
6. We have seen a switch from price support, to more transparent coupled support and then latterly to largely decoupled support, with coupled support now quite limited due to the distortive impact it has on agricultural markets. Do we have sufficient detail on the breakdown of these payments?
7. Unlike the US, no use is made of counter cyclical payments in the EU. What kind of monitoring would the EU need in place if it were to introduce counter cyclical payments in the EU?
8. There has been a focus on the ways in which direct payments could be reduced particularly for large farms. There is always concern about capping in that it violates cohesion and convergence between MS'. It is argued that some form of redistributive payment is needed for smaller farms. In a financial sense this would help to secure those smaller and less intensive farms, which yield environmental benefits. Do we have

sufficient data on agriculture at the MS level to explore the full implications of payment capping?

9. The CAP makes the process of structural adjustment in agriculture smoother. The strong price fluctuations experienced in some agricultural markets can lead to cashflow constraints for farmers. Do we have enough data to understand the cashflow implications of volatility for farmers?

10. The CAP therefore needs tools to manage risk (weather, price and production risk) if the aim is to enhance farm resilience. Do we have enough data to measure the risk exposure farmers' face?

11. Decoupled payments are known to present a buffer against risk and therefore a protection against very low incomes levels which could otherwise lead to underinvestment. We know that this cushion is not uniform. Do we have enough data to describe the benefit provided by decoupled support with respect to income volatility?

12. It is considered that there is a risk that public support measures which address risk management may crowd out private insurance and other risk management tools (killing demand for private sector solutions). Do we have enough data on the availability and use of private sector risk management solutions among farmers? This is particularly relevant as income stabilisation tools are allowed for in MS CAP Strategic Plans.

**CAP Objective 2: Increasing Competiveness (Productivity)**

**Motivation:** Historically, pressure to improve agricultural productivity came from the need to maintain and improve the sector's international competitiveness. However, of great importance now also is the need to deliver productivity improvements that provide environmental benefits. Productivity improvements that reduce input usage, not only save the farmer money, but also have the potential to deliver benefits for the environment.

Numerous initiatives within agriculture can help to drive productivity. These include research and innovation programmes, the development and adoption of new technologies, improvements in the infrastructure of rural areas, better provision of farm advice and the availability and uptake of training opportunities

**Some issues that arise under this theme**

1. Can productivity be measured in a better way so that it includes both positive and negative market externalities, such as biodiversity and other environmental issues? There are quite a few partial productivity measures in FADN but does all of the necessary data exist in order to measure productivity more fully?

2. Do we have enough data to measure the costs required to address environmental bads? This is important if we are going to develop policies to address these concerns which are attractive to farmers.

3. Do we have enough data to measure the benefits of applying new technologies? This is important as it can influence the adoption of such technology.

4. Understanding of the extent of adoption of new technologies is important. Do we have enough data to understand perceptions around new technology? This is important as it can affect the adoption of such technology.
5. It would be good to understand usage of broadband for meetings, training, its use as a decision support tool, and its use to access market information.

**CAP Objective 3: Strengthening Farmers' Position in Value Chains**

**Motivation:** There is considerable concern that retailer and producer concentration in the food chain weakens the market power of farmers. By strengthening co-operation among farmers, their market power could be increased. CAP Strategic Plans allow for interventions that would increase the capacity of producers to organise, thereby increasing their market power and potentially their share of the value chain.

**Some issues that arise under this theme:**

1. Market transparency is clearly important to establish a baseline and measure changes in the distribution of value added in the food chain. What data can be gathered to reflect this?
2. There is a role for Blockchain technology in transparency, but at this time there is no data to describe the extent of its use. In the first instance a baseline for use could be established
3. Geographical Indications can improve value added. Do we have data to illustrate the benefit to farmers that arise from the marketing of their output under geographical indicators?
4. Organics can improve value added. Do we have data to illustrate the benefit to farmers that arise from the marketing of their output under geographical indicators?
5. Local food systems (short supply chains) can improve value added. Local economic multipliers will be higher with shorter supply chains. Do we have data to illustrate the benefit to farmers that arise from the marketing of their output under geographical indicators?

## 4.2. Economic Data Gaps Representing Additional Data Needs

Based on the preceding analysis we can now provide a description of the desirable economic data for monitoring and evaluation purposes. The list provides a basis for more detailed exploration of the potential to provide such data in subsequent stages of the project. No consideration is taken at this point of the level of spatial scale that would be appropriate for this data. Furthermore, no consideration is made at this point of the precise description of each indicator. These themes are summarised in Table 6.

**Table 6: Economic Sustainability – Relevant Themes**

| **Relevant Themes** |
|---|
| • Viable Farm Incomes<br>  ○ Farm incomes relative to incomes in the broader economy<br>  ○ Farm Labour Productivity<br>  ○ Farm Structural Change and Income<br>  ○ Farm Assets and Liabilities<br>  ○ Share of support in farm income<br>  ○ Distribution of farm income support<br>  ○ Volatility in farm income<br>  ○ Usage of Risk Management measures |
| • Productivity<br>  ○ Agricultural Productivity Growth<br>  ○ Total Factor Productivity and Sectoral Productivity Growth<br>  ○ Technology Adoption<br>  ○ Agricultural Training |
| • Farmer position in the Value Chain<br>  ○ Concentration in the farm sector<br>  ○ Distribution of value added in the food chain<br>  ○ Co-operation among farmers<br>  ○ Market transparency<br>  ○ Use of futures markets<br>  ○ Use of blockchain in the foodchain<br>  ○ Short supply chains (local processing)<br>  ○ Geographical Indications<br>  ○ Organic Production<br>  ○ Use of contracts by crop |
| • Other<br>  ○ Underemployment<br>  ○ Generational Renewal<br>  ○ Incomes of farm employees<br>  ○ Age structure of farm employees<br>  ○ Farm workforce Salaried<br>  ○ Farm workforce Non-Salaried<br>  ○ Farm Employment by Gender<br>  ○ Farm Employment by Age<br>  ○ Skills and qualifications of farm employees<br>  ○ Non-farm Income of farmers |

Source: Own elaboration based on review of stakeholder documentation and stakeholder feedback

# 5. Environmental Data Requirements

In this section the Environmental themes that are relevant in the context of the European Green Deal, the Farm to Fork Strategy, other EU policies and CAP reform are described. Environmental and biodiversity are covered in Objectives 4, 5 and 6 of the CAP.

## 5.1. Broad Environmental Themes

**CAP Objective 4: Agriculture and Climate Mitigation**

**Motivation:** The motivation for CAP objective 4 is that increased temperatures, aridity, risk of land degradation and desertification may occur, while the occurrence of extreme climate events is on the increase. The CAP Strategic plans will have to align with National Energy and National Climate Plans and therefore efforts to reduce emissions will have to be tracked.

**Some issues that arise under this theme:**

1. Data on the extent of use of GHG mitigation technologies.
2. Data on the use of particular management practices that reduce emissions.
3. Data on soil organic carbon sinks – using appropriate soil management techniques.
4. Data on Biomass production and forestry.
5. Data on farm level fossil fuel use.
6. Data on food losses (production stage) and waste.
7. Data on barriers to the adoption of mitigation actions:
    - Biophysical;
    - cognitive and behavioural;
    - social and institutional.
8. Data on whether farmers have specific training on the type of measures to be used to reduce emissions?
9. Data on emissions per unit of output? These are important to help us understand the wider (global) implications of emission reduction strategies for carbon leakage.
10. Trade-offs between different environmental goods/bads need to be considered, so it would make sense to track a range of environmental metrics.
11. Data on the usage of precision farming techniques.
12. Data on the growing of nitrogen fixing plants.
13. In the context of climate adaptation there may be a need for data on agri-tech innovations in soil moisture conservation, water management, and the extent of solutions such as the use of improved varieties and related climate adaption related advisory services.
14. Currently (May 2021) the nature of eco-schemes under the CAP is not decided. When these schemes are defined, the associated data requirements can be considered.

**CAP Objective 5: Efficient Soil Management**

**Motivation:** This theme calls for more measurement and indictors relating to soil, recognising that soils are vital for agricultural production, perform vital environmental roles such as carbon sequestration and water purification and also are significant in biodiversity provision.

**Some issues that arise under this theme:**

1. The need for measures of soil biodiversity.
2. The importance of data on soil carbon sequestration.
3. The capacity to measure soil organic carbon.
4. Data on pesticide use in the context of the potential for soil contamination.
5. Data on management practices being used to guard against soil erosion.
6. Data on precision farming – a very large number of technologies fall under the definition of precisions farming.
7. Data on the methods of tilling that are used by farmers.

**CAP Objective 6: Biodiversity and enhanced eco system services**

**Motivation:** This theme calls for more measurement and indicators in the area of biodiversity. Biodiversity is an issue for both farmland and cropland. It is relevant for habitats and landscape features (hedges, walls). Landscape features have an aesthetic value. The status of habitats are in decline, as is the farmland bird population. There is a series of factors that are pressurising farmland species.

It is important to distinguish habitat diversity – which is driven by crop specialisation and crop rotation, from habitat features – hedges, wall etc. The literature talks about a decline in both habitat diversity and habitat landscape features in the EU.

**Issues that arise under this theme:**

1. Could farm landscape features be measured remotely?
2. Given the likely high level of biodiversity provision by small farms, there is the question of widening the FADN sample to cover smaller farms in order to capture such biodiversity e.g. High Nature Value (HNV) farming is rich in habitat variety and habitat features, and characterised by extensive agricultural production expressed by a low livestock density and the presence of permanent grasslands, as well as diversified crop production on arable land. Organic agriculture and agro-ecology are also relevant in this context (European Commission, 2016).
3. Which new and developing technologies (e.g. precision farming and digital farming) or a range of different agronomic practices (multi-cropping, natural pest control, soil conservation measures) are being used to reduce input usage in a way that means that intensification that could damage biodiversity does not happen?

4. There may be a need for higher resolution forestry mapping – better than what Copernicus currently offers (25m$^2$).
5. The fact that biodiversity relates to local conditions means that MS level actions are particularly important (hence the desire for MS CAP Strategic Plans).
6. There are already differences in the way Pillar II schemes are put together at MS level, and this can be contrasted with the more homogeneous approach to which Pillar I support is delivered. In the context of the CAP 2023-27 and the emergence of MS CAP Strategic Plans, there may yet be a need for specific MS level environmental indicator provision.
7. There is a wider need for a full biodiversity monitoring system. The Commissions suggests that Copernicus could be used to help in the generation of such an indicator set, with other indicators coming from LUCAS.
8. There is a need also for data and indicators on pollinator populations.

## 5.2. Environmental Data Gaps Representing Additional Data Needs

Based on the preceding analysis we can now provide a description of the desirable environmental data for monitoring and evaluation purposes. The list provides a basis for more detailed exploration of the potential to provide such data in subsequent stages of the project. No consideration is taken at this point of the level of spatial scale that would be appropriate for this data as this will be addressed in later deliverables. Furthermore, no consideration is made at this point of the precise description of each indicator. These themes are summarised in Table 7.

**Table 7: Environmental Sustainability – Relevant Themes**

| **Relevant Themes** |
|---|
| • Agriculture and Climate Mitigation<br>  ○ GHGs<br>  ○ Carbon Sequestration |
| • Soils<br>  ○ Soil Erosion<br>  ○ Soil Organic Matter Loss<br>  ○ Soil Biodiversity Loss<br>  ○ Soil Compaction<br>  ○ Soil Contamination<br>  ○ Salinisation<br>  ○ Sealed Soils<br>  ○ Desertification<br>  ○ Soil Practices Addressing Soil Degradation<br>  ○ Crop Rotation<br>  ○ Soil Cover<br>  ○ Tillage Management Against Erosion<br>  ○ Precision Farming |
| • Biodiversity<br>  ○ Farmland Bird Index<br>  ○ Conservation status of habitats and species of EU interest which are dependent on agriculture<br>  ○ Grassland Butterflies Index<br>  ○ Key Pressures on Farmland Species (there are many)<br>  ○ Farm landscape features and their loss<br>  ○ Presence of high-nature-value farming |
| • Other<br>  ○ Ammonia<br>  ○ Adoption of biocontrol<br>  ○ Renewable energy<br>  ○ Genetic diversity of seeds<br>  ○ Pollinators |

Source: Own elaboration based on review of stakeholder documentation and stakeholder feedback

# 6. Social Data Requirements

In this section the Social themes that are relevant in the context of the European Green Deal, the Farm to Fork Strategy, other EU policies and CAP reform are described. Social concerns are addressed in Objectives 7, 8 and 9 of the CAP.

## 6.1. Broad Social Themes

**CAP Objective 7: Structural Change and Generational Renewal**

**Motivation:** This theme is typically focused on concerns relating to structure, commonly measured by farm numbers and farm size. Demographic issues are also relevant, such as the ratio of older to younger farmers or the area of land operated by younger as opposed to older farmers.

**Issues that arise under this theme**

1. There is an issue of whether the operator is actually a younger family member than the owner. Is this detail properly reflected in the data? If not the data may be misleading.
2. The issue of small farms and their exclusion from FADN again arises. The inclusions of very small farms in the sample frame may change the farmer age distribution, with implications for our understanding of age structure.
3. What type of farming is being engaged in by new entrants to the sector?
4. What drives farmer investment decisions?
5. Is the data available on land prices (selling and renting), adequate, given that it may affect entry and exit decisions, and have resulting implications for generational renewal?
6. Do we have sufficient data on access to capital by age category? Do we for example know the success rate of farmers by age in obtaining business loans?
7. Rural development promotes lot of initiatives that can benefit young/new entrant farmers. Do we have all the data we would like on that?
8. The two CAP pillars can be made to work more effectively in support of young farmers. Do we have the capacity to examine Pillar I and Pillar II schemes in the context of their impact on young farmers?
9. Will there be a break in the link between payments and land to encourage older farmer to transfer land? Do we already have enough data to explore the implications of such a policy? If not then what might that mean for data collection needs?
10. Can we gather more data on the institutional setting at a national level relating to taxation, and retirement? Do these national policies hinder or assist CAP objectives around generational renewal?
11. Do we have data on different co-operation arrangements between younger and older farmers? Such data might allow us to see which arrangements are more effective in the context of a range of CAP objectives.

12. It would be useful to have data on the extent to which farmers have had the ability to go abroad to study or gain expertise as part of their learning experience.
13. The off-farm hours worked by farmers and the income generated by farmers through off-farm work is of interest. It is relevant in the context of increasing farm household income and the diversification in the sources of farm household income.
14. Data on the extent of the collaboration among farmers would be useful. The number of farmers engaged on collaboration and the nature or purpose of the collaboration farmers engage in could monitored.

**CAP Objective 8: Jobs Growth and Rural Poverty**

**Motivation:** Rural areas make up close to half of the EU territory, but just one fifth of the EU population live in rural areas. Moreover, the rural population in the EU is decreasing. Just 13% of GVA in the EU is created in rural areas.

The CAP has a role to play in supporting rural areas. The primary element of the agri-food sector (farming) is located in rural areas, but this is not always the case with respect to food processing. Employment opportunities in rural areas outside of agriculture may therefore be limited, especially in areas which are more remote. There is a need therefore to address the poor performing labour market in rural areas.

**Issues that arise under this theme:**

1. There is a need for structural transformation and internet access in rural areas to make it more feasible for businesses to operate in rural areas, thereby creating employment. Therefore there is a motivation to collect data to provide baseline measures and to demonstrate progress.
2. There is a need to promote social inclusion and also to provide access to infrastructure and services. Baselines and progress in this regard needs to be measured.
3. There is a need to address the poor performing labour market in rural areas.
4. Migration from urban to rural areas may be contributing to a fall in rural poverty (or vice versa?) Do we have data that allows us to adequately understand such population flows?
5. Much of the renewable energy in the EU is generated in rural areas. Can we get data on renewable energy production in rural areas? This would counterbalance criticism of the GHG emissions generated by agriculture.
6. Given the future importance of internet access for agriculture and the application of technology, data on broadband in rural areas and particularly its availability, speed and usage are important. To what extent are slower speeds and no coverage at all an issue?

**CAP Objective 9: Health, Food and Anti-microbial Resistance**

**Motivation:** The resistance of micro-organisms to anti-microbials is a critical human and animal health concern. This is therefore a challenge that has to be dealt with by the future CAP. It requires increased focus on the use of anti-microbials in animal husbandry. The current CAP may be already well aligned with food safety standards, however, increased urgent focus on anti-microbials is required.

Anti-microbials are used especially in intensive farming as preventative treatments in feed and water. There has already been a significant drop in anti-microbial use in animal husbandry in the EU in the last decade and there is no evidence to date of significant animal health issues with reduced use of anti-microbials.

**Issues that arise under this theme**

1. Can we get data on farm level measures being used to reduce the use of anti-microbials?
2. Can we get data on the usage of vaccines and anti-microbial alternatives?
3. Can we get data on farm level use of anti-microbials? What kind of registers exist at EU MS level for the recording of usage of anti-microbials? Can these be used to source data at farm level?
4. Is there any data on the scope and extent of farm advisory training offered in reducing the use of anti-microbials across the EU MS'?
5. Is there any data on the extent to which individual farmers have developed/are developing farm health plans in conjunction with their vet?
6. The legal proposals for the future CAP describe indicators to be monitored. Could we develop metrics that would show the economic benefit of using alternatives to anti-microbials?
7. The usage of on farm sensors could provide early warning of whether there was disease on a farm. Can we harness data from such sources?
8. Measures of farm biosecurity are also becoming a reality. Can we harness such data that measures the quality of a farm's biosecurity?

## 6.2. Social Data Gaps Representing Additional Data Needs

Based on the preceding analysis we can now provide a description of the desirable social data for monitoring and evaluation purposes. The list provides a basis for more detailed exploration of the potential to provide such data in subsequent stages of the project. No consideration is taken at this point of the level of spatial scale that would be appropriate for this data. Furthermore, no consideration is made at this point of the precise description of each indicator. These themes are summarised in Table 8.

**Table 8: Social Sustainability – Relevant Themes**

| **Relevant Themes** |
|---|
| • Structural Change and Generational Renewal<br>  ○ Evolution of Farm Numbers<br>  ○ Evolution of Farm Size<br>  ○ Ageing in the Farm Population<br>  ○ Farm Diversity<br>  ○ Status of Young Farmers<br>  ○ Age and Farm Specialisation<br>  ○ Age and Farm Income<br>  ○ Volume of Land Sales<br>  ○ Land Selling Prices<br>  ○ Land Rental Prices<br>  ○ Access to Finance and Credit<br>  ○ Level of Training |
| • Jobs and Growth in Rural Areas<br>  ○ GDP Growth and Poverty Rates<br>  ○ Unemployment in Rural Area<br>  ○ Broadband Coverage and Speeds<br>  ○ Role of Agriculture in total employment<br>  ○ Size of the Agricultural Labour Force<br>  ○ Off-Farm Income |
| • Health, Food & Antimicrobial Resistance<br>  ○ Sales of veterinary antimicrobial agents<br>  ○ Use of veterinary antimicrobials in EU animal husbandry |
| • Other<br>  ○ Distance from services<br>  ○ Remoteness<br>  ○ Accessibility<br>  ○ Connectivity<br>  ○ Poverty rate<br>  ○ Home consumption<br>  ○ Social inclusion |

Source: Own elaboration based on review of stakeholder documentation and stakeholder feedback

# 7. Conclusions

This deliverable has reviewed EU policy, national level policy and perspectives on policy offered by various stakeholders. EU policies that affect the agri-food sector have been subject to outside influences such as the UN SDGs and the Paris Climate Agreement.

The European Green Deal, the EU Farm to Fork Strategy, the EU Biodiversity Strategy and a number of other initiatives have emerged to reflect evolving societal concerns which are set to reshape the role of agriculture in the EU.

Civil society has agitated for radical change in EU policies, to reflect emerging global concerns particularly relating to environmental sustainability. Agriculture and food industry representative organisations, have recognised the need to make the agri-food sector more sustainable, but have generally adopted a more conservative view with respect to the extent and pace of the policy changes that are required.

The recent revision of the CAP's objectives, have widened its relevance to society and have emphasised environmental goals to a much greater extent than was previously the case. This has addressed the imbalance that existed in the stated sustainability objectives of the CAP, which previously emphasised economic and social sustainability over environmental sustainability.

It can be expected therefore that the CAP 2023-27 will place stronger emphasis on the achievement of a range of environmental goals, while at the same time promoting the modernisation of agriculture, so that it can adapt to the changes required and also provide the income and lifestyle necessary to make agriculture an attractive career choice.

An extensive review of required sustainability indicators was undertaken within the FLINT FP7 project over the period 2013-2016. It identified a number of emerging priority economic, social and environmental themes and explored the collection of data to develop suitable indicators. Many of these themes, while already of concern to civil society groups, were not embedded in EU policy at the time FLINT was being conducted. Notably also, there were no quantifiable policy targets against which to measure progress or success.

The review of policy development and perspectives on policy undertaken in this deliverable demonstrates that many of the indicator themes identified in the FLINT FP7 project are now becoming embedded in policy objectives at the EU level. Notably also, these policies are increasingly associated with quantifiable targets and a change in emphasis that will require transparency in measuring progress towards such targets. Of particular importance is the change towards a performance/results based model in the CAP, replacing the historical emphasis on regulatory compliance.

It is envisaged by the European Commission that the introduction of MS CAP Strategic Plans, with tailored policy objectives, can be achieved while maintaining an overarching EU level indicator set. While this commonality might be a requirement for the sake of CAP simplification, the reality is that individual MS' can benefit by increasing considerably their capacity to measure the status and impact of agriculture through the prompt production of reliable indicators. While only a limited set of such indicators may be MS' to develop a sophisticated set of indicators to help develop, and where necessary amend, national level policies designed to deliver on EU level objectives.

While the CAP CMEF already has a considerable indicator set, such indicators are collected at a relatively aggregate level, telling us little about the specifics of individual farm holdings. Given that policy influences the decision making of individual farmers, there is value in developing an indicator framework that has a high level of spatial detail. This spatial detail can also take account of farm specific differences such as differences in climate and soil type, which can be important in the context of sustainability. Developments in technology, in terms of data collection, data processing, data management and data analysis, increasingly make the provision of data with a high spatial resolution a viable and affordable prospect. There may also be the possibility to scale up this farm level detail to provide regional and national aggregate level impacts. In short, the motivation for spatially detailed agricultural indicators has never been stronger and the feasibility has never been greater.

This review could not find a clear signal as to what the future CAP reform (beyond 2027) might mean for indicator requirements. No doubt the capacity to produce indicators will continue to increase, reflecting technological developments. Perhaps it is the level of spatial detail and the level of integration of indicators that will need to be emphasised beyond 2027, with the individual indicator themes remaining in line with those identified as necessary in the period to 2027.

In summary this review has concluded that there is a requirement at EU MS level for:

- a considerable amount of additional environmental data. At the core of this should be data that addresses the priorities set out in the EU Farm to Fork Strategy This would include GHG emissions and sequestration, fertiliser use, pesticide use, organics, other less intensive agricultural systems that can deliver high environmental benefits, forestry and bioenergy.
- some additional data for the social dimension. In this regard, quality of life measures seem to be particularly important. Quality of life potentially spans a wide range of concerns, from social isolation to access to facilities and broadband, to work life balance, stress, mental health, physical health and gender inequalities.
- some additional data for the economic dimension, particularly with respect to risk management and the distribution of value added in the food chain.
- if possible some data on innovation, since innovation will be vital in ensuring that EU agriculture can achieve the ambitions of the Farm to Fork Strategy.

Finally, while most of the objectives of the reformed CAP and Farm to Fork strategy require change on the supply side of the food system, some objectives require changes on the demand side, such as alterations to consumers' diets. While this demand side element has a vital role to play in making food systems more sustainable, food demand lies beyond our definition of agriculture. Therefore, it is not proposed to pursue demand side indicator needs for monitoring and evaluation of food demand or food waste. Similarly, there are needs identified in the food chain beyond the farm gate, such as changes at the processing stage. Again, while such changes are important in delivering a more sustainable food system, they lie beyond the definition of primary agriculture which this project seeks to investigate.

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