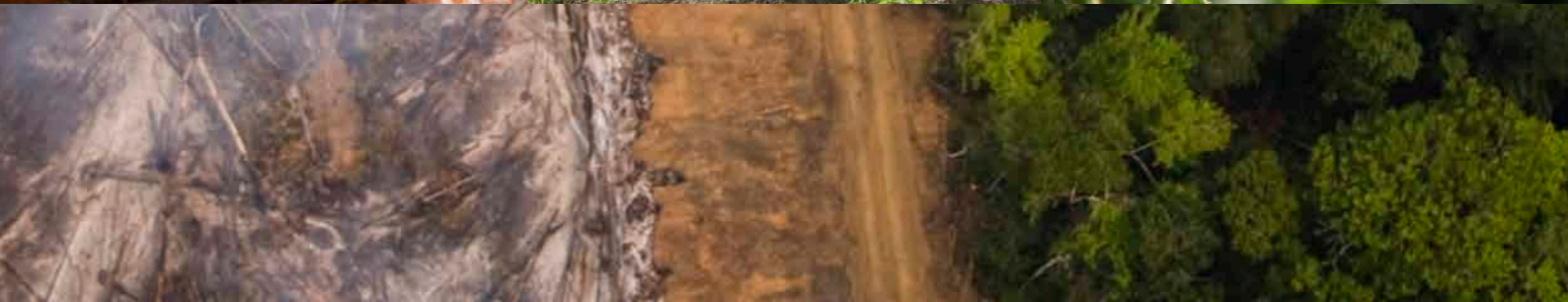


Agriculture and deforestation

The EU Common Agricultural
Policy, soy, and forest destruction

Proposals for Reform



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Abbreviations

BSE	Bovine Spongiform Encephalopathy
CAP	Common Agricultural Policy
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
EU	European Union
EU-27	The 27 Member States of the European Union in 2007-2013 (i.e. prior to the accession of Croatia on 1 July 2013): Belgium (BE), Denmark (DK), France (FR), Germany (DE), Greece (EL), Ireland (IE), Italy (IT), Luxembourg (LU), Netherlands (NL), Portugal (PT), Spain (ES) and United Kingdom (UK), Austria (AT), Finland (FI) and Sweden (SE), Cyprus (CY), Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Malta (MT), Poland (PL), Slovakia (SK) and Slovenia (SI), Bulgaria (BG) and Romania (RO).
GATT	General Agreement on Tariffs and Trade
GMO	Genetically Modified Organism
ILUC	Indirect Land-Use Change
WTO	World Trade Organization

Glossary

Term	Description/definition
Agricultural Area	Any area taken up by arable land, permanent grassland or permanent crops.
Agri-environment-climate measures	Practices undertaken voluntarily by farmers, over a set period, which have environmental benefits and/or help to mitigate and adapt to climate change. Support may be provided through Rural Development programmes. Payments compensate farmers for the extra costs that they incur and the income that they forego when they undertake these practices. The practices must go beyond a number of obligations which apply to farmers in any case – including (but not limited to) cross-compliance and relevant national legislation. A given practice which is funded through the greening provisions of Pillar I of the Common Agricultural Policy may not also be funded through an agri-environment-climate measure.
Animal welfare	The wellbeing of farm animals. European Union rules specify that animals should enjoy the following freedoms: freedom from hunger and thirst, freedom from discomfort, freedom from pain, injury and disease, freedom to express normal behaviour and freedom from fear and distress. Other things being equal, the fact that farmers are obliged to respect these standards when rearing animals means that the cost of producing milk, meat and other animal products in the European Union is higher than in countries where such standards do not apply.
Basic Payment Scheme	<p>The scheme which came into effect from 2015 under the 2013 reform of the Common Agricultural Policy, replacing the Single Payment Scheme. It operates on the basis of payment entitlements allocated to farmers in the first year of application of the scheme and activated each year by farmers. Previously, under the 2007-2013 rules of the Common Agricultural Policy, farmers received direct payments under either the Single Payment Scheme or the Single Area Payment Scheme.</p> <p>Eligibility for the Basic Payment Scheme or, as the case may be, the Single Area Payment Scheme is a precondition for farmers to receive other direct payments such as the green direct payment, the redistributive payment, the payment for areas with natural or other specific constraint and the payment for young farmers.</p>
Capping	The 2013 reform of the Common Agricultural Policy gave Member States the option to “cap”, i.e. to limit, the amount of the Basic Payment that any farmer receives. The funds “saved” under this mechanism stay in the Member State concerned and are transferred to the Rural Development envelope. Capping is voluntary for Member States and is a specific application of degressivity.
Cross-compliance	<p>The requirement for farmers to respect certain rules in order to receive direct payments and some other forms of support. These rules concern food safety, animal health, plant health, the climate, the environment, the protection of water resources, animal welfare and the condition in which farmland is maintained.</p> <p>There are two components of these rules: statutory management requirements and good agricultural and environmental conditions. If a farmer is found not to respect these rules, his or her direct payments may be reduced.</p>

Term	Description/definition
Decoupling	<p>The removal of the link between the receipt of a direct payment and the production of a specific product. Decoupling was introduced by the 2003 reform of the Common Agricultural Policy, prior to which farmers received a direct payment only if they produced the specific product to which the direct payment was associated. This meant that the profitability of producing a product (cereals, beef, meat...) did not depend only on the price at which the farmer could sell the product in the market, but also on the amount of the direct payment that was associated with that particular product. The 2003 reform decoupled many direct payments from production, and this process was continued in the 2008 “health check”. The overall effect of decoupling has been to move the agricultural sector more towards the free market and to give farmers greater freedom to produce according to market demand.</p> <p>The health check permitted Member States to continue to couple a small number of direct payments to production (for instance the suckler cow premium and the sheep and goat premium). The possibility of keeping a link between production and direct payments was maintained in the 2013 reform. The reason is to support the continued production of particular products so as to avoid land falling out of farming in vulnerable regions.</p>
Direct payments	<p>Direct payments were established by the 1992 reform of the Common Agricultural Policy. Prior to this reform, the Common Agricultural Policy supported prices: i.e. the prices at which farmers sold their products in the market (such support is therefore not paid directly to farmers). The 1992 reform reduced the level of price support. To prevent a corresponding fall in the incomes of farmers, direct payments were introduced.</p> <p>Nowadays, direct payments are made to farmers in order to support their incomes and to remunerate them for their production of public goods.</p>
Ecological focus area	<p>Areas which bring benefits for the environment, improve biodiversity and maintain attractive landscapes (such as landscape features, buffer strips, afforested areas, fallow land, areas with nitrogen-fixing crops etc.). Since 2015, every farmer in the European Union who claims a direct payment and has more than 15 hectares of arable land is obliged to have 5 per cent of his or her arable land covered by ecological focus areas, although there are some exceptions, for example for farmers who have more than 75 per cent of their area under grassland. This obligation is one of three ‘greening’ measures of the Common Agricultural Policy 2014-2020 - the others being the maintenance of permanent grassland and crop diversification.</p> <p>The 5 per cent obligation may be increased to 7 per cent subject to a European Commission report in 2017 and a legislative proposal from the Commission.</p>
European Agricultural Fund for Rural Development (EAFRD)	<p>The fund created in September 2005, and in operation from the beginning of 2007, as the single source of EU funding for Rural Development. It replaced the Guidance Section of the European Agricultural Guidance and Guarantee Fund and that part of the guarantee section from which some of the Rural Development measures had been funded.</p>

Term	Description/definition
European Agricultural Guarantee Fund (EAGF)	The fund created in September 2005, and in operation from the beginning of 2007, which replaced the guarantee section of the European Agricultural Guidance and Guarantee Fund. It provides funding for direct payment to farmers, for the management of the agricultural markets and for a number of other purposes such as veterinary and plant health measures, food programmes and information activities.
Export refund / Export subsidy	The term 'export refund' is synonymous with the term 'export subsidy', but the former tends to be used in the context of the Common Agricultural Policy while the latter tends to be used in the context of the World Trade Organization (WTO). Export refunds may be paid by the European Union to trading companies that sell certain agricultural goods in third countries. The refund normally covers the difference between the internal EU price and the world market price. Export refunds in 2013 reached the rate of zero for all products, and they may only be activated when the market conditions are such that exceptional measures are justified.
General agreement on tariffs and trade (GATT)	Established in 1944, this was both an international organisation and an agreement between countries on trade. As an organisation it no longer exists, having been superseded by the World Trade Organization. As an agreement the last version was concluded in 1994. It now constitutes the WTO agreement governing trade in goods.
Good agricultural and environmental condition (GAEC)	Farmers are obliged to maintain their land in 'good agricultural and environmental condition'. The concept includes protection of soil against erosion, maintenance of soil organic matter and soil structure, and safeguarding of landscape features. It is the Member States – not the EU – which decide the exact specification of these parameters.
Green direct payment	A payment to farmers introduced by the 2013 reform of the Common Agricultural Policy, made on condition that they undertake practices beneficial to the climate and the environment. Member States must allocate 30 per cent of their direct payment envelope to green direct payments. The basic practices that farmers must undertake are: <ul style="list-style-type: none"> ● maintaining permanent grassland, ● crop diversification, ● having 5 per cent (later 7 per cent) of their land as ecological focus areas. Subject to a decision by Member States a farmer can, instead of applying these basic practices, undertake practices which are considered equivalent (such as crop rotation instead of crop diversification).
Import quota	The maximum quantity of a good that a country's importers may import at zero or reduced duty.
Intervention buying / Public intervention	The purchasing of surplus supplies by the public authorities of Member States in order to stabilise the market when prices for certain agricultural products fall below a predetermined level. The products may be stored until the market price increases and then returned to the market for sale, exported to a third country, or disposed of in an alternative way.

Term	Description/definition
(exceptional) Market Measures	The market management instruments laid down in the single common market organisation are meant to create the conditions for stabilising prices and thus – amongst other things – to stabilise farmers' incomes. Agricultural production typically depends on long-term investments, climate, plant and animal disease control, and volatile international markets. These and other factors sometimes lead to temporary severe market disturbances, jeopardising the mid-term or long-term viability of agricultural production. When this occurs, the single common market organisation gives a possibility of remedial action by exceptional market measures.
National ceiling	<p>The maximum amount that can be paid, by Member State and by year, under the single payment scheme or the single area payment scheme. The concept of national ceilings was introduced in the 2003 reform of the Common Agricultural Policy.</p> <p>National ceilings are established by the Commission based on a pre-allocation of the EU budget dedicated to direct payments in the context of the financial perspective.</p>
Pillars	The Common Agricultural Policy comprises two 'pillars'. Pillar 1 is support to farmers' incomes. This support is provided in the form of direct payments and market measures and is entirely financed from the European Agricultural Guarantee Fund. Pillar 2 is the support provided for the development of rural areas. This support takes the form of Rural Development programmes and is co-financed from the European Agricultural Fund for Rural Development.
Transfers between pillars	<p>The 2013 reform of the Common Agricultural Policy permitted Member States to transfer up to 15 per cent of their direct payment envelope (which is part of Pillar 1) to their Rural Development envelope (Pillar 2). Amounts transferred do not have to be co-financed by Member States.</p> <p>Alternatively, Member States may make a transfer in the opposite direction (i.e. up to 15 per cent of their Rural Development envelope to their direct payment envelope). Those Member States for which the direct payment per hectare is less than 90 per cent of the EU average may transfer up to 25 per cent of their Rural Development envelope to their direct payment envelope.</p>

Source: European Commission (2016f)

1. Introduction

The EU Common Agricultural Policy (CAP) governs direct payments to farms as well as market conditions. Established in 1962 as a scheme to support EU-wide food security with price guarantees, it has been through several rounds of reform. “Greening” components with a focus on environmental aspects and ecosystem services have now gained in importance.

Livestock rearing is one of EU agriculture’s main production sectors. Its major inputs include concentrate feed, i.e. protein- and energy-rich feed such as soy or cereals. These are sourced from croplands, and, depending on how these crops are grown, concentrate feed may come with a considerable environmental impact which must be taken into account when analysing the environmental performance of livestock production. One such impact is deforestation, in particular in tropical regions, with its adverse effects on biodiversity, greenhouse gas emissions, soil erosion, etc. The key example of this is the importation to the EU of animal feed in the form of soybeans cropped on recently deforested areas in Brazil, Argentina or Paraguay (Cuyppers et al., 2013, Khatun, 2012).

CAP reform rounds are an opportunity for improvements. The increasing importance of environmental aspects in the CAP and the ongoing discussions on the CAP post-2020 are thus a promising context to investigate the role of CAP measures in driving deforestation in countries from which concentrate feed imports are sourced, and to suggest changes in the CAP to reduce any such incentives for deforestation abroad.

The aim of this report is to compile the basis for such work. Beginning with an overview of the CAP, its historical development and the various rounds of CAP reform, it then goes on to consider the EU livestock sector and its feed demand in particular. It assesses the role which the CAP may have played, and still plays, in determining the structure of EU livestock production and livestock feed production and imports, with a focus on feed imports from countries of origin where deforestation plays a role. It draws on this assessment to make recommendations on aspects which should be taken up in the current CAP reform to reduce any incentives for deforestation. Finally, the report addresses factors beyond direct CAP influence which also play a crucial role in deforestation, such as the general level of consumption of livestock products.

This contributed to achieving food security and self-sufficiency within the EU, but it resulted in large-scale overproduction of some agricultural commodities, such as dairy products and certain grains. Part of this overproduction was exported with the help of export subsidies, causing a corresponding distortion of some world markets, while part had to be stored or disposed of within the EU (European Commission, 2012). In the 1980s, the CAP price support scheme of guaranteed minimum prices kept prices high. Prices for grain products within the EU were two to three times higher than world market prices, strongly incentivising production for export while dampening EU internal demand, including for feed grains. The EU thus changed from being one of the main importers of (feed) grains and animal products during the 1970s to become one of the major net exporters during the 1980s, which also led to considerable distortions on the corresponding global markets.

Parallel to the establishment of the CAP in the early 1960s, the negotiations under the Dillon Round of the General Agreement on Tariffs and Trade (GATT) led in 1962 to a decision allowing almost tax-free importation by EU Member States of protein-rich non-grain feed for the livestock sector (soybeans and other oilseeds and products, corn gluten feed, beet pulp, citrus pulp and other fruit wastes, and brewers' and distillers' grains), on the grounds that these products were essential for the EU livestock sector but did not compete with EU production. This led to incentives for farmers to import non-grain concentrate feed products from countries outside the EU, while their own subsidised grain production was sold for export (Peeters, 2012, Hasha, 2002).

1992 – 2013: Reforms to reduce world trade distortions

These world trade distortions were noticed by the GATT, and some general measures to reduce the subsidising of exports were developed and agreed during the GATT Uruguay Round Agreement on Agriculture in 1994. In support of this, the EU had prepared beforehand the 1992 MacSharry reform, enacted in 1993, which included the reduction of price support payments and the introduction of direct payments to farmers instead (Matthews et al., 2006). As a consequence of this reduction in price support payments, EU internal grain prices came down by 30 per cent between 1993 and 1996 (Hasha, 2002). Before this change, prices had been artificially high for EU consumers, while the EU flooded international markets with its surplus supplies at cheap prices, thereby depressing prices abroad.

At the same time, European policy was being influenced by the momentum of international environmental concern (the Rio Earth Summit took place in 1992) over climate change, environmental degradation and the unsustainable exploitation of natural resources, in particular in developing countries. In this context the European Commission decided to focus increasingly on food quality, sustainability and animal welfare measures by providing support for farm investments, training, improved processing and marketing to European farmers (European Commission, 2012).

The ensuing Agenda 2000 reform adopted in 1999 led to a further 15 per cent reduction in grain prices between 1996 and 2001 (Hasha, 2002). Furthermore, the Agenda 2000 reform changed the overall structure of the CAP by introducing the Two Pillar system and by integrating rural development into agricultural policy (European Commission, 2012, Bailey et al., 2016). While Pillar 1 regulates direct payments to farmers, as well as market measures (e.g. support payments for private storage), Pillar 2 concentrates on the rural development components of the CAP. The CAP reform thus led to a shift from a rather product-oriented policy towards a more environmental and rural development agenda (Bailey et al., 2016). These changes were also undertaken to address some of the key challenges for EU agriculture and agricultural policy at this time, namely the increasing number of EU Member States, the overall budget costs, and the animal disease crises over bovine spongiform encephalopathy (BSE) and foot-and-mouth disease (FMD). Under a new EU reform adopted in 2003, single farm payments (SFPs), decoupled from specific production activities,

replaced most of the production-based direct payments linked to specific products (Matthews et al., 2006).

Besides these changes, in the mid-2000s the EU gave free market access to some developing countries to help them to integrate into world markets. This was undertaken as part of the Everything But Arms (EBA) initiative, launched in 2001 and benefiting 49 countries mainly from the African continent, allowing them duty-free and quota-free EU market access for all exports (excluding arms and armaments). Total exports from all countries under the EBA initiative were worth EUR 10.5 billion in 2011 (European Commission, 2012, European Commission, 2013a).

The EU also reduced the payments for oilseeds, field peas and beans, bringing them down to parity or near parity with payments for grains. This led to reduced incentives for farmers to produce concentrate feed crops, and increased the dependence of livestock production on feed imports (Hasha, 2002). On the other hand, the abolition in 2008 of any specific support for energy crop production made obsolete the previous restrictions on the areas eligible for support for oilseeds. These restrictions had been part of the 1992 Blair House Memorandum of Understanding (or Blair House Agreement) between the EU and the US, established during the Uruguay Round, and had helped resolve disputes over EU support programs for oil crops that hindered US access to those markets. Although controversial, this agreement had helped pave the way to agreements in the Uruguay Round (Meunier and Kalypso, 1999).

One other measure affecting EU protein crop production was the abolition in 2011 of the protein premium, a direct payment of about EUR 56 per hectare which had been available since 2003 for crops such as peas, field beans and sweet lupins. Introduced at a time when many other payments were decoupled from specific products, this premium was restricted to an EU-wide Maximum Guaranteed Area (MGA) of 1,648,000 hectares, although this limit was never reached during the period the protein premium applied. The eventual integration of these direct payments into the Single Payment Schemes followed the decision under the CAP 2008 health check to further decouple remaining coupled payments (European Commission, 2011) (Bues et al., 2013). However, to a limited extent payments to support the production of protein crops within the EU have since returned in a different form. Since 2014, Member States have had the authority to make 'Voluntary Coupled Payments' to farmers within their national jurisdiction. Payments for protein crops under this arrangement amounted to EUR 443 million in 2015 (European Commission, 2015c).

2013: The new CAP to promote sustainability in the European Union food sector

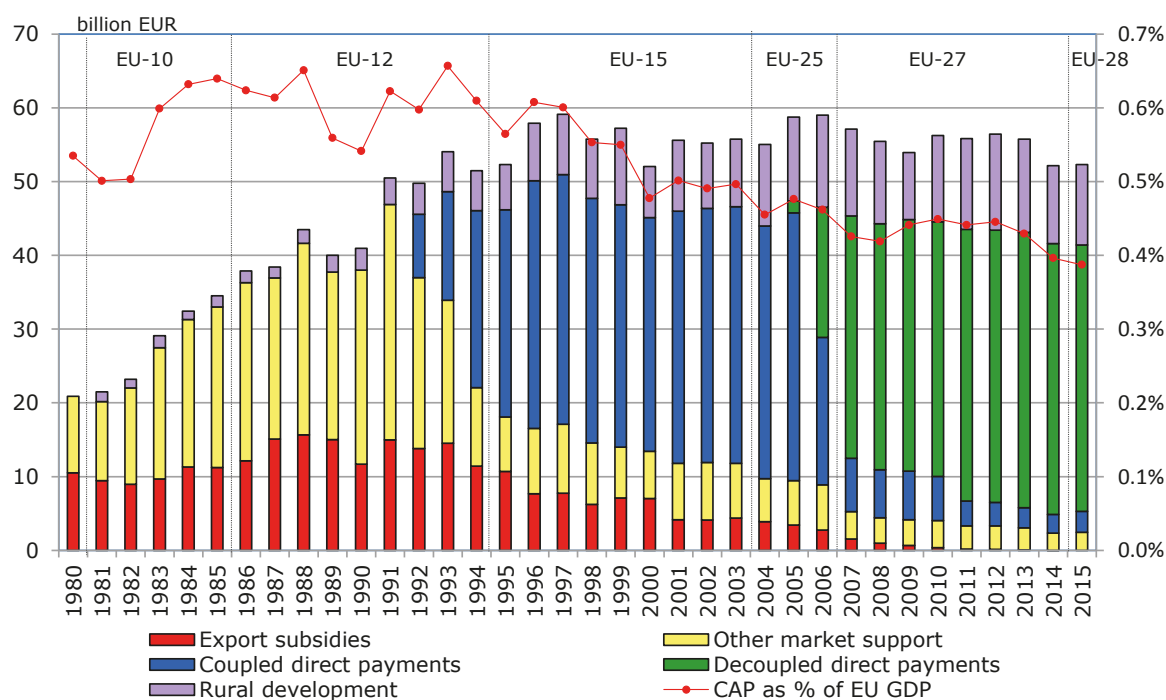
The 2013 CAP reform, currently in place, provides the framework for EU agriculture from 2013 to 2020. The process leading to this reform started in 2010 with three challenges – economic, environmental and territorial. These challenges were subsequently framed as three policy objectives, namely “viable food production”, “sustainable management of natural resources”, and “balanced territorial development”, and finally, was moulded into the three reform objectives of “enhanced competitiveness”, “improved sustainability” and “greater effectiveness” (European Commission, 2013b) or, as many authors and NGOs put it, the objective of using “public money for public goods”. The European Commission, Council and Parliament collaboratively agreed to this reform package on 26 June 2013.

The CAP remains structured in the Two Pillar form dating from the Agenda 2000 reform. Its annual budget is about EUR 55 billion (in 2011 prices), of which about 70 per cent is spent on decoupled direct payments to farmers, about 5 per cent each on coupled payments and on market measures, and about 20 per cent on rural development programmes (European Commission, 2016d). For the timeframe of the current CAP reform (2014-2020), this means around EUR 312.7 billion for Pillar 1 (managed by the European Agricultural Guarantee Fund – EAGF) and around EUR 95.6 billion for

Pillar 2 (managed by the European Agricultural Fund for Rural Development – EAFRD) (BMVEL, 2015). From 2015 onwards around 72 billion euros (12 billion euros per year) from the EAGF is reserved for certain “greening” practices within the direct payments system, e.g. for addressing biodiversity loss or securing soil carbon sequestration (European Commission, 2015a).

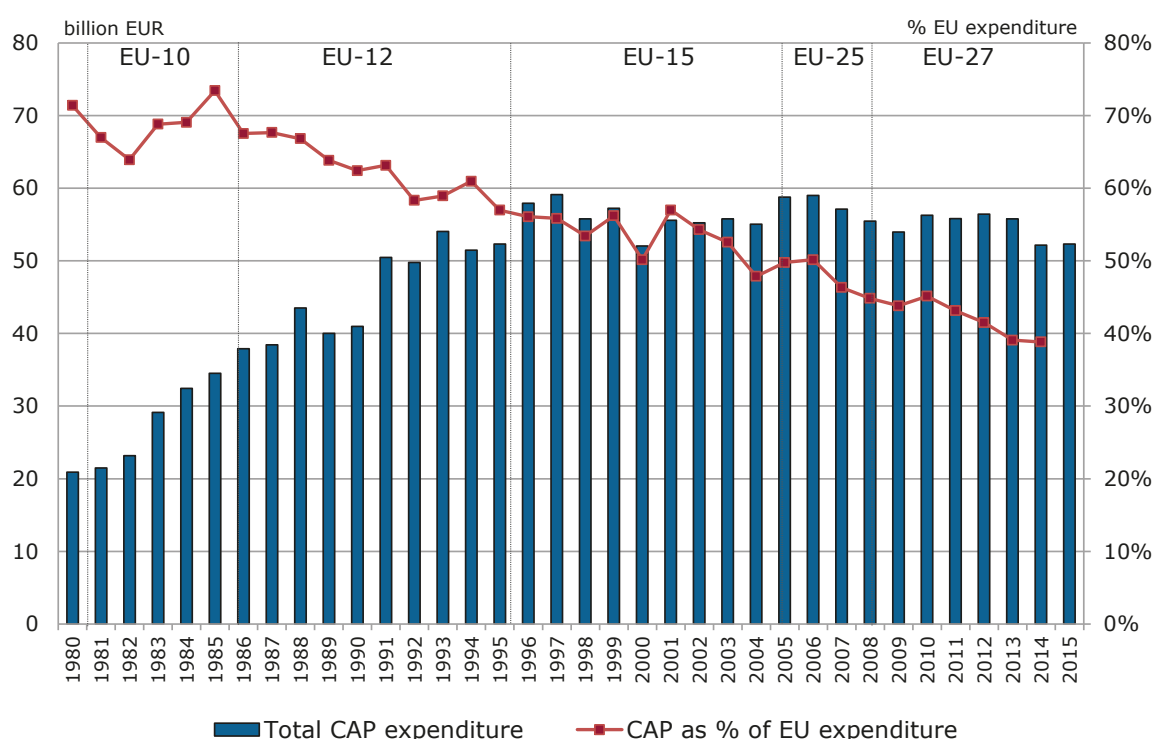
The different expenses of the CAP and their relative shares in the budget are shown in Figure 2 below. Total CAP expenses almost tripled between 1980 and the 1990s, and have remained between EUR 50-55 billion annually since then (in 2011 prices). This constant level in absolute terms means a reduction in the share of total EU GDP, from 0.6-0.7 per cent in the 1990s down to 0.4 per cent in 2015. In relation to the total EU budget (currently about 1 per cent of EU GDP), the share of CAP expenditure has declined from 70 per cent to about 40 per cent (Figure 3). Additionally, Figure 2 shows that CAP spending on market exports ended in 2011, while from 2005 onwards more spending has been allocated for decoupled direct payments, not linked to specific production activities, instead of being spent on coupled direct payments linked to specific production.

Figure 2: CAP expenditure and CAP Reform paths



Source: European Commission (2016d)

Figure 3: CAP expenditure in total EU expenditure



Source: European Commission (2016b)

One key new aspect of the 2013 CAP reform is the implementation of three “greening” measures that aim at integrating environmentally beneficial and climate friendly practices into agricultural production (cf. below), regulated under Pillar 1 (European Commission, 2013b). From this reform onwards, 30 per cent of the direct payments under the CAP are allocated to these obligatory greening measures and all direct payments to farmers are conditional on compliance with these three greening measures (Peeters, 2012). The greening measures are organised under the following three headings (European Council, 2013a):

- **Crop diversification** (Art. 44): If a farmer’s arable land covers between 10 and 30 hectares at least two different crops have to be grown, and the main crop should be limited to 75 per cent of the total arable land (Art. 44 (1)). If the arable land exceeds 30 hectares, at least three crops must be grown, with a main crop of not more than 75 per cent and the two main crops not exceeding 95 per cent of the total arable land (Art. 44 (2)). Excluded from these regulations are areas for arable land that produce grasses or other herbaceous forage, as well as permanent grassland.
- **Maintaining permanent grassland** (Art. 45): national and regional governments have to maintain permanent grassland. The ratio of permanent grassland to total agricultural area must not fall by more than 5 per cent with respect to the reference year. If it does so, governments must take action to reverse this development. This can be achieved, for example, by requiring that farmers who have converted permanent grassland to cropland must reconvert this back to grassland, and banning future conversions of grassland. The measure to maintain permanent grassland replaces the earlier Good Agricultural and Environmental Conditions (GAEC) standards for the protection of permanent pastures.

- **Ecological focus areas** (Art. 46): a farmer must cultivate at least 5 per cent of the eligible arable land of the farm (excluding permanent grasslands and farms with under three hectares of arable land) as ecological focus areas. These measures were established with the specific objective of safeguarding and improving biodiversity on farms. The measures include set-aside arable land, fallow land, buffer strips, landscape features, afforested areas and terraces, as well as short rotation coppice with reduced use of inputs (fertilisers) on the farm, and areas with catch crops and winter green cover and nitrogen fixing crops.

These greening measures relate to annual direct payments, available to all EU farmers. Farmers thus decide on an annual basis whether or not to comply in order to receive the direct payments (with the exception of organic farms, which do not need to specifically confirm compliance with the greening measures in order to receive the direct payments, as their organic certification already covers this). This differs from the “greening” payments under Pillar 2, which are multi-annual, location specific and targeted to specific priorities (Westhoek et al., 2012). The 2013 reform also makes environmental aspects explicit in Pillar 2, as at least 30 per cent of its budget is allocated to voluntary measures benefiting the environment and climate change. These measures can cover production aspects such as conversion to organic farming, or conservation aspects such as Areas of Natural Constraints (ANC), Natura 2000 sites, forestry measures and investments that provide benefits for the environment and climate change (European Commission, 2013b). The largest parts are multi-annual agri-environmental payments in return for environmental services provision.

In the livestock sector, the main stimulus from the cross-compliance schemes in the CAP 2013 reform is for animal welfare. Farmers have to comply with the minimum EU standards for animal welfare provided in the farm directive (Council Directive 98/58/EC) in order to receive direct payments. In addition, investment in infrastructure that benefits animal welfare can be funded. Overall, the CAP 2013 reform includes more measures than the earlier 2003 reform for the livestock farming sector, such as the former Measure 121 (modernisation of farm holdings), Measure 131 (complying with the EU animal welfare regulations) and Measure 215 (animal protection payments), that are continued under a different organisation in the rural development programmes 2014-2020 (Westhoek et al., 2012)¹. However, the minimum standards are very low (Ryland, D., 2015) and focus on cattle and pigs only, and the budget allocated to animal welfare measures is minor; only about 1.4 per cent of the rural development programme, or 0.5 per cent of the CAP budget (European Commission, undated).

It is largely unknown whether the CAP 2013 Reform will fulfil its intention of integrating sustainable practices that benefit the environment and climate change, and how the reform will impact world trade. Early evidence tends to show that the potential for environmental improvement has not been realised (Hart et al., 2016). The **crop diversification measures** will only impact 2 per cent of the EU arable area, as most EU farmers already cultivate more than three crops. Therefore, this measure will only be relevant for certain specific agricultural areas with large monocultures, for example areas in northern Germany where maize is grown for bioenergy production (Westhoek et al., 2012). The **permanent grassland measures** may have a positive but limited environmental impact, as it is expected that even without this regulation only small amounts of grassland would have been converted into arable land, since few permanent grassland areas are suitable for crop production. The implications for the **ecological focus areas** are less clear and impacts seem rather low. Modelling studies suggest that the introduction of these focus areas may increase species richness by only about one per cent on farmlands by 2020 after the implementation of the CAP greening measures. It may not necessarily lead to an increase in ecological focus areas on all farms, as farmers without

¹ For the description of enumerated measures please consult http://enrd.ec.europa.eu/enrd-static/policy-in-action/rural-development-policy-overview/axes-and-measures/en/axis1_en.html?
For the list of measures after 2013, consult http://ec.europa.eu/agriculture/rural-development-2014-2020_en

enough qualifying acreage may instead rent farmland which already contains established ecological focus areas in order to receive the CAP funding. However, biodiversity effects strongly depend on the landscape structure of these areas. If these areas are implemented in a well-coordinated way at the landscape level, providing adequate habitats for threatened species, they can have considerable impacts on species richness (Westhoek et al., 2012). Current implementation of the ecological focus areas is however criticised, as they are likely to fail to meet the biodiversity improvement envisaged, given that a number of crops can be grown on them under the productive ecological focus area use; currently about three-quarters are under nitrogen-fixing crops, catch crops or cover crops, partly with fairly intensive fertilizer and pesticide use (Underwood, E. and Tucker, G. (2016).

Thus the environmental effects of the measures related to ecological focus areas and permanent grassland depend not merely on the acreage of implementation, but more particularly on how these areas are managed and whether their establishment is coordinated at the landscape level. Environmental benefits may differ considerably depending on the specific management of the ecological focus areas and the maintenance of the permanent grassland. The maintenance of intensively managed permanent grassland, for example, provides much less environmental benefit than if they are managed extensively, but the greening component allows for both intensively and extensively managed permanent grassland, as it does not further specify how management should be undertaken (see Table 1) (Hauck et al., 2014).

Table 1: Summary of the impacts of different greening options of the CAP on ecosystem services

Ecosystem services	Ecological focus areas – set aside	Ecological focus areas – buffer strips	Maintenance of permanent grasslands – intensive use	Maintenance of permanent grasslands – extensive use	Crop diversification
Provisioning services					
Biomass for energy & biofuels	ó	ó	–	–	ó
Food crop production	–	–	–	–	
Livestock		6	+	+	
Regulating services					
Climate regulation	+		–	+	+
Regulation of water flows	+	+	–	+	
Water purification	ó	+	–	+	ó
Erosion control and prevention	ó	+	–		+
Pollination	+	+	–	+	+
Pest control	--	ó			+
Cultural services					
Recreation		+	–	+	
Aesthetic information	ó	+	–	+	+

"+" indicate a positive, "--" a negative and "ó" a mixed impact for the ecosystem services

Source: Hauck et al. (2014, page 53)

Furthermore, the environmental performance of these measures needs to be assessed in relation to the system boundaries set by the national boundaries of the EU and the potential leakage of negative effects outside the EU. This is of particular relevance for all measures that are likely to lead to lower production levels within the EU, unless internal EU consumption levels are reduced correspondingly, or unless environmental requirements of similar strength can be imposed on imported goods, which is often not possible due to WTO rules.

Based on the historical development of the CAP, including its market distortion effects as well as the uncertainties of the consequences of the 2013 reform, some actors call for more fundamental changes to the CAP. Depending on their perspective, different actors make different suggestions and envisage a range of different future developments of the CAP:

- **the CAP basically evolving further along the Two Pillar approach** of direct payments, with more or less fundamental changes within this general structure;
- **to avoid any market distortion, the CAP being withdrawn** or at least losing much of its importance for farm incomes;
- **the CAP broadening its focus to fully cover the whole area of rural development** rather than only agriculture; or
- **the CAP broadening its focus to cover the whole food system**, thereby becoming instead a Common (Sustainable) Food Policy.

The first of these positions, evolution along the Two Pillar approach, would mean decoupled direct payments remaining in place while coupled payments further lose in relevance; and greening components becoming more important. In any case, a mid-term review of the current situation is due by the end of 2018 (EU Regulation 1306/2013, Art. 110, Par. 5). Even if the basic structure of the CAP is not questioned fundamentally, the current “greening” components are often criticised as ineffective and it is stated that they could be greatly strengthened to truly support sustainable agriculture within the EU. Besides the greening measures, other aspects are clearly subject to criticism as well. Some NGOs specifically argue for balanced financing between the Two Pillars, for example, thus strengthening the rural development component.

Such positions, advocating more or less fundamental reforms of the CAP, are for example supported by NGOs including IFOAM-EU, the Institute for European Environmental Policy (IEEP), WWF, the European Environmental Bureau (EEB) and BirdLife Europe (EEB and Birdlife International, 2016, IFAB, 2015, Hart, 2015, IFOAM EU, 2016, WWF, 2016). A recent (March 2016) letter to the European Commission President, signed by over 100 NGOs, calls for a fitness check of the CAP under the European Commission’s Regulatory Fitness and Performance (REFIT) programme, which has evaluated a range of EU policies over the past years but hitherto not including the CAP (Birdlife International, 2016).

The second position, withdrawing the CAP or greatly reducing its importance, is favoured by neoliberals and free market advocates such as the UK-based Institute of Economic Affairs (IEA) (Niemietz, 2013). The website “Reform the CAP” edited by the European Centre for International Political Economy (ECIPE) provides many resources on these topics and advocates a reform of the CAP towards more market oriented approaches (e.g. by abolishing distorting subsidies), and in particular towards a strict focus on the provision of environmental public goods (Zahrnt, 2010).

The third position, broadening the CAP's focus to the whole area of rural development, would mean that other bases for livelihood besides agriculture became more important and might be addressed specifically.

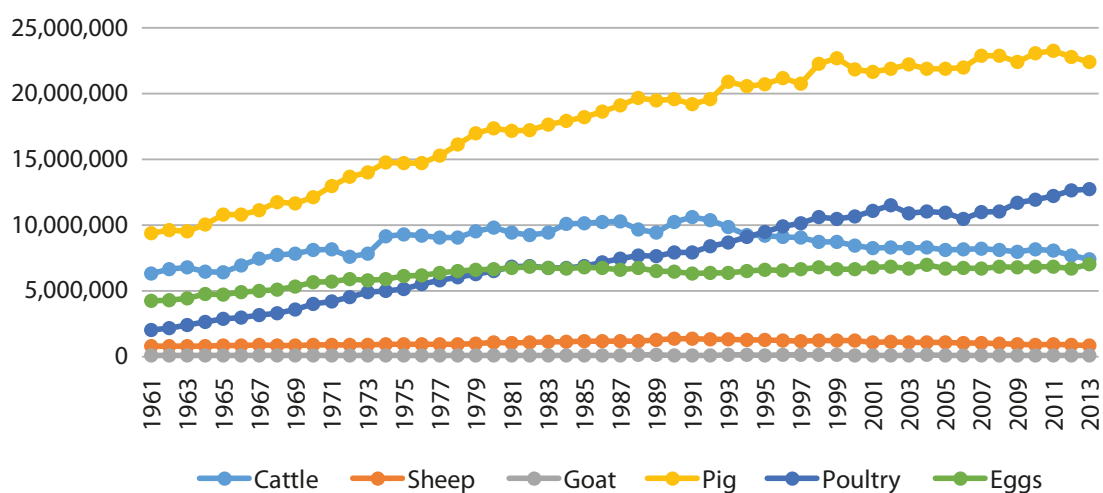
Finally, broadening the CAP to make it a Common (Sustainable) Food Policy would help it take up issues that need to be addressed within wider system boundaries, such as leakage of environmental impacts, or consumption behaviour. This approach is advocated, for example, by the Food Research Collaboration (FRC) (Bailey et al., 2016).

3. Livestock in the European Union and deforestation abroad

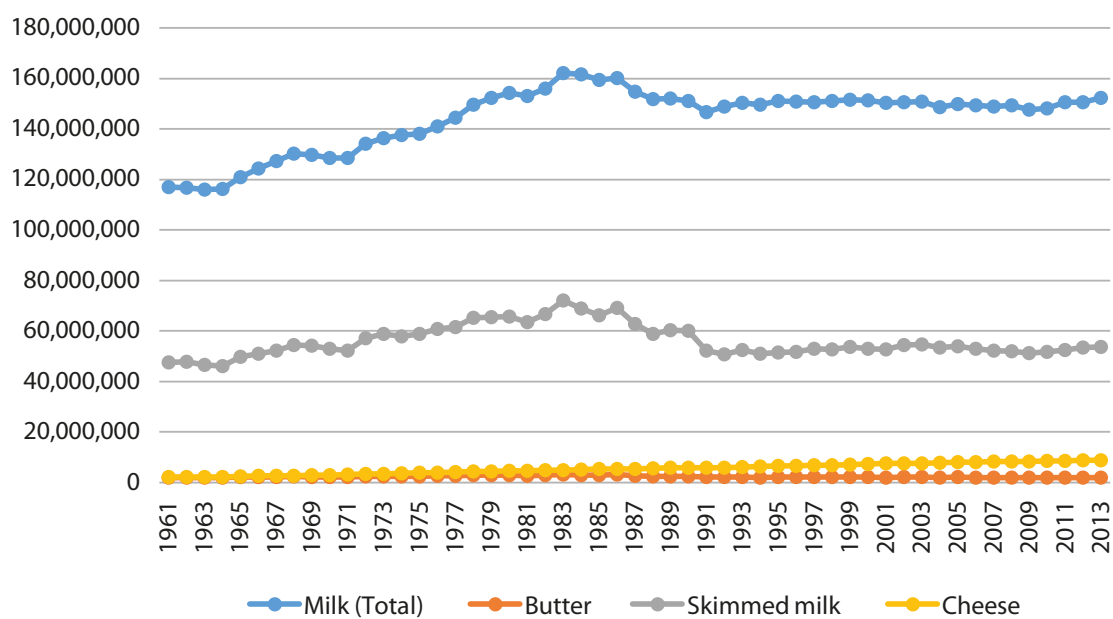
This section discusses the linkages between livestock production in the EU and deforestation abroad.

Livestock in the European Union

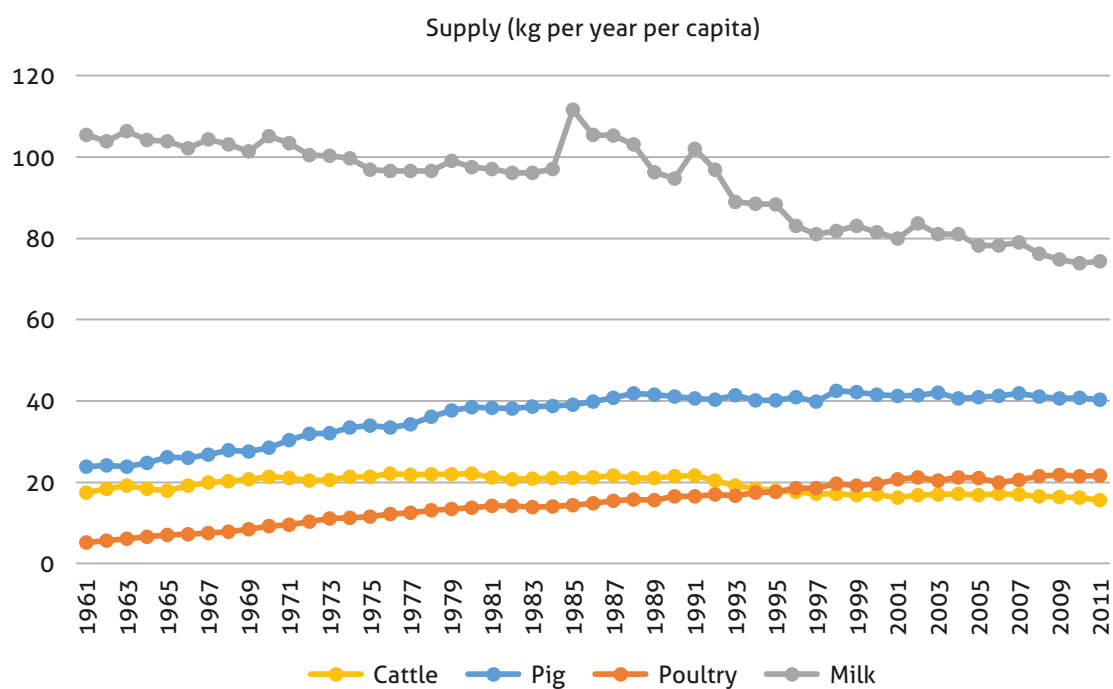
Globally, livestock production more than doubled between 1970 and 2010. Large increases in meat and animal product consumption in developing countries are a major factor. The EU has seen a steady increase in pig and poultry meat production and consumption, although egg and milk production and consumption have levelled off and partly even declined since the early 1990s (Figures 4a and 4b). In 2013 more than 41 per cent of the value of farm products in the EU derived from animal products, mainly from the beef and dairy sector (22 per cent of the total farm value output), pigs for meat production (9.5 per cent) and poultry and eggs (7 per cent) (FEFAC, 2014). Depending on the product, most of this is consumed within the EU itself. Consumption of animal products in the EU is currently quite high on average, but differs widely between countries, with annual per capita meat consumption ranging from 13 kg to 26 kg for beef, for example, or from 28 kg to 60 kg for pork and 15 kg to 28 kg for poultry (Figure 5 and Figure 6). Part of the increase in consumption is clearly demand driven, due to higher incomes, etc., but developments in genetics, breeding, feed composition and management as well as other production and processing improvements have all contributed to increasing the supply of animal products. This has also led to increased shares of cereal production being used for animal feed purposes instead of human food consumption (Guyomard et al., 2013). Due to the high production levels that match high consumption, self-sufficiency of animal products within the EU is very high, at more than 90 per cent (de Visser et al., 2014). While this may sound positive and in line with the EU's target to provide food security for its citizens, this does not give a full picture of the livestock sector's self-sufficiency, as large quantities of animal feed are imported from outside the EU.

Figure 4a: Meat and egg production (in t/year)

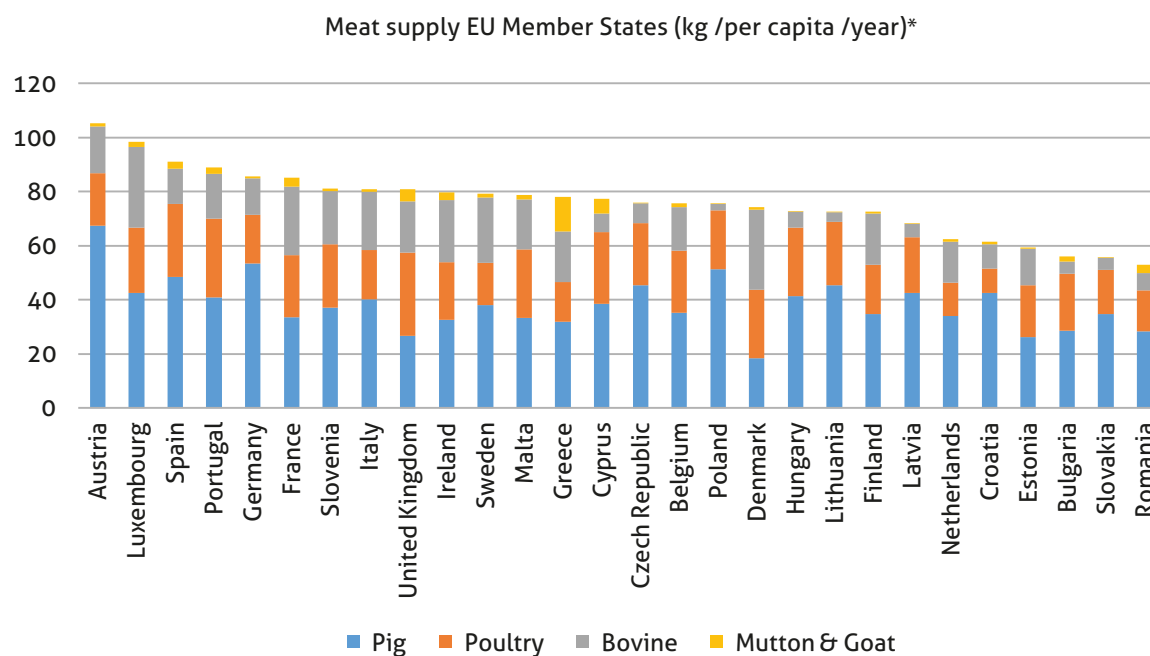
Source: FAOSTAT (2016)

Figure 4b: Production of milk and milk products (in t/year)

Source: FAOSTAT (2016)

Figure 5: Animal products – per capita supply (i.e. production + imports – exports) in the EU

Source: FAOSTAT (2016)

Figure 6: Animal products – per capita supply for all EU Member States, 2011

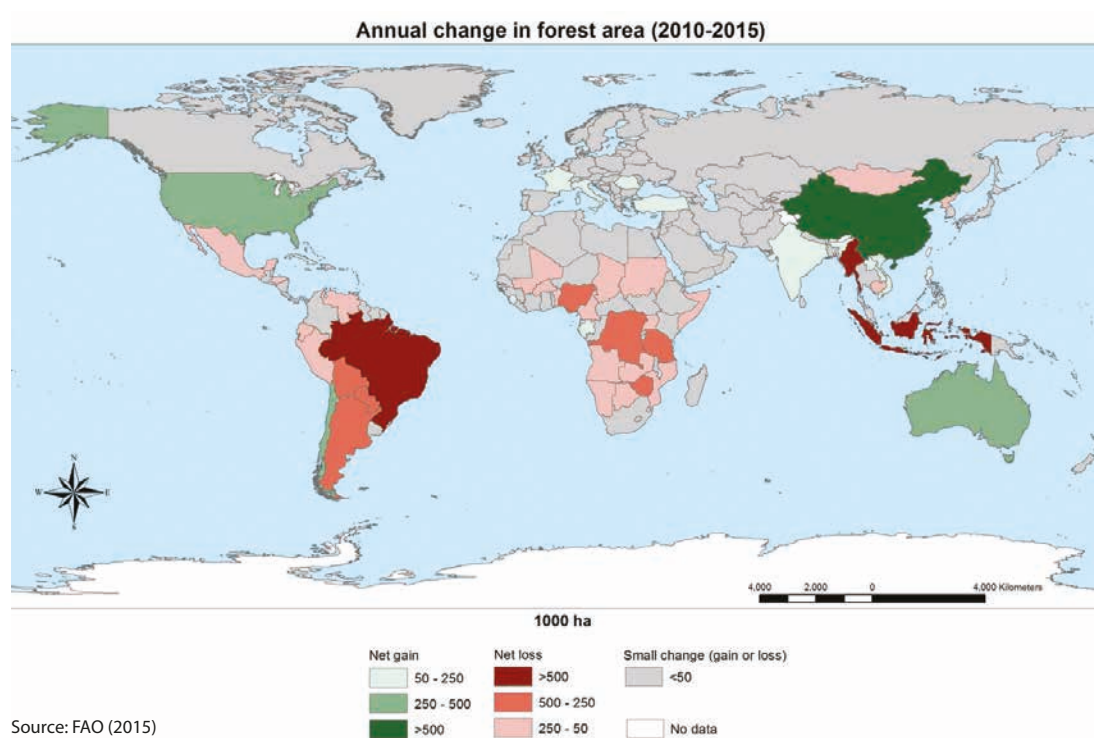
Source: FAOSTAT (2016b)

* Meat supply is the domestically available quantity of meat, which is production plus imports minus exports plus stock changes. This figure is readily available from FAOSTAT. The difference to consumption is food wastage and other losses along the value chain.

Deforestation

Deforestation and forest degradation due to farming have been occurring for centuries (Figure 7). Although reasons for deforestation are complex and diverse, depending on the region, the expansion of agricultural land is one of the main causes (FAO & ITTO, 2011) and cattle ranching, soybean production and palm oil cultivation are major drivers in South America and in South-Eastern Asia respectively. In this report we are interested in the potential linkage between EU livestock feed imports and deforestation. We thus expand somewhat on the situation in Brazil, the most important source country for feed imports where deforestation occurs, followed by Argentina and Paraguay. We focus on soybeans as these are the most important concentrate feed products imported into the EU from those countries.

Figure 7: Deforestation in world countries



Feed use in the European Union

Ruminants (animals such as cattle, buffalo, sheep, goats and camels which have a four compartment stomach) are able to digest grass and other pasture-based feeds, whereas pigs and poultry largely depend on other feed sources, such as grains. However, so-called feed concentrates that provide a high protein content are fed to all animals, including ruminants that could thrive on grass and forage alone, in order to obtain high yields and rapid weight gain so as to meet the existing demand for animal products. Current high yields in ruminant milk and meat production are possible only because there is a significant proportion of such concentrates in feeding rations.

Most of these concentrates consist of grains and oilseed meals, derived for example from maize and soya specifically cropped for feed purposes. Other substances can also be used, however, including by-products, residues, legumes such as field peas and beans, cassava, corn gluten feed, brans, corn germ meal, citrus pulp and sugar beet pulp and other fruit and vegetable waste, brewers' or distillers' residues, molasses, animal and vegetable fats, skimmed milk powder, fish meal, and meat and bone meal (www.feedipedia.org).

Based on their physiology, ruminants are not able to live fully on concentrate feed, and thus lower proportions of concentrate feed are used in their feeding rations than in those for poultry and pigs. Different livestock types also require different optimal protein contents in their feed. The highest protein content (16-18 per cent) is needed for feeding poultry, while dairy rations vary between 14 and 16 per cent protein, and pork between 12 and 14 per cent. In recent years meat consumption within the EU has shifted from ruminant animals to pork and poultry, correspondingly increasing the demand for concentrate feed in relation to grassland-based fodder. Soybean meal is a very attractive concentrate feed as it is relatively easy to crop under a wide range of climatic and environmental conditions, and as it contains much higher amounts of protein than other feed crops (see Table 2) (Hasha, 2002).

Table 2: Nutrient content of some important feed ingredients

Feed ingredients	Energy*	Protein**	Fiber***
Corn	80	7.9	1
Barley	74	11.5	5
Feed wheat	78	10.9	2.8
Soybean meal	78	48	7
Rapeseed meal	64	36	13.2
Cassava	68	2.4	7.6
Corn gluten feed	75	21	10
Citrus pulp	74	6	12.2

*Total digestible nutrients (TDN) for ruminant animals, in percent. **Crude protein, in percent. ***Crude fiber, in percent.

Source: Hasha (2002, page 16)

Van Gelder et al. (2008) have analysed the quantities of soybean products consumed in the EU livestock sector, the proportion of which is derived from imports and from internal EU production respectively, and the amounts of livestock feed consumed by the different animal types. Interestingly, most of the soybean meal used within the EU27 (from both internal production and imports) is consumed by the pig and poultry sector, in total and also per kg of product, while cattle for meat and dairy production together consume only around 13 per cent (see Table 3 and Table 4 below).

Table 3: Soybean meal used in types of animal compound feed in the EU-27, 2007

Type of animal compound feed	Production volume	Estimated soy meal content	Volume of soy meal in compound feed	% of EU soy meal
	1,000 tonnes	%	1,000 tonnes	%
Cattle – meat	12,148	13.9%	1,683	5%
Cattle – dairy	27,852	10.4%	2,893	8%
Pigs	51,440	28.8%	14,815	41%
Poultry – broilers	30,929	36.8%	11,389	32%
Poultry – layers	15,532	22.4%	3,477	10%
Other animals (incl. pet food)	9,522	16.6%	1,577	4%
Total	147,423	24.3%	35,834	100%

Source: Van Gelder et al. (2008, page 7)

Table 4: Soybean meal needed for the EU-27 consumption of different types of livestock products, 2007

Livestock product	Total consumption	Soy meal per unit	Soy meal needed	
	1,000 tonnes		1,000 tonnes	kg/person
Beef and veal	8,704	232 grams/kg	2,020	4.1
Milk	39,015	21 grams/litre	806	1.6
Pork	20,693	648 grams/kg	13,416	27.1
Poultry meat	10,641	967 grams/kg	10,294	20.8
Eggs	131,697	32 grams/egg	4,212	8.5
Cheese	8,070	186 grams/kg	1,500	3.0
Other products & exports**			3,586	7.2
Total			35,834	72.4

*Milk in million litres and eggs in million eggs.

** Other products: livestock products from all other animals (sheep, goats, ducks, etc.).

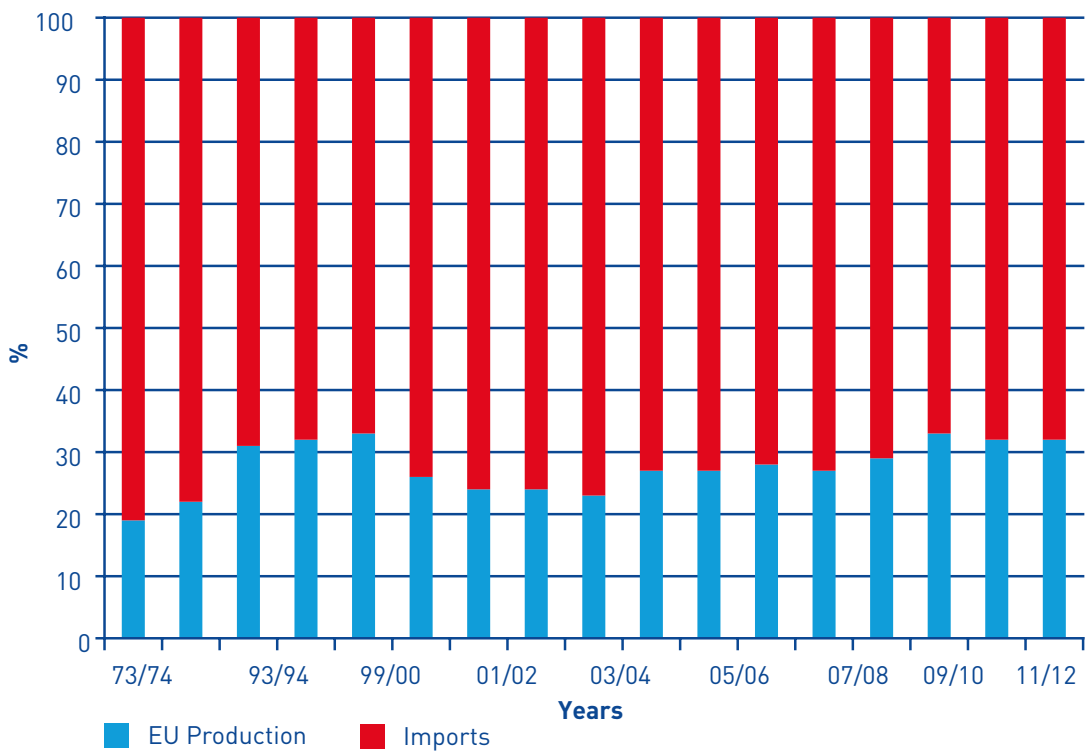
Exports: all types of livestock products exported outside the EU-27.

Source: Van Gelder et al. (2008, page 8)

Trade patterns in livestock and feed

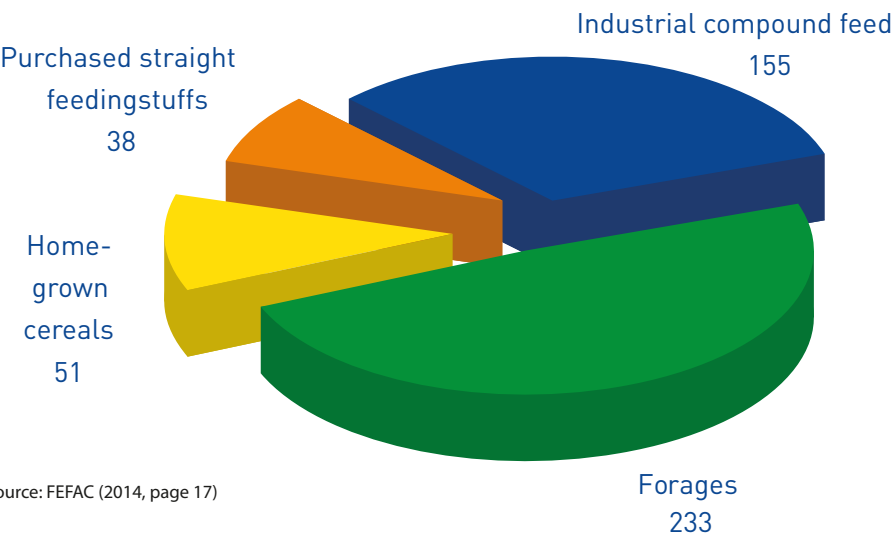
While the EU itself produces most of the animal products it consumes, its self-sufficiency in animal feed is low. Shares differ considerably between feed types, however. Nearly 50 per cent of the livestock feed within the EU consists of forage, produced locally. As regards proteins, about 30 per cent of such feed is produced within the EU while 70 per cent is imported. These proportions have remained relatively constant over time, with EU production accounting for between 25 and 30 per cent over the past 20 years (Figure 8 and Figure 9).

Figure 8: EU27 dependency in feed protein



Source: FEFAC (2015)

Figure 9: Livestock sourcing in feed in the EU28 (million tons)



Source: FEFAC (2014, page 17)

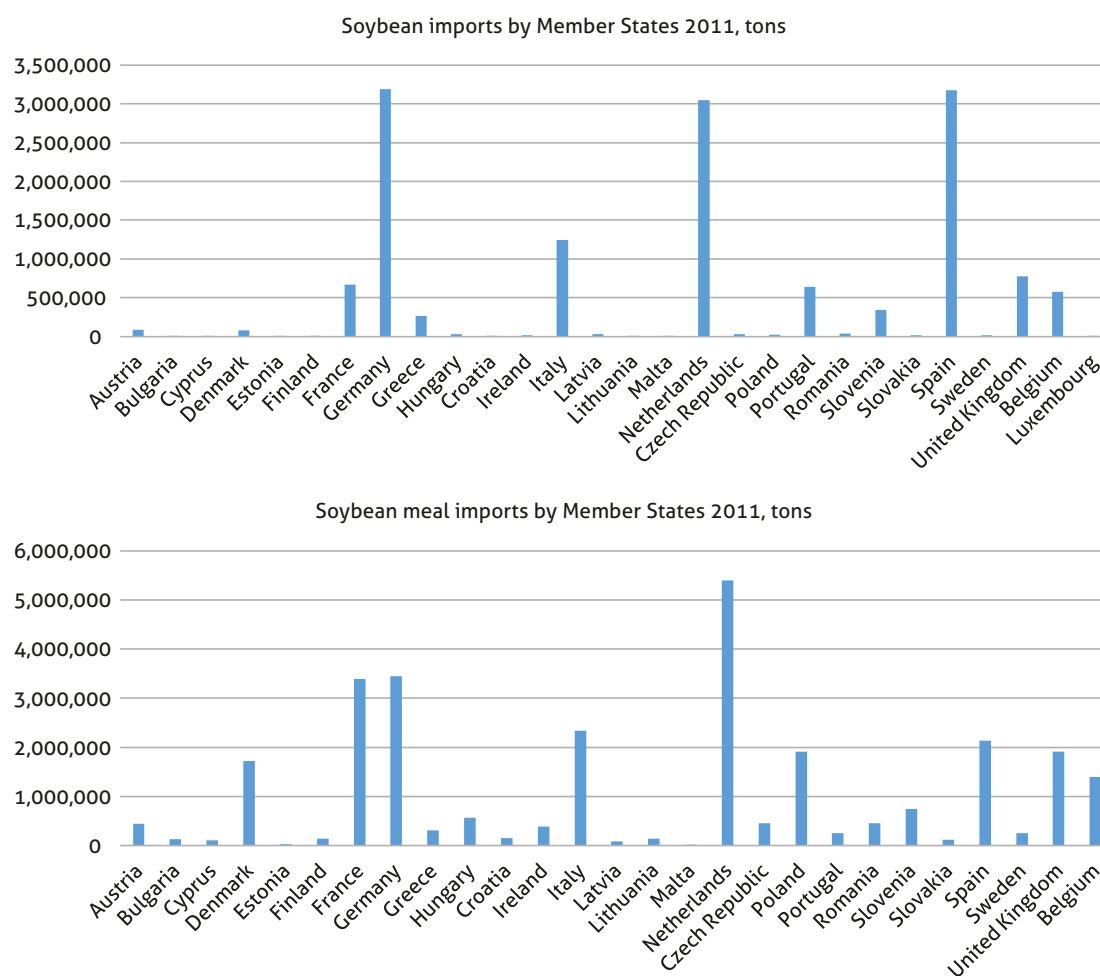
Thus the EU faces an undersupply of protein crops for livestock feed. A recent study (Früh et al., 2015) finds different underlying reasons for this, one of them being that using meat and bone meal as a livestock feed resource was banned in 2001 after the BSE crisis, when these animal meals were identified as vectors for the disease. This ban has meant the use of an additional 1.5 million tons of soybean meal to substitute for the meat and bone meal formerly used in livestock feed (Hasha, 2002). At the same time, the CAP and international trade agreements led to disincentives for European farmers to fill the production gap with protein crops. These policies allowed for the protection of cereal crop production within the EU with guaranteed high prices while permitting oilseeds and protein feed crops to be imported nearly duty-free. This resulted in lower market prices for protein crops compared to cereals. In addition, growing cereals is relatively easier, agronomically, than growing protein crops, which tend to have less stable yields, are less competitive against weeds, and are more susceptible to lodging and to drought stress as well as to pests and diseases (Bues et al., 2013, Früh et al., 2015).

Production within the EU of protein crops such as fava beans, peas, chickpeas, lupins and soybeans is thus very low. The combined acreage of these protein crops grown in the EU for human and animal feed consumption combined has fallen steadily, from 4.7 per cent of total arable land in the EU in 1961 to 1.8 per cent in 2013 (Bues et al., 2013). At the same time, grain legume imports, mainly soy, increased considerably. In particular, only around 3 per cent of the soybeans used as feed concentrate are produced within the EU, while in 2013 the EU imported 35 million tons of soybean primary product equivalents, in the form of 18 million tons of soybean meal and 12 million tons of soybeans (Eurostat, 2016) assuming a conversion rate from primary product to meal of about 80 per cent (de Visser et al., 2014); FAOSTAT Commodity Balances report somewhat higher numbers, of about 30 million tons soybean meal (cake) (made from ground up soybean cake) and 15 million tons of soybeans. This represents about 13 per cent of total world soybean production in 2013, of about 280 million tons.

Import volumes differ greatly between EU Member States. The Netherlands, Germany and France are the biggest importers of soybean meal, followed by the UK, Spain, Italy, Poland and Denmark. For soybeans, the biggest importers are the Netherlands, Germany and Spain, followed by Italy, UK, Portugal, France and Belgium (Figure 10). These numbers show a distinct divide in the EU between eastern European Member States (plus Greece and Cyprus) on the one hand and most of the western European Member States on the other, the latter having livestock production systems that are much more dependent on soybean and soybean meal imports.

It is worth emphasising that this situation is different on organic farms, where there is much more cultivation of legumes due to their well-established role in organic crop rotations with the beneficial side effects of nitrogen fixation and enhancing soil fertility. Thus organic farms produce 20-40 per cent of the grain legumes grown in the EU, and an even higher proportion of forage legumes (Bues et al., 2013).

Figure 10: Soybean and soybean meal imports to EU Member States for 2011 (last year where data are available)



Source: FAOSTAT (2016a)

The import data do not necessarily reveal the pattern of end use within the EU, as re-exports may occur. The export data from FAOSTAT show that the Netherlands re-exports almost 90 per cent of the soybean quantities it imports, and 50 per cent of the soybean meal, while Germany re-exports almost a third of soybeans (but not soybean meal). Thus, the Netherlands has a strong trade function for soybeans and soybean meal in the EU, exporting mainly to Germany, Belgium and the UK (while Germany exports mainly to the Czech Republic, Poland and Denmark). Belgium also re-exports around 50 per cent of soybeans and soybean meal. More details on these trade flows, including the trading companies involved, can be derived from the Transformative Transparency Initiative (SEI & GCP, 2016), and from FAOSTAT for intra-EU trade.

Figure 11a: Production, demand and self-sufficiency of protein rich feed material in the EU-27 in protein equivalents

EU-27 balance sheet for protein rich feed materials in 2012/13 1,000 t of protein equivalent			
Products	Production	Consumption	Self sufficiency
Soy	344	14,280	2%
Rapeseed + sunflower	5,022	6,795	74%
Pulses	424	450	94%
Dried forages	623	589	106%
Miscellaneous	743	1,336	56%
Total vegetable proteins	7,156	23,450	31%
Fishmeal	235	350	67%
Total all protein sources	7,391	23,800	31%

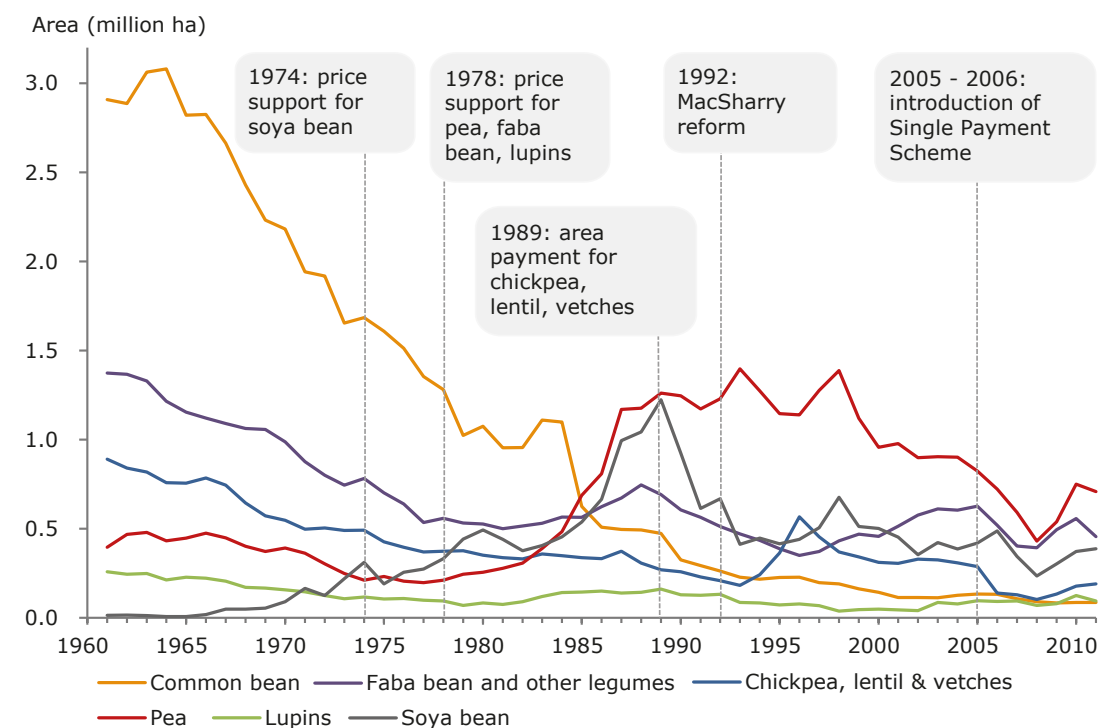
* EU production from EU seeds

** Including consumption by the petfood industry and on-farm uses

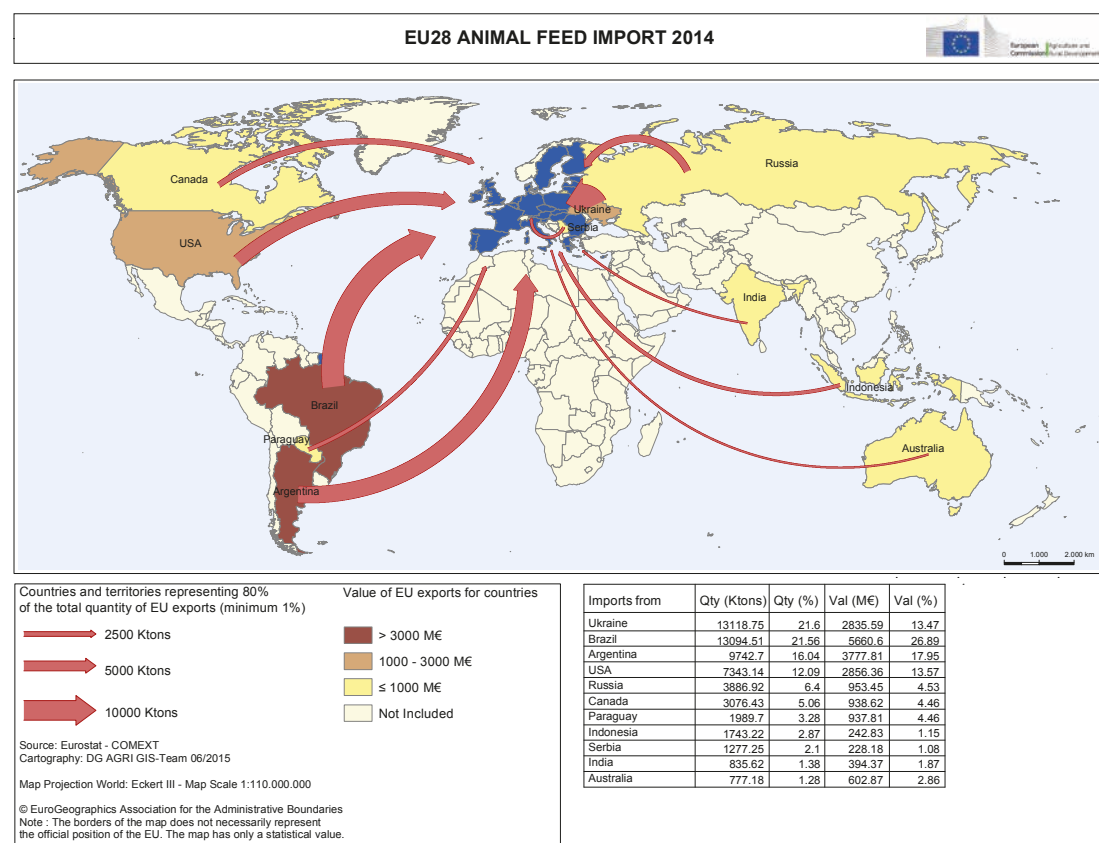
Miscellaneous: includes groundnuts, linseed, copra, palm kernel, and cottonseed meals and corn gluten feed
We emphasise that the units in this table are protein equivalents and NOT tons of product or product meal.

Source: FEFAC (2015, page 8)

In order to fill the gap in the supply of protein crops, large quantities are imported into the EU from other countries. Despite local growing initiatives (e.g. Danube Soy), dependency on non-EU countries remains high. Analysing the origins of all EU imports of feedstuffs shows that about half comes from Brazil and Argentina, supplying respectively 27 and 18 per cent of the total. Next in significance as source countries are Ukraine and the USA, each supplying about 14 per cent, followed by Russia, China and Canada (about 4.5 per cent each), Paraguay (3.5 per cent) and Indonesia (1.2 per cent) (Figure 12).

Figure 11b) Production areas of different protein crops in the EU-27

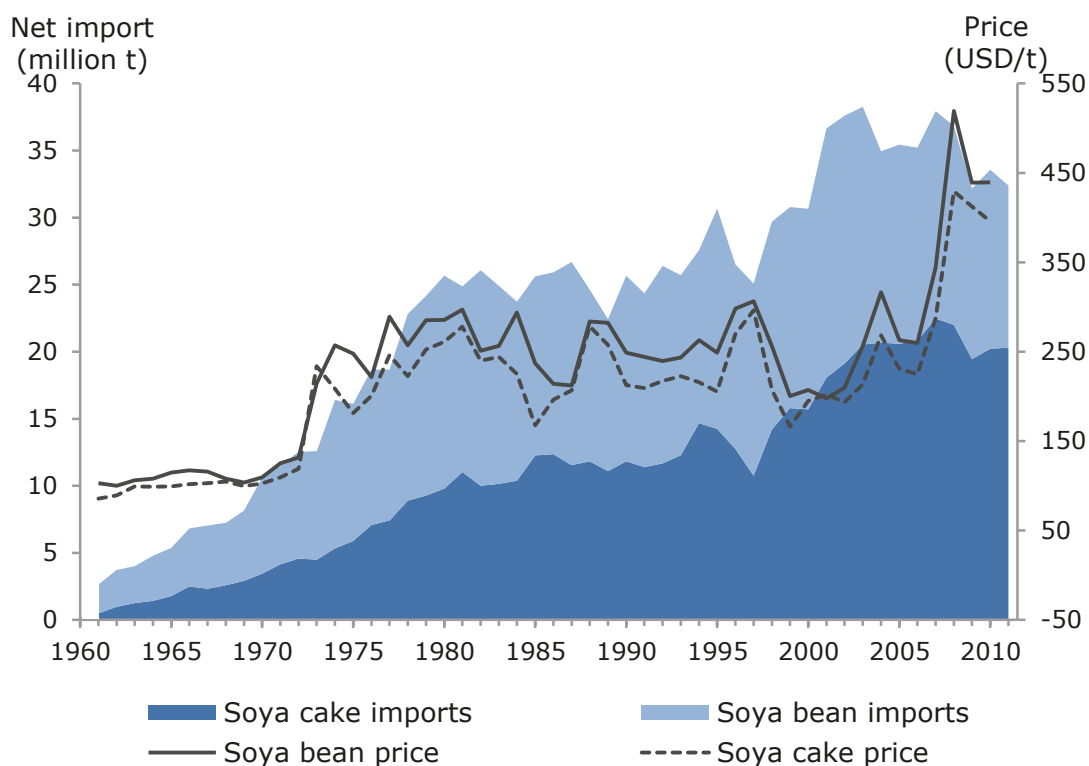
Source: Bues et al. (2013, page 29)

Figure 12: EU 28 animal feed import 2014

Source: EUROPEAN COMMISSION. 2014. EU 28 ANIMAL FEED IMPORT 2014 [Online]. European Commission. Agriculture and Rural Development. Available: https://ec.europa.eu/agriculture/sites/agriculture/files/statistics/trade/2014/maps/anfe_imp_2014.pdf [Accessed 17/04/2016].

In terms of EU imports of soybean and soybean meal alone (Figure 13) there are only three major source countries, Brazil, Argentina and the USA, followed by Paraguay (see Figure 14 below) (European Commission, 2015b). Also worth mentioning, however, is the increase in supplies from the Ukraine, as an exporter bordering the EU.

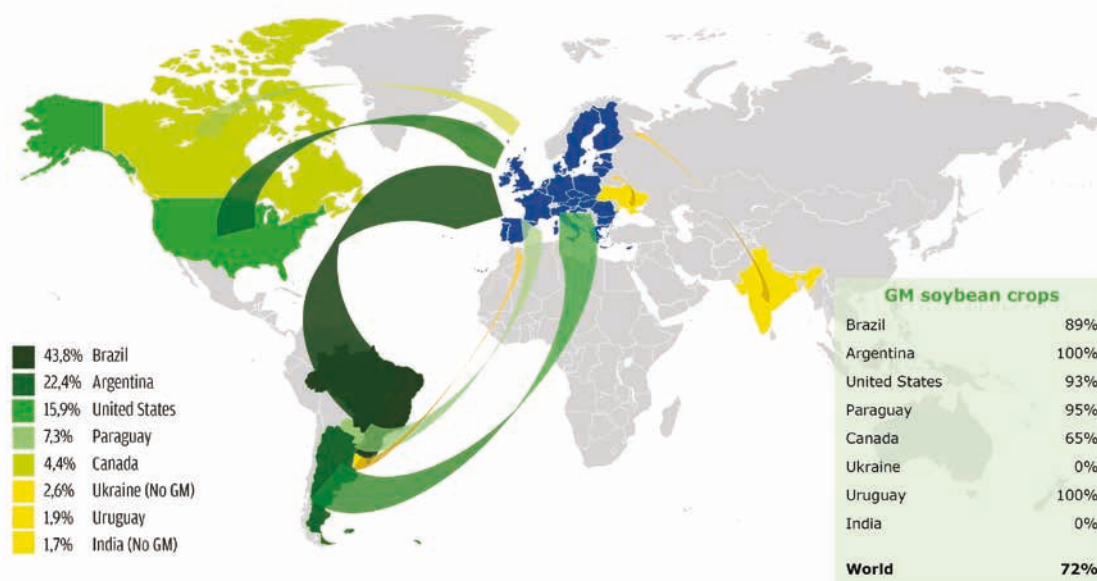
Figure 13: Changes in feed imports



Source: Bues et al., (2013) page 35

Figure 14: Soybean and soybean product exports to the EU

Export Soybean and Soymeal to the EU in 2013: 32 million tons



Source: European Commission (2015b)

The EU's soy imports, totalling about 35 million tons of primary soybean equivalent (i.e. about 28 million tons of soybean meal) would correspond to a requirement for around 12-13 million hectares of arable land for an equivalent level of production in the EU, i.e. more than 10 per cent of the total EU arable land area (assuming an average yield of about 2.7 tons per hectare based on FAOSTAT average yield data for the EU, which cover a range from 2.2 to 3.2 tons per hectare over recent years, and assuming that this amount of suitable land could be made available).

In terms of the arable land requirement in the actual source countries, using the import shares reported above (which correspond to 14 million tons from Brazil, 7 million tons from Argentina and 2.3 million tons from Paraguay) and again assuming yields of 2.7 tons per hectare (as FAOSTAT reports yield ranges at similar levels in those countries as in the EU), this corresponds to 5.2 million hectares cultivated in Brazil, 2.7 million hectares in Argentina and 0.9 million hectares in Paraguay.

These quantities correspond to 17 per cent of Brazil's total production in 2013, 14 per cent of Argentina's and 26 per cent of Paraguay's. The proportions of their output exported to the EU in the period 1990-2008 were higher than this, averaging 60 per cent for Brazil, 50 per cent for Argentina and 30 per cent for Paraguay (Cuypers et al., 2013); there has thus been a considerable reduction in the EU share of their exports in recent years, mainly due to increases in their production without similar increases in EU demand.

Table 5: Soybean export quantities and shares in EU imports, 2013

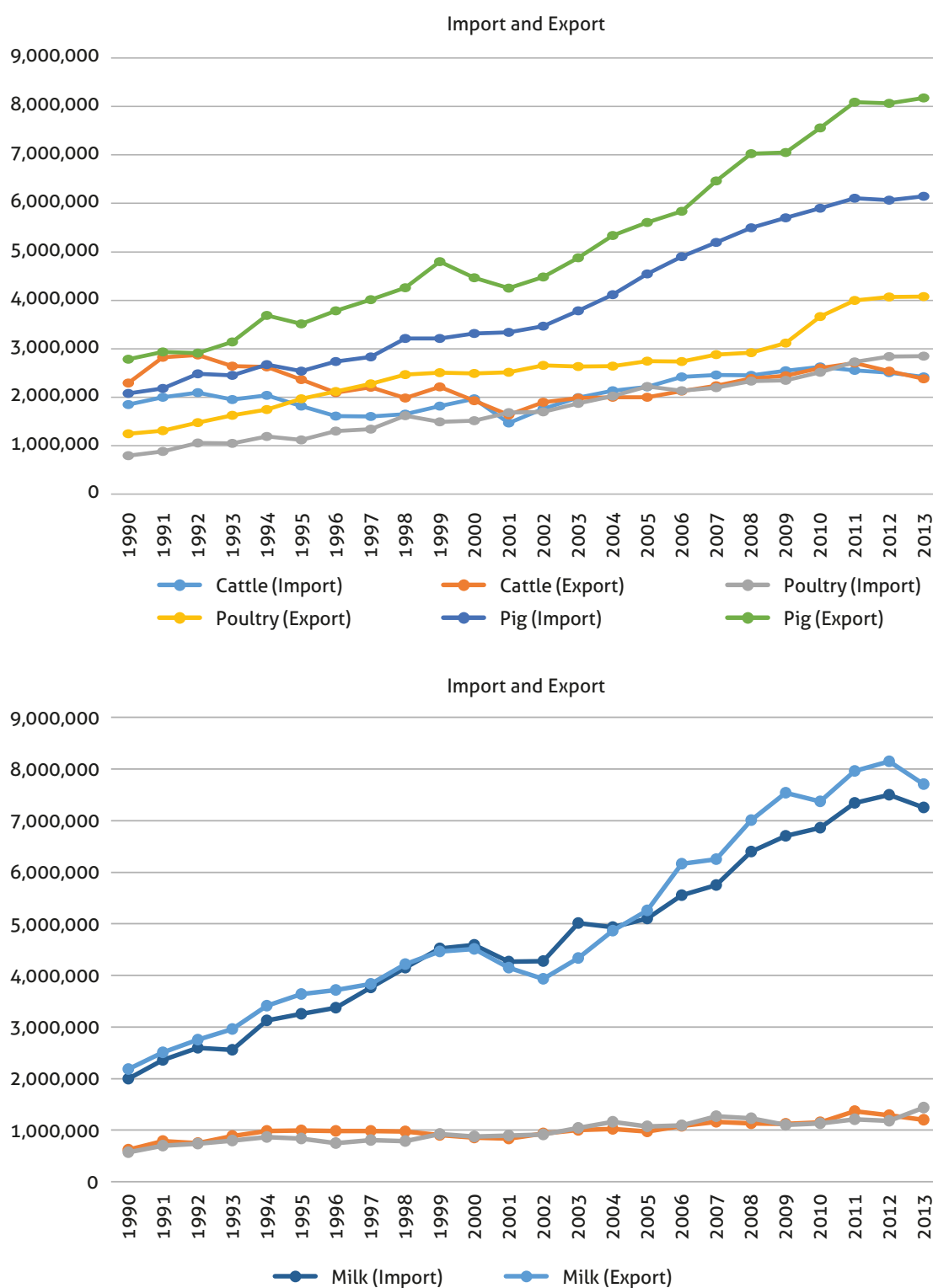
Exporter	Total soy production (Mt)	Quantity exported to the EU (Mt)	Quantity exported to the EU (% production)	% of EU soy imports	Area needed to produce the soy that is exported to the EU (million ha)	Yield (t/ha) (average 2010-2014, FAOSTAT)
Brazil	81.7	14	17%	44%	4.8 mln ha	2.9
Argentina	49.3	7	14%	22%	2.7 mln ha	2.6
US	91.4	5.1	6%	16%	1.7 mln ha	2.9
Paraguay	9.1	2.4	26%	7%	0.9 mln ha	2.6
Canada	5.4	1.3	24%	4%	0.5 mln ha	2.9
Ukraine	2.8	1	36%	3%	0.5 mln ha	1.9

Yields: derived by summing production over 5 years and then dividing by the sum of the areas over the same 5 years.

Source: Cuypers et al. (2013), FAOSTAT (2016)

When considering the deforestation impact of EU livestock production and consumption, it is necessary to take account not only of EU feed imports but also of imports of animal products themselves. Figure 15 below shows imports of animal products to the EU, in relation to domestic production and to exports. In recent years (2011-2013) imports have been equivalent to about 15 per cent of domestic production for beef and veal, 22 per cent for poultry and 12-17 per cent for pig meat. For eggs and fresh milk the corresponding figures are one per cent and five per cent respectively (FAOSTAT 2016). It should be noted, however, that part of this production plus imports is then exported, so that actual domestic consumption is less than the figures for production plus imports would suggest (Figure 15).

Figure 15: Animal products – imports and exports in the EU (tons/year)



Source: FAOSTAT (2016b)

Feed production and deforestation

The demand for cropland for feed production clearly increases rather than reduces the pressures on forests, but it is difficult to assess how much of the arable land devoted to producing concentrate feed (and particularly soybeans) for the EU market comes at the cost of deforestation in the exporting countries. This is due to the complex multiple drivers behind deforestation.

The most direct driver of deforestation is profit per hectare. The higher the profit that can be made from clearing forest land, the higher are the incentives to do so. This explains, for example, the observation that yield increases can lead to increased deforestation (Barretto et al., 2013). Logic might say that higher yields would mean less land was needed for the same output, which should reduce pressure on forests. In areas where land availability is limited, this can indeed hold true and intensification can happen without an extension of agricultural areas. If, however, higher yields drive up the profitability of crop growing, in areas where land can easily be cleared, this may in fact lead to increased deforestation, as concentrate feed production becomes more competitive in these areas, by comparison with other areas where deforestation may not be an issue. Thus the production and demand for animal products in the EU, as well as global trade developments, can result in a situation where forest clearing for soybean production for exports to the EU becomes a profitable activity, leading to increased deforestation.

A second key driver of deforestation is infrastructure development, predominantly road-building. Hansen et al. (2013), for example, address this empirically and show the different causes of deforestation and forest degradation based on GIS mapping. They find that infrastructure development, among other causes, is of key importance for deforestation. However, it may be emphasised that infrastructure development into forests and subsequent deforestation are not ends in themselves. They are always undertaken to facilitate some productive activity on the (former) forest land, be it crop or livestock production, wood or minerals. In cases where forest areas become more easily accessible, the costs of forest clearance, cropping the land and marketing the products all decrease, thus once again increasing incentives for deforestation (ultimately, via increasing profits per hectare). It could thus happen that road-building makes formerly remote forest areas accessible and that converting them to cropland becomes viable. Without the existence of a demand for soybeans, other crops might be grown on that land. Profits on this new acreage might be higher than in other regions with already established cropland, for example because of more suitable climatic conditions and better soil characteristics. In this case, reducing EU soy imports would not necessarily result in reduced deforestation.

A third factor, indirect land-use change (ILUC), can also have a significant effect on deforestation. Andrade de Sá et al. (2013), for example, consider the case of increasing sugar cane production for biofuel in southern Brazil, based on former pastures converted to cropland. They find that this leads to a displacement of cattle grazing from this region towards the North, where new cattle grazing areas are established at the border of the Amazon by deforestation and the conversion of forest areas to grasslands. Such ILUC dynamics show large time-lags and are difficult to observe empirically. However, if dynamics of this type are present, it could also happen that a reduction of soybean imports, from a region where soybean production had been displacing other agricultural practices, could lead to decreased deforestation, as these other activities would no longer themselves be displaced. In cases of ILUC, however, the soybean-growing area might be far away from the site of the potential increases or decreases in deforestation, so that its relevance might not be readily visible. We can frame this ILUC pattern as leakage, where establishing new areas for soy production without direct deforestation would lead indirectly to deforestation elsewhere, with the activities traditionally undertaken on the areas now devoted to soy not just stopping but being displaced elsewhere, maybe even to another country, and being associated there with the establishment of new cropland on former forest areas. In such a case, no deforestation may be observed in the country of origin of

the soy, but nevertheless, this soy production has resulted in deforestation through the leakage effect. The occurrence and magnitude of this leakage will depend on the elasticity of demand of the potentially displaced crops. If reduced production increases their price but demand remains high, then indeed it is likely that other regions will step in and leakage can be expected; conversely if demand drops (as previous consumers find substitutes, for example), it is more likely that the growing of the crops in question will diminish.

Fourth, policy-related and institutional aspects are important. Possible factors include, for example, perverse incentives arising from poorly designed regulations (e.g. support payments for certain products), a lack of regulation or the inadequate implementation of existing regulations (e.g. on forest protection), a lack of secure land tenure rights, or rules that make land tenure rights dependent on the land being used for production. The importance of such institutional aspects is reflected in several analyses that show how well-implemented regulations can help in reducing deforestation. The authors emphasise, on the other hand, that such trends may be reversed as soon as the regulation or its implementation is weakened (Macedo et al., 2012, Arima et al., 2014, Hecht, 2012).

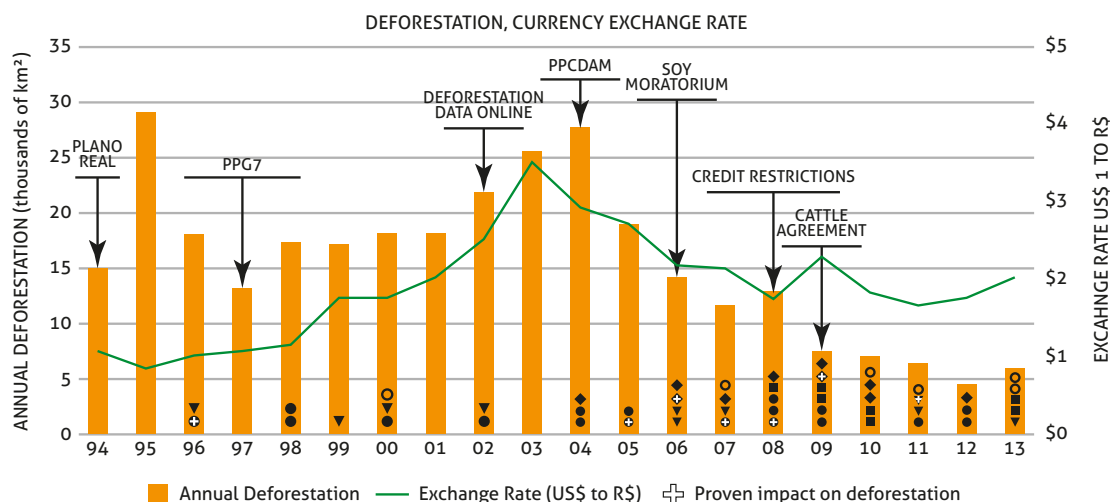
These are general patterns that may or may not be present in a given region at a given time. It is only through detailed specific assessment of a particular region that a proper assessment can be made of the cause-effect relationships governing observed patterns of deforestation. Much recent research is available, for example on deforestation in Brazil and the Amazon and soy production in particular (e.g. Gibbs et al. (2015), Gibbs et al. (2016), (Tritsch and Arvor, 2016, Rausch and Gibbs 2016, Eloy et al. (2016), Godar et al. (2016) Nepstad et al. (2014), Macedo et al. (2012)). In Brazil, big reductions in deforestation rates were observed following the 2004 peak, falling by about 80 per cent by 2013 (cf. Figure 16), but the latest data indicate a change in this trend, with deforestation increasing rapidly in the Amazon again; rates were 29 per cent higher in 2015 than in 2014, and rose by a further 29 per cent in 2016 (Domonoske, 2016). In Argentina and Paraguay deforestation rates rose from about 0.2 Mha/year before 2000 to about 0.4 Mha/year since the mid-2000s (Henders et al., 2015).

The main explanation for this is probably to be found in a number of recent policies and voluntary agreements (Nepstad et al., 2014, Gibbs et al., 2016), such as command and control regulations (e.g. credit restrictions, etc.) and supply chain initiatives (Soy Moratorium and Cattle Agreements), as well as increased focus on strict implementation of the existing policies. For example, the proportion of soybeans cropped on newly deforested land in the Amazon fell from about 30 per cent to around 1 per cent after implementation of the Soy Moratorium, which was established in 2006 and made permanent in 2016 (Gibbs et al., 2015). The Soy Moratorium only applies in the Amazon region in the north-west of the country, however, whereas deforestation for soy in the central Cerrado region (see map inset), for example, remained high. It may even be argued that certain leakage effects could arise

The Cerrado region of Brazil



from such regulation, by shifting soya production on newly cleared land from one region to the other without any overall reduction in clearing (Gibbs et al., 2015). However, more data and analysis of those dynamics are needed to confirm this and get a full picture of the causal chains. Godar et al. (2016) investigated soy production and exports from Brazil and found that the EU imports more than a third of its soy from areas with high deforestation risk (according to the critical deforestation list compiled by the Brazilian Ministry of the Environment in 2012), and more than 50 per cent from municipalities with forced labour. For China these figures are considerably lower in percentage term, albeit slightly higher in absolute terms as regards deforestation, and considerably higher as regards forced labour. The importance of this institutional context may be illustrated by the fact that deforestation decreased while prices for soy and beef increased at the same time, contrary to what would be predicted by a simple application of the argument of increasing profits as presented opposite (Figure 17).

Figure 16: Annual deforestation rates in Brazil, 1994-2013

Annual deforestation. Brazilian Real exchange rate, and the principal policy and supply chain interventions that may have influenced deforestation rates. Those interventions with evidence of impact on deforestation are designated with a cross in figure and bolded in legend. Annual deforestation from INPE 2013 (26).

COMMAND AND CONTROL POLICIES/PROGRAMS: MP1511 – Legal Reserve increased to 80% ('96)1, Environmental Crimes Law turns Deforestation into Crime ('98)2, Creation of the Program for Prevention and Control of Fires and Forest Fires in the Brazilian Amazon (PROARCO) – This was a response to the fire risk of the 1998 El Niño, with US\$ 30 million loan from the World Bank ('98)3 (54), Creation of National System of Conservation Units (SNUC) ('00)4, Commitment to increase protected area network in the Amazon (ARPA) ('02)5, Program for the Prevention and Control of Deforestation in the Brazilian Amazon (PPCDAM) ('04)6, Monthly Monitoring System (DETER) ('04)7, Enforcement Campaign from the Federal Police – Large Operations to detain deforestation ('05)8, BR 163 Designation of areas under provisional administrative limitation and later the creation of protected areas ('05)9, Decree 6321 – Registry and Embargo on deforested areas ('07)10, Critical County Program and Credit Restriction ('8)11, Credit Restriction to illegally deforested areas – BACEN Res. 3.545 ('08)12, Regularizing Rural Properties in Para and Mato Grosso, Environmental Registry of Rural Properties ('08)13, Beef Sector legally binding commitment not to buy meat from illegally deforested areas Terms of Adjustments of Conduct (TACs) ('09)14, Regularizing rural properties at the National level – More Environment Program Decree 7.029 ('09)15, Possible Decentralization of Environmental issues, including forestry licensing and management (Complementary Law n. 410) ('11)16, New Brazilian Forest Code approved (NFC) and requirement of environmental registry for rural properties (CAR) ('12)17, Green Settlements Programs created by Incra ('12)18.

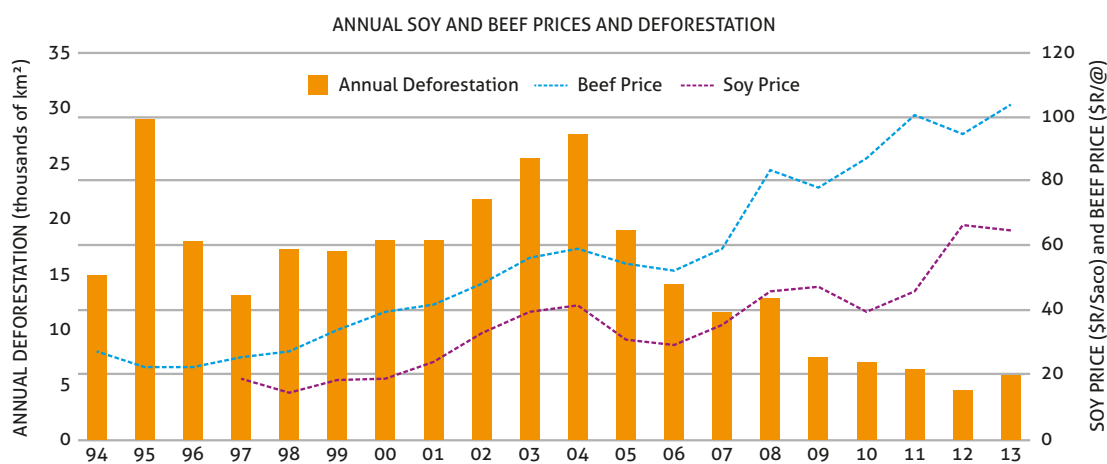
JURISDICTIONAL PROGRAMS: Green Tax Allocation (ICMS Verde) in Amapá and Roraima ('96)19,20, Rural Property Environmental Licensing System of Mato Grosso (SLARP) ('99)21, Green Tax Allocation (ICMS Verde) in Mato Grosso ('00)22, Green Tax Allocation (ICMS Verde) in Tocantins ('02)23, Public Forest Law ('06)24, BR163 Forest District ('06)25, BR 163 Sustainable Plan ('07)26, Bolsa Verde Program ('11)27, Program of Green Municipalities (PMV) launched in Para ('11)28, Green Tax Allocation (ICMS Verde) in Para ('13)29.

REDD+ CLIMATE POLICY: Creation of Amazon Fund to receive funds to mitigate deforestation ('08)30, National Climate Change Plan ('09)31, Subnational Efforts – creation of Governors Climate and Forest Task Force (GCF) ('09)32, Acre REDD+ Strategy – Law for Incentives of Environmental Services (SISA) ('10)33, Low Carbon Agricultural Program (Loans) (ABC) ('10)34, Mato Grosso REDD+ Strategy – Law ('13)35, Proposed National Strategy for REDD+ ('13)36.

SUSTAINABLE SUPPLY CHAIN INITIATIVES: Roundtable on Sustainable Palm Oil (RSPO) launched ('04)37, Soy Moratorium ('06)38, Roundtable on Responsible Soy launched (RTRS) ('06)39, RSPO P&C ('07)40, Bonsucro launched ('08)41, Cattle Agreements ('09)42, Brazilian Working Group for Sustainable Beef (GTBS) ('09)43, Consumer Goods Forum (CGF) commitment to zero net deforestation ('10)44, RTRS P&C ('10)45, Creation of Global Roundtable on Sustainable Beef (GRSB) ('12)46.

INFRASTRUCTURE: Plan Advancing Brazil ('00-03)47, Plan of Accelerated Growth – Large infrastructure investments in the Amazon Biome ('07-10)48, Belo Monte Dam ('10)49, Santo Antonio and Jirau Dams ('11 and '13)50, Tapajós Dam ('13)51.

Source: Figure s1 in Nepstad et al. (2014)

Figure 17: Annual soy and beef prices and deforestation in Brazil

A peak in the price of soy and beef and high deforestation is observed in 2004 in the final years of the Agro-Industrial Expansion phase, followed by a decrease in prices in 2006 as deforestation begins to fall. Soy prices are the annual average for the state of Paraná, and beef prices are the annual average for the state of São Paulo from CEPEA 2014 (73). Annual deforestation from INPE 2013 (26).

Source: Figure s2 in Nepstad et al., 2014

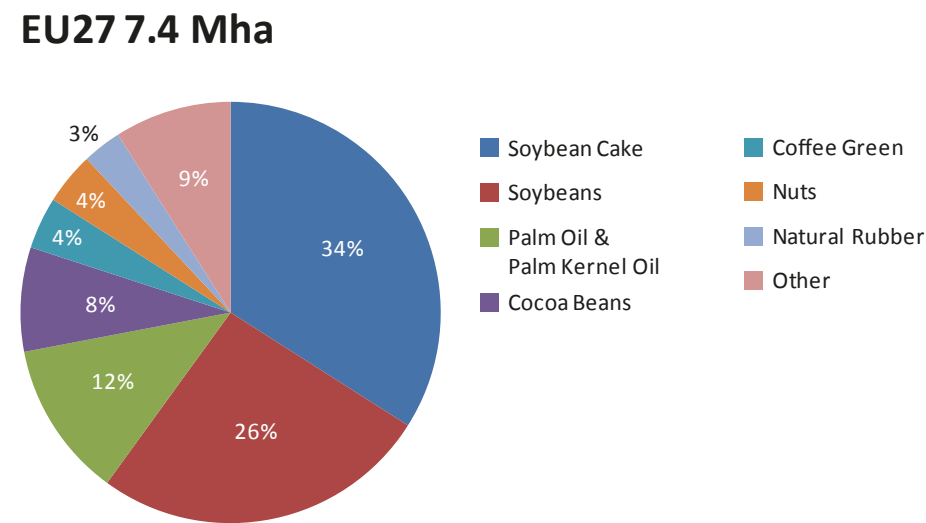
This is consistent with the environmental Kuznets hypothesis, claimed to be effective for deforestation in the Amazon as well, which states that after a phase of increasing deforestation with parallel improvement along a range of socio-economic indicators, society turns towards more environmentally friendly management with correspondingly decreasing deforestation rates (Tritsch and Arvor, 2016).

However, from 2012 to 2013 a slight increase in deforestation in Brazil has been observed and Soares-Filho et al. (2014) for example argue that this may be the beginning of a trend of increasing deforestation. Also, a high proportion of deforestation was illegal in the period from 2001 to 2009 (Stickler et al., 2013). This again points to the importance of monitoring and implementation of existing rules and agreements, without which even the best regulation will not achieve much (Sousa, 2016, Rausch and Gibbs, 2016).

Besides such a “micro” perspective on the role of national and local policies and their implementation in the countries where deforestation is an issue, one can adopt a “macro” perspective assessing more aggregate “pressures” on forests stemming from the increased use of land areas for cropland, irrespective of the institutional context. Such assessment is the basis for Cuypers et al. (2013), for example, correlating land use of imports to the EU with deforestation rates in the countries of origin. No detailed regional assessments of policies and deforestation patterns is undertaken and the analysis is based on the assumption that each hectare used for crops or pasture or other land use is proportionally responsible for deforestation. Based on this assessment, cumulative over the period 1990-2008 (and regrettably not for more recent years), the EU 27 caused about 7.4 million ha of embodied deforestation from crop product imports (Figure 18) and 8.7 million ha from crop and livestock product imports combined (Figure 19).

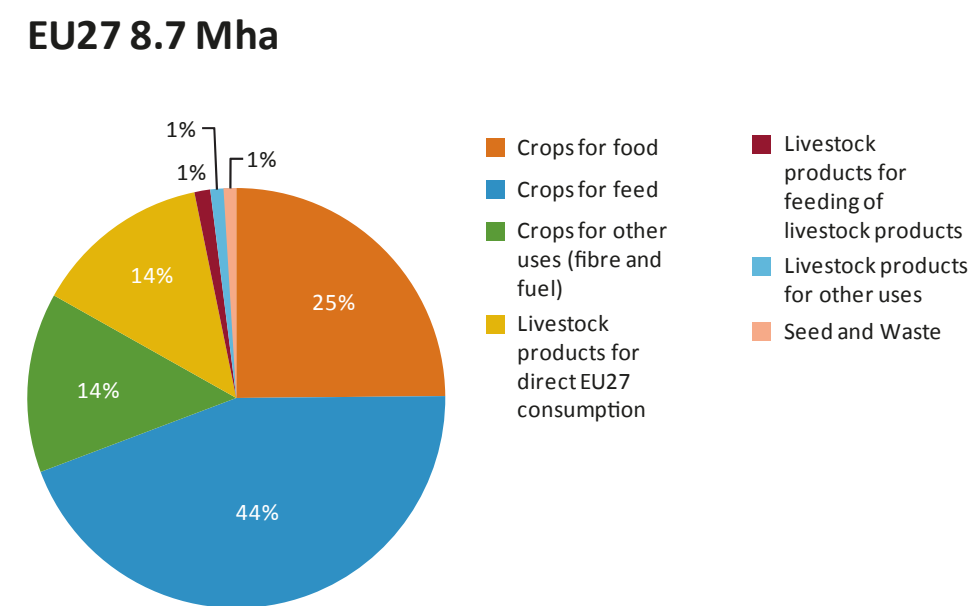
On average, these areas of embodied deforestation correspond to about 0.4-0.5 million hectares per year for this period, i.e. an area equivalent to about a tenth of the area of Denmark, the Netherlands or Croatia. This is about 7 per cent of annual total global deforestation for the years 2010-2015 (FAO, 2015). The largest share of this embodied deforestation attributed to crop imports in the EU derives from oil crops, mainly soy. Thus, based on the correlation between deforestation and cropping areas described above, soybean cakes and soybeans were responsible for 60 per cent, followed by oil palm (12 per cent), coffee and cocoa (12 per cent) and industrial products, such as rubber (6 per cent) (Figure 19). As regards the shares of combined crop and livestock imports, the largest share relates to livestock product consumption (59 per cent), either via the import of feed crops (44 per cent) or as meat (14 per cent) (Figure 20).

Figure 18: Embodied deforestation from EU27 crop product imports



Source: Cuypers et al. (2013, page 59)

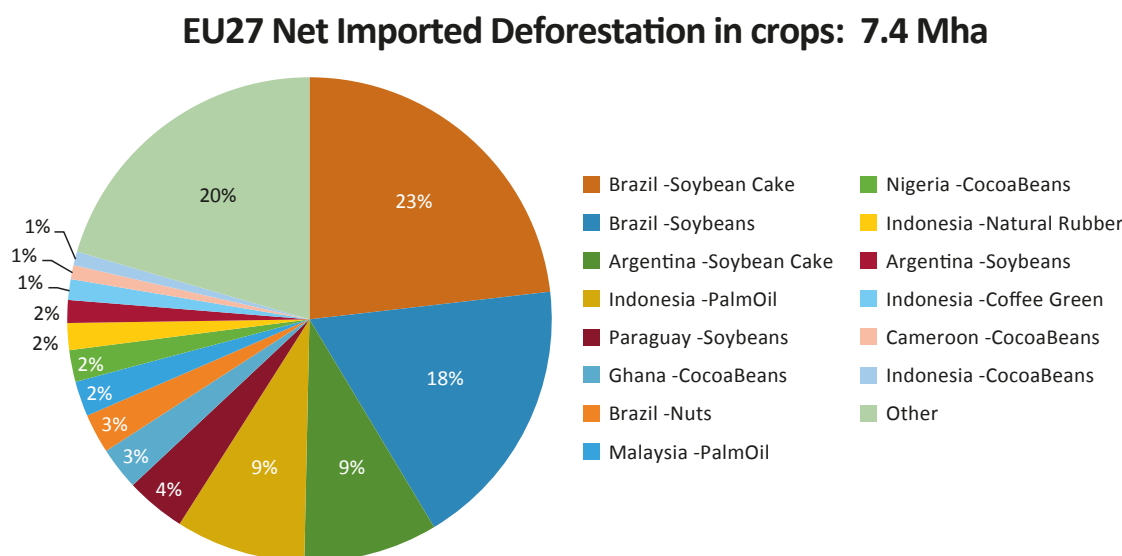
Figure 19: Embodied deforestation in EU27 crop and livestock imports



Source: Cuypers et al. (2013, page 58)

For further illustration, Figure 20 shows the combined differentiation of crops and countries.

Figure 20: Crops and countries of origin for deforestation embodied in EU27 crop imports



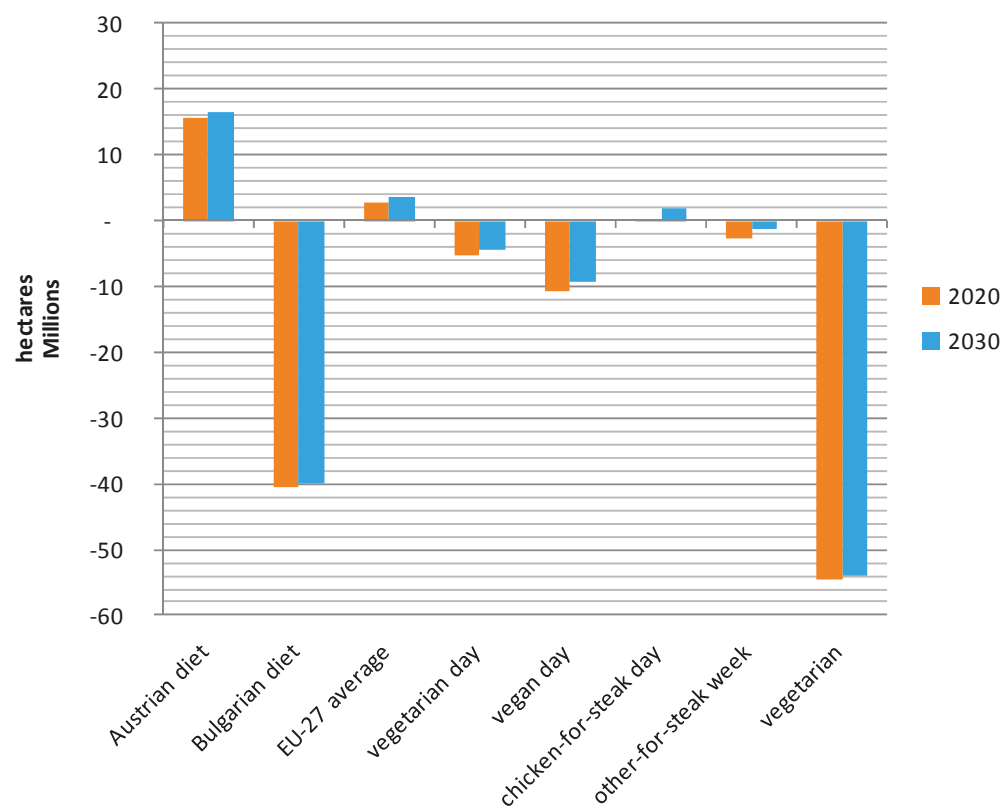
Source: Cuypers et al. (2013, page 60)

Transparency for Sustainable Economies (Trase) (SEI & GCP, 2016) uses more recent and more detailed data to trace back detailed trade flows of key commodities. To assign deforestation values to trade volumes, it uses a similar approach as Cuypers et al. (2013) based on correlations between areas harvested and deforestation reported in the location of origin (at municipality level). Trase explicitly states that the embodied deforestation values derived in this way are correlations only and cannot be seen as causal connections, but that they provide a measure of risk for deforestation that can be an important input to decision making.

Finally, Henders et al. (2015) use similar methods to trace embodied deforestation in key products, and find that beef production is the most important driver, followed by soy production. In relation to total deforestation in South American countries analysed in this paper and covering all commodities, exports are responsible for a lower share only, exceeded by the impact of consumption in those regions. However, specifically for soybeans, most of the related deforestation is embodied in exports, while domestic consumption accounts for a smaller part only.

An advantage of this approach based on correlations is the potential to provide some foresight on future deforestation in a relatively easy way. Cuypers et al. (2013) analyse how the embodied deforestation of the EU27 may develop in the future. Based on the assumption that the EU population will slightly increase and that consumption patterns do not change, their modeling shows that by 2030 an additional 3-4 million hectares of agricultural land will be needed. If the per capita food consumption of animal products increases significantly, matching an average high animal product diet as currently present in Austria, for example, an additional 16 million hectares will be needed, i.e. almost 10 per cent of the current agricultural area in the EU of about 175 million hectares. A low consumption diet (Bulgarian diet) would lead to a reduction by 40 million hectares (i.e. almost minus 25 per cent), and a vegetarian diet would lead to a reduction by 55 million hectares, i.e. by about a third (Figure 21).

Figure 21: Increased and decreased land use for different EU27 diets in 2020 and 2030 compared to current land use for EU27 consumption



Source: Cuypers et al. (2013)

4. CAP and deforestation

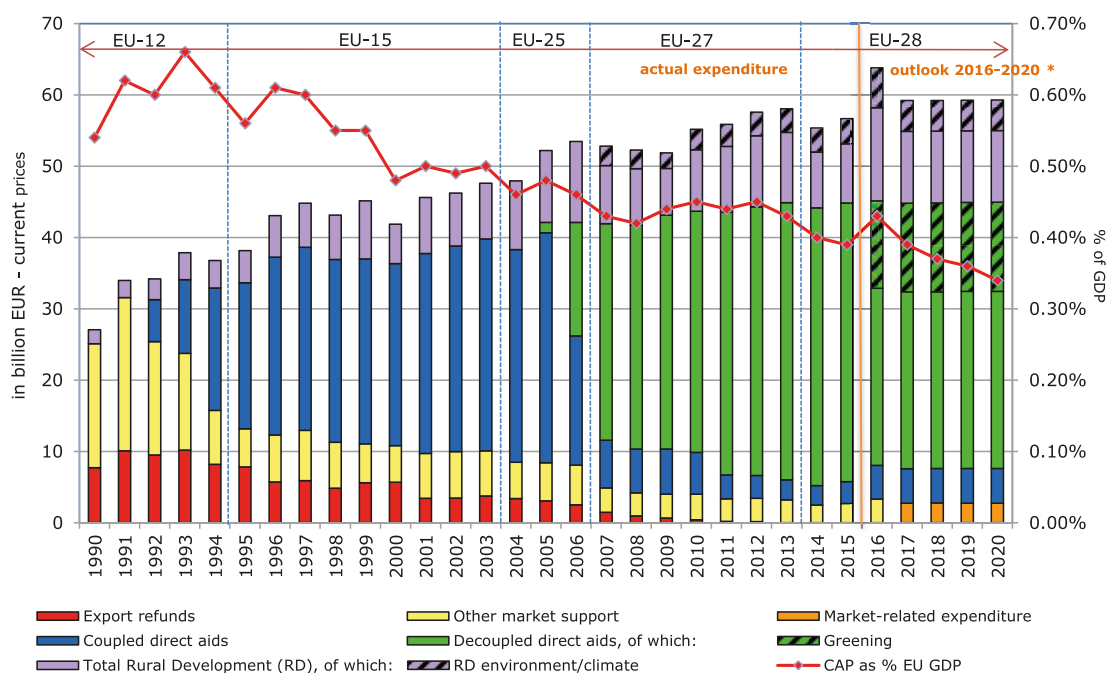
The previous sections introduced the EU CAP (section 2), and EU livestock production and feed use, as well as patterns of deforestation (section 3). From the discussion in section 3, we can draw two broad conclusions. First, higher imports of concentrate feed to the EU increase pressure on land and thus the risk of deforestation. In principle, livestock product imports may also increase this pressure, for example if they are sourced from similarly concentrate-feed dependent production systems, and also if they stem from pasture-based beef cattle rearing with high deforestation risk, for example from Brazil. This influence of imports on deforestation cannot be captured by simple cause-and-effect chains, however, but must rather be seen as a more complex cause-effect “fabric”. Second, policies in the source countries of feed or livestock imports are of key relevance as drivers and also for reducing deforestation.

The purpose of this section is to assess the 2013 CAP reforms and their influence on the livestock sector within the EU, and how this may influence deforestation given the patterns described above. In doing this, we focus on the potential incentives of the CAP to increase imports of feed or livestock products to the EU, as there is no direct influence of the CAP on domestic policies in the source countries.

Our analysis of potential incentives is structured according to the different aspects of the CAP as laid out in section 2, namely a) decoupled direct payments in general, b) greening measures in particular, and c) market measures and coupled payments. Furthermore, we discuss the potential role of d) demand for animal products, rather than supply, as a main driver of feed and livestock product imports.

As shown in Figure 22, most CAP spending for the CAP reform period 2013–2020 still comes under Pillar 1. Most of this budget is allocated to decoupled payments to European farmers, and at least 30 per cent of these decoupled payments must be spent on greening measures (maintenance of permanent pastures, crop diversification and ecological focus areas). In addition, the budget for Pillar 1 still contains a small amount for market-related expenditures, which include expenditure for wine programmes, producer organisations in the fruit and vegetables sector, the school fruit and milk schemes, beekeeping, etc. Finally, coupled direct payments still exist for certain products.

Figure 22: CAP expenditure and CAP Reform path at current prices



Source: European Commission (2016a)

Decoupled payments

Under the CAP Reform 2013 the CAP continues to make use of direct payments to ensure adequate living standards for farmers. One of the reform's main changes in respect of these direct payments is the requirement that farmers comply with the agreed greening measures. Direct payments are still largely decoupled, however, meaning that farmers receive them independently of the products they produce.

A study assessing the influence of direct payments under the CAP Reforms on farmers' production decisions was undertaken by Viscecchia and Giannoccaro (2014). The authors analysed the decision behaviour of livestock farmers in two scenarios: a baseline scenario under the CAP 2009 conditions (including Single Farm Scheme, Rural Development Policy and other instruments such as upper limits on stocking rates, milk quotas and cross-compliance) and a second so-called NO-CAP scenario with the complete abolition of all CAP instruments (removal of all CAP payments and also of the instruments that impose constraints on production). They conducted a survey within nine Member States and more than 2,360 farms, from which they then analysed a sample of 1,301 livestock farms. The results of the survey indicate that around 30 per cent of the farmers were influenced by the CAP regulations targeting the livestock sector and would either increase their production (5.8 per cent) or decrease their production (23.6 per cent) if CAP payments (and constraints) in the livestock sector were removed in the future. However, nearly 60 per cent of their projected behaviour was not affected by the different CAP and NO-CAP scenarios. Secondly, the survey showed that the likelihood of changes was dependent on the farm structure, such as the acreage of land owned; the larger the farm size in terms of area owned, the higher the likelihood that farmers would reduce their livestock production if the CAP scenario changed. Farmers in hill or mountain regions were also more likely to reduce their production if CAP support was abolished, and livestock production under organic practices would also tend more towards a decreasing strategy in the event of reduced payments.

Finally, the age of the farmers was a significant factor; the older the farmer, the lower the likelihood that the farmer would increase livestock production if the CAP scenario changed.

This suggests that at least for the livestock sector (we currently still lack studies for the protein crop production sector) production is to a significant extent demand driven, and thus more dependent on the consumption patterns of animal products within the EU than on production support payments. However, this is less so for organic production and in the more adverse production contexts of hill and mountain areas, where farmers are more dependent on CAP payments and their production would thus be affected more negatively by abolishing CAP payments. In hill and mountain areas it is difficult to cultivate crops and livestock production should thus be maintained in these regions. Otherwise the pasture areas in these regions would be lost for agricultural production, necessitating additional feed imports to make up the shortfall. Similarly, organic farms tend to have higher shares of roughage feed, so that a reduction in their production, if it were replaced by increased production from conventional systems (assuming no change in demand), might lead to increased concentrate feed imports to meet the latter's increased feed demand. Finally, intensive livestock producers can also be "caught" by long-term investments (housing, etc.) that play a much bigger role in livestock production than in other agricultural sectors. After having undertaken such investments, these producers then have less flexibility in reducing livestock production before these investments have been amortised.

Decoupled direct payments are thus most relevant for production systems that tend to be associated with lower concentrate feed demand (hill and mountain areas, organic production). If these payments were reduced, this production would decrease. If demand for livestock products did not fall correspondingly, this domestic livestock production would be replaced by production systems that rely on higher concentrate feed shares, or by imports of livestock products, thus potentially leading to leakage rather than the reduction of deforestation (depending on where the animal products are sourced and how they are produced).

Greening measures

There are three greening measures, namely crop diversification, the maintenance of permanent pastures and ecological focus areas (cf. section 2).

Crop diversification may help to increase locally grown protein crops and thus may help to reduce soybean imports, as such crops play an important role in optimised crop rotations, as can be seen on organic farms, for example. The current CAP rules, however, do not specify which crops should be cultivated under this diversification measure. In the absence of explicit regulations that specifically promote the cultivation of protein crops, it cannot be assumed that farmers will choose to do so, which will presumably depend mainly on demand and market prices. Thus, the incentives to cultivate protein crops are not strong under this measure.

Maintaining permanent pastures may help to provide forage for ruminants, such as cattle, sheep and goats. However, the EU is already self-sufficient in forage feed production, and imports from abroad are small. Moreover, among the main livestock types, ruminants consume the smallest share of imported protein-rich concentrate feed (around 13 per cent, see section 3), and thus have the lowest leverage in reducing related deforestation abroad, whereas the animals which account for most concentrate feed use, pigs and poultry, are physiologically unable to feed on grass. Furthermore, even for ruminants, if grassland-sourced feed increased in their feeding rations, their yields would drop considerably, as the current high yields in milk and meat are dependent on a high proportion of concentrate feed in feeding rations. Unless demand fell correspondingly, this would result in increased demand for imports of dairy products and ruminant meat. Such imports would lead to leakage of the deforestation avoided from reduced protein feed imports, unless it could be ensured that these ruminant products were produced without deforestation. For all these reasons,

the implications of the permanent pasture maintenance measure on imports of protein feed, or on deforestation, respectively, are likely to be low.

The third measure, maintaining ecological focus areas, can have positive or negative effects on domestic protein crop areas in the EU. As a farmer must maintain at least 5 per cent of the farm's eligible arable land as ecological focus areas, these areas may be lost for the production of protein crops, thereby reducing even further the EU's internal production of protein crops for livestock feed (Devriendt et al., 2013, FEFAC, 2014, Westhoek et al., 2012). The CAP Reform 2013 provides several possibilities for farmers to cultivate these ecological focus areas, for example as afforested areas, terraces or short rotation coppice with reduced input uses (fertilisers) on the farm, which may provide additional income for the farmer. Farmers may therefore decide in favour of measures which are more profitable than the production of livestock feed. On the other hand, some of the possibilities regulated under this measure are options to cultivate catch crops, winter green cover and nitrogen fixing crops, including soybeans, peas and other potential protein feed crops. These can be used as livestock feed sources and therefore may help to reduce soybean imports from countries outside the EU. Again, ultimately the decision on which crops are cultivated on these focus areas is likely to be market driven. This illustrates the trade-offs involved when investigating the potential for domestic protein feed production in the EU. Ecological focus areas provide areas that could be used for such production, thus reducing the need for imports and reducing the related impacts abroad, but by doing so they will undermine the biodiversity gains for which the ecological focus areas were created.

Market measures and coupled payments

Under the CAP 2013 Reform, Pillar 1 maintains some market measures with related expenditures, mainly involving investments in school programmes such as the school milk schemes. It also still contains some coupled payments.

Coupled payments have decreased constantly through the different CAP Reforms, as shown in Figure 22. Currently, their share in the overall CAP budget is below 10 per cent, ranging from 8 to 13 per cent in the different Member States. However, some coupled payments are still included under the CAP Reform 2013. These include payments for cereals such as common wheat, durum wheat, barley, maize and paddy rice, and for animal products such as fresh or chilled beef and veal, butter and skimmed milk powder. In addition, aid can be provided for private storage of some products, such as white sugar, olive oil, flax fibre, fresh or chilled meat of bovine animals, butter, cheese, skimmed milk powder and pig-, sheep- and goat-meat (European Council, 2013b). Moreover, under Article 53 of Regulation 1307/2013 (European Council, 2013a), Member States are allowed to allocate up to 13 per cent of their national ceilings (i.e. of the decoupled payments) to coupled payments. Some of these coupled payments provide incentives for farmers to increase animal production. This may be due to the benefit of guaranteed prices for the products concerned, or due to the insurance effect of the potential to receive such payments in case market contexts become too difficult, or, most directly, due to the availability of payments related to animal heads, such as the beef premium or the suckler cow premium (European Commission, 1999).

A further possibility exists which can increase the significance of coupled payments, under Article 53(3) of Regulation 1307/2013 that "Member States which decide to use at least 2 per cent of their national ceilings to support the production of protein crops should be allowed to increase those percentages by up to two percentage points" (European Council, 2013a) (the national ceiling being the maximum annual spending for a member state under the single payments schemes). This provides some incentives for Member States and farmers to increase the production of protein crops. Another point relating to the direct payments is that the regulations under Article 9 of Regulation 1307/2013 state that persons do not receive payments for maintaining grassland, if they do not carry

out agricultural activities. This Article may help to utilise the available grassland resources for livestock grazing and not for other uses, thereby helping to reduce the need to import concentrate feed. Again, however, increased shares of grassland in feeding rations tends to correlate with lower yields, so that (without changes in demand) this results in leakage, as the products would then need to be produced elsewhere and imported.

While on the one hand the CAP reform restricted the budget for these market measures and coupled payments, on the other hand the intervention limits for crisis intervention measures have been somewhat relaxed. For example, the upper limit for interventions on butter purchases at fixed prices has been increased from 30,000 tons to 50,000 tons, and the price limit triggering market intervention for beef meat has been increased from EUR 1,560 to 1,890 per ton (BMVEL, 2015, European Parliament, 2016, European Council, 2007). Furthermore, for the milk sector, there are still possibilities for private storage support of butter and skimmed milk. However, since 2009 direct export refunds have no longer been paid for the export of milk (European Commission, 2016c).

Overall, these market measures and coupled payments are relatively small, making up only 5 per cent of the total CAP budget, and are only used as a safety net, when global market prices decrease too drastically (European Commission, 2013b). The impact of these market measures on production outside the EU will thus be relatively small (Westhoek et al., 2012). Nevertheless, albeit small in relative terms, these market measures and coupled payments still lead to high aggregate absolute payments of several billion euros, and thus to production incentives with corresponding potentially adverse effects on deforestation. However, the impact of these remaining market measures on deforestation in the source countries for concentrate feed are difficult to quantify, given the complexity of the direct and indirect reasons behind deforestation, as illustrated above in section 3. In any case, the general trend towards decoupled payments tends to work in the direction of reducing rather than increasing incentives for activities potentially directly linked to deforestation.

It is important to note that, independently of the CAP Reform, some EU Member States have already recognised the need to increase the production of protein crops in order to reduce dependence on imports. Germany, for example, invested a total of EUR seven million in 2014-2015 in innovation and development of protein plant research. The same amount is planned to be invested in 2016-2017. Member States thus invest money in promoting protein crops, independent of the CAP financing provided under the new Reform (BMVEL, 2015). Support for protein crops is announced to make up about 10 per cent of the available coupled payments in the period till 2020 and thus is fourth in importance for coupled payments after beef and veal, milk and milk products, and sheep and goats (European Commission, 2015c). On average, it is at about EUR 102 per hectare for 2015-2020 on a maximum of 4.3 million ha, totalling about EUR 440 million. Support for organic farming (cf. Stolze et al. (2016) can also be seen as providing some incentive effect in increasing protein crop areas, as such crops are grown proportionally considerably more on organic farms than on conventional farms.

It must also be emphasised that the current CAP 2013 Reform, as regards livestock production, focuses more on animal health and welfare issues than on environmental concerns. These measures are more concerned with the local production situation, rather than leading to direct changes outside the EU. However, incentives to increase the share of pasture-based livestock production may arise from the new measures for animal welfare, integrated as a cross-compliance mechanism, such as Measure 121 (modernisation of farm holdings), Measure 131 (complying with the EU animal welfare regulations) and Measure 215 (animal protection payments) from the pre-2013 period. These measures were maintained for 2014-2020 albeit under a different structure in the rural development programmes (Westhoek et al., 2012), and they need to be fulfilled for the farmer to receive payments. Pasture-based livestock production requires less concentrate feed, reduces the amount of animals kept for the production of animal products per area, and thus tends to reduce animal product quantities.

Finally, there are some payments for specific production situations and practices. To help establish farms and to promote investment in young farmers, new and young farmers can be given additional payments for a maximum of five years (around EUR 44 per hectare in Germany, for example) (BMVEL, 2015). Depending on how the new and young farmers decide to produce, the resulting incentives could be very varied in their impact, perhaps incentivising the use of sustainable practices, which may not be financially viable without external support (e.g. protein crops), for instance, or conversely helping set up monoculture practices with maximum financial benefit. Specific payments can also be given for small farms, for organic production and for areas with natural constraints, as well as for producer cooperation. The organic payments, and probably also the payments for areas with natural constraints, create incentives for less intensive production, where grasslands and domestically produced legumes play a bigger role.

Table 6 below gives an overview of coupled payments for the years 2013 – 2015.

Table 6: Detailed CAP payments

	2013	2014v	2015
	MEUR		
EAGF (European Agricultural Guarantee Fund); expenditure will be financed from appropriated revenue ¹			
Decoupled direct aid	38 842.1	38 952.1	38 642.0
Coupled direct aid	2 816.0	2 707.6	3 078.6
including aid for			
Cattle premium	975.5	946.4	933.0
Cotton	242.2	231.8	239.0
Special support (Article 68)	1 101.0	1 062.4	1 430.0
Programme of Options Specifically Relating to Remoteness and Insularity (POSEI)	434.5	426.0	439.0
Crisis reserve ²	–	424.5	433.0
Market-related measures, including:			
Arable crops	0.1	2.5	pm
Olive oil	60.9	43.0	46.6
Textile plants	17.1	6.3	6.2
Fruits and vegetables	1 138.1	1 010.5	1 305.5
Wine	1 044.2	1 022.4	1 095.0
Other vegetable products	227.6	240.8	233.4
Reimbursement for products not included in Annex 1	4.8	0.1	0.1
Milk products	70.3	71.8	131.4
Beef	6.4	0.4	0.1
Pork, eggs and poultry, bees	80.5	32.9	40.8
Monitoring, disputes	119.3	117.1	87.3
Basis for planning, administration	33.9	34.7	68.9
Total market expenditure and direct aid ³	45 302.1	44 288.0	45 234.1
Veterinary and phytosanitary expenditure	263.3	252.2	256.1
EAFRD (European Agricultural Fund for Rural Development)			
Total funds for EAFRD obligations	14 803.5	13 987.3	13 819.2
Total funds for EAFRD payments	13 031.9	11 701.3	11 162.3
Total expenditure of the EAFRD, including:	12 997.1		
Modernisation of agricultural operations	1 470.1	–	–
Infrastructure for rural areas	591.3	–	–
Value creation for agricultural and forestry products	576.2	–	–
Young farmers	392.0	–	–
Early retirement	349.3	–	–
Agri-environment measures	3 338.0	–	–

Compensation allowances for natural disadvantages	1 079.7	–	–
Compensation allowances for disadvantaged areas	993.7	–	–
Services for the rural economy and the rural population	561.7	–	–
Village renewal	503.1	–	–
Business creation and development	249.0	–	–
LEADER (Community-led local development strategies)	836.6	–	–
Total agricultural expenditure – Payments	58 299.2	55 989.3	56 396.4
Total EU budget expenditure – Payments	148 166.4	140 369.2	141 214.0
EU Agricultural expenditure (%)	39.0	39.7	39.4
EU Fisheries Fund			
European Fisheries Fund ⁴ – Obligations	849.7	873.4	889.2
European Fisheries Fund ⁵ – Payments	677.6	589.4	815.3
Other Fishing Measures ⁶ – Obligations	105.1	157.0	129.6

2 Financial contribution from earmarked revenue 2013: 1 346 MEUR; 2014: 710 MEUR; 2015: 1 768 BEUR.

3 Crisis reserves not used in 2014.

4 Budget year 2013, including expenditure for fisheries markets (=31.4 MEUR) and veterinary and phytosanitary expenditure. These expenditures are no longer financed by the EAGF as of 2014.

5 Budget year 2013: European Fisheries Fund (EFF); from 2014: European Maritime and Fisheries Fund (EMFF).

6 Regional and international fishery organisations, international fisheries agreements.

Source: (BMVEL, 2015) page 123

Production or consumption as drivers of deforestation

While the CAP targets land use and food production within the EU, it can have considerable implications on land use and deforestation abroad, mainly due to the ways it can affect the EU livestock sector and feed imports. The challenge remains, therefore, to trace exactly how the detailed cause-effect chains operate (cf. section 3 above). Results would be clearest if, for instance, the 2013 CAP Reform were seen to promote the increase of livestock production and consumption, and thus of corresponding feed imports. This would be likely to increase pressure on land and deforestation in the countries of origin. On the other hand, if the CAP reform led to incentives to increase the areas for protein crops in the EU, this would be likely to reduce protein crop imports from other countries, such as Brazil, Argentina and Paraguay, and thus reduce pressure for further deforestation. However, as laid out above, the incentives under the CAP and its effects seem to be not very strong, and ambiguous, in how they may affect deforestation abroad. Demand levels, and how or whether they change, play an important role in the final outcome.

It is thus crucial to emphasise that animal production levels are influenced by measures that address the demand or the supply side. Currently, the focus of the CAP is clearly on food production patterns, instead of on human consumption of animal products. On the supply side, as laid out above, several aspects of the CAP may be relevant for deforestation, potentially affecting livestock production and imports directly or via feed production and imports. On the other hand, the CAP's influence on the demand side is likely to be low. However, in what follows, we illustrate briefly why changes in demand may be quite relevant and may provide significant leverage for addressing deforestation, albeit the CAP itself does not directly contain measures to address this.

To assess the role of supply and demand, we begin by looking at EU self-sufficiency for meat and dairy products, which is as follows (Table 7):

Table 7: Agricultural self-sufficiency in the EU

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013e
Common wheat	119.0	106.8	102.2	103.1	119.0	108.5	111.2	107.8	113.7	126.1
Barley	124.0	90.1	106.6	115.4	121.0	114.2	97.3	106.1	109.0	121.9
Maize	108.5	101.9	89.9	75.9	103.0	94.5	89.1	101.1	82.0	88.6
Rice	68.6	67.2	66.3	65.6	64.9	76.5	69.9	73.7	72.3	64.3
Sugar	113.9	109.2	91.5	91.9	83.9	95.9	83.3	98.9	89.7	88.6
Cheese	105.8	105.3	105.6	105.7	105.3	105.6	106.7	106.8	107.7	107.9
Butter	110.6	109.6	105.1	106.3	107.4	104.0	101.9	105.9	105.6	104.5
Skimmed milk powder	101.1	116.1	110.3	130.5	144.6	152.8	140.6	159.1	161.8	158.2
Whole milk powder	275.2	273.4	241.5	204.4	261.6	299.0	270.2	226.6	237.7	213.5
Beef and veal	98.6	96.4	96.0	96.2	98.3	97.2	100.4	102.3	101.2	99.6
Pig meat	106.3	105.6	106.1	107.1	107.9	107.6	108.9	110.5	110.6	111.0
Poultry meat	103.2	101.3	101.3	99.8	100.3	100.7	103.1	103.8	104.0	104.2
Sheep and goat meat	82.6	81.8	80.9	80.7	79.6	79.3	81.5	84.1	87.2	86.1

Source: Eurostat via Italian Presidency Background Paper for Milan Informal Council of Agricultural Ministers, Sept 30 2014

FAOSTAT data (FAOSTAT 2016) give a somewhat different view, calculating percentage self-sufficiency as domestic production divided by the sum of domestic production plus imports minus exports, and coming up with figures for the recent years 2011-2013 of 105 per cent EU self-sufficiency for pig meat, 110 per cent for poultry meat and about 100 per cent for milk and eggs.

The very high values for milk powder in Table 7 do not have much bearing on overall self-sufficiency for milk as they relate to only a small part of total milk volumes. The data show that supply and demand of animal products within the EU are not far out of balance for animal products, and thus that no huge percentages of production are exported (which, if it were the case, would mean that support for such production was also acting as export support).

Nevertheless, with net export levels of 5 to 10 per cent of production as is the case for poultry or pig meat, the question arises as to whether the EU needs market intervention and price support for animal products. This is particularly pertinent as it can be observed that most animal products show a recent trend of increasing overproduction and exports. Furthermore, while overall EU self-sufficiency reveals no extremes, patterns in individual Member States may differ considerably from this, being levelled off at the EU level via trade between the member countries. Germany, for example, with an annual production of around 30.3 million tons of milk in 2011, is the world's fifth largest milk producer after the US, India, China and Brazil and on a similar level as Russia, and giving Germany almost 128 per cent self-sufficiency in cow milk (FAOSTAT, 2016a).

In the EU, on aggregate, supply corresponds rather well to demand, i.e. self-sufficiency in animal products is not too far from 100 per cent and exports are rather low. There is no very high overproduction, as production is basically consumed internally (while it is a matter of subjective judgment whether 10 per cent overproduction is deemed high or not). It must be emphasised, however, that these production and consumption levels include food wastage. In the EU this accounts for about 20 per cent of meat and 10 per cent of milk, and in both categories occurs mainly at consumer level (FAO, 2011). Reducing this food wastage would allow a corresponding reduction in

production, with related effects on feed demand. Furthermore, these consumption levels go along with high shares of animal protein in human diets (about 60 per cent) (FAOSTAT, 2016a), which could also be reduced, not least for health reasons (e.g. WHO (2014), Abete et al. (2014)), thus further increasing self-sufficiency.

The role of the CAP is thus less one of providing the wrong incentives (and thereby producing more than is needed), but rather more a case of missed opportunities to steer the sector in the direction of sustainable production. Currently demand is high, and agricultural production aims at meeting this demand cheaply. The CAP does not impose direct restrictions on production, for instance via the internalisation of its external impacts.

Take the case of nitrate surpluses generated by high levels of manure production through intensive livestock farming regimes in some parts of the EU, which can have serious negative impacts on the environment. These impacts include loss of plant diversity, acceleration of climate change and eutrophication (growth of algae and other plant life, which take oxygen from the water, killing fish and molluscs). The issue is covered by the Nitrates Directive, leading to a few indirect restraints through the CAP. In Nitrate Vulnerable Zones the Directive provides for maximum spreading limits and for minimum storage capacity for livestock outside spreading periods. Given the still high nitrogen surplus levels in the EU of about 60kg nitrogen/hectare/year in EU-15, and about 30kg in Central/Eastern EU countries (Eurostat, 2017), these measures however do not yet seem to be strong enough. Nor may the CAP explicitly support such production beyond the overall distortive effects of any non-targeted subsidies. In this context, large-scale livestock production based on concentrate feeds is economically efficient and a prerequisite for producing cheap meat and milk for domestic consumption. This production structure may thus be more driven by the market than by any specific CAP incentives for the use of high proportions of concentrate feed.

In this context, it is interesting to mention briefly the EU's recent experience with milk quotas. Introduced in 1984 to reduce the spiralling overproduction of milk and butter, the milk quota was abolished in 2015, in order to implement more market-oriented production structures, and to allow EU producers to benefit by exporting to meet the rising demand abroad, in particular in Asia (European Commission, 2016e). Thus, one measure that would have curbed the growth of exports and correspondingly restrained production has been abolished. Again, this is not the case of a specific incentive in the CAP for increased production, but rather of the absence of measures in the CAP to curb production that potentially has adverse effects. On the other hand one does have to ask, once again, where and from which production systems the milk would have been sourced in the absence of higher EU exports, if demand in those external markets remained high. Net effects on deforestation may be zero. Nevertheless, by reducing its own exports, the EU could at least reduce its own responsibility for the corresponding feed demand. The responsibility for action would then shift to those producers who jumped in to replace EU supplies.

5. Amending the CAP to reduce deforestation impact

As the analysis in the previous section has shown, the CAP contains few elements that might lead directly to deforestation. It gives no explicit support to concentrate feed imports, or to livestock production based on concentrate feed; the closest it comes to this may be the existence of some coupled payments for animal products, which are comparatively small in the whole CAP budget. It may also be the case that some of the payments for ecological focus areas, by taking those areas out of arable use, may lead to reduced domestic protein crop production. But these coupled payments and the payments for ecological focus areas also entail measures that provide additional incentives for growing protein crops. Thus the overall direct adverse impacts of CAP measures on deforestation abroad are judged to be small.

Nevertheless, as discussed in the sections above, the EU's agricultural production, which is supported by the CAP, clearly correlates with deforestation via the imports of protein rich feed crops from countries with high deforestation. Furthermore, the EU's high levels of production of animal products correlate with higher protein feed imports than would be needed if animal production levels were lower.

Reducing incentives in the CAP for livestock production, i.e. reducing the relevant coupled payments which still exist, would thus be likely to correlate with lower deforestation. **However, what would be most effective in reducing deforestation, as regards the CAP, would be to amend the CAP to create additional measures for:**

- 1) **reducing imports of protein feed crops and livestock products from countries with deforestation risks;**
- 2) **domestic protein crop production;**
- 3) **reducing livestock production based on imported protein-rich concentrate feed; and**
- 4) **increasing livestock production based on other feed sources only**, such as grassland-based ruminant production or the use of livestock feed sourced from food wastage and residues.

Some of these measures would entail a reduction in livestock product supply, and thus require the consideration of complementary demand side measures and of the potential leakage of adverse effects. Similarly, some of these measures would entail an increase of protein feed crop production, and thus require a discussion of where to source the necessary acreage, and of the potential related leakage effects of the displacement of other crops. These caveats will be taken up at the end of this section.

In the following section this report makes recommendations for a) what could be modified under current CAP rules, b) what would need to be addressed under a new post-2020 food and farm policy, and c) what additional measures could be taken besides the CAP.

A) What could be modified under current CAP rules?

The CAP may not do much to directly incentivise production that leads to deforestation. There are, for instance, no specific subsidies for imported feedstuffs. However, some parts of the CAP, such as the beef premium and animal product related market support measures, clearly make these activities more attractive. Abandoning these payments would thus be likely to result in somewhat lower livestock production, and a reduction in corresponding feed imports and the associated potential risk of deforestation.

Reducing the remaining coupled payments for animal products

According to the payments listed in EU Agricultural and Fisheries Expenditures (Table 6), the beef premium is the largest CAP payment coupled to animal production. The additional coupled payments according to Article 53 of Regulation 1307/2013 (cf. above) are also in a similar range, but it is not clear whether and in which countries they may relate to animal production. Abolishing direct payments per head of animal would clearly be a disincentive to animal production, entailing a corresponding reduction in feed demand. However, as these payments relate to ruminants, they target a smaller part of the demand for soybeans and for concentrate feed in general, and may also affect the utilisation of grasslands. Thus, due account should be given to the fact that currently, this premium also supports extensive grassland based production. Animal premiums with purely production support characteristics should be abandoned (e.g. the calf slaughter premium), while others should be strongly linked to the conditional achievement of direct environmental goals or of sustainable feeding practices and animal welfare, such as grassland based and concentrate free feed, outdoor grazing requirements, etc.

Most of the remaining product-specific coupled payments for milk and meat have the character of market crisis intervention measures, so they offer producers some insurance against certain market risks (such as low prices), and their abolition would mean producers having to internalise these risks. In the face of the resulting increase in production costs, production would likely fall, with correspondingly lower demand for feed and thus also for protein feed imports. However, different producers might react differently; large-scale intensive producers, for instance, with lower costs per kg product, might be better equipped to deal with such risks than smaller and less intensive producers. If that were the case, the reduction in concentrate feed might not be as big as expected, as the production cuts would mainly come from producers who rely more on grasslands. It is not possible to undertake in this report a thorough assessment of these considerations, which are raised here merely as arguments of plausibility.

Moreover, it probably makes sense for such market intervention measures to continue to exist at a certain level, for stabilising production and dealing with extreme market circumstances, if they are retained in a form that clearly works as an insurance only and not as direct production support.

The EU school milk programme can be seen as a market intervention that directly supports demand and corresponding production. At about EUR 80 million per year it represents only a negligible share of the total CAP budget, however, and, besides its direct product support effects, it is being reformed to become more effective in supporting healthy food for children and to include more educational measures and information provision (EU Business, 2016).

Further “greening” of general payments

A further shift of CAP payments from Pillar 1 (direct agricultural support payments and market measures) to Pillar 2 (rural development) would support the prioritisation of specific environmental measures based on notions of “public money for public goods”, such as low-input, organic or integrated production (IP) schemes as well as legume/protein crop increases. This shift could impact feed imports. Making Pillar 1 more oriented towards “public money for public goods” could have the same impact, for instance by applying sustainability criteria to the cross-compliance requirements for obtaining Pillar 1 payments. These could include not only the established criteria covering climate, water or biodiversity at single farm level, but also others such as payments targeting regional aspects beyond single farms, which are thus conditional on a number of farmers meeting the requirements together (e.g. agglomeration payments for achieving biodiversity or water quality targets on a landscape- or watershed-level with several farms being concerned). Such sustainability criteria for farm and landscape level could also be applied to feed imports, in principle.

Reducing livestock production based on protein feed imports

Another option (besides using cross-compliance for reducing imported protein feed) could be to reduce protein feed imports by focusing on the need to mitigate surpluses of nitrogen and other nutrients. Importing these feed crops leads to the import of nutrients from outside the EU that are finally disposed of in the EU, thus continuously contributing to the high nitrogen surplus in the EU.

Reducing general payments

It must be stated that the decoupled payments under the current CAP are also subsidies that allow farms to operate, albeit they are not targeted at specific types of production. Reducing these payments, with corresponding changes in the incentives relevant for agricultural production, would also be a possibility. This would increase pressure on production, but also on increased efficiency, with the probable result of further concentration in the agricultural sector towards bigger farms, and an added focus on the high yields that can only be achieved with concentrate feed. It would therefore be essential for a reduction in general payments, and further market liberalisation, to be accompanied by complementary measures to mitigate such adverse effects and to truly achieve a reduction in incentives for deforestation.

B) What would need to be addressed under a new post-2020 food and farm policy?

To improve the CAP to mitigate deforestation, more can be achieved by amending the CAP itself, than by abolishing the few remaining parts of the existing CAP. Amendments of the CAP that work towards more strict and effective greening measures are likely to have greater leverage on livestock production and feed import volumes.

Such changes in the CAP could make agricultural support conditional on reducing nitrogen surpluses, increasing animal health and welfare, and the efficient use of available resources. This would act to reduce ratios of animal numbers per hectare of agricultural land, with a correspondingly reduced imbalance of manure supply and nutrient demand per hectare. It would also act to reduce concentrate feed use in feeding rations for animal production, with an increased focus on sustainable grassland utilisation. In general, support could increasingly be targeted towards less intensive production systems such as organic production, grassland-based livestock systems or permaculture.

Support would then focus on consistency strategies (“how to optimally utilise the available resources within a whole production systems context”) rather than on efficiency strategies (“how to produce with minimal impacts per unit of output”). The mechanism would always be the same, namely a reduction in animal numbers, and a change of feeding rations towards increased grassland shares, both correlating with a corresponding reduction in concentrate feed demand. Such measures could

be complemented by support for research and development of domestic protein feed and high quality forage and grasslands within the EU.

Demand side measures and leakage

Many of the measures suggested tend to entail reductions in animal production (e.g. due to lower yields when changing from concentrate feed to grassland). Unless there is a commensurate reduction in demand for animal products, these measures would just lead to a relocation of production, correspondingly resulting in leakage as regards deforestation impacts. A similar challenge applies to the measures that aim at increasing domestic protein feed crop production; analysis is needed of where such crops would be grown, which other crops they would displace, and whether those other crops would then be grown elsewhere, with potentially similar impacts on deforestation. If more soybeans were grown in the EU at the expense of cereals, for instance, those cereals might be grown in suitable regions where soya is currently grown, thus leading to net zero effects on deforestation.

To ensure positive effects on reducing deforestation, most of the measures suggested need to be accompanied by demand-side campaigns or measures to reduce overall EU consumption of animal products. Reducing the share of animal proteins in diets is often also argued on health grounds (WHO, 2014). Currently they provide almost 60 per cent of protein supply per capita in the EU (FAOSTAT, 2016a). It is not possible to identify what would be their optimal share on health grounds alone, given that well designed vegetarian diets are also a possibility, but animal protein shares in human diets could become considerably lower than they are today. Campaigns and measures could also target food wastage in the EU, currently running at 20 per cent for meat and 10 per cent for milk (see section 4).

Reducing the consumption of animal products has a lot of potential in terms of leverage for reducing deforestation, in view of its direct result of a corresponding drop in concentrate feed demand. Most consumption-related measures are not likely to be part of the CAP, with its focus on production, but could be argued to be a part of a new Food and Farm policy. One possible approach could be to aim to raise prices, and thereby to reduce demand, via more complete internalisation of the external costs of food production. This could be done by developing further the greening component of the current CAP.

This might involve the taxation of excessive nitrogen surpluses, water pollution and methane, or taxation of inputs and activities that strongly correlate with these impacts. Alternatively it might involve stronger regulation to reduce external costs, addressing nitrogen surpluses, per hectare quantities for manure disposal, ratios of animal numbers to agricultural land areas, animal health issues such as the use of antibiotics and welfare issues such as minimum space requirements, etc.

The feasibility of such instruments clearly depends on the details of their design and implementation. Acceptance by stakeholders, and monitoring, verification and reporting costs, will be of particular importance when assessing the feasibility of different approaches.

Increasing food prices to curb demand would, however, need to be analysed in detail regarding its adverse effects on food accessibility, for instance its effects on poorer people, for whom spending on food tends to account for a higher proportion of disposable income.

Increasing domestic grassland-based animal production

Increasing animal production on grassland could be achieved by strengthening the permanent pasture greening measure, but also by increasing the payments for areas with natural constraints and the payments for organic farms, as well as by introducing other specific payments for permanent and temporary pastures. Another approach would be to impose restrictions on concentrate feed use in feeding rations within the greening measures or cross-compliance requirements, thus creating incentives to reduce concentrate feed and correspondingly to increase the use of grassland and other

forages. Corresponding CAP measures could be related to a metric such as “human-edible feed conversion efficiency” (heFCE), which captures the feed-food trade-off of different feed sources (Ertl et al., 2016).

Reducing livestock production that is based on protein feed imports

Reducing livestock production, based on protein feed imports could be achieved potentially using a cross-compliance measure under a new CAP. Such a measure would reduce the demand for protein feed imports and thus the corresponding risk of deforestation. It could, however, be challenged under WTO rules.

Reducing imports of protein feed crops from countries with deforestation risk

This would be the most direct approach to reducing the deforestation pressure arising from agricultural production in the EU. It could be framed via additional conditions to CAP funding. This could probably best be done as part of cross-compliance measures; conditions of this kind would not fit with the greening measures, given their focus on environmental aspects of domestic production. The recent findings of Godar et al. (2016) show that a large proportion of EU protein feed imports stems from municipalities with deforestation risk as identified by the Brazilian Ministry of the Environment 2012 critical deforestation list, and from municipalities with forced labour. Hence such a measure could have a direct impact.

Compliance with WTO rules could, however, be a potential challenge, unless the producer country government (in this case Brazil) encourages the EU to put such measures in place, as is the case with the EU Forest Law Enforcement, Governance and Trade (FLEGT) Programme (FAO, 2017).

Increasing domestic protein feed crop production

The current coupled payments offer some specific support for protein feed crops. Implicitly, payments for organic agriculture also give such support, as legumes play a key role in organic crop rotations. Amending the CAP to achieve higher domestic production of protein feed crops could entail increased coupled support for these crops, as well as for organic production. In principle, amendments could also specify legume components in crop rotations for the crop diversification aspects of the greening measures. This would, however, once again result in coupled payments for protein feed crops.

Increasing the utilisation of wastage, residues and by-products as animal feed

Finally, demand for concentrate feed could be reduced by specific support to raise existing levels of feed usage of food wastage, crop residues and by-products. This may need further research from the feed industry to compile optimal feed mixes based on these materials. If the problem of bone, blood and meat meal being a vector for BSE could be solved, then those protein resources could again be used as animal feed instead of being wasted. Ethical aspects of feeding such animal-sourced feed to animals clearly need to be addressed, but we do not discuss these aspects here.

Recent research has investigated possible overall production levels, and the case of the Netherlands in particular, if livestock systems no longer used energy and protein inputs from concentrate feed, focusing instead on grassland-based systems for ruminant production and the use of wastage, residues and by-products in feeding monogastric (non-ruminant) animals (Schader et al., 2015, Van Kernebeek et al., 2016). The authors found that the correspondingly lower production levels would mean that the share of animal protein in human diets would need to drop to one third or one quarter of current levels, unless livestock product imports were used to allow for a higher share.

Addressing demand

As long as consumers want high quantities of cheap animal products and as long as production is allowed and willing to meet this demand, concentrate-based mass production of livestock will

dominate. The approaches mentioned above would all come with a reduction in livestock production. Unless complemented by demand side measures, this would be likely to result in considerable leakage, as domestic EU production would merely be replaced by imports. Thus, demand side measures directly aiming at reducing animal product consumption levels may have the greatest leverage.

There is no room in the current CAP for targeting consumption directly; such measures would need to be addressed in complementary policy contexts or in an integrated food and farming policy. However, specific support for production practices with low external costs or implementing measures to internalise external costs in agricultural production as described above would be likely to lead to lower production and higher prices, thus setting incentives for reduced demand. To achieve truly sustainable agricultural production systems in the EU, the CAP should be linked much more to the demand side and to general food policy, and might become a common food systems policy rather than being focused on agricultural production.

C) What additional measures could be taken besides the CAP or a new post-2020 food and farm policy?

Reducing imports of livestock products from countries with deforestation risk

Deforestation is not only driven by crop production, but also by livestock production in countries with deforestation risk. The EU's imports of livestock products from such countries may thus directly influence deforestation levels, and measures to address and reduce this risk need to be considered alongside this discussion focusing on concentrate feed sourcing. Such measures, however, would relate not to agricultural production in the EU, but rather to trade and consumption only, and would thus not be covered under the CAP.

Importing only legally produced soya through negotiating bilateral agreements

As pointed out (see section 3) a large percentage of EU soy imports is illegally sourced. Soy beans, meal and oil represent just under half of the total estimated value of illegal deforestation commodity imports. In Brazil the vast majority of deforestation is for cattle and soy – mainly for export - and illegal deforestation remains rampant.

Schemes to achieve a reduction of such illegally sourced imports could be inspired by the EU FLEGT Action Plan, which aims to develop and implement measures to address illegal logging and related trade with timber producing countries. Under this plan, Voluntary Partnership Agreements (VPAs) can be concluded whereby such countries can have easy access to EU markets once they have implemented a legality assurance scheme. Schemes of this kind could use criteria to ensure that conditions are in place covering aspects such as adequate governance, enforcement and related capacities, transparent monitoring and tenure security. Negotiating VPA-type deals between the EU and producer countries to regulate imports that lead to deforestation is an option to be looked at.

Labelling the origin of feedstocks

Information provision is one potentially important aspect of all approaches to mitigating deforestation risk, whether focused on the demand side or the supply side. One approach would be to aim at "full cost accounting", to identify and list all external costs and to show the true costs of production (and consumption). This could help to communicate clearly which aspects of production may be most problematic for deforestation, thus informing consumers and producers, and perhaps also providing a basis for related interventions aimed at ensuring the internalisation of external costs or at disincentivising products with high external costs.

One way to achieve this could be to label certain products according to some existing standard, or to set up rules on imports conditional on certain production standards, although the latter may be

difficult under WTO rules. An example to circumvent WTO rules is the way Article 17 of the EU renewables energy directive is formulated, stating that biofuels that do not comply with a range of sustainability criteria (such as not being grown on land recently converted from forests) are not eligible for financial support and cannot be used for compliance with renewable energy or greenhouse gas emissions targets (European Council, 2009b). A problem with this policy is, however, that the EU has abdicated its responsibilities to regulate what qualifies as sustainable to the different certification schemes, many of which don't have strong enough procedures in place to ensure that products with their labels don't lead to deforestation. Hence there is a liability loophole created by this policy that should be avoided.

Options outside the CAP for increasing domestic protein feed crop production (Bues et al., 2013) may involve using 1) climate policies; 2) nutrient policies such as the Nitrates Directive; and 3) direct support for protein producer initiatives.

Climate and nutrient policies

Climate and nutrient policies have a different prime target than reducing deforestation, but depending on their specific implementation they can have important side-benefits regarding this other goal. Climate policies can help the arguments for avoiding deforestation via the huge related carbon emissions impact. Due to national boundaries in current climate policies, this is less relevant for the EU itself, but attempts to support stronger climate policies in the source countries could contribute to reducing deforestation. Furthermore, if at some stage embodied emissions were to become an issue in climate policy, deforestation and related emissions would be a prime target for action. Nutrient policies are of more direct relevance, as part of the nutrient surplus in the EU is due to feed imports. Actions on reducing nutrient surpluses may target intensive animal production systems with high nitrogen loads and feed imports. Established nutrient policies such as the Nitrates Directive provide an existing and well-established institutional framework for such actions.

Support for protein producer initiatives

The direct support for specific crops runs counter to the current development of the CAP, where decoupled measures are increasingly emphasised. Similarly, it would also run contrary to the thrust of the GATT Agriculture Agreement. Nevertheless, if increasing domestic protein crop production is recognised as an important goal for the coming years, such direct support payments may be a viable option.

Ideally, such payments should then be designed in a way that is not too restrictive and they should be well designed to meet the target they aim at. If the objective is supporting domestic feed production, then the payments should be executed for that, covering not only protein feed crops but also forage crops in general, for example.

Furthermore, such payments should be available for alternative protein feed sources as well. Domestic protein feed sources do not necessarily relate to protein crops only. Support for research and development of innovative approaches such as insect based protein fed on food wastage (e.g. larvae of the Black Soldier Fly) or algae-based feed-protein could be increased.

Increasing tariffs for imports of forest risk commodities or lowering tariffs for sustainably produced commodities

As mentioned in section 2, since the adoption of the Dillon Round of WTO negotiations tariffs for the various soy products in the EU are zero or low. Raising tariffs may be difficult but lowering tariffs for legally and sustainably produced commodities is possible and has been done in the past for sustainable timber under the EU's Generalised Scheme of Preferences. In the case of soy products this would work for soy oil and soy flour (Brack, 2015). Maintaining the zero tariff for soybean meal and soybeans would require proof that they are legally and sustainably produced.

6. Summary of key policy recommendations

The current CAP does not directly incentivise production that leads to deforestation as there are no specific subsidies for imported feedstuffs. However, some parts of the CAP, such as the beef premium and animal product related market support measures, clearly make these activities more attractive. Abandoning these payments could therefore result in somewhat lower livestock production, and a reduction in corresponding feed imports and the associated potential risk of deforestation.

More can, however, be achieved by amending the CAP as part of the current reform process and by turning the CAP into a Food and Farm Policy. Such changes could make agricultural support conditional on reducing nitrogen surpluses, increasing animal health and welfare, and the efficient use of available resources. Such a policy would focus on measures that would lead to reduced incentives for livestock production (e.g. internalisation of external costs, support for grassland-based production systems and increased support for organic agriculture and permaculture).

Addressing demand is in any case critical. As long as consumers want high quantities of cheap animal products and as long as production is allowed and willing to meet this demand, concentrate-based mass production of livestock will dominate. Lower consumption levels and a move towards a true circular economy are critical. The EU therefore needs to develop policies that reduce the consumption of forest risk commodities, preferably as part of an EU Action Plan to address deforestation and strengthen the circular economy. An EU Action Plan should be based on lessons learned from the EU FLEGT Action Plan and other EU initiatives to regulate supply chains.⁷

This Action Plan should also elaborate possible incentives for legal and sustainable production and consumption of soy and other feedstuffs, possibly including the development of sustainability criteria for feed imports - to be negotiated and agreed with all stakeholders in producer countries. These criteria should include indicators on deforestation, and on respect for customary land tenure, but also on indirect land use change to address conversion. Such criteria could be used as the basis for cross-compliance measures under the CAP.

In conclusion, amendments to the current CAP could contribute to reducing deforestation but much more can be expected from a reformed CAP – if that were to focus on reduced nitrogen surpluses and increased animal health and welfare. Even then, it is essential to reduce consumption of animal products in the EU and adopt policies that support such reductions, ensuring only legally and sustainably sourced feedstuffs are produced or consumed in the EU. These are vital steps to reducing the EU's deforestation footprint.

⁷ http://www.fern.org/sites/fern.org/files/Developing%20EU%20measures_0.pdf

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