

# Mapping and analysis of the implementation of the CAP

## Annex 2: Theoretical analysis

Client: European Commission – DG Agriculture and Rural Development

Brussels, November 2016





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# Foreword

This annex forms part of the study “*Mapping and analysis of the implementation of the CAP*”. This study had three main objectives: (1) to map the implementation of the CAP by the 28 Member States, focusing on their implementation choices, the motivation for these choices and the importance attached to the three CAP general objectives; (2) to develop a typology for grouping Member States according to these choices; and (3) to answer the evaluation questions related to relevance, coherence, conditions for enabling effectiveness, administrative burden and contribution to the EU2020 strategy. The study is carried out in relation to the objectives of:

- Viable food production, with a focus on agricultural income, agricultural productivity and price stability;
- Sustainable management of natural resources and climate action, with a focus on greenhouse gas emissions, biodiversity, soil and water; and
- Balanced territorial development, with a focus on rural employment, growth and poverty in rural areas.

Annex 2 was compiled to support the development of the intervention logic and the answering of the evaluation questions. The annex comprises a theoretical analysis of the possible impact of the different CAP instruments and measures on the three CAP objectives.



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## II. Annex 2: Theoretical analysis

### II.1 Introduction

The study "*Mapping and analysis of the implementation of the CAP*" has three main objectives: (1) to map the implementation of the CAP by the Member States, focussing on the implementation choices, the motivation for these choices and the importance attached to the CAP general objectives, (2) to develop a typology of Member States according to these choices and (3) to answer evaluation questions related to relevance, coherence, conditions for enabling effectiveness, administrative burden and contribution to the EU2020 strategy.

The structure of the annex is as follows:

- Chapter II.2 provides the theoretical analysis for 'viable food production' and the corresponding IOI matrix;
- Chapter II.3 provides the theoretical analysis for 'sustainable management of natural resources and climate action' and the corresponding IOI matrix;
- Chapter II.4 describes the theoretical analysis for 'balanced territorial development'.



## II.2 Theoretical analysis and IOI for evaluation question 1 on viable food production

A three-step procedure has been used to establish the causal links between policy measures and their impacts on the various general and specific CAP objectives. First, an investigation has been made of economic theories that are relevant to establish these links (with a focus on agricultural income, agricultural productivity and price stability) and references are made to the academic literature and the applications made there. Second, using this information and a careful analysis of the functioning of specific policy instruments the Instrument-Objective-Impact matrix has been prepared. Third, the information obtained has been used to end up at a well-established and refined intervention logic.

### II.2.1 Theoretical analysis

The table below provides an overview of the main theories that will be used in the analysis. They are ordered according to the key subjects that are identified from analysing the general specific objectives associated with viable food production. An extensive discussion of these theories is beyond the scope of the current exercise. The selected scientific references that are provided in the table link each of the theories to the academic literature.

Table II-1. Subjects linked to the specific objectives associated with viable food production and theoretical approaches

Subjects linked to specific objective	Theory	Selected references
Farm income, including transfer efficiency	Farm household theory	Schmitt (1988), Sadoulet and De Janvry (1995), Dewbre and Mishra (2002), Ellis (1993), Agrosynergie (2011)
Agricultural productivity	Agricultural productivity and efficiency analysis (production economics)	Hayami and Ruttan (1985), Kumbhakar, and Knox-Lovell (2001), Thirtle et al, (2004), Coelli et al (2005), Alston et al (2010), Sauer and Xu (2014)
Price stability	Market and price theory, economics of stockholding	Helmberger and Chavas (1996); Schmitz et al (2010), Vercaemmen (2011)

The following section provides a brief overview of the main insights and derived hypothesis from these theories with a focus on agricultural income, agricultural productivity and price stability.

#### Farm income

For analysing effects on farm income and production the micro-economic farm households theory will be used. Although this approach is so far mostly used to illustrate theoretical impacts of changes in product prices and direct payments (e.g. Agrosynergie, 2011), this framework can be easily extended to also include changes in costs, including changes in costs induced by changes in regulatory policy measures or conditionalities (e.g. cross compliance). The Farm Household Income-curve represents in fact an income or budget constraint, expressed as a function of the households labor input. The basic idea is that the farm household can allocate the available time from its household members in three ways: (i) work on the farm; (ii) work off-farm; and (iii) time spent on not-working or leisure. The allocation of labour will depend on "prices", i.e. the relative remuneration of labour when working on the farm and the wage associated with off-farm employment. In addition the preferences of the household with respect to leisure and consumption goods are taken into account. The farm household is assumed to maximize its utility (this includes the standard idea of profit maximization but is richer in that it allows the farm household preferences for other issues than money (e.g. risk) to also play a role).

Without representing all the details, Table II-2 summarizes the main hypothesis that follow from this model and that are relevant in answering the evaluation questions with respect to the specific objective of farm household income. Here it is recognized that farm labour income is a more limited concept than farm household income.

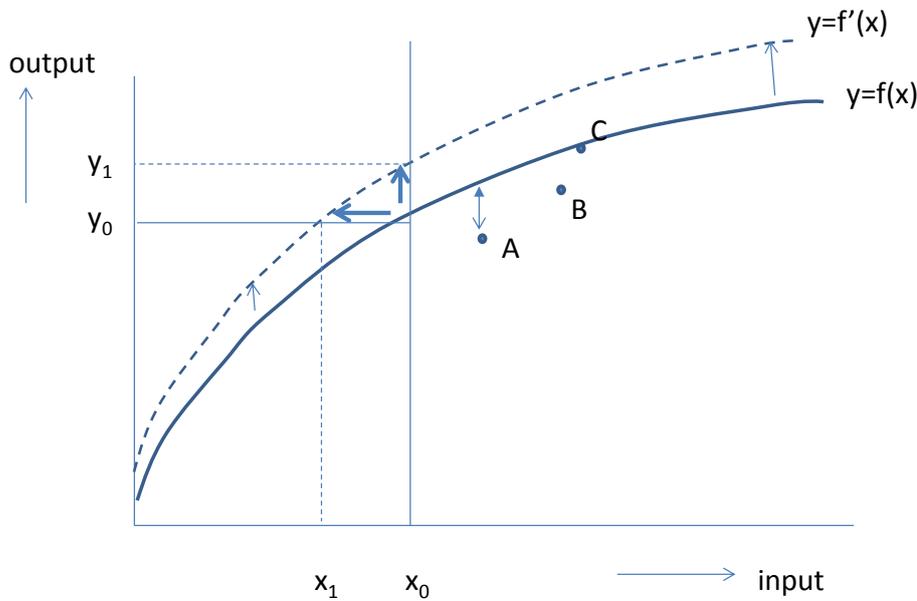
Table II-2. Selected hypothesis on farm income derived from the farm household model-theory

Measure or scheme	Expected effect on farm income	Additional comments
Generic payment, decoupled from production (basic premium)	Has a positive effect on farm income and also on farm household income	Only a minimal direct impact on farm labour allocation and agricultural production is expected. There might be indirect impacts due to impact on agricultural structures (farm size distribution). If a Member State uses a regional model for implementing its direct payment scheme, the direct payments may contribute to reduce the inequality in the farm income distribution and to restoring territorial balance
Decoupled payments, targeted to specific beneficiary groups (e.g. young farmers scheme)	A targeted direct payment will have a positive impact on the income of all the farm households in the beneficiary group	
Direct payments coupled to production (e.g. voluntary coupled payment)	Have a positive impact on farm income	Coupled payments affect the labour allocation and agricultural production and are not minimally distorting (i.e. have market impacts)
Direct payment with a set-aside condition (e.g. green payment and EFA requirement)	The net impact on income depends on the height of the payment in relation to the additional costs that have to be made to fulfil the requirements	In case the side condition increases costs or implies a constraint with respect to land use (EFA, permanent pasture preservation) also impacts on agricultural production can be expected
Market measures leading to (sometimes) higher product prices (e.g. price support, safety net provision, crisis reserve payments)	Increases in output prices (and declines in input prices) have a positive effect on farm income	Changes in (relative) prices will also affect land use and agricultural production
Introducing conditionality to the receipt of direct payments (e.g. cross compliance)	The side conditions included in the conditionality might lead to additional (compliance) costs which will potentially reduce the positive net income effect of the direct payment	The side conditions can imply an impact on agricultural production (e.g. adhering to manure application norms) and may also affect internal competitiveness (if all farms comply with the same standards this creates a level playing field)

### Agricultural productivity

Agricultural productivity is defined as the amount of output produced per unit of all inputs. The link between inputs and outputs is extensively studied in production economics, with the production function (expressing output  $y$  as a function of all inputs  $x$ ,  $y=f(x)$ ) being a core concept (see Figure II-1 for a graphical representation and Coelli et al, 2005). Factor productivity increase in this theory is associated with an upward shift in the production technology. Its result is that, in the new situation, factor productivity has increased, implying that with the same amount of inputs as before now more output (amount  $y_1$  rather than  $y_0$ ) can be produced, or that the same amount of output as was produced before can now be produced with less inputs (e.g. using only  $x_1$  rather than  $x_0$ ). An increase in total factor productivity is thus equivalent with an increase in the physical efficiency with which inputs are transformed into outputs. Increases in productivity improve the profitability of an activity and also its competitiveness.

Figure II-1. The production function and agricultural productivity



While there is no disagreement on this general notion, a look at the productivity literature and its various applications shows that productivity has no definable, unique purpose and there is no single measure that can be applied to it. The choice between them depends on the purpose of productivity measurement and, in many instances, on the availability of data. Broadly, productivity measures can be classified as partial (or single) factor productivity measures (i.e. the ratio of output and one input factor), or multi (total)-factor productivity measures (TFP) (i.e. the ratio of output to a bundle of inputs). Partial measures of productivity growth, such as yields per hectare, milk per cow or output per worker are simpler to calculate and intuitive. But their drawback is that they, when viewed in an isolated way, can give a misleading assessment of a sector's productivity performance if different inputs are growing at different rates. The reason is that partial factor productivity measures do not account for the possibility of either factor substitution, or output substitution. Constructing a TFP index is more complex than a partial productivity index and the aggregation of inputs and outputs is both conceptually and empirically difficult.

Improvements in TFP can come from different sources or innovations, including changes in technology, production organisation and scale, changes in operating environment (including policy) and industry composition (through farm entry and exit) (see for example Thirtle et al, 2004). Factor productivity increase may be associated with parallel as well as non-parallel upward shifts of the production technology. The productivity change can be neutral to all factors of production or be saving a specific factor or set of factors. According to the so-called induced innovation theory there is a tendency for technology improvements that are introduced to be factor-saving in the most expensive inputs (e.g. the installation of energy-saving equipment in a period of high energy prices).

In another strand of literature, the efficiency literature, the production function (e.g.  $f(x)$ ) is interpreted to be a best practice or efficiency frontier. In Figure II-1 farms producing at a point off the production frontier (e.g. point A and B) are called inefficient, whereas the farm producing at the frontier (e.g. point C on production frontier  $f(x)$ ) is technically efficient. The inefficiency relates to the fact that according to the observed best farming practice frontier farmers producing at A and B should have been able to produce more output with the same amount of input (or produce the same amount of output with less input.) The literature allows to decompose efficiency and factor productivity measures into factors that can provide a first explanation about the sources of the

detected overall factor productivity growth. Among the key factors driving total factor productivity in agriculture are innovation (related to investment, technology adoption and knowledge diffusion) and farm size restructuring (see Sauer and Xu, 2014).

A number of general hypotheses about the impact of specific policy measures on agricultural productivity can be derived from the production economics theory discussed above (see Table II-3 for a summary).

Table II-3. Selected hypothesis on agricultural productivity derived from production economics theory

Measure or scheme	Expected effect on agricultural production	Additional comments
Market measures supporting the price of a specific product (price support, coupled payments)	The price incentive to outputs make it attractive invest in this activity relative to others, thereby increasing productivity w.r.t. this output	The change in output mix will also affect the input mix used: inputs associated with the expanding production activities will be used more; inputs associated with declining outputs will be used less
Generic payment, decoupled from production (basic premium)	Has no direct impact on agricultural productivity as it does not alter relative prices and thus not change incentives for making investments	When the direct payment is implemented as a flat rate (i.e. payment per hectare of land) it is likely to affect the land price. When it thus affect the factor input/output price ratio's this is likely to have an additional (second order) impact on production (e.g. inducing the introduction of land-saving innovations leading to an increased land productivity). When farmers are liquidity constrained direct payments can have a positive impact on investments and by that contribute to increased productivity in an indirect way .
Decoupled payments, targeted to specific beneficiary groups (e.g. young farmers scheme, payment to farmers facing natural handicaps in production)	Have no (direct) impact on agricultural productivity unless the payments would reduce liquidity constraints farmers are facing. In the latter case such payments may create an incentive for further investments and productivity improvement.	There might be an indirect effect of such payments on the farm structure (number of farms, farm size distribution) of the target groups which then may create a (positive) second order effect on agricultural productivity.
Direct payment with a set-aside condition (e.g. green payment and EFA requirement)	Total factor productivity might increase when land with a less than average productivity is put set-aside.	When excluding the set-aside or EFA land from the land base land productivity is likely to increase due to slippage effect.
Investments in physical assets	Measures encouraging investments will most likely increase factor productivity (e.g. embedded technological change)	When investment measures are targeted at "unproductive" purposes (e.g. improving sustainability, reducing emissions) the impacts on productivity might be ambiguous or even negative.

An important aspect to realize is that productivity analysis may lead to different outcomes depending on the level (macroeconomic, sector, farm, activity) of the analysis. Policy measures that lead to a productivity increase at farm level (which is according to the defined indicators the level at which most evaluations will take place) does, depending on which farms are targeted and the interaction effects between farms, not necessarily have to imply that at macro-economic or agricultural sector level agricultural productivity will also increase or increase with the same amount. As an example, measures that support small farms, may lead to a slowdown in the evolution of agricultural structures, and by that indirectly lead to a reduction in the productivity gains associated with the sector's exploitation of economies of scale. Moreover, support of activities that

initially were not chosen because of lack of profitability may draw resources into these supported activities that previously had a higher productivity (in economic or value added terms).

### Price stability

It is in particular market measures that focus on stabilizing markets and contribute to a fair standard of living for the concerned agricultural community. Any theoretical reflection should start with discussing what is meant with stable markets. When is a market stable? A critical issue here is how to evaluate price movements, since in popular discussions market stability is sometimes reduced to stable prices, whereas at the same time from an economic theoretical point of view the free adjustment of prices is crucial for the well-functioning of markets. In economic theory market equilibrium is associated with a stable price (equilibrium is a situation in which no one of the parties active in the market has an incentive to change its behaviour, implying that there is no pressure for further price changes). Price adjustments contribute to equilibrate demand and supply and non-adjusting prices would cause disequilibria (and rationing). Since both demand and supply are subject to continuous shocks, that may come from various sources (e.g. weather or disease disturbances, preference shifts, income shocks), the price mechanism should be able to directly reflect the impact these have in changing scarcity and by that inform market parties to play their needed role (e.g. change their demand and supply behaviour in accordance with the new relative price structure and own objectives such as profit and utility maximization). As was argued in a seminal article by Hayek (1937) the market and price mechanism is a crucial and very efficient information processing device. In his own words (from another publication):

"because all the details of the changes constantly affecting the conditions of demand and supply of the different commodities can never be fully known, or quickly enough be collected and disseminated, by any one centre, what is required is some [thing]..., which automatically records all the relevant effects of individual actions, and whose indications are at the same time the resultant of, and the guide for, all the individual decisions. This is precisely what the price system does under competition and which no other system even promises to accomplish."  
(Hayek, 1944, 52).

Whereas price flexibility is a requirement for the well-functioning of markets, extreme volatility of prices is widely recognized to be a characteristic of an instable market. There are several factors contributing to price volatility. A well-known factor is the limited responsiveness, in particular in the short term, of both supply and demand to changes in prices. For many years this has been one of the main reasons to intervene in prices via agricultural policies (e.g. classical price support). The limited or slow adjustments in supply and demand to price changes in combination with the different lag structure in production and consumption can lead to cyclical behaviour in prices (e.g. pig cycle, or cobweb behaviour) which is violating the rational expectations-hypothesis. An implication of this is that part of the price fluctuations might have a "noise"-character, which does not signal behaviour that producers, users or consumers should fully take into account. In addition to this price volatility can attract parties that behave in a speculative way, which may, at least in the short-run, lead to aggravated price swings rather than to the dampening of them. According to economic theory this leads to over- and undershooting of the price that would be consistent with the market fundamentals.

Based on the considerations made above, a market is called stable when it is able to handle a large volume of trades and/or the impacts of regular shocks occurring in that market, without causing large shifts in price. This implies that the market is not "thin" but rather sufficiently "deep": there are a large number of suppliers, demanders and traders that all have a sufficient flexibility to respond to price signals to avoid extreme price volatility but rather help to let the price to move within a certain

band around the true equilibrium price. Note that so defined market stability is a relative concept, for which no absolute criteria exist.

Table II-4 presents a number of hypothesis with respect to how selected relevant policy measures are expected to impact on price stability.

Table II-4. Selected hypothesis with respect to market stability and price volatility based on economic theory

Measure or scheme	Expected effect on market stability and price volatility	Additional comments
Direct payments, decoupled from production (all types)	Have a negligible direct impact on agricultural production and thus also not affect market price or market stability	There might be an indirect impact on supply, which depends on the risk profile of farmers and the degree to which direct payments affect the farmers attitude to risk (e.g. direct payments may induce farmers to go more into risky crops).
Market measures supporting the price of a specific product (coupled support)	The supply of the supported product will increase, which will have a negative impact on price. Under the normal conditions applicable to agricultural supply the elasticity of supply of producers receiving coupled support is likely to increase.	The impact on price responsiveness at market level is more complex. To the extend coupled support induces the market into a lower price – increased trade volume-equilibrium, both the supply and demand elasticity at market level are likely to decline (becoming more inelastic), thereby increasing the potential vulnerability to price volatility and market instability (second order effect).
Market measures introducing a safety net (public intervention mechanism and minimum price)	Contribute to the smoothing of prices and limit the price band within which prices can fluctuate (reduce downside price swings)	The trigger price level at which the intervention mechanism is activated matters. In case of a relative to the equilibrium price low trigger price level domestic suppliers will have a long trajectory in which they adjust in response to price changes observed at the market. In case of a relative high trigger price level (e.g. classical price support) this will limit the role of domestic suppliers in buffering market shocks, and could thereby contribute to increased market instability and price volatility for third countries or at the world market (conditional on the EU being a large player in the world market).
Crisis prevention measures	Reduced the probability of having a calamity occurring and thereby contributes to market stability and reduced price volatility	
Crisis reserve	Contribute to helping farmers through a calamity situation, thereby maintaining production capacity and shortening the time back to a normal market situation after a calamity has happened	
Measures supporting farm competitiveness (higher product	Measures improving competitiveness extend the	

Measure or scheme	Expected effect on market stability and price volatility	Additional comments
quality; increased farm revenues from short supply chains)	price-responsive range of the supply curve (lower the shut-down point). The extended price responsiveness contributes to market stability	
Measures supporting farm risk prevention and management (price risk)	Makes farmers (and supply) less responsive to price risk (price volatility), implying a reduction in the shock-buffering capacity in the market. This will potentially decrease market stability and increase price volatility	

### Additional theories

Above the theories directly relevant to agricultural income, agricultural productivity and price stability are elaborated on. Aside of direct effects there are also indirect effects (e.g. agricultural structures may be affected by direct payments, which in turn might affect factor productivity by bits impact of farm scale). An important other example is competitiveness: maintaining competitiveness is related to improvements in factor productivity that can be achieved. So, for evaluation viable food production also other theories than the ones mentioned above can be relevant. Where necessary these theories will be relied upon, although it is beyond the scope of this report to further document these theories.

### II.2.2 The instrument-objective-impact or IOI matrix

The theoretical background has been combined with a careful analysis of the different instruments (including the options available to Member States) to construct and fill the following instrument-objective-impact- or IOI-matrix.

Table II-5. Instrument Objective Impact matrix (IOI) relevant to viable food production

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
Cross-compliance		Cross compliance contributes to the 'development of a sustainable agriculture through a better awareness of beneficiaries of the need to respect basic standards [and] to make the CAP more compatible with the expectation of the society through a better consistency of that policy with the environment, public health, animal health, plant health and animal welfare policies' (preamble 54 of Regulation 1306/2013)	To the extent there is initially not full compliance, the regulatory constraints associated with cross compliance (SMRs, GAECs) can induce additional costs with the induced increase in compliance and additional paperwork, which might negatively affect income (effect likely to be small)	No significant impact expected since all regulations associated with cross compliance refer to already existing legislation and GAEC influence production capacity (keeping land in good agricultural and environmental condition), but not output	no impact expected
Basic payment scheme		As a direct payment, the Basic Payment (BP) is aimed at supporting farm income. So it adds to farm income in a direct way. Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).	According to the farm household theory the basic payment will have a positive impact on the income of the farm household. To the extent the BP leads to an increase in land prices it may also improve farmer's wealth.	Since the basic premium is a direct payment that is decoupled of production the direct impact on agricultural production will be negligible. When farmers are liquidity constrained, the basic payment may lead to additional means for productivity enhancing investments. There might be an indirect impact due to the impact the base premium may have upon the evolution of agricultural structures	As a direct payment that is decoupled from production, the basic premium is being minimally market distorting. As it has a negligible impact on production its market impact will be minimal. So will be its contribution to price stability

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
Voluntary transitional national aid for farmers		In order to ensure a steady decrease of the pre-accession aid levels and to ensure compatibility with the convergence mechanism, new Member States may grant a top-up on the single area payment. As a direct payment, the transitional national aid payment is aimed at supporting farm income. So it adds to farm income in a direct way.	According to the farm household theory the transitional national aid payment will have a positive impact on the income of the farm household. Since the transitional national aid payment is a stable income source - not depending on weather or markets - it adds to reduce the variability of farmer income.	Since the transitional national aid payment is a direct payment that is decoupled from production, the direct impact on agricultural productivity is likely to be negligible. When farmers are liquidity constrained, voluntary transitional or national aid payments may lead to additional means for productivity enhancing investments.	As a direct payment that is decoupled from production, the transitional national aid payment is being minimally market distorting. As it has a negligible impact on production, its market impact will be minimal. So will be its contribution to price stability.
Voluntary redistributive payment		In order to differentiate the level of support among small and large farms, a redistributive payment can be granted as top-up for a certain number of 'first' ha. As a direct payment, the redistributive payment is aimed at supporting farm income. So it adds to farm income in a direct way. Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).	According to the farm household theory the redistributive payment will have a positive impact on the income of the farm household. Since the redistributive payment is a stable income source - not depending on weather or markets - it adds to reduce the variability of farmer income. To the extent the redistributive payment leads to an increase in land prices it may also improve farmer's wealth.	Since the redistributive payment is a direct payment that is decoupled from production, the direct impact on agricultural productivity will be negligible. There might be an indirect impact due to the impact the redistributive payment may have upon the evolution of agricultural structures	As a direct payment that is decoupled from production, the redistributive payment is being minimally market distorting. As it has a negligible impact on production, its market impact will be minimal. So will be its contribution to price stability.
Payment for farmers observing agricultural practices beneficial for the climate and the environment	Crop Diversification	The enhancement of environmental performance through a mandatory "greening" component of direct payments which will support agricultural practices beneficial for the climate and the environment applicable throughout the Union (recital 37 of Reg 1307/2013).	The greening payment has a positive impact on income, the magnitude of which will depend on the extent to which the green payment exceeds the costs associated with crop diversification, maintenance of	Constraining the farmer's crop mix choice is likely to have a negative impact on total factor productivity. Broadening the crop rotation may have an indirect effect on soil quality and lead to a positive effect on crop yields (partial productivity	No direct effect expected

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
		<p>The payments should:</p> <ul style="list-style-type: none"> <li>• Address both climatic and environmental policy goals;</li> <li>• be simple, general, annual and non-contractual;</li> <li>• go beyond cross-compliance; and</li> <li>• be linked to agriculture</li> </ul>	permanent grassland and ecological focus areas	indicator)	
	Maintenance of Permanent Grassland	<p>Specially, the objectives for each of the sub-measures is as follows: Crop diversification - to achieve 'enhanced environmental benefit...in particular the improvement of soil quality' (Recital 41 of Regulation (EC) 1307/2013) / Maintenance of Permanent Grassland: to ensure environmental benefits, in particular carbon sequestration (Recital 42) / EFAs: to safeguard and improve biodiversity on farms (Recital 44)</p>	The greening payment has a positive impact on income, the magnitude of which will depend on the extent to which the green payment exceeds the costs associated with crop diversification, maintenance of permanent grassland and ecological focus	No effect expected	No direct effect expected
	Ecological Focus Areas		The greening payment has a positive impact on income, the magnitude of which will depend on the extent to which the green payment exceeds the costs associated with crop diversification, maintenance of permanent grassland and ecological focus areas	As EFAs reduce the land available for agricultural production or impose other constraints on land use (e.g. equivalence measures). To the extent land with a lower than average productivity is used for EFA's the factor (and land) productivity on the area remaining available for regular production is likely to increase.	No direct effect expected
Voluntary payment for farmers in areas with natural constraints		<p>This specific direct payment is aimed at providing additional support for farmers who are in a disadvantaged competitive position because of the natural constraints they face.</p> <p>As a direct payment, the payment for</p>	<p>According to the farm household theory the ANC payment will have a positive impact on the income of the farm household.</p> <p>Since the ANC payment is a stable income source - not</p>	<p>Since the ANC payment is a direct payment that is decoupled from production and focused on compensating for natural constraints the direct impact on productivity is likely to be limited</p>	<p>As a direct payment that is decoupled from production, the ANC payment is being minimally market distorting.</p> <p>As it has a negligible impact on production, its market impact will</p>

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
		<p>areas with natural constraints (ANC payment) is aimed at supporting farm income. So it adds to farm income in a direct way.</p> <p>Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).</p>	<p>depending on weather or markets - it adds to reduce the variability of farmer income.</p> <p>To the extent the ANC payment leads to an increase in land prices it may also improve farmer's wealth.</p>	<p>There might be an indirect impact (negative) due to the impact the ANC payment may have upon the evolution of agricultural structures.</p>	<p>be minimal. So will be its contribution to price stability.</p>
Payment for young farmers commencing their agricultural activity		<p>The measure is motivating the young farmers to take over the farm and supporting necessary generation change in agriculture.</p>	<p>According to the farm household theory the young farmer payment will have a positive impact on the income of the farm household during a maximum of five years.</p> <p>Since the young farmer payment is a stable income source - not depending on weather or markets - it adds to reduce the variability of farmer income .</p>	<p>Since the young farmer payment is a direct payment that is decoupled of production, the direct impact on agricultural productivity is expected to be limited unless they are facing liquidity constraints. In the latter case the payment may provide farmers with additional means that might be used for productivity enhancing investment.</p>	<p>As a direct payment that is decoupled from production, the young farmers payment is being minimally market distorting.</p> <p>As it has a negligible impact on production, its market impact will be minimal. So will be its contribution to price stability</p>
Voluntary coupled support scheme		<p>Coupled support can be granted to farmers to help a vulnerable sector or support a type of farming in a certain region.</p> <p>Its impact will be equivalent to an effective price increase for the targeted crop or animal production activity.</p>	<p>Coupled support will have a positive impact on the income of the farm household.</p> <p>Coupled payments affect the labour allocation and the composition of agricultural production; as such they are market distorting.</p> <p>There might be an indirect impact due to the positive impact the coupled support may have upon the evolution of agricultural structures.</p>	<p>Coupled support increases the profitability of the supported activity relative to other ones and make it more attractive to make productivity enhancing investments in the supported activity..</p>	<p>The supply of the supported products is likely to increase, which has a negative impact on prices.</p> <p>A second order effect could arise if demand and supply elasticity decrease, thereby increasing the potential vulnerability to price volatility and market instability.</p>

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
Crop-specific payment for cotton		<p>Coupled support for cotton can be granted to farmers in order to maintain cotton production in Bulgaria, Greece, Spain and Portugal.</p> <p>Its impact will be equivalent to an effective price increase for cotton.</p>	<p>Coupled support will have a positive impact on the income of the farm household.</p> <p>Coupled payments affect the labour allocation and the composition of agricultural production; as such they are market distorting.</p> <p>There might be an indirect impact due to the positive impact the coupled support may have upon the evolution of agricultural structures.</p>	<p>Targeted support to cotton increases the profitability of cotton relative to other ones and make it more attractive to make productivity enhancing investments in the supported activity.</p>	<p>The supply of cotton is likely to increase, which has a negative impact on prices.</p> <p>A second order effect could arise if demand and supply elasticity decrease, thereby increasing the potential vulnerability to price volatility and market instability.</p>
Voluntary simplified scheme for small farmers		<p>In order to simplify procedures for aid to small CAP beneficiaries, Member States can grant a fixed annual payment (usually between 500 and 1250 euro) to small farmers.</p>	<p>According to the farm household theory the small farmers' payment will have a positive impact on the income of the farm household.</p> <p>Since the small farmers' payment is a stable income source - not depending on weather or markets - it adds to reduce the variability of farmer income.</p> <p>To the extent the small farmers' payment leads to an increase in land prices it may also improve farmer's wealth.</p>	<p>Since the small farmers' payment is a direct payment that is decoupled from production, the direct impact on farm investments are likely to be limited and so will be the impacts on productivity. To the extent small farmers face liquidity constraints the simplified small farmer scheme may provide farmers with additional means that might be used for productivity enhancing investment.</p> <p>There might be an indirect (negative) impact on (sector) productivity to the extent the simplified small farmers payment scheme leads to a slowdown in the evolution of agricultural structures.</p>	<p>As a direct payment that is decoupled from production, the small farmers' payment is being minimally market distorting.</p> <p>As it has a negligible impact on production, its market impact will be minimal. So will be its contribution to price stability.</p>

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
Framework within which Bulgaria, Croatia and Romania may complement direct payments		Bulgaria, Croatia and Romania are still phasing in their direct payments. Therefore these Member States are allowed to use national direct payments in order to complement the direct payments. As a direct payment, national direct payments are aimed at supporting farm income. So it adds to farm income in a direct way.	According to the farm household theory the national direct payments will have a positive impact on the income of the farm household. Since the national direct payment is a stable income source - not depending on weather or markets - it adds to reduce the variability of farmer income.	National complements to direct payment increase the support. To the extent this is decoupled from production the impact on productivity is likely to be limited. To the extent it is coupled to specific activities or sectors it is likely to affect relative profitability and also investment decisions and the associated productivity enhancement.	As a direct payment that is decoupled from production, the national direct payment is being minimally market distorting. As it has a negligible impact on production, its market impact will be minimal. So will be its contribution to price stability.
Knowledge transfer and information actions (M1)	M1.1 - support for vocational training and skills acquisition actions	Knowledge transfer and information actions will have a rather indirect impact on agricultural income as training as such does not directly create agricultural income.	Better knowledge will improve the entrepreneurial skills and the optimization of the production process. This leads to a positive impact on farm income	Knowledge transfer and information actions will improve the quality of human capital and by that lead to a positive impact on agricultural productivity	Vocational training and skills acquisition is likely to have a negligible impact on
	M1.2 - support for demonstration activities and information actions	Support of demonstration activities and information actions are not expected to have a direct impact on the agricultural income but could have an indirect impact.	Support of demonstration activities and information actions are not expected to have a direct impact on the agricultural income but could have an indirect impact.	Support of demonstration activities and information actions contribute to diffuse knowledge about innovations to a wider group of farmers. To the extent this induces farmers to apply innovative techniques or improve farm management productivity is likely to increase	No direct impact expected.
	M1.3 - support for short-term farm and forest management exchange as well as farm and forest visits	The exchange is expected to have a small impact on the agricultural income.	The exchange is not expected to have an impact on income earned with viable food production activities	No impact expected	No impact expected

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
Investments in physical assets (M4)	M4.1 - support for investments in agricultural holdings	The overall objective of this measure is to improve the economic and environmental performance of agricultural enterprises.	No direct effect on farm income expected; support covers part of expenditures associated with investment. There might be an indirect effect as the investment may lead to an increase in productivity depending on the type of action	A positive impact is expected due to expected increase in productivity enhancing investments.	No direct impact expected.
	M4.2 - support for investments in processing/marketing and/or development of agricultural products	To improve the economic and environmental performance of agricultural enterprises. More specifically, to increase the efficiency of the processing and marketing of agricultural products and creating a shorter and more localised supply chain.	Investments aim to have a positive impact of the value added in the food chain, part of which accrues to agricultural producers and increase their income	A positive impact is expected due to expected increase in productivity enhancing investments.	No clear impact defined in literature. An indirect effect might be that the investments contribute to consumer loyalty to (short supply chain) products, thereby making them less sensitive to price volatility
	M4.3 - support for investments in infrastructure related to development, modernisation or adaptation of agriculture and forestry	To improve the economic and environmental performance of agricultural enterprises. More specifically, to develop adapt and modernise agriculture and forestry. This includes access to productive land, land consolidation and supply and efficiency of energy and water resources.	A positive impact is expected since it offers better access to markets	A positive(indirect) impact is expected due to expected increase in productivity enhancing investments.	no direct impact expected
	M4.4 - support for non-productive investments linked to the achievement of agro-environment-climate objectives	To improve the environmental performance of agricultural enterprises. To realise environment and climate related benefits, non-remunerative investments in infrastructure are sometimes required.	No impact expected under the assumption that: the support will just covers the additional costs	No direct impact expected. There might be an indirect effect on food production productivity, depending on whether agro-environment and food production are complementary or competing activities	no impact expected

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
Restoring agricultural production potential damaged by natural disasters and introduction of appropriate prevention (M5)	M5.1 - support for investments in preventive actions aimed at reducing the consequences of probable natural disasters, adverse climatic events and catastrophic events	The agricultural sector is especially vulnerable to damage to productive capital caused by natural hazards and extreme events, which are exacerbated by climate change. This measure helps farms cope with this risk, by supporting investments which prevent or reduce damage to the agricultural production potential. This should support farm viability and competitiveness.	Reduces vulnerability to income shocks due to disasters	Impact on productivity is expected to be very limited	Contributes to reducing the impacts of market disruption due to natural disasters
	M5.2 - support for investments for the restoration of agricultural land and production potential damaged by natural disasters, adverse climatic events and catastrophic events	The agricultural sector is especially vulnerable to damage to productive capital caused by natural hazards and extreme events, which are exacerbated by climate change. This measure helps farms cope with this risk, by supporting investments in restoration of production potential. This should support farm viability and competitiveness.	Contribute to an increase of available land and improves its productive capacity, which will have a positive impact on farm income	Increases/restores agricultural production capacity, with a positive impact on availability and quality of land and on the modernity of productive capital, will have a positive impact on productivity	Restoration of pf production potential contributes to dampening of price fluctuations and speeds up the return to normal market conditions after a calamity
farm and business development (M6)	M6.1 - business start up aid for young farmers	SMEs are the backbone of the rural economy of the Union. Furthermore, support tailored to young farmers is needed, because they set up a business for the first time.	There is a direct impact expected for the start ups of young farmers and their income but the overall impact on agricultural income is likely to be limited	Start-up aid is likely to have a positive impact on investments and are likely to have a positive impact on productivity (in particular for the beneficiaries)	No direct impact expected
	M6.2 - business start up aid for non-agricultural activities in rural areas	For the development of rural areas, the creation and development of new economic activity is essential. This can concern leisure and culture, the provision of services to agriculture and forestry and activities related to health care and social integration.	There is an indirect impact expected for the start ups of non-agricultural activities in rural areas, which contributes to the agricultural income	No direct impact expected. There might be an indirect impact expected for the start ups of non-agricultural activities in rural areas for agricultural production to the extent this impacts the farm structure evolution in agricultural	No direct impact expected

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
				production	
	M6.3 - business start up aid for the development of small farms	SMEs are the backbone of the rural economy of the Union. Physical investments are needed to contribute to the economic and environmental performance of agricultural holdings. More specifically, this encompasses improving efficiency of the agricultural products and infrastructure for the development of agriculture and forestry.	There is an indirect impact expected for the start ups of small firms in rural areas on agricultural income (due to increased productivity)	Aid targeted to improving efficiency is likely to have a positive impact on productivity	No direct impact expected
	M6.4 - support for investments in creation and development of non-agricultural activities	For the development of rural areas, the creation and development of new economic activity is essential. This can be realised through both start-ups and diversification of existing activities.	No direct impact expected	No direct impact expected. There might be an indirect effect on food production productivity, depending on whether agro-environment and food production are complementary or competing activities	No direct impact expected
	M6.5 - payments for farmers eligible for the small farmers scheme who permanently transfer their holding to another farmer	Support for farmers who commit to transfer their entire holding and the corresponding payment entitlements to another farmer encourage the restructuring of the agricultural sector.	There is a positive potential impact on income expected.	Transfer of holdings may improve the possibilities to exploit economies of scale and have a positive impact on productivity	No direct impact expected as aggregate supply and its responsiveness to price may hardly be affected
Agri-environment-climate (M10)	M10.1 - payment for agri-environment-climate commitments	Agri-environment-climate payments should continue to play a prominent role in supporting the sustainable development of rural areas and in responding to society's increasing demands for environmental	Marginal effect on income expected, since compensation is assumed to only covers costs and forgone benefits	To the extent these payment increase the amount of land that is farmed in a less-intensive way a negative impact on productivity is expected	No direct impact expected

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
	M10.2 - support for conservation and sustainable use and development of genetic resources in agriculture	services. They should further encourage farmers and other land managers to serve society as a whole by introducing or continuing to apply agricultural practices that contribute to climate change mitigation and adaptation and that are compatible with the protection and improvement of the environment, the landscape and its features, natural resources, and the soil and genetic diversity (recital 2 of Reg 1305/2013).	No direct impact expected	No direct impact expected, but to the extent that genetic resources help to improve future crop varieties here is a potential indirect positive effect on productivity	No direct impact expected
Organic farming (M11)	M11.1 - payment to convert to organic farming practices and methods	M11 is a response to the increasing demand of society for the use of environmentally friendly farm practices and for high standards of animal welfare. In order to increase synergy in biodiversity, benefits delivered by the organic farming measure, collective contracts or co-operation between farmers should be encouraged to cover larger, adjacent areas. In order to avoid a large-scale return by farmers to conventional farming support should be given to both conversion and maintenance measures (recital 23 of Reg 1305/2013).	Payments contribute to reducing the costs of transition to organic production and have as such a positive expected impact on income. To the extent organic produce get a price premium that more than covers the additional costs it also will contribute to agricultural income	No clear impact on productivity, because the difficulty in comparing productivity of two different ways of production that produce different outputs, both in terms of quantity and quality (valuation). For the organic case physical productivity indicators (e.g. yield per hectare) might indicate a decline in productivity due to the limits imposed on the use of specific inputs	Product differentiation may contribute to more stable prices
	M11.2 - payment to maintain organic farming practices and methods		Support is expected to have a positive impact on farm income	Measure is likely to preserve existing production patterns and thus no direct impact is expected. Since "maintenance" implies re-investments and making use of the technical progress embodied in these investments, there might be an indirect positive impact on	No impact expected

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
cooperation (M16)	M16.1 - support for the establishment and operation of operational groups of the EIP for agricultural productivity and sustainability	<p>The broad scope of this measure recognises the fact that "supporting a much broader range of types of cooperation, with a wider range of beneficiaries, from smaller operators to larger ones, can contribute to achieving the objectives of rural development policy by helping operators in rural areas overcome the economic, environmental and other disadvantages of fragmentation".</p> <p>Support for cooperation for the development of new products has been "adapted to better meet the requirements of the knowledge economy", by permitting "projects by a single operator to be financed under that measure, on condition that the results obtained are disseminated, thus achieving the aim of diffusing new practices, processes or products". [Recital 29 of Reg 1305/2013]</p>	Positive impact on income expected	productivity growth Positive impact on productivity expected as this facilitates innovation and is likely to contribute to increase cost-efficiency	No direct impact expected
	M16.2 - support for pilot projects and for the development of new products, practices, processes and technologies		no direct impact expected	no direct impact expected, but pilots (demonstration effect) may contribute to productivity enhancement in an indirect way	no direct impact expected
	M16.3 - cooperation among small operators in organising joint work processes and sharing facilities and resources, and for developing and marketing tourism		Positive impact on income expected since measure contributes to reducing costs and more efficient use of inputs (incl. capital goods)	To the extent the cooperation leads to an increase in efficiency (e.g. better utilization of economies of scale and scope) it will also have a positive impact on productivity	no direct impact expected
	M16.4 - support for horizontal and vertical cooperation among supply chain actors for the establishment and development of short supply chains and local markets and for promotion activities in		Contributes to increase the value added at farm level and has a positive impact on local farm income	To the extent the cooperation leads to an increase in efficiency (e.g. better optimization of the production activities, improving the realized value added) it will also have a positive impact on productivity.	local markets and the sales of valued consumer products via short supply chains are likely to show more stable prices for farmers than commodity markets

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
	a local context relating to the development of short supply chains and local markets				
	M16.5 - support for joint action undertaken with a view to mitigating or adapting to climate change and for joint approaches to environmental projects and ongoing environmental practices		Is expected to have a positive indirect effect on income	No clear impact on productivity expected	no direct impact expected; there might be an indirect effect of lower vulnerability to market disruptions due to climate change
	M16.6 - support for cooperation among supply chain actors for sustainable provision of biomass for use in food and energy production and industrial processes		increasing access to new markets is expected to have a positive impact on income	To the extent this contributes to making the outputs of agriculture (including its by-products and residuals) more valuable, this increases factor productivity	no direct impact expected
	M16.7 - support for non-CLLD strategies		no direct impact expected	no direct impact expected	no direct impact expected
	M16.8 - support for drawing up of forest management plans or equivalent instruments		no direct impact expected	no direct impact expected	no direct impact expected

Measure	Sub-measure	Motivation	Expected impact on viable food production		
			Agricultural income	Agricultural productivity	Price stability
	M16.9 - support for diversification of farming activities into activities concerning health care, social integration, community-supported agriculture and education about the environment and food		positive impact on income (level) and due to increased portfolio of diversified activities lower income variability expected	no direct impact expected; diversification may lead to a decline in productivity relative to specialized forms of production	no direct impact expected

## II.3 Theoretical analysis and IOI for evaluation question 2 on sustainable management of natural resources and climate action

The relationship between policy instruments and environmental impacts is not straightforward and deterministic as impacts differ according to the specific context. For this reason, the first step has been to carry out a theoretical analysis, based on empirical evidence from the literature to establish the relationship between a variety of factors (e.g. different types of farming and forest systems, land management practices and other farm and forest activities, farm / forest size and structure and trends affecting these land use sectors (e.g. specialisation/intensification and abandonment)) and the four areas of focus for this EQ, namely greenhouse gas emissions, biodiversity, water and soils.

It should be noted that, although the analysis within this EQ focuses on four distinct environmental issues: greenhouse gas emissions, biodiversity, water and soils, for the analysis these will need to be broken down to examine their constituent parts. For example, under biodiversity, the assessment will consider the way in which implementation choices address both species and habitat maintenance, enhancement and restoration; and under greenhouse gas emissions, the assessment will consider the way instruments and measures are designed to address energy efficiency, enhancing carbon sinks through carbon sequestration, as well as reductions in emissions more generally on cropland and within livestock systems.

Secondly, based on this information and an identification of the objectives (intervention logic) of each of the CAP policy measures, we have established hypotheses on the potential impact of each of the policy measures on the four focus areas for EQ2.

Thirdly we have developed an overall intervention logic for all measures relating to the general objective of the 'sustainable management of natural resources and climate action', showing the links between each of the relevant measures, the four sub-objectives and the CAP specific objectives.

### II.3.1 Theoretical analysis

A broad review of the literature has been carried out at a meta-level to identify the key linkages in the chain between the policy measures, farm/forest structures, systems and practices, other driving forces/trends, environmental and climate outcomes (focussing on greenhouse gas emissions, biodiversity, water and soils. This is necessary to inform the establishment of hypotheses and judgements on the potential environmental and climate effects of each of the CAP policy measures (see the Instrument-Objective-Impact assessment below).

The theoretical analysis will be reviewed internally over next period of the project to ensure that all relevant aspects of these relationships for both agriculture and forestry systems have been identified to provide a firm foundation for the analytical phase of the study.

The relationship between the diverse range of farming and forest structures, systems and practices exist in the EU and the provision of environmental and climate goods and services is a complex one. Although there are broad relationships that can be identified, actual impacts are very dependent on the impact of the combination of these structural and operational factors in a particular location. The key factors that will affect the environmental and climate outcomes include (adapted from Cooper et al, 2010):

- Type of land use;
- Type of farming or forestry system, including intensity of management;

- The land management practices applied (including inputs used, varieties of tree species, crops or livestock selected, types of machinery employed, etc.) and their sensitivity to the local environment - the precise timing and spatial extent of a particular practice, as well as its use, may be significant in terms of environmental outcomes;
- The size and structure of the farm or forest, including size of parcels and scale of operation;
- The infrastructure in place within the farm/forest (e.g. manure storage facilities), as well as within the locality (e.g. drainage, irrigation);
- Driving forces/trends and economic viability of the system.

It should be noted that many type of farming systems and farming practices provide more than one environmental or climate benefit, albeit often to different degrees. More efficient irrigation systems, for example, make a direct contribution to sustainable levels of water abstraction, and they may also require less energy and hence lead to a reduction in greenhouse gas emissions. Maintaining species rich grassland will have a positive impact on biodiversity and will also help ensure carbon stocks are maintained in the soil. In other situations, conflicts may arise. For example, investments in highly efficient milking parlours to enable a higher milking frequency may enhance carbon efficiency in dairy production but these systems are often associated with more specialised dairy systems, often of limited value in biodiversity terms (Cooper et al, 2010; Hart et al, 2011).

The sections below explore the relationship between these factors and each of the four focus areas for EQ2. Given the complexity of the relationship, only a very general overview is provided here of how farm structures and drivers of intensification and abandonment affect environmental and climate outcomes. This is followed by a more detailed elaboration of how farming and forest systems and practices impact upon greenhouse gas emissions, biodiversity, water and soil. The information is based on a review of recent meta-studies which in turn have carried out in depth literature reviews on these topics (e.g. Cooper et al, 2010; Poláková et al, 2011; Poláková et al, 2013; Hart et al, 2011).

**Farm size and structure:** The relationship between the structure of farms and forests and environmental and climate outcomes is complex and influenced by many factors, including the history of land tenure. There is therefore no simple relationship that can be drawn from the analysis.

The scale of the holding will have various implications for the environment and climate as it will influence factors such as the ability to use certain technologies, the availability of labour and the pressure to maximise returns per hectare, which in turn will influence the practices adopted and the environmental /climate outcomes. However, the literature provides evidence that, both smaller and larger farms can be shown to have beneficial or detrimental impacts depending on the individual circumstances.

However, land consolidation, moving towards larger parcel sizes and agronomic units, often involves the removal of older field boundaries, trees and patches of unused land. This process is generally accompanied by greater specialisation of the enterprise to capture economies of scale. Smaller field sizes can be more environmentally beneficial, due to the because of the retention of natural or historic features, the contribution to a mosaic of land uses, the greater density of semi-natural vegetation likely to be present, and the constraints imposed on the use of larger and heavier machinery (Cooper et al, 2010). The removal of many of these features to enlarge field sizes therefore will often have an environmentally negative impact. However, this is not always the case and large expanses of appropriately managed unenclosed land are the preferred habitat for some species.

**Intensification, specialisation and abandonment:** when considering the impact of policy measures on the environmental/climate, it is important to be clear about the counterfactual situation. For example, the trends in some areas are towards greater specialisation and intensification of farming systems. In others marginalisation and eventual land abandonment may be more dominant.

Whether these changes are beneficial or detrimental for the environment and climate largely depends on their context and precisely what changes in habitats and landscape structure occur. However, measures that both promote or discourage such trends can have an impact, particularly on biodiversity, but also on soils and water and depending on the land management practices that ensue, on greenhouse gas emissions.

### **Greenhouse Gas Emissions**

The agriculture and forestry sectors have an impact on the climate, either through producing GHG emissions (direct and indirect), or through carbon sequestration. The agriculture sector remains a significant emitter of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) emissions (10.3% for the EU-28 – 2012 figures) and in some countries these constitute a considerable proportion of total greenhouse gas emissions (ranging from around 2 % in Malta to over 30 % in Ireland). In terms of CO<sub>2</sub> emissions from the Land Use, Land Use Change and Forestry (LULUCF) sector, overall the sector is a net sink which has remained fairly stable since 1990, however this sink is expected to shrink over the coming years linked to a rise in anticipated emissions from forest management. Cropland management overall is a net source of emissions (although not in all countries) and is predicted to remain a source in the future. Grazing land management overall for the EU-28 is a net sink (although in the past it has been a source of emissions) and is predicted to remain a sink in the future. For forest management, the net sink for the EU-28 has remained relatively stable since 1990, but here projections suggest this net sink declining significantly to 2030 as a result of aging forest stands and increased harvesting, predominantly for energy use (Böttcher and Graichen, 2015).

Some level of emissions is an inevitable consequence of food production and timber use. The majority of the global warming potential from emissions generated by agriculture are from emission of nitrous oxide (N<sub>2</sub>O), following the application of nitrogen (N) fertilizers and livestock manures to land (c. 50%), and from emission of methane (CH<sub>4</sub>) from enteric fermentation and manures (c. 35%). However, research has identified a range of agricultural practices that can promote the reduction in emissions or increase in removals of GHG emissions from the atmosphere (see Table II-6). These will vary in their mitigation potential from country to country, depending on the soil type, climate (arid, wet) and existing land use.

Table II-6: List of climate mitigation actions with evidence of mitigation potential on agricultural land in the EU-28

<b>Land Use</b>
Conversion of arable land to grassland to sequester carbon in the soil
Agroforestry
Wetland/peatland conservation/ restoration
Woodland planting
Preventing deforestation and removal of farmland trees
Management of existing woodland, hedgerows, woody buffer strips and trees on agricultural land
<b>Crop Production Systems</b>
Reduced tillage
Zero tillage
Leaving crop residues on the soil surface
Ceasing to burn crop residues and vegetation
Use cover/catch crops
<b>Livestock Production Systems</b>
Livestock disease management
Use of sexed semen for breeding dairy replacements
Breeding lower methane emissions in ruminants
Feed additives for ruminant diets
Optimised feeding strategies for livestock
<b>Manure, Fertiliser &amp; Soil management</b>
Soil and nutrient management plans
Use of nitrification inhibitors
Improved nitrogen efficiency
Biological N fixation in rotations and in grass mixes
<b>Energy</b>
Carbon auditing tools
Improved on-farm energy efficiency

Source: Martineau et al, forthcoming, Frelih-Larsen et al, 2014

The other key way in which GHG emissions can be influenced in rural areas is through the reduction in the use of or displacement of fossil fuels and the production of renewable energy, whether to produce fuel for heat and power. There are many options here, for example, the introduction of energy efficiency measures, the use of biomass for heat, the use of agricultural crops and residues for biofuels and the introduction of solar or wind energy and hydro-power initiatives. There has been much literature written on the indirect land use change impacts of using agricultural crops in particular as feedstocks for biofuels, with the emphasis turning increasingly to the use of wastes and residues as a more sustainable means of production bioenergy. A key issue to determine therefore is the extent to which the CAP measure is promoting actions that are sustainable in the longer term and will not create ILUC.

Since greenhouse gas emissions have the same impact on global warming wherever they take place, then climate mitigation benefits can be secured only if overall emissions fall. For example, if livestock or crop production is displaced from the EU to other countries, this will only be beneficial if the production systems elsewhere are associated with lower emissions per unit of production. This will need to be taken into consideration when considering the impact of different CAP measures on greenhouse gas emissions.

Considerations that must be taken into account when assessing the potential relevance, coherence or effectiveness of CAP measures on GHG emissions.

- Does the measure promote specific actions that directly will (in the country concerned):
  - reduce greenhouse gas emissions?
  - increase removals of CO<sub>2</sub>?
  - maintain carbon stores in soils?
- Does the measure promote activities that could increase greenhouse gas emissions / release carbon stores into the atmosphere?
- Is there likely to be a production displacement effect (within the EU only considered here) that could have the potential to counter any GHG emission reductions brought about by the actions supported?
- Is it likely that the measure's design and focus would enable the identified outcomes to be achieved – targeting, spatial coverage, funding etc?

### Biodiversity

*Agriculture:* The relationship between agricultural management and biodiversity is complex and very location specific. The abundance and diversity of species associated with agricultural land will depend of their modification from the state of a natural habitat (without human intervention) and the intensity of management carried out. This means that lower intensity management systems are often characterised by higher levels of biodiversity (e.g. High Nature Value farming systems). Organic systems also tend to have a higher diversity of habitats, both non-farmed and farmed habitats, of higher ecological quality than conventional farming systems (e.g. Gabriel et al, 2010; Winqvist et al, 2011). It is the loss of extensive farming systems, either through their intensification or abandonment that is the greatest risk to biodiversity.

The ecological processes and species associated with different agricultural habitats are also affected greatly by three important landscape-related factors:

- Spatial scale of the fields and farming system (e.g. from very small-scale strip farming, to enclosed fields or extensive unenclosed landscapes) – this is important because some species have particular requirements in terms of habitat area and its spatial configuration
- The presence and ecological quality of field boundary habitats (eg hedges and ditches, uncropped strips) and other non-farmed habitat features (eg trees and ponds).
- Landscape diversity (to cater for species that have different requirements for breeding and feeding, in terms of:
  - composition (ie habitat and boundary types);
  - structure (ie scale of fields and other elements); and
  - interactions with other habitat types other than farmland (eg forests, wetlands, and urban areas etc). (Poláková et al, 2011)

The 2011 report for DG AGRI on 'Addressing biodiversity and habitat preservation through Measures applied under the Common Agricultural Policy' (Poláková et al, 2011) comprised a detailed literature review of the impacts of key farming practices on biodiversity. This showed that the following land use practices were particularly important in terms of their impact on biodiversity, highlighting that the impacts of the practices will vary according to habitat type and it is important to ensure the right intensity of the management practice which will vary according to local circumstances (eg soil type, vegetation type and condition, climate, historical management and current management objectives):

- Ensuring the optimal levels and combination of grazing, cutting, hydrological management, burning on semi-natural habitats;
- Crop rotation and fallow land help maintain crop diversity which in turn increases biodiversity in many farming landscapes;

- In mixed farming systems, maintaining some land as permanent grassland (or perennial crops) is beneficial for biodiversity, because the absence of ploughing allows soil organic matter and soil fauna levels to build up, with knock-on benefits for species higher up the food chain, such as soil-invertebrate feeding birds;
- Boundary features such as hedgerows, trees, ponds, ditches, stone terraces and uncropped areas with patches of rough grass or scrub:
  - enable some species of forest, wetland, scrub and rocky habitats to exist in otherwise agricultural dominated areas;
  - provide important cover and food resources for some farmland species;
  - can facilitate the movement of some species through what would otherwise be a hostile landscape;
  - Although it should be noted that some species of open farmed landscapes, such as the steppe grasslands and moorlands, are detrimentally affected by the introduction of trees and boundary features as they use to open landscape to avoid predators;
- Mitigating the effects of practices, such as annual cultivations, pesticide use, drainage and irrigation and the use of artificial fertilisers by delaying ploughing so that winter stubbles are retained, and leaving cereal field margins unsprayed with pesticides;
- Introducing management to compensate for unavoidable impacts, through targeted replacement of habitat components - for example, sowing field margins with plants that provide high density food resources (eg seeds for birds, nectar-rich plants for pollinators) or creating bare fallow patches in the crop for ground nesting birds).

*Forest establishment and management.* Forests can play an important role in conserving biodiversity, providing important habitats for species of flora and fauna, although they may also have negative impacts. The nature of the impacts depend on factors such as: size and location, genetic diversity of trees species, level of commercial harvesting, fertilizer and other input use, land improvements, such as drainage, soil improvements, landscaping.

Forests that are biodiversity rich or of High Nature Value, tend to possess some or all of the following characteristics:

- native tree, shrub and ground cover species in forests with a high degree of naturalness;
- tall trees, including old and dead trees, with deadwood on the forest floor;
- they cover a sizeable area that have been managed sustainably for quite a long time.

Managing these forests to maintain their biodiversity value, therefore requires silvicultural systems that can accommodate this diversity.

Afforestation can also be positive for biodiversity where new woodland habitats are created on degraded land or areas of low biodiversity value, particularly if these areas can connect existing fragmented areas of woodland. However, the location and species choice for any afforestation will affect its biodiversity value as will site preparation activities such as drainage and the creation of forest roads (Buscardo et al, 2008; Elmarsdottir et al, 2008).

Box II-2.

Considerations that must be taken into account when assessing the potential relevance, coherence or effectiveness of CAP measures on biodiversity.

- What specific actions are included within the measure and do they focus on maintaining or enhancing habitats and species in the local context? If so what?
- What types of agricultural habitats are the focus of the measure?
- Will the measure affect the overall landscape structure?
- Are the measures universally applicable, spatially limited and are they compulsory or voluntary for farmers?
- Will the measure provide supporting services to maintaining / enhancing biodiversity – e.g. enabling the

drafting of management plans, provision of advice targeted at relevant management practices etc.

- Is it likely that the measure's design and focus would enable the identified outcomes to be achieved – targeting, spatial coverage, funding etc?

## Water

Water is a key natural resource. There are two aspects relating to 'water' that are relevant for EQ2 - both water quality (good chemical and ecological status of ground and surface water) and water quantity/availability (ensuring sustainable water abstraction and avoiding water scarcity).

While the pressures facing water resources are often different in each Member State or even river basin, reducing the pressure on water resources is important throughout the EU as it may have consequences upstream and downstream, and have associated benefits for ecosystems (eg on biodiversity), economy (eg on reducing energy used for water pumping and treatment) and climate stability (eg on GHG emissions linked to energy use) (Poláková et al, 2013).

Land management activities are critically important for maintaining water resources. Agricultural practices for example, affect:

- Water availability through their use of water for irrigation, animal husbandry, on-farm processing etc;
- Water quality through diffuse pollution from nutrients and pesticides;
- Water flows in river basins by drainage and irrigation; and
- Soil functionality, with knock-on effects on water flows, water infiltration rates, and water pollution by sediment overflow.

Forests also play an important role in terms of soil protection and regulating freshwater supplies, providing protection against soil erosion and desertification and helping regulate the hydrological cycle. The conversion of agricultural land into forest/agro-forestry systems can have positive effects on water management, through the protection and improvement of water quality.

## Water Quality

Water quality is affected by diffuse (where pollutants are being dispersed over a wide area) and point source (emanating from a specific, observable source) pollution from nitrogen, phosphorous, pesticides and sedimentation. Nutrient surpluses often arise from the application of nutrients in excess of what is required by the crops and grassland, but may also arise from the way in which such nutrients are stored. The degree to which water quality is affected will depend on a range of factors including soil and weather characteristics, slope, vegetation and the intensity, frequency and period of grazing and the rate at which manure is applied.

Investments in new infrastructure as well as land management practices can have an impact on water quality. The literature highlights the following as influencing improvements in water quality:

- covered storage facilities for organic manures, slurries and silage will help with emissions to the atmosphere, help prevent run-off of silage effluent as well as allow the application of manures and slurries onto the land at the optimum point to avoid run-off into water courses;
- Minimise the use of inputs and optimise the application of inorganic fertilisers, organic manures and slurry, matching them to crop requirements as closely as possible, to avoid nutrient surpluses and risk of run-off – this can be achieved through various means including nutrient planning, precision farming techniques, integrated farming methods, crop rotation and biological pest control. Some excess nutrients can also be absorbed by cover crops following the cereal harvest;
- Soil management techniques to avoid soil erosion and sedimentation on both crop and grassland will help avoid minimise phosphate pollution and other nutrient run-off (see soil section below, but particularly buffer strips and headland, if located in the right place)

- Cultivation of crops requiring less nutrient inputs;
- Avoidance of overgrazing and unsuitable supplementary feeding practices

### Water quantity

Key to the sustainable management of water resources is to ensure that water abstraction is within sustainable levels so that aquifers are replenished naturally and not depleted over time. This is particularly an issue in arid areas, but also in areas not typically considered arid, but where rainfall is sporadic and long periods without rainfall are experienced. To achieve these efforts to minimise water consumption are important, for example through reducing irrigation, through the recycling and re-use of water and maintaining the water holding capacity of the land, avoiding unnecessary drainage operations. Also important is to avoid unnecessary water loss, for example through reducing flood risk after heavy rainfall events.

There is a range of actions that can help achieve these aims. Investments in technologies that can promote water capture, storage and re-use are one aspect of this. However, there is also a range of land management activities that can be beneficial. For example:

- Restoring floodplains and wetlands;
- Maintaining natural and semi-natural habitats such as wetlands and marshes can mitigate the effect of high rainfall events and maintain a more constant supply of water;
- Avoiding land drainage activities;
- Maintaining or creating green infrastructure, for example hedgerows, trees etc which can create barriers to slow water run-off following rainfall events and hence reduce flood risk;
- Optimising crop patterns – for example changes of the crop cycle; choosing species or varieties of crop that are inherently drought tolerant;
- Increasing soil water retention – for example through tillage practices, mulching; application of soil conditioners; weed control; incorporating fallow land into the cropping system, maintaining or creating buffer strips; use of intermediate crops; modification of the soil surface; maintaining crop residues;
- Reducing crop water needs by optimal management of the leaf canopy.

Box II-3. Considerations that must be taken into account when assessing the potential relevance, coherence or effectiveness of CAP measures on water.

- Does the measure include actions that will:
  - Contribute to improving water quality; and/or
  - Improve the sustainability of water use.
- Will the measure provide supporting services to improve water quality or water availability – e.g. provision of advice targeted at relevant management practices etc.
- Is it likely that the measure's design and focus would enable the identified outcomes to be achieved – targeting, spatial coverage, funding etc?

### Soils

Appropriate soil management is important to protect the quality and functioning of soils, including its fertility as well as to support the delivery of sustainable and high quality water resources. It often has co-benefits and trade-offs with other environmental priorities including climate change mitigation and adaptation, biodiversity protection as well as farmers' economic objectives.

The appropriate management of soil is necessary to prevent or reduce soil degradation processes, such as reducing soil erosion, compaction, floods and landslides, loss of soil organic matter, salinification and loss of soil biodiversity (COM 2006). The role of soils in achieving water quantity and quality objectives has been addressed above. Its role in delivering climate mitigation benefits is achieved through preserving existing carbon stocks in agricultural soils, increasing sequestration of

carbon in soils, and reducing nitrous oxide emissions associated with agricultural land use. On the other hand, poor management of soils can lead to increased GHG emissions, for example, due to fertiliser use, drainage and mineralisation of peatlands, or soil erosion and associated loss of soil organic matter.

The research shows that there is a range of management actions that deliver soil benefits. Their suitability and hence effectiveness will be location specific and will depend on a range of factors including soil type, aspect, slope and climate. Ideally a soil management plan would need to have been produced to identify the particular soil needs in a given location. The relevant management actions include (Joint Research Centre, 2009, Polakova et al, 2013):

- **Cropland management** (such as winter cover and catch crops, crop rotations with or without legumes, crop residue management, reduced tillage; reduced fertiliser and pesticide applications, maintaining grass in orchards and vineyards, replacing row crops with perennial/permanent crops; avoiding cultivation on steep slopes, ploughing along the slope, creating in-field ridges and buffers, introducing or maintaining terraces, hedges, trees or other windbreaks and soil retention features);
- **Grazing land management** (such as maintenance of semi-natural permanent grassland without ploughing; optimising grazing intensity to avoid overgrazing (this could include shepherding), adjusting the length and timing of grazing to avoid grazing during wet periods, grassland renovation to improve the composition of grassland – although this would not be appropriate in semi-natural habitats); and
- **Cross-cutting actions** which include land use changes and forestry (such as the introduction or maintenance of buffer strips around fields and along water courses (location is critical), maintaining and restoring wetlands, conversion of arable land to grassland, maintaining and restoring wetlands/peatlands and rewetting organic soils, agro-forestry; woodland creation; use of lighter machinery).

These actions will often also involve co-benefits for climate mitigation, water quality, water resource use as possibly also biodiversity.

Considerations that must be taken into account when assessing the potential relevance, coherence or effectiveness of CAP measures on soils

Box II-4.

Considerations that must be taken into account when assessing the potential relevance, coherence or effectiveness of CAP measures on soils

- What type of soil degradation processes is the measure focused on?
- What co-benefits are likely from the measure – particularly for GHG emissions, water resources and biodiversity?
- Will the measure provide supporting services to improve soil quality – e.g. provision of advice targeted at relevant management practices etc.
- Is it likely that the measure's design and focus would enable the identified outcomes to be achieved – targeting, spatial coverage, funding etc?

### II.3.2 *The instrument-objective-impact or IOI matrix*

The CAP measures are only one of a range of drivers influencing farm structures, systems and management practices. However, in focussing on the potential impact of the CAP measures, it is important to recognise that they vary not just in their objectives but also in the way in which they support different actions. For example, in some cases, such as the agri-environment-climate measure, the implementation of the measure can involve a very detailed set of management practices expected in return for the payment. In other cases, such as payments in Areas of Natural

Constraints, the payment is provided automatically to farmers within a prescribed area, with no direct environmental or climate requirements attached (although in practice the payment may maintain certain environmentally beneficial agricultural systems in place that might otherwise be at risk). In other cases, the payments are made for specific investments, which may be allocated on a competitive basis and judged on the basis of a series of criteria, which may or may not be environmental in nature.

In terms of the different types of mechanisms in place under the CAP that can have an environmental impact include:

- Those with the potential to have a direct impacts:
  - Area based payments, incentivising specific land uses and management practices;
  - Investments in infrastructure, new technologies, local services and amenities as well as non-productive investments, such as capital items required to support environmental activities;
  - Support for pilot projects;
- Those with the potential to have an indirect impact:
  - supporting measures – e.g. advice, support for cooperation, preparation of management plans etc;
  - support to systems which may be environmentally beneficial – e.g. payments in Areas of Natural Constraints; where extensive systems benefit from the redistributive payment.

To be able to determine whether, and to what extent, these measures deliver benefits for greenhouse gas emissions, biodiversity, water and soils on the ground, it is important to recognise the different ways in which CAP policy measures operation. For example, there are measures that have a universal character, applying to all farmers across the EU-28, such as Pillar I direct payments and others that are not universally applied, whose impact will depend inter alia on proportion of farmers implementing the measure and their implementation choices (e.g. Pillar I greening measures, Pillar II measures). Voluntary approaches are characteristic predominantly for Pillar II, however, some measures under the single CMO are also voluntary, such as the environmental measures in the fruit and vegetable sector. In addition, the way in which these measures are designed, targeted, implemented, their spatial reach across landscapes, plus the degree to which they are sufficiently financed, all have an impact on the degree to which they have the potential to deliver environmental and climate benefits.

For the analysis under EQ2, it is the detailed content of the measures that will be important to identify in order to be able to assess the extent to which they have the potential to address the specific environmental issues that are the focus of EQ2. For example, as highlighted above, an agri-environment scheme may include multiple options, whose objective may be to maintain species rich grassland and/or to introduce buffer strips next to watercourses and/or to plant hedgerows, and/or to introduce integrated crop management etc., each of which will have a different environmental/climate purpose and hence a different outcome.

The theoretical background, coupled with an assessment of the objectives and intervention logics of individual measures, enables hypotheses on potential impacts of each CAP measure on the four environmental and climate focus items to be established. This is summarised in the instrument-objective-impact- (IOI) matrix presented in the next pages.

Table II-7. Instrument Objective Impact matrix (IOI) for Sustainable Management of Natural Resources and Climate Action

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
Cross-compliance		Cross compliance contributes to the 'development of a sustainable agriculture through a better awareness of beneficiaries of the need to respect basic standards [and] to make the CAP more compatible with the expectation of the society through a better consistency of that policy with the environment, public health, animal health, plant health and animal welfare policies' (preamble 54 of Reg. 1306/2013)	There may be GHG emission impacts from those GAEC standards relating to soil and carbon stock (e.g. GAEC 4 - Minimum soil cover / GAEC 5 - Minimum land management reflecting site specific conditions to limit soil erosion / GAEC 6 - Maintenance of soil organic matter level through appropriate practices, including ban on burning arable stubble, except for plant health reasons as well as possible GAEC 7 to maintain landscape features insofar as this protects carbon stores in woody features.	<p>Direct impact possible:</p> <ul style="list-style-type: none"> <li>- relevant SMRs include a number of farm level requirements under the Birds and Habitats Directives (SMRs 2 and 3).</li> <li>- GAEC 7 requiring the retention of certain landscape features, including a ban on the cutting of hedges and trees during the bird breeding and rearing season and possible measures for avoiding invasive species and pests to protect valuable refuges for biodiversity.</li> </ul> <p>Indirect impact possible via other GAEC standards with some relevance to biodiversity, but which are primarily focused on other ecosystem services - e.g. protecting soil and carbon stock (GAEC 4, 5 and 6) and water management (GAEC 1 on establishing buffer strips along water</p>	<p>Direct impacts possible from GAEC standards relating to soil and carbon stock (e.g. GAEC 4 - Minimum soil cover / GAEC 5 - Minimum land management reflecting site specific conditions to limit soil erosion / GAEC 6 - Maintenance of soil organic matter level through appropriate practices, including ban on burning arable stubble, except for plant health reasons as well as possible GAEC 7 to maintain landscape features insofar as this protects carbon stores in woody features.</p>	Direct impacts possible from SMR 1 (compliance with Nitrates Directive), GAEC 1 - buffer strips / GAEC2 - compliance with authorisation procedures for irrigation/ GAEC3 - protection of groundwater against pollution)

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
				courses).		
Basic payment scheme		As a direct payment, the Basic Payment (BP) is aimed at supporting farm income. So it adds to farm income in a direct way. Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).	No direct impact expected. However, the cross compliance requirements apply to the BP and therefore the BP has a potential indirect impact because it may strengthen compliance with EU environmental legislation, for instance on greenhouse gas emissions, and introduce basic protection of environmental resources not covered by legislation, e.g. for soils and landscape features	No direct impact expected. However, the cross compliance requirements apply to the BP and therefore the BP has a potential indirect impact because it may strengthen compliance with EU environmental legislation, for instance on greenhouse gas emissions, and introduce basic protection of environmental resources not covered by legislation, e.g. for soils and landscape features	No direct impact expected. However, the cross compliance requirements apply to the BP and therefore the BP has a potential indirect impact because it may strengthen compliance with EU environmental legislation, for instance on greenhouse gas emissions, and introduce basic protection of environmental resources not covered by legislation, e.g. for soils and landscape features	No direct impact expected. However, the cross compliance requirements apply to the BP and therefore the BP has a potential indirect impact because it may strengthen compliance with EU environmental legislation, for instance on nitrate pollution or groundwater and introduce basic protection of water resources not covered by legislation, e.g. by requiring the introduction of buffer strips
Payment for farmers observing agricultural practices beneficial for the climate and the environment	Crop Diversification	The enhancement of environmental performance through a mandatory "greening" component of direct payments which will support agricultural practices beneficial for the climate and the environment applicable throughout the Union (recital 37 of Reg 1307/2013).  The payments should: • Address both climatic and	No direct impact expected. However if it were to increase the area of land under leguminous crops, the nitrogen fixed in the soil may reduce the levels of fertiliser required and potentially lead to a small reduction in demand for imported animal feed and any greenhouse gas emissions associated with these	Has the potential to bring modest benefits for biodiversity in situations where it encourages a greater rotation of arable crops, including the introduction of fallow or legumes into the rotation.	No direct impact expected. However if it were to increase the area of land under leguminous crops, the nitrogen fixed in the soil may reduce the levels of fertiliser required and therefore improve water quality. However, negative impacts could be experienced if post harvest management is not put in	No direct impact expected. However if it were to increase the area of land under leguminous crops, the nitrogen fixed in the soil may reduce the levels of fertiliser required and therefore improve water quality. However, negative impacts could be experienced if post harvest management is not put in

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
		environmental policy goals; • be simple, general, annual and non-contractual;			place to avoid nitrogen leaching into watercourses.	place to avoid nitrogen leaching into watercourses.
	Maintenance of Permanent Grassland	• go beyond cross-compliance; and • be linked to agriculture Specially, the objectives for each of the sub-measures is as follows: Crop diversification - to achieve 'enhanced environmental benefit...in particular the improvement of soil quality' (Recital 41 of Reg. (EC) 1307/2013) / Maintenance of Permanent Grassland: to ensure environmental benefits, in particular carbon sequestration (Recital 42) / EFAs: to safeguard and improve biodiversity on farms (Recital 44)	The protection of environmentally sensitive permanent grassland where no ploughing is permitted should help maintain carbon stores in soils.	There should be benefits for biodiversity, particularly where farm level authorisation procedures are in place. The ban on ploughing and conversion on the most environmentally sensitive areas in Natura 2000 areas, in keeping with the Habitats Directive should provide some benefits (although unclear whether these will be additional to what is required via law), as should designation of ESPG outside N2K areas.	The protection of environmentally sensitive permanent grassland where no ploughing is permitted should help maintain carbon stores in soils and help prevent erosion.	No direct impact expected
	Ecological Focus Areas		Some impact is to be expected, depending on which of the EFA elements are taken up by farmers, the specific implementation rules (e.g. concerning input use), which elements are additional to actions that would have been taking place anyway and over what proportion of land.	Some impact is to be expected, depending on which of the EFA elements are taken up by farmers, the specific implementation rules (e.g. concerning input use), which elements are additional to actions that would have been taking place anyway and over what proportion of land.	Some impact is to be expected, depending on which of the EFA elements are taken up by farmers, the specific implementation rules (e.g. concerning input use), which elements are additional to actions that would have been taking place anyway and over what proportion of land.	Some impact is to be expected, depending on which of the EFA elements are taken up by farmers, the specific implementation rules (e.g. concerning input use), which elements are additional to actions that would have been taking place anyway and over what proportion of land.

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
Voluntary payment for farmers in areas with natural constraints		<p>This specific direct payment is aimed at providing additional support for farmers who are in a disadvantaged competitive position because of the natural constraints they face.</p> <p>As a direct payment, the payment for areas with natural constraints (ANC payment) is aimed at supporting farm income. So it adds to farm income in a direct way.</p> <p>Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).</p>	<p>No direct impact.</p> <p>Indirect impact possible as likely to maintain marginal agriculture above counterfactual level, equates to more farmland and more livestock, so could increase local emissions. Without the support, there could be less production in LFAs and more production outside the EU and even in intensive areas within Europe - neither of which is likely to be more GHG intensive. Inhibits growth of scrub and afforestation and so reduces carbon sequestration. But maintains areas of permanent pasture and where these are not ploughed and reseeded regularly, it will enhance carbon stores.</p>	<p>No direct impact.</p> <p>Support may lead to indirect biodiversity benefits, particularly where payments help to maintain extensive livestock grazing systems.</p>	<p>No direct impact. Support may lead to indirect benefits for soil quality, particularly where payments help to maintain extensive livestock grazing systems, which in turn maintain soil carbon and help avoid soil erosion.</p>	No direct impact expected.
Payment for young farmers commencing their agricultural activity		<p>The measure is motivating the young farmers to take over the farm and supporting necessary generation change in agriculture.</p>	<p>No direct impact expected.</p> <p>There might be an indirect impact to the extent that the payment contributes to the continuation of viable multifunctional farming in high nature value areas.</p>	<p>No direct impact expected.</p> <p>There might be an indirect impact to the extent that the payment contributes to the continuation of viable multifunctional farming in high nature value areas.</p>	No direct impact expected.	No direct impact expected.

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
Voluntary coupled support scheme		Coupled support can be granted to farmers to help a vulnerable sector or support a type of farming in a certain region. Its impact will be equivalent to an effective price increase for the targeted crop or animal production activity.	No direct impact expected. Indirect impacts will depend on what farming systems are supported and where. For example, where extensive grazing systems on permanent grassland are supported, carbon stores will be protected (although emissions will still occur from the livestock). Where protein crops are supported, some benefits may arise from the reduced levels of fertiliser required on leguminous crops and indirectly through potentially reducing imports of animal feed and any GHG emissions associated with these. Where SRC is supported, this may displace other crops but probably captures more carbon per hectare than competing crops, while less than full growth forest. Some displacement of fossil fuels is also possible.	No direct impact expected. Indirect impacts will depend on what farming systems are supported, where and for what purpose. For example where support is provided to maintain extensive grazing systems on permanent grassland with little or no input of fertilisers and agrochemicals this could enable the maintenance of semi-natural habitats.	No direct impact. Support may lead to indirect benefits for soil quality, particularly where payments help to maintain extensive livestock grazing systems, which in turn maintain soil carbon and help avoid soil erosion.	No direct impact expected.

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
Knowledge transfer and information actions (M1)	M1.1 - support for vocational training and skills acquisition actions	Knowledge transfer and information actions will have a rather indirect impact on agricultural income as training as such does not directly create agricultural income.	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4 and 5 or where used to support renewable energy development.	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4a	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4c and 5e	No direct impact expected. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4b and 5a
	M1.2 - support for demonstration activities and information actions	Support of demonstration activities and information actions are not expected to have a direct impact on the agricultural income but could have an indirect impact.	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4 and 5 or where used to support renewable energy development.	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4a	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4c and 5e	No direct impact expected. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4b and 5a
	M1.3 - support for short-term farm and forest management exchange as well as farm and forest visits	The exchange is expected to have a small impact on the agricultural income.	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4b, 4c and 5a, 5b, 5c, 5d and 5e or where used to support renewable energy development.	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4a	No direct impact. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4c and 5e	No direct impact expected. Some indirect impact possible, but this will depend on the focus of the action - particularly where prioritised under Focus Area 4b and 5a

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
Investments in physical assets (M4)	M4.1 - support for investments in agricultural holdings	The overall objective of this measure is to improve the economic and environmental performance of agricultural enterprises.	Some impact possible depending on the focus of the action - particularly likely to have an impact where prioritised under Focus Areas 5a, 5b, 5c, 5d and 5e	No direct impact expected	Some impact possible depending on the focus of the action - particularly likely to have an impact where prioritised under Focus Areas 4c and 5e	Some impact possible. depending on the focus of the action - particularly where prioritised under Focus Area 4b and 5a
	M4.2 - support for investments in processing/marketing and/or development of agricultural products	To improve the economic and environmental performance of agricultural enterprises. More specifically, to increase the efficiency of the processing and marketing of agricultural products and creating a shorter and more localised supply chain.	No direct impact expected		No direct impact expected	No direct impact expected
	M4.3 - support for investments in infrastructure related to development, modernisation or adaptation of agriculture and forestry	To improve the economic and environmental performance of agricultural enterprises. More specifically, to develop adapt and modernise agriculture and forestry. This includes access to productive land, land consolidation and supply and efficiency of energy and water resources.	Some impact possible depending on the focus of the action - particularly likely to have an impact where prioritised under Focus Areas 5a, 5b, 5c, 5d and 5e	No direct impact expected	Some impact possible depending on the focus of the action - particularly likely to have an impact where prioritised under Focus Areas 4c and 5e	Some impact possible. depending on the focus of the action - particularly where prioritised under Focus Area 4b and 5a
	M4.4 - support for non-productive investments linked to the achievement of agri-environment-climate objectives	To improve the environmental performance of agricultural enterprises. To realise environment and climate related benefits, non-remunerative investments in infrastructure are	Direct impact expected where actions complement the use of the agri-environment-climate measure for actions which reduce GHG emissions	Direct impact expected where actions complement the use of the agri-environment-climate measure to maintain or enhance habitats and	Direct impact expected where actions complement the use of the agri-environment-climate measure to improve soil quality	Direct impact expected where actions complement the use of the agri-environment-climate measure to improve water quality and/or water

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
		sometimes required.		species		resource use
Farm and business development (M6)	M6.1 - business start up aid for young farmers	SMEs are the backbone of the rural economy of the Union. Furthermore, support tailored to young farmers is needed, because they set up a business for the first time.	No direct impact expected.	No direct impact expected	No direct impact expected	No direct impact expected
	M6.2 - business start up aid for non-agricultural activities in rural areas	For the development of rural areas, the creation and development of new economic activity is essential. This can concern leisure and culture, the provision of services to agriculture and forestry and activities related to health care and social integration.	Some impact possible where diversification activities enable reduced GHG emissions - particularly likely to have an impact where prioritised under Focus Areas 5a, 5b, 5c, 5d and 5e	Some impact possible where diversification activities lead to positive biodiversity impacts - particularly likely to have an impact where prioritised under Focus Area 4a	Some impact possible where diversification activities focus on improvements in soil quality- particularly likely to have an impact where prioritised under Focus Areas 4c and 5e	Some impact possible where diversification activities focus on improvements in water quality, water resource use or soil quality- particularly likely to have an impact where prioritised under Focus Areas 4b, and 5a,
	M6.3 - business start up aid for the development of small farms	SMEs are the backbone of the rural economy of the Union. Physical investments are needed to contribute to the economic and environmental performance of agricultural holdings. More specifically, this encompasses improving efficiency of the agricultural products and infrastructure for the development of agriculture and forestry.	No direct impact expected.	No direct impact expected.	No direct impact expected.	No direct impact expected.

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	M6.4 - support for investments in creation and development of non-agricultural activities	For the development of rural areas, the creation and development of new economic activity is essential. This can be realised through both start-ups and diversification of existing activities.	Some impact possible where investments enable reduced GHG emissions - particularly likely to have an impact where prioritised under Focus Areas 5a, 5b, 5c, 5d and 5e	Some impact possible where investments lead to positive biodiversity impacts - particularly likely to have an impact where prioritised under Focus Area 4a	Some impact possible where investments focus on improvements in water quality, water resource use or soil quality- particularly likely to have an impact where prioritised under Focus Areas 4c and 5e	Some impact possible where diversification activities focus on improvements in water quality, water resource use or soil quality- particularly likely to have an impact where prioritised under Focus Areas 4b, and 5a,
	M6.5 - payments for farmers eligible for the small farmers scheme who permanently transfer their holding to another farmer	Support for farmers who commit to transfer their entire holding and the corresponding payment entitlements to another farmer encourages the restructuring of the agricultural sector.	No direct impact expected.	No direct impact expected.	No direct impact expected.	No direct impact expected.
Basic services and village renewal in rural areas (M7)	M7.1 - support for drawing up and updating of plans for the development of municipalities and villages in rural areas and their basic services and of protection and management plans relating to Natura 2000 sites and other areas of high nature value	This support can contribute to restoring, preserving and enhancing biodiversity and high nature-value farming. This can rear local breeds in danger of being lost to farming and preserve plant genetic resources under threat of genetic erosion.	No direct impact expected	Indirect positive impact where management plans for N2K and areas of high nature value are put in place	No direct impact expected	No direct impact expected.

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	M7.2 - support for investments in the creation, improvement or expansion of all types of small scale infrastructure, including investments in renewable energy and energy saving	Local infrastructure and basic services are essential for growth potential in rural areas. Specifically for renewable energy and energy efficiency, dedicated support can steer the shift towards a low carbon and climate resilient economy, preserve and protect the environment and improve security of supply.	Some impact possible where investments enable reduced GHG emissions - particularly likely to have an impact where prioritised under Focus Areas 5a, 5b, 5c, 5d and 5e	No direct impact expected	Some impact possible where investments focus on improvements in water quality, water resource use or soil quality- particularly likely to have an impact where prioritised under Focus Areas 4c and 5e	Some impact possible where diversification activities focus on improvements in water quality, water resource use or soil quality- particularly likely to have an impact where prioritised under Focus Areas 4b, and 5a,
	M7.3 - support for broadband infrastructure, including its creation, improvement and expansion, passive broadband infrastructure and provision of access to broadband and public e-government	The development of local infrastructure and local basic services in rural areas is an essential element of any effort to realise the growth potential and to promote the sustainability of rural areas. This includes access to Information and Communication Technologies and the development of fast and ultra-fast broadband.	No direct impact expected	No direct impact expected	No direct impact expected	No direct impact expected.
	M7.4 - support for investments in the setting-up, improvement or expansion of local basic services for the rural population including leisure and	The development of local infrastructure and local basic services in rural areas is an essential element of any effort to realise the growth potential and to promote the sustainability of rural areas. This includes leisure and culture services.	No direct impact expected	No direct impact expected	No direct impact expected	No direct impact expected.

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	culture, and the related infrastructure					
	M7.5 - support for investments for public use in recreational infrastructure, tourist information and small scale tourism infrastructure	Farm and non-agricultural business development should be aimed at employment promotion and the setting up of quality jobs in rural areas. Projects that bring together agriculture and rural tourism through the promotion of sustainable and responsible tourism in rural areas, should be encouraged.	No direct impact expected. Indirect impact is possible if the investments made lead to reduced GHG emission, i.e. in low carbon infrastructure, encouraging 'green' tourism, including use of public transport etc.	No direct impact expected. Some indirect impact is possible if the investments enhance biodiversity - e.g. incorporating biodiversity into infrastructure development (e.g. green roofs, actions to benefit pollinators etc)	No direct impact expected..	No direct impact expected. Indirect impact is possible if the investments made lead to water benefits - particularly likely in relation to water resource use, e.g. recycling of waste water etc.
	M7.6 - support for studies/investments associated with the maintenance, restoration and upgrading of the cultural and natural heritage of villages, rural landscapes and high nature value sites including related socioeconomic aspects, as well as environmental awareness actions	The development of local infrastructure and local basic services in rural areas is an essential element of any effort to realise the growth potential and to promote the sustainability of rural areas. This includes the renewal of villages and activities aimed at the restoration and upgrading of the cultural and natural heritage of villages and rural landscapes.	Direct impact possible where support leads to investments that are low carbon.	Direct impact possible where support leads to investments that improve the status of sites of high nature value	Direct impact possible where support leads to investments that improve soil quality	Direct impact possible where support leads to investments that improve the sustainability of water resource use and/or improve water quality

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	M7.7 - support for investments targeting the relocation of activities and conversion of buildings or other facilities located inside or close to rural settlements, with a view to improving the quality of life or increasing the environmental performance of the settlement	Self-explanatory: relocation and conversion should improve the quality of life and environmental performance of settlements.	Direct impact possible where support leads to investments that are low carbon and promote renewable energies.	Direct impact possible where support leads to investments that enhance biodiversity, (e.g. green roofs, actions to benefit pollinators etc)	No direct impact expected ,	Direct impact is possible if the investments made lead to water benefits - particularly likely in relation to water resource use, e.g. recycling of waste water etc.
Investments in forest area development and improvement of the viability of forests (M8)	M8.1 - support for afforestation/creation of woodland	Forestry is an integral part of rural development and support for sustainable and climate friendly land use should include forest area development and sustainable management of forests (recital 20 of Reg 1305/2013). This single M8 measure covers all types of support for forestry investments and management,	Positive impact expected in long term due to carbon storage benefits of trees. Initial planting may lead to soil carbon emissions from soil cultivation	Positive impact expected, but will depend on factors such as: biodiversity status of the land before planning, species chosen, size, scale and location and subsequent management.	Unclear impact: impacts may vary in short, medium and longer term. It may improve carbon sequestration potential in soils and help avoid soil erosion. However, establishment may involve drainage, soil amelioration or sub-soiling which may have detrimental impacts.	Unclear impact: impacts may vary in short, medium and longer term. It may help avoid soil erosion and run-off into water courses. However, establishment may involve drainage, which may have detrimental impacts on water flow and affect flood risk.

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	M8.2 - support for establishment and maintenance of agro-forestry systems	with a view of helping beneficiaries to realise integrated projects with increased added value while achieving simplification.	Positive impact expected in long term due to potential to increase carbon sequestration. Initial planting may lead to soil carbon emissions from soil cultivation. Impact will also depend on the subsequent management and fertilisation and frequency of harvest.	Positive impact expected, depending on the tree species used and the intensity of management. If non-native trees species are grown near semi-natural woodland habitats the impact may be negative.	Positive impact expected as has the potential to improve soil moisture content, reduce the risk of soil erosion, and improve soil fertility.	Positive impact expected as has the potential to improve soil moisture content and hence efficiency of water use, reduce the risk of soil flooding, reduce NO3 leaching
	M8.3 - support for prevention of damage to forests from forest fires and natural disasters and catastrophic events		Positive impact due to carbon storage capacity of trees (although forests/woodland cannot sequester carbon indefinitely). Prevents the loss of GHG emissions through burning etc.	Positive impact in terms of preventing biodiversity loss, where the forest is of high biodiversity value	Positive impact expected in terms of preventing soil erosion which could occur from forest damage.	Potential indirect impact due to soil benefits (reduced soils erosion)
	M8.4 - support for restoration of damage to forests from forest fires and natural disasters and catastrophic events		Positive impact expected in long term due to carbon storage benefits of trees. Initial planting may lead to soil carbon emissions from soil cultivation	Positive impact expected, but will depend on factors such as: species chosen and subsequent management.	Positive impact expected mainly in relation to avoiding soil erosion .	Potential indirect impact due to soil benefits (reduced soils erosion)
	M8.5 - support for investments improving the resilience and environmental value of forest ecosystems		Positive impact expected	Positive impact expected	Positive impact expected	Positive impact expected

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	M8.6 - support for investments in forestry technologies and in processing, mobilising and marketing of forest products		Possible positive impact if technologies and processing systems developed are low carbon	No direct impact expected	No direct impact expected	Possible positive impact if technologies and processing systems developed improve efficiency of water use / incorporate water saving technologies.
Agri-environment-climate (M10)	M10.1 - payment for agri-environment-climate commitments	Agri-environment-climate payments should continue to play a prominent role in supporting the sustainable development of rural areas and in responding to society's increasing demands for environmental services. They should further encourage farmers and other land managers to serve society as a whole by introducing or continuing to apply agricultural practices that contribute to climate change mitigation and adaptation and that are compatible with the protection and improvement of the environment, the landscape and its features, natural resources, and the soil and genetic diversity (recital 2 of Reg 1305/2013).	Positive impact expected. Impact will depend on precisely what sort of actions are prioritised under the various schemes in place	Positive impact expected. Impact will depend on precisely what sort of actions are prioritised under the various schemes in place	Positive impact expected. Impact will depend on precisely what sort of actions are prioritised under the various schemes in place	Positive impact expected. Impact will depend on precisely what sort of actions are prioritised under the various schemes in place
	M10.2 - support for conservation and sustainable use and development of genetic resources in agriculture		Possible positive impact where genetic resources are developed with a view to minimising GHG emissions	Positive impact expected where indigenous breeds of plant or livestock species are supported	Positive impact possible where local breeds of plant or livestock are supported that are adapted to local conditions, e.g. arid zones, which would mean less pressure on soils.	Indirect impact possible where local breeds of plant or livestock are supported that are adapted to local conditions, e.g. arid zones, which would mean less pressure on soils, with knock on beneficial effects on water resources.

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
Organic farming (M11)	M11.1 - payment to convert to organic farming practices and methods	M11 is a response to the increasing demand of society for the use of environmentally friendly farm practices and for high standards of animal welfare. In order to increase synergy in biodiversity, benefits delivered by the organic farming measure, collective contracts or co-operation between farmers should be encouraged to cover larger, adjacent areas. In order to avoid a large-scale return by farmers to conventional farming support should be given to both conversion and maintenance measures (recital 23 of Reg 1305/2013).	Impact unclear - could be beneficial impacts as a result of lower fertiliser and chemical inputs, but lower stocking densities and longer lifespan of livestock can result in higher GHG emissions/unit output.	Positive impact expected in general, but impact will depend on specifics of the organic farming system, previous land use etc	Positive impact expected in general particularly on soil quality as a result of lower fertiliser and chemical inputs, but impact will depend on specifics of the organic farming system	Positive impact expected in general particularly on water quality as a result of lower fertiliser and chemical inputs, but impact will depend on specifics of the organic farming system
	M11.2 - payment to maintain organic farming practices and methods		As above and depends on what the alternative farming system would be	As above and depends on what the alternative farming system would be	As above and depends on what the alternative farming system would be	As above and depends on what the alternative farming system would be
Cooperation (M16)	M16.1 - support for the establishment and operation of operational groups of the EIP for agricultural productivity and sustainability	The broad scope of this measure recognises the fact that "supporting a much broader range of types of cooperation, with a wider range of beneficiaries, from smaller operators to larger ones, can contribute to achieving the	No direct impact expected, but indirectly the EIP operational groups may develop innovations that can be applied leading to reduced GHG emissions.	No direct impact expected, but indirectly the EIP operational groups may develop innovations that can be applied leading to enhanced biodiversity.	No direct impact expected, but indirectly the EIP operational groups may develop innovations that can be applied leading to enhanced soil quality	No direct impact expected, but indirectly the EIP operational groups may develop innovations that can be applied leading to the more efficient use of natural resources/ enhanced water quality

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	M16.2 - support for pilot projects and for the development of new products, practices, processes and technologies	objectives of rural development policy by helping operators in rural areas overcome the economic, environmental and other disadvantages of fragmentation".	Direct impact expected if support focuses on pilots or other initiatives with the aim of achieving reduced GHG emissions.	Direct impact expected if support focuses on pilots or other initiatives with the aim of achieving enhanced biodiversity.	Direct impact expected if support focuses on pilots or other initiatives with the aim of achieving more efficient use of natural resources / enhanced soil quality.	Direct impact expected if support focuses on pilots or other initiatives with the aim of achieving more efficient use of natural resources / enhanced water quality.
	M16.3 - cooperation among small operators in organising joint work processes and sharing facilities and resources, and for developing and marketing tourism	Support for cooperation for the development of new products has been "adapted to better meet the requirements of the knowledge economy", by permitting "projects by a single operator to be financed under that measure, on condition that the results obtained are disseminated, thus achieving the aim of diffusing new practices, processes or products". [Recital 29 of Reg 1305/2013]	Direct impact may be possible if cooperation leads to less use of machinery or other equipment that relies on fossil fuel for example.	No direct impact expected	No direct impact expected	Direct impact may be possible if cooperation leads to less use of natural resources, e.g. water savings
	M16.4 - support for horizontal and vertical cooperation among supply chain actors for the establishment and development of short supply chains and local markets and for promotion activities in a local context relating to the development of short supply chains and local markets		No direct impact expected	No direct impact expected	No direct impact expected	No direct impact expected

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	M16.5 - support for joint action undertaken with a view to mitigating or adapting to climate change and for joint approaches to environmental projects and ongoing environmental practices		Direct impact expected where the focus is on mitigating or adapting to climate change	Direct impact expected where the focus of the joint action is on achieving biodiversity outcomes or adapting to the climate impacts on biodiversity.	Direct impact expected where the focus of the joint action is on natural resource use and adapting to climate change,	Direct impact expected where the focus of the joint action is on natural resource use and adapting to climate change, particularly in relation to the more efficient use of water resources.
	M16.6 - support for cooperation among supply chain actors for sustainable provision of biomass for use in food and energy production and industrial processes		Direct impact possible where lifecycle analysis shows reductions of GHG emissions	Direct impact expected if conditions put in place for sustainable supply reduce impacts on biodiversity	Direct impact expected if conditions put in place for sustainable supply ensure the sustainable use of soil resources	Direct impact expected if conditions put in place for sustainable supply ensure the sustainable use of water resources
	M16.7 - support for non-CLLD strategies		No direct impact expected	No direct impact expected	No direct impact expected	No direct impact expected

Measure	Sub-measure	Motivation	Expected impact on sustainable management of natural resources and climate action			
			Greenhouse Gas Emissions	Biodiversity	Soil	Water
	M16.8 - support for drawing up of forest management plans or equivalent instruments		No direct impact expected, but indirectly forest management plans should identify ways of minimising GHG emissions and maximising removals	No direct impact expected, but indirectly forest management plans should identify ways of ensuring the maintenance or enhancement of biodiversity	No direct impact expected, but indirectly forest management plans should identify ways of ensuring the sustainable use of soil resources.	No direct impact expected, but indirectly forest management plans should identify ways of ensuring the sustainable use of water resources.
	M16.9 - support for diversification of farming activities into activities concerning health care, social integration, community-supported agriculture and education about the environment and food		No direct impact expected	No direct impact expected	No direct impact expected	No direct impact expected

## II.4 Theoretical analysis and IOI for evaluation question 3 on balanced territorial development

### II.4.1 Theoretical analysis

Table II-8 provides an overview of the main theories that will be used in the analysis. They are ordered according to the key subjects that are identified from analysing the general specific objectives associated with balanced territorial development. As an extensive discussion of these theories is beyond the scope of the current exercise, the selected scientific references are provided in Table II-8, linking each of the theories to the academic literature. In the following a brief overview of the main insights and derived hypothesis from these theories with a focus on rural employment, growth and poverty reduction in rural areas are discussed.

Table II-8. Subjects linked to the specific objectives associated with viable food production and theoretical approaches

Subjects linked to specific objective	Theory	Selected references
Maintaining rural employment	Rural economic resilience theory	Buikstra et. al., 2010 <sup>1</sup> , Heijman et al., 2007 <sup>2</sup>
Economic growth in rural areas	Neo-endogenous development theory	Ward et al., 2005, Murdoch 2000, Terluin, 2003, Lowe et al., 2006, Ecorys, 2010.
Poverty reduction	Multidimensional approach	Sen, 1989, Anand and Sen, 2000, Foster et al., 2010

#### Maintaining rural employment

Rural employment is defined by Eurostat as people that are employed for the population aged 15-64 in thinly-populated areas.<sup>3</sup> There is broad theoretical debate on how employment can be understood. Most of these theories start with “a common framework of a single composite good, output, produced under conditions of diminishing returns to each scarce factor of production and constant returns to scale. The conditions governing production are described by a production function, and the demand for labour is derived from this function. The supply of labour is based on individual decisions to give up other activities – loosely described as leisure - and allocate time to labour. These relations yield a negatively sloped aggregate demand curve for labour relating offers of employment and the relative price of labour, or real wage, and a positively sloped supply curve of labour. The intersection of the two curves determines the market clearing real wage and the equilibrium level of employment. Unemployment can be defined as the difference between the amount of employment demanded and supplied at each real wage or as the difference between actual and equilibrium employment.”<sup>4</sup>

Traditionally rural areas have been seen as areas of production and places of work. “Increasingly, though, they have come to be appreciated as places to live in and as sites for leisure. This transition depends upon levels of affluence and the spread of post-materialist values in society. As people move beyond concerns with material security and embrace quality of life issues they place increasing value on the opportunities rural areas provide for living space, recreation, the enjoyment of amenity and wildlife, and a wholesome and pleasant environment.”<sup>5</sup> Therefore changes in rural employment levels are strongly associated with several other parameters like earlier described:

<sup>1</sup> [http://www.readcube.com/articles/10.1002%2Fjcop.20409?r3\\_referer=wol&tracking\\_action=preview\\_click&show\\_checkout=1&purchase\\_referrer=onlinelibrary.wiley.com&purchase\\_site\\_license=LICENSE\\_DENIED\\_NO\\_CUSTOMER](http://www.readcube.com/articles/10.1002%2Fjcop.20409?r3_referer=wol&tracking_action=preview_click&show_checkout=1&purchase_referrer=onlinelibrary.wiley.com&purchase_site_license=LICENSE_DENIED_NO_CUSTOMER)

<sup>2</sup> Heijman, W., Hagelaar, G. and Heide, M.v.d., 2007. Rural resilience as a new development concept, EAAE seminar Serbian Association of Agricultural Economists, Novi Sad, Serbia.

<sup>3</sup> <http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetailDoc&id=8011&no=8>

<sup>4</sup> <http://repository.cmu.edu/cgi/viewcontent.cgi?article=1760&context=tepper>

<sup>5</sup> [http://www.google.nl/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjEtriwyL\\_JAhXCYQ8KHQR9DDMQFggkMAA&url=http%3A%2F%2Fwww.panda.org%2Fdownloads%2Furope%2Fcomp\\_report1.pdf&usg=AFQjCNGVW9qi6DMKTEgGmrrxL9N9uPZY4Q](http://www.google.nl/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjEtriwyL_JAhXCYQ8KHQR9DDMQFggkMAA&url=http%3A%2F%2Fwww.panda.org%2Fdownloads%2Furope%2Fcomp_report1.pdf&usg=AFQjCNGVW9qi6DMKTEgGmrrxL9N9uPZY4Q)

individual choices, output growth, investment trends, technology adoption, human capital, etc. (Ahearn et al., 2005:2006,<sup>6</sup> Alasia et al., 2009,<sup>7</sup> El-Osta et al., 2004,<sup>8</sup>) and how is dealt with these factors in labour policy.

Therefore we use here the broad concept of rural resilience, introduced by Heijman et a. (2007)<sup>9</sup> to understand factors that can be of influence on rural employment. "Rural resilience refers to the capacity of a rural region to adapt to changing external circumstances in such a way that a satisfactory standard of living is maintained, while coping with its inherent ecological, economic and social vulnerability. In analogy to urban resilience (Colding, 2007; CSIRO, 2007) the concept of rural resilience determines the degree to which a specific rural area is able to tolerate alteration before reorganizing around a new set of structures and processes. It describes how well a rural area can balance ecosystem, economic and social functions (Heijman et al., 2007), which all have a strong link to labour employment.

Without representing all the details here, Table II-9 summarizes a number of main hypothesis that follow from this model and that are relevant in answering the evaluation questions with respect to the specific objective of rural employment.

Table II-9. Selected hypothesis on rural employment derived from the rural economic resilience theory

Measure or scheme	Expected effect on rural employment	Additional comments
Basic payment	By ensuring a certain amount of income, decoupled support could contribute to the decision of farmers to stay in the agricultural sector.	There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the decoupled support on agricultural structures.
Redistributive payment	Redistributive payment adds to farm income in a direct way. Therefore by ensuring a certain amount of income, redistributive payment could contribute to the decision of farmers to stay in the agricultural sector.	There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the redistributive payment on agricultural structures.
Voluntary simplified scheme for small farmers	By ensuring a certain amount of income, the small farmers' payment could contribute to the decision of farmers to stay in the agricultural sector.	There might be a negative second order impact on maintaining rural employment (number of farmers) via the blocking effect of the small farmers' payment on the evolution of agricultural structures.
Young farmers scheme	Payment contributes to having attractive employment opportunities in rural areas	
Elements of VCS	By ensuring a certain amount of income, coupled support could contribute to the decision of farmers to stay in the agricultural sector.	There might be a positive indirect impact on maintaining rural employment (number of farmers) via the indirect effect of the coupled support on agricultural structures.
Measures related to knowledge transfer and information actions	The effects of measures related to knowledge transfer and information actions on rural employment will be rather indirect by increasing social	Enhances rural resilience

<sup>6</sup> Ahearn, M.C., Yee, J., and Korb, P., 2005. Effects of differing farm policies on farm structure and dynamics. *American Journal of Agricultural Economics* 87, pp. 1182-1189.

Ahearn, M.C., El-Osta, H., and Dewbre, J., 2006. The impact of coupled and decoupled government subsidies on off-farm labour participation of U.S. farm operators. *American Journal of Agricultural Economics* 88, pp. 393-408

<sup>7</sup> Alasia, A., Weersink, A., Bollman, R.D., and Cranfield, J., 2009. Off-farm labour decision of Canadian farm operators: Urbanization effects and rural labour linkages. *Journal of Rural Studies* 25, pp. 12-24.

<sup>8</sup> El-Osta, H.S., Mishra, A.K., and Ahearn, M.C., 2004. Labour supply by farm operators under "decoupled" farm program payments. *Review of Economics of the Household* 2, pp. 367-385.

<sup>9</sup> Heijman, W., Hagelaar, G. and Heide, M.v.d., 2007. Rural resilience as a new development concept, EAAE seminar Serbian Association of Agricultural Economists, Novi Sad, Serbia.

Measure or scheme	Expected effect on rural employment	Additional comments
	capital and creating the possibility of a more divers rural economy.	
Measures related to investments	Investments in rural infrastructure could have a positive effect on the rural economy and thus on rural employment as well.	
Measures related to farm and business development	Measures related to farm and business development could have a positive effect by assisting the rural economy in adapting to new contexts (e.g.. generation renewal)	Support for farm and business development might have a negative effect on rural employment in the long term as potentially marginal farms are supported for a limited number of years giving them the possibility to exist while they otherwise wouldn't.
Measures related to basic services and village renewal in rural areas	Measures focussing on basic services and village renewal could have a positive effect on rural employment by increasing the economic diversification and resilience of the rural area.	
LEADER	Effects are expected to be indirect as exchange is the first purpose.	

### Economic growth in rural areas

Economic growth can be defined as an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. Agriculture is historically an important component for the economy of rural areas however, according to the OECD, for example, agriculture "is no longer the backbone of rural economies."<sup>10</sup> Also it is noted in Lee et al. (2009), "that the most pervasive change affecting rural economies is the declining relative importance of agriculture in European rural economies. Two main economic processes underlie this: first the rise of the 'New Rural Economy' and second the refocusing of agricultural activity towards the production of quality food products on the one hand, and environmental benefits on the other. Both these processes are contributing towards the diversification of rural economies, reducing the economic reliance on mainstream agriculture and promoting the non-farm economy and alternative for Member States of farm-related business".<sup>11</sup>

A theory that can be used to explain economic growth is *the neo-endogenous growth model* wherein both local and extra-local barriers and drivers of growth are recognised. In this model the focus is on the dynamic interactions between local areas and their wider political, institutional, trading and natural environments and how these interactions are mediated (Ward et al. 2005, p. 5). Rural development is about horizontal relations and networks between local actors but also vertical relations through which the 'top-down' meets the 'bottom-up' (Murdoch 2000). Hence, rural development is considered as a complex mesh of networks in which resources are mobilised and in which the control of the process consists of an interplay between local and external forces (Terluin 2003, p. 333). The key is to ensure that local actors, with good stocks of human and social capital, positively and proactively participate in internal and external development processes (Ward et al. 2005, p. 5).

Lowe et al. (2006, p. 42) agree that "if the goal is to widen the base and vitality of the economies of rural areas, it is surely important that the crucial, consistent and largely non-agricultural drivers that are revitalising rural economies are supported." Thus it can be argued that to sustain economic growth in rural areas not only a vital agricultural economy is needed, but also a divers economy.<sup>12</sup>

<sup>10</sup> OECD 2006. Rural Policy Reviews. The New Rural Paradigm. POLICIES AND GOVERNANCE, p. 41.

<sup>11</sup> [http://ec.europa.eu/agriculture/analysis/external/employment/full-text\\_en.pdf](http://ec.europa.eu/agriculture/analysis/external/employment/full-text_en.pdf)

<sup>12</sup> [http://ec.europa.eu/agriculture/analysis/external/employment/full-text\\_en.pdf](http://ec.europa.eu/agriculture/analysis/external/employment/full-text_en.pdf)

A number of general hypotheses about the impact of specific policy measures on growth can be derived from the theory discussed above (see Table II-10 for a summary).

Table II-10. Selected hypothesis on economic growth derived from the neo-endogenous growth model

Measure or scheme	Expected effect on economic growth in rural areas	Additional comments
Basic payment	No direct effect is expected on economic growth.	There might be a positive indirect impact on growth via the indirect effect of the BP on agricultural structures.
Redistributive payment	No direct effect is expected on economic growth.	There might be a positive indirect impact on growth via the indirect effect of the redistributive payment on agricultural structures.
Voluntary simplified scheme for small farmers	No direct effect is expected on economic growth.	There might be a negative indirect impact on growth via the indirect effect of the small farmers' payment on agricultural structures.
Young farmers scheme	Due to the positive effect of the young farmers payment on agricultural structures, there might be a positive impact on growth	
Elements of VCS	Coupled support could strengthen the viability of agriculture in marginal areas.	
Measures related to knowledge transfer and information actions	Positive effect on economic growth as it develops human and social capital	Within the neo-endogenous growth model human capital is identified as one of the key elements in rural development.
Measures related to investments	Investments in the rural area should have a positive effect on rural economic growth.	Investments should enhance the overall performance and sustainability of the rural economy.
Measures related to farm and business development	Farm and business development could have a positive effect on the rural economic growth by improving the economic performance of agricultural holdings.	A more indirect effect on economic growth can also be expected due to the positive effect this has on agricultural structure
Measures related to basic services and village renewal in rural areas	An indirect effect can be expected due to the improvement of rural infrastructure and the development of cultural capital in the rural area.	
LEADER	No direct impacts.	

## Poverty reduction in rural areas

Poverty is mostly measured in monetary terms, whether according to a national poverty line or by international benchmarks. It captures the levels of income or consumption expenditure per capita or per household. Monetary poverty measures are often referred to as a single indicator, but Ravallion (2011)<sup>13</sup> argues that these are in fact composite measures of consumption and income, derived from market prices in aggregation.<sup>14</sup> The World Bank's frequently cited 'dollar-a-day' international poverty line is probably the best-known poverty indicator (World Bank 2008).<sup>15</sup> The poverty line is set in 2015 on US\$1.90.<sup>16</sup>

The European commission defines poverty in two levels, absolute poverty and relative poverty. Both definitions are defined below.

### Absolute poverty

A measure of absolute poverty identifies the number of people below a fixed real poverty threshold (i.e.: 1 €/person/day). This concept is usually associated with physical necessities and is mainly applied in developing countries.

The second of the indicators endorsed by the Council, material deprivation, describes social exclusion in absolute terms. The material deprivation rate refers to the percentage of population who cannot afford at least three of these nine items:

1. One week annual holiday away from home
2. To face unexpected expenses
3. To pay for arrears (mortgage or rent, utility bills or hire purchase instalments)
4. A meal with meat, chicken, fish or vegetarian equivalent every second day
5. To keep home adequately warm
6. To have a washing machine
7. To have a colour TV
8. To have a telephone
9. To have a personal car

### Relative poverty

A measure of relative poverty defines poverty in relation to the general level of income in a society. People who are below a relative poverty threshold are those whose income is less than a concrete percentage (i.e.: 60%) of the median household income. Clearly, the absolute value of the relative poverty threshold (which in itself is an arbitrary figure) varies greatly among Member States. However, this relative measure of poverty see Member States to be more appropriate for quantifying the number of poor people in developed countries, such as in the EU-27.<sup>17</sup>

Rural poverty can be seen in a different context than urban poverty. With the enlargements of the EU, the rural population as well as the number of people at risk of poverty in rural areas have considerably increased. In the EU the greatest share of population at risk of poverty is in thinly populated areas (21%). In other areas (intermediate and densely populated) the average share of poor population is below 15%.<sup>18</sup>

<sup>13</sup> Ravallion M. 2011. On multidimensional indices of poverty. *Journal of Economic Inequality* 9(2), 235–248.

<sup>14</sup> [http://aci-ar.gov.au/files/node/14358/ias76\\_the\\_contribution\\_of\\_agricultural\\_growth\\_to\\_p\\_27524.pdf](http://aci-ar.gov.au/files/node/14358/ias76_the_contribution_of_agricultural_growth_to_p_27524.pdf)

<sup>15</sup> Worldbank 2008. World development indicators: poverty data—a supplement to world development indicators, 2008. World Bank: Washington, DC.

<sup>16</sup> <http://www.worldbank.org/en/topic/poverty/brief/global-poverty-line-faq>

<sup>17</sup> [http://ec.europa.eu/agriculture/rural-area-economics/briefs/pdf/01\\_en.pdf](http://ec.europa.eu/agriculture/rural-area-economics/briefs/pdf/01_en.pdf)

<sup>18</sup> [http://ec.europa.eu/agriculture/rural-area-economics/briefs/pdf/01\\_en.pdf](http://ec.europa.eu/agriculture/rural-area-economics/briefs/pdf/01_en.pdf)

As described, poverty is often captured in monetary measures. However, since monetary measures do not reflect the many dimensions of poverty, new approaches to poverty have been developed, mainly to complement, rather than to replace, monetary indicators. There are several types of alternative indicators and one way of classifying them is as one-dimensional or multidimensional indicators.<sup>19</sup>

A strong advocate of a system of one-dimensional rather than multidimensional indicators is Ravallion (1996).<sup>20</sup> In his opinion one-dimensional measures, like the Millennium Development Goals (MDGs), are more practical for policymakers because they can be, among others, used to indicate outcomes of specific policies and they can better take into account consumer choice in a market economy.

There has been growing interest in multidimensional measures of poverty. According to the capability approach, wellbeing depends on a person's capabilities or freedom to achieve certain valuable 'doings and beings', so that expanding people's capabilities should be the prime objective of human development. While income is important, it is not an end in itself, but the means through which an individual gains 'command over resources' (Anand and Sen 2000), which can then be converted into capabilities. In this framework, poverty is viewed as capability deprivation. Multidimensional measures, indicating levels of achievement below certain minimum levels, reflect the complexity of wellbeing and poverty in that they convey the extent to which a person is poor in several distinct and independently important dimensions (Foster et al. 2010).

Benefits of a multidimensional approach are that several things matter simultaneously. Also in policy approaches this can be taken into account. Most countries have achieved rapid rural poverty reduction with a nation's economic growth, however this is not absolutely essential to progress in reducing poverty.<sup>21</sup> One source of extra budget known to be especially effective in reducing poverty is remittances from people who work abroad (Acosta, Fajnzylber and Lopez, 2007)<sup>22</sup>. Poverty can be reduced in rural areas also through migration of farm workers to off-farm jobs, in rural or urban areas. Christiaensen and Todo (2008)<sup>23</sup> observe that as countries develop: a) their economies restructure away from agriculture into manufacturing and services and b) people move from rural to urban areas. They emphasize however that, while intertwined, these structural and spatial transformation processes typically do not fully overlap. They find that migration from farm to non-farm work in rural areas is poverty reducing.<sup>24</sup>

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<sup>19</sup> [http://aci-ar.gov.au/files/node/14358/ias76\\_the\\_contribution\\_of\\_agricultural\\_growth\\_to\\_p\\_27524.pdf](http://aci-ar.gov.au/files/node/14358/ias76_the_contribution_of_agricultural_growth_to_p_27524.pdf)

<sup>20</sup> Ravallion M. 1996. Issues in measuring and modelling poverty. *The Economic Journal* 106 (438), 1328–1343.

<sup>21</sup> <http://www.oecd.org/tad/44804637.pdf>

<sup>22</sup> Acosta, P., Fajnzylber, P. and H. Lopez (2007), "The Impact of Remittances on Poverty and Human Capital: Evidence from Latin American Household Surveys", World Bank Policy Research Working Paper No. 4 247.

<sup>23</sup> Christiaensen, L. and Y. Todo (2008), "Poverty Reduction during the Rural-Urban Transformation – The Role of the Missing Middle", The World Bank Group.

<sup>24</sup> <http://www.oecd.org/tad/44804637.pdf>

Table II-11. Hypothesis with respect to how selected relevant policy measures are expected to impact on rural poverty

Measure or scheme	Expected effect on rural poverty	Additional comments
Basic payment	The BP supports farm incomes in rural areas and will as such contribute to reduce poverty.	This measure has an impact on monetary poverty rather than on the multidimensional concept of poverty.
Redistributive payment	The redistributive payment supports farm incomes in rural areas and will as such contribute to reduce poverty.	This measure has an impact on monetary poverty rather than on the multidimensional concept of poverty.
Voluntary simplified scheme for small farmers	The small farmers' payment supports farm incomes in rural areas and will as such contribute to reduce poverty.	This measure has an impact on monetary poverty rather than on the multidimensional concept of poverty.
Young farmers scheme	No direct impact expected	
Elements of VCS	Coupled payments support farm incomes in rural areas and will as such contribute to reduce poverty.	This measure has an impact on monetary poverty rather than on the multidimensional concept of poverty.
Measures related to knowledge transfer and information actions	These measures aim to increase the level of skills in the rural areas. By increasing capacities opportunities for employment and growth and thus income rural poverty is indirectly addressed.	Measures related to increasing knowledge and levels of education will decrease the risk on social exclusion and improve labour market prospects.
Measures related to investments	Investing in infrastructure could have on a medium to long term a positive impact on employment in the rural areas and thus have an indirect positive impact on reducing rural poverty.	
Measures related to farm and business development	No direct impact expected	Business start-up aids could indirectly positively impact reducing rural poverty by ensuring generational renewal in the agricultural sector, therefore supporting rural employment while trying to avoid depopulation of rural areas. Thus, indirectly these measures have a potential in reducing rural poverty in the medium to long term.
Measures related to basic services and village renewal in rural areas	Measures related to basic services and village renewal have shown to have a positive impact on the reduction of rural poverty <sup>25</sup> .	
LEADER	It could have a positive impact on the reduction of rural poverty by building communities and increasing social capital.	

<sup>25</sup> European Commission (2008). Poverty and social exclusion in rural areas.

## II.4.2 The instrument-objective-impact or IOI matrix

Table II-12. Instrument Objective Impact Matrix (IOI) for the objective of Balanced Territorial Development

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
Basic payment scheme		As a direct payment, the Basic Payment (BP) is aimed at supporting farm income. So it adds to farm income in a direct way. Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).	By ensuring a certain amount of income, the BP could contribute to the decision of farmers to stay in the agricultural sector. As such, the BP has an impact on the maintenance of rural employment. There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the BP on agricultural structures.	No direct impact expected, as agricultural production is not affected by the BP. There might be a positive second order impact on growth via the indirect effect of the BP on agricultural structures.	The BP supports farm incomes in rural areas and will as such contribute to reducing poverty.
Redistributive payment		In order to differentiate the level of support among small and large farms, a redistributive payment can be granted as top-up for a certain number of 'first' ha. As a direct payment, the redistributive payment is aimed at supporting farm income. So it adds to farm income in a direct way. Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).	Redistributive payment adds to farm income in a direct way. Therefore by ensuring a certain amount of income, redistributive payment could contribute to the decision of farmers to stay in the agricultural sector. There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the redistributive payment on agricultural structures.	No direct effect is expected on economic growth. There might be a positive second order impact on growth via the indirect effect of the redistributive payment on agricultural structures.	The redistributive payment supports farm incomes in rural areas and will as such contribute to reduce poverty. This measure has an impact on monetary poverty rather than on the multidimensional concept of poverty.
Voluntary transitional national aid for farmers		In order to ensure a steady decrease of the pre-accession aid levels and to ensure compatibility with the convergence mechanism, new Member States may grant a	By ensuring a certain amount of income, the transitional national aid payment could contribute to the decision of farmers to stay in the	No direct impact expected, as agricultural production is not affected by the transitional national aid payment.	The transitional national aid payment supports farm incomes in rural areas and will as such contribute to reduce

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
		top-up on the single area payment. As a direct payment, the transitional national aid payment is aimed at supporting farm income. So it adds to farm income in a direct way.	agricultural sector. As such, the BP has an impact on the maintenance of rural employment.		poverty.
Voluntary redistributive payment		In order to differentiate the level of support among small and large farms, a redistributive payment can be granted as top-up for a certain number of 'first' ha. As a direct payment, the redistributive payment is aimed at supporting farm income. So it adds to farm income in a direct way. Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).	By ensuring a certain amount of income, the redistributive payment could contribute to the decision of farmers to stay in the agricultural sector. As such, the redistributive payment has an impact on the maintenance of rural employment. There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the redistributive payment on agricultural structures.	No direct impact expected, as agricultural production is not affected by the redistributive payment. There might be a positive second order impact on growth via the indirect effect of the redistributive payment on agricultural structures.	The redistributive payment supports farm incomes in rural areas and will as such contribute to reduce poverty.
Voluntary payment for farmers in areas with natural constraints		This specific direct payment is aimed at providing additional support for farmers who are in a disadvantaged competitive position because of the natural constraints they face. As a direct payment, the payment for areas with natural constraints (ANC payment) is aimed at supporting farm income. So it adds to farm income in a direct way. Depending on land ownership and impacts on land prices/rental rates there might be leakage to non- farmers (e.g. landlords).	By ensuring a certain amount of income, the ANC payment could contribute to the decision of farmers to stay in the agricultural sector. As such, the ANC payment has an impact on the maintenance of rural employment. There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the ANC payment on agricultural structures.	No direct impact expected, as agricultural production is not affected by the ANC payment. There might be a positive second order impact on growth via the indirect effect of the ANC payment on agricultural structures.	The ANC payment supports farm incomes in rural areas and will as such contribute to reduce poverty.

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
Payment for young farmers commencing their agricultural activity		The measure is motivating the young farmers to take over the farm and supporting necessary generation change in agriculture.	Payment contributes to having attractive employment opportunities in rural areas	Due to the positive effect of the young farmers payment on agricultural structures, there might be a positive impact on growth	No impact expected
Voluntary coupled support scheme		Coupled support can be granted to farmers to help a vulnerable sector or support a type of farming in a certain region. Its impact will be equivalent to an effective price increase for the targeted crop or animal production activity.	By ensuring a certain amount of income, coupled support could contribute to the decision of farmers to stay in the agricultural sector. As such, coupled support has an impact on the maintenance of rural employment. There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the coupled support on agricultural structures.	Coupled support could strengthen the viability of agriculture in marginal areas.	Coupled payments support farm incomes in rural areas and will as such contribute to reduce poverty.
Crop-specific payment for cotton		Coupled support for cotton can be granted to farmers in order to maintain cotton production in Bulgaria, Greece, Spain and Portugal. Its impact will be equivalent to an effective price increase for cotton.	By ensuring a certain amount of income, coupled support could contribute to the decision of farmers to stay in the agricultural sector. As such, coupled support has an impact on the maintenance of rural employment. There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the coupled support on agricultural structures.	Coupled support could strengthen the viability of agriculture in marginal areas.	Coupled payments support farm incomes in rural areas and will as such contribute to reduce poverty.

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
Voluntary simplified scheme for small farmers		In order to simplify procedures for aid to small CAP beneficiaries, Member States can grant a fixed annual payment (usually between 500 and 1250 euro) to small farmers.	By ensuring a certain amount of income, the small farmers' payment could contribute to the decision of farmers to stay in the agricultural sector. As such, the small farmers' payment has an impact on the maintenance of rural employment. There might be a negative second order impact on maintaining rural employment (number of farmers) via the blocking effect of the small farmers' payment on the evolution of agricultural structures.	No direct impact expected, as agricultural production is not affected by the small farmers' payment. There might be a negative second order impact on growth via the indirect effect of the small farmers' payment on agricultural structures.	The small farmers' payment supports farm incomes in rural areas and will as such contribute to reduce poverty.
framework within which Bulgaria, Croatia and Romania may complement direct payments		Bulgaria, Croatia and Romania are still phasing in their direct payments. Therefore these Member States are allowed to use national direct payments in order to complement the direct payments. As a direct payment, national direct payments are aimed at supporting farm income. So it adds to farm income in a direct way.	By ensuring a certain amount of income, the national direct payment could contribute to the decision of farmers to stay in the agricultural sector. As such, the national direct payment has an impact on the maintenance of rural employment. There might be a positive second order impact on maintaining rural employment (number of farmers) via the indirect effect of the national direct payment on agricultural structures.	No direct impact expected, as agricultural production is not affected by the national direct payment. There might be a positive second order impact on growth via the indirect effect of the national direct payment on agricultural structures.	The national direct payment supports farm incomes in rural areas and will as such contribute to reduce poverty.

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
Knowledge transfer and information actions (M1)	M1.1 - support for vocational training and skills acquisition actions	Knowledge transfer and information actions will have a rather indirect impact on agricultural income as training as such does not directly create agricultural income.	The impact related to knowledge transfer and information actions on growth will be indirect as training as such does not directly create new growth. However, training and improved skills can be a tool that in the end will lead to more growth and a more diverse rural economy.	The impact related to knowledge transfer and information actions on poverty reduction will be indirect as training as such does not directly reduce poverty. However, training and improved skills can be a tool that in the end will lead to a reduced poverty and a more diverse rural economy.	No direct impacts expected
	M1.2 - support for demonstration activities and information actions	Support of demonstration activities and information actions are not expected to have a direct impact on the agricultural income but could have an indirect impact.	Support of demonstration activities and information actions are not expected to have a direct impact on growth, only a rather indirect impact can be expected when there will be an active spin off of the activities..	Support of demonstration activities and information actions are not expected to have a direct impact on the poverty reduction but could have a rather indirect impact.	No direct impacts expected
	M1.3 - support for short-term farm and forest management exchange as well as farm and forest visits	The exchange is expected to have a small impact on the agricultural income.	The exchange is not expected to have a direct impact on the growth of rural areas.	The exchange is not expected to have a direct impact on the reduction of poverty in rural areas.	No direct impacts expected
Investments in physical assets (M4)	M4.1 - support for investments in agricultural holdings	The overall objective of this measure is to improve the economic and environmental performance of agricultural enterprises.	As the economic performance of the holding is improved there is potential for a positive indirect impact on rural employment	A positive impact can be expected	An indirect impact on poverty in rural areas by improved rural employment possibilities can be expected.
	M4.2 - support for investments in processing/marketing and/or development of agricultural products	To improve the economic and environmental performance of agricultural enterprises. More specifically, to increase the efficiency of the processing and marketing of agricultural products and creating a shorter and more localised supply chain.	Could have a positive indirect impact on rural employment	A positive direct impact on economic growth can be expected	An indirect impact on poverty in rural areas by improved rural employment possibilities can be expected.

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
	M4.3 - support for investments in infrastructure related to development, modernisation or adaptation of agriculture and forestry	To improve the economic and environmental performance of agricultural enterprises. More specifically, to develop adapt and modernise agriculture and forestry. This includes access to productive land, land consolidation and supply and efficiency of energy and water resources.	Could have a positive indirect impact on rural employment	A positive direct impact on economic growth can be expected	An indirect impact on poverty in rural areas by improved rural employment possibilities can be expected
	M4.4 - support for non-productive investments linked to the achievement of agri-environment-climate objectives	To improve the environmental performance of agricultural enterprises. To realise environment and climate related benefits, non-remunerative investments in infrastructure are sometimes required.	No direct impact	No direct impact	No direct impact
farm and business development (M6)	M6.1 - business start up aid for young farmers	SMEs are the backbone of the rural economy of the Union. Furthermore, support tailored to young farmers is needed, because they set up a business for the first time.	There is a direct impact expected for the start ups of young farmers on rural employment of young farmers but overall an indirect impact expected for rural employment.	There is no direct impact expected for the start ups of young farmers on the growth.	There is no direct impact expected for the start ups of young farmers on the reduction of poverty in rural areas.
	M6.2 - business start up aid for non-agricultural activities in rural areas	For the development of rural areas, the creation and development of new economic activity is essential. This can concern leisure and culture, the provision of services to agriculture and forestry and activities related to health care and social integration.	There is a direct impact expected for the start ups of non-agricultural activities in rural areas on rural employment but overall an indirect impact expected for rural employment.	There is an indirect impact expected for the start ups of non-agricultural activities in rural areas on the growth.	There is an indirect impact expected for the start ups of non-agricultural activities in rural areas on the reduction of poverty in rural areas.
	M6.3 - business start up aid for the development of small farms	SMEs are the backbone of the rural economy of the Union. Physical investments are needed to contribute to the economic and environmental performance of agricultural	There is an indirect impact expected for the start ups of small firms on rural employment.	There is an indirect impact expected for the start ups of small firms on the growth.	There is an indirect impact expected for the start ups of small firms on the reduction of poverty in rural areas.

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
		holdings. More specifically, this encompasses improving efficiency of the agricultural products and infrastructure for the development of agriculture and forestry.			
	M6.4 - support for investments in creation and development of non-agricultural activities	For the development of rural areas, the creation and development of new economic activity is essential. This can be realised through both start-ups and diversification of existing activities.	There is an indirect impact expected for the creation and development of non-agricultural activities on rural employment.	There is an indirect impact expected for the creation and development of non-agricultural activities on the growth.	There is an indirect impact expected for the creation and development of non-agricultural activities on the reduction of poverty in rural areas.
	M6.5 - payments for farmers eligible for the small farmers scheme who permanently transfer their holding to another farmer	Support for farmers who commit to transfer their entire holding and the corresponding payment entitlements to another farmer encourage the restructuring of the agricultural sector.	There is a direct impact expected on rural employment due to the payments to farmers of the small farmers scheme who permanently transfer their holding to another farmer.	There is an indirect impact expected on the growth for the payments to farmers of the small farmers scheme who permanently transfer their holding to another farmer.	There is an indirect impact expected on the reduction of poverty in rural areas for the payments to farmers of the small farmers scheme who permanently transfer their holding to another farmer.
Basic services and village renewal in rural areas (M7)	M7.1 - support for drawing up and updating of plans for the development of municipalities and villages in rural areas and their basic services and of protection and management plans relating to Natura 2000 sites and other areas of high nature value	This support can contribute to restoring, preserving and enhancing biodiversity and high nature-value farming. This can rear local breeds in danger of being lost to farming and preserve plant genetic resources under threat of genetic erosion.	The basic services and village renewal in rural areas are not expected to have a direct impact on rural employment.	The basic services and village renewal in rural areas are not expected to have a direct impact on growth.	The basic services and village renewal in rural areas are not expected to have a direct impact on the poverty reduction in rural areas.

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
	M7.2 - support for investments in the creation, improvement or expansion of all types of small scale infrastructure, including investments in renewable energy and energy saving	Local infrastructure and basic services are essential for growth potential in rural areas. Specifically for renewable energy and energy efficiency, dedicated support can steer the shift towards a low carbon and climate resilient economy, preserve and protect the environment and improve security of supply.	The basic services and village renewal in rural areas are not expected to have a direct impact on rural employment.	The basic services and village renewal in rural areas are not expected to have a direct impact on growth.	The basic services and village renewal in rural areas are not expected to have a direct impact on the poverty reduction in rural areas.
	M7.3 - support for broadband infrastructure, including its creation, improvement and expansion, passive broadband infrastructure and provision of access to broadband and public e-government	The development of local infrastructure and local basic services in rural areas is an essential element of any effort to realise the growth potential and to promote the sustainability of rural areas. This includes access to Information and Communication Technologies and the development of fast and ultra-fast broadband.	The basic services and village renewal in rural areas are not expected to have a direct impact on rural employment.	The basic services and village renewal in rural areas are not expected to have a direct impact on growth.	The basic services and village renewal in rural areas are expected to have a direct impact on the poverty reduction in rural areas.
	M7.4 - support for investments in the setting-up, improvement or expansion of local basic services for the rural population including leisure and culture, and the related infrastructure	The development of local infrastructure and local basic services in rural areas is an essential element of any effort to realise the growth potential and to promote the sustainability of rural areas. This includes leisure and culture services.	The basic services and village renewal in rural areas are expected to have an indirect impact on rural employment.	The basic services and village renewal in rural areas are not expected to have a direct impact on growth.	The basic services and village renewal in rural areas are expected to have a direct impact on the poverty reduction in rural areas.

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
	M7.5 - support for investments for public use in recreational infrastructure, tourist information and small scale tourism infrastructure	Farm and non-agricultural business development should be aimed at employment promotion and the setting up of quality jobs in rural areas. Projects that bring together agriculture and rural tourism through the promotion of sustainable and responsible tourism in rural areas, should be encouraged.	The basic services and village renewal in rural areas are expected to have a direct impact on rural employment.	The basic services and village renewal in rural areas are expected to have an indirect impact on growth.	The basic services and village renewal in rural areas are expected to have an indirect impact on the poverty reduction in rural areas.
	M7.6 - support for studies/investments associated with the maintenance, restoration and upgrading of the cultural and natural heritage of villages, rural landscapes and high nature value sites including related socioeconomic aspects, as well as environmental awareness actions	The development of local infrastructure and local basic services in rural areas is an essential element of any effort to realise the growth potential and to promote the sustainability of rural areas. This includes the renewal of villages and activities aimed at the restoration and upgrading of the cultural and natural heritage of villages and rural landscapes.	The basic services and village renewal in rural areas are expected to have an indirect impact on rural employment.	The basic services and village renewal in rural areas are not expected to have a direct impact on growth.	The basic services and village renewal in rural areas are expected to have an indirect impact on the poverty reduction in rural areas.
	M7.7 - support for investments targeting the relocation of activities and conversion of buildings or other facilities located inside or close to rural settlements,	Self-explanatory: relocation and conversion should improve the quality of life and environmental performance of settlements.	The basic services and village renewal in rural areas are expected to have an indirect impact on rural employment.	The basic services and village renewal in rural areas are expected to have a rather indirect impact on growth.	The basic services and village renewal in rural areas are expected to have an indirect impact on the poverty reduction in rural areas.

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
	with a view to improving the quality of life or increasing the environmental performance of the settlement				
	M7.8 others				
cooperation (M16)	M16.1 - support for the establishment and operation of operational groups of the EIP for agricultural productivity and sustainability	"The broad scope of this measure recognises the fact that supporting a much broader range of types of cooperation, with a wider range of beneficiaries, from smaller operators to larger ones, can contribute to achieving the objectives of rural development policy by helping operators in rural areas overcome the economic, environmental and other disadvantages of fragmentation. Support for cooperation for the development of new products has been adapted to better meet the requirements of the knowledge economy, by permitting projects by a single operator to be financed under that measure, on condition that the results obtained are disseminated, thus achieving the aim of diffusing new practices, processes or products. [Recital 29 of Reg 1305/2013]"	Positive impact expected as this sub-measure potentially positively influences social and human capital.	Economic growth can be stimulated if the operational groups have positive impact on productivity and sustainability.	Positive indirect impact by positively influencing social capital in rural areas.
	M16.2 - support for pilot projects and for the development of new products, practices, processes and technologies		Positive impact can be expected as this might drive innovation in the rural areas.	A positive impact is expected as new products, practices, processes are developed.	A positive second order impact could be the possibility
	M16.3 - cooperation among small operators in organising joint work processes and sharing facilities and resources, and for developing and marketing tourism		An indirect impact can be expected due to second order effects on the diversification of the rural economy.	No direct impacts expected	As small operators are able to share costs for the use of labour and other facilities this could have a positive influence on their financial situation.
	M16.4 - support for horizontal and vertical		No direct impact expected	This could have a positive impact on economic growth of rural areas, as	No direct impact expected

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
	cooperation among supply chain actors for the establishment and development of short supply chains and local markets and for promotion activities in a local context relating to the development of short supply chains and local markets			business opportunities are expanded.	
	M16.5 - support for joint action undertaken with a view to mitigating or adapting to climate change and for joint approaches to environmental projects and ongoing environmental practices		No direct impact expected	No direct impact expected	No direct impact expected
	M16.6 - support for cooperation among supply chain actors for sustainable provision of biomass for use in food and energy production and industrial processes		No direct impact expected	No direct impact expected	No direct impact expected
	M16.7 - support for				

Measure	Sub-measure	Motivation as stated in legislation (recitals, Art. or other)	Expected impact on CAP objectives based upon theory		
			Balanced territorial development		
			Rural employment	Growth	Poverty in rural areas
	non-CLLD strategies				
	M16.8 - support for drawing up of forest management plans or equivalent instruments		No direct impact expected	No direct impact expected	No direct impact expected
	M16.9 - support for diversification of farming activities into activities concerning health care, social integration, community-supported agriculture and education about the environment and food		This could have a positive impact on rural employment supporting a more diverse rural economy.	The impacts are likely to be of a second order on economic growth.	A positive impact on the reduction of poverty in rural areas can be expected as social and human capital is increased.
	M16.10 - others				



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