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The Importance of Coherent and Integrated Energy and Agriculture Policies in Meeting EU Climate Change Objectives

Antony Froggatt, Estelle Rouhaud and Tereza Svačinová

The EU is on track to reach both its Kyoto Protocol commitments and its own 2020 targets for the reduction of greenhouse gas emissions (GHG). However, meeting the ambitious 2050 decarbonisation objective will require significant changes across Europe, and in particular in the energy and agricultural sectors. In the energy sector, efficiency and renewable targets are at the heart of the transformation, with major successes recorded in some member states. Conversely, there has been only slow progress regarding the further development of carbon capture and storage, and structural problems remain with the Emissions Trading Scheme. The reform of the Common Agriculture Policy is creating new opportunities to both deliver further reductions in GHG emissions and to adapt the sector, while changing weather patterns and temperatures affect production. Overall, deeper cuts in emissions will require improved integration of agriculture, climate and energy policies, in order to avoid competing measures and contradictory objectives.

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European Union Climate policy Energy policy Agriculture policy

Introduction

"Climate change is the greatest challenge of our generation"
European Commission President José Manuel Durão Barroso (EU 2007)

While each country contributes to global climate change, and while each country is or will be impacted by it, the advanced economies, which produce the largest share of greenhouse gas (GHG) emissions, must rapidly reduce their emissions if the overall increase in global average temperature is to remain below 2 degree Celsius. The European Union (EU) has been a longstanding champion in climate politics through its policies to reduce its own emissions and through its commitment to global action. The Climate Change and Energy Package adopted in 2009 was viewed as a milestone in EU climate change policy, as it set ambitious emissions reduction targets for 2020, and introduced, for the first time, a clear alignment of the energy security and the decarbonisation agendas. Indeed, the package brought together the domestic objectives of the climate and energy sectors, recognising that without a significant reform of the energy sector, climate policy objectives are unachievable, as the EU's energy sector is responsible for approximately 80 percent of the EU's CO_2 emissions.

Since its inception at EU level, the agricultural sector has been the subject of major structural reforms, which have recently included a strong environmental component. This is in response both to the climate change agenda and to the wider support for more sustainable production. As the agricultural sector will likely be the sector most affected by climate change, there is also a pressing need for further reform to facilitate adaptation.

For the EU, both climate change and energy security are a focus for cooperative activities with many countries. Climate change is seen as a key element of its external relations and, to some extent, a source of its normative or soft power. Many bilateral projects have been developed, including clean coal with China and India, as well as deforestation with Indonesia. "Strategic partnerships" were also established with key states and regions. Examples include the EU-China Partnership on Climate Change, the EU-India Initiative on Clean Development

**** Antony Froggatt is Senior Research Fellow for Energy, Environment and Resource Governance at Chatham House, London. Estelle Rouhaud is Energy, Environment and Resource Governance Programme Coordinator at Chatham House. Tereza Svačinová is PhD student at the Institute of International Studies (IIS), Faculty of Social Sciences, Charles University in Prague.***

and Climate Change, and the Joint Africa-EU 2011-13 strategy action plan setting out a strategic partnership on climate change and energy.

Energy and climate change, as with other environmental and social issues, experience ebbs and flows of media, public and political interest. 2009 and the run up to the United Nations Climate Change Summit in Copenhagen was undoubtedly a high point of – at least European – political interest. Sustained social interest and media coverage, coupled with the championing of climate issues by powerful member states resulted in the adoption of the 2009 climate and energy package. Eurobarometer reports show an increase in public support for European action on climate change through 2009, and then a decline in priority given to the issue in the last couple of years.[1] This changing level of public and political awareness and support is vital for the effective implementation of existing policies and for the establishment of new ones.

In 2014, the European institutions will be refreshed, with European Parliament (EP) elections and the replacement of the European Commission. This will be followed by key developments at international level, with a new international climate change regime expected at the United Nations Framework Convention on Climate Change (UNFCCC) in December 2015. In previous international negotiations, the EU has attempted to play a lead role in developing ambitious policies (Groen, Niemann and Oberthür 2012), and is expected to continue to try to do so.

This paper will focus on the current EU climate change policy and its impact upon two other major policies of the European Union, namely energy and agriculture. It will argue that better integration of the three policies is necessary in order to avoid competing measures and contradictory objectives. In addition, it will present the argument that the rationale for climate action needs to be presented clearly in light of the on-going reforms.

1. EU Climate Policy

The current climate policy of the EU mainly focuses on mitigation, and was initiated to respond to the necessity of complying with the Union's international obligations via the Kyoto Protocol. The Protocol committed the then 15 member states to collectively reducing their GHG emissions by 8 percent below 1990 levels by 2012.

The EU extended its obligations and developed a policy to tackle climate change through more ambitious reduction targets and appropriate instruments. The Climate and Energy Package,[2] published in 2007 and adopted in 2009, unveiled the EU's medium-term strategy in terms of climate change and energy security, with the aim of introducing an energy-efficient and low carbon economy. The Package's climate change objective sets a 20 percent GHG reduction target, from 1990 levels, to be achieved by 2020, which could go up to 30 percent if similar efforts are made by other major countries of the world. Discussions within EU institutions and in some member states calling for a move to 30 percent regardless of other countries' efforts are on-going. Targets for 2050 are not included in the Climate and Energy Package, but the non-binding 2050 Low Carbon Roadmap, published by the European Commission in March 2011, suggests an 80 to 95 percent reduction of emissions by 2050 below 1990 levels (EC 2011g). This objective was also endorsed by the European Council. More recently in March 2013, the European Commission published a Green Paper and opened a consultation to set out energy and climate targets for 2030 (EC 2013a).

1 After 2009, the questions relating to climate change were altered, and thus a pre and post Copenhagen direct comparison is not possible.

2 See the EC DG Climate Action webpage: http://ec.europa.eu/clima/policies/package/index_en.htm.

These reduction commitments reflect the ambition of the EU, regardless of the (slow) progress achieved through the UN international negotiations process, or current levels of commitment by other major economies from the developed and developing worlds.[3] The EU is also pro-active on the international scene, and is pressing for faster action and strengthened dialogue between key countries.

As regards current emissions, the latest data available from the European Environment Agency (EEA) demonstrate that, at the end of 2010, the EU-15 was on track to meet its Kyoto target, with recent estimates indicating that EU-15 emissions in 2010 were approximately 16.5 percent below 1990 levels, and if international aviation is excluded, as is the case with Kyoto Protocol commitments, emissions in the EU have fallen by 17.6 percent since 1990 (EEA 2012b:10). In comparison, United States GHG emissions increased by 8.4 percent from 1990 to 2011 (EPA 2013). However, in recent years, emissions for the US have fallen, as a result of the greater use of gas and renewables – replacing coal – and the decline in US manufacturing. Consequently, emissions are expected to fall by 10.5 percent in 2020 with respect to 2005 levels (Burtraw and Woerman 2012:7, Eshelman 2012).

The EU has a series of instruments in place, the goal of which is to reduce its emissions. The most prominent of these is the Emissions Trading Scheme (ETS), established in 2005. The EU ETS is based on the principle of cap and trade, i.e. emissions of participating European companies are capped and reduced over time so total emissions are supposed to fall, and reduction targets are achieved. The ETS operates in the 27 member states, and covers around 45 percent of the EU's GHG emissions for more than 11,000 installations and industries. It can also be linked to other emissions trading schemes both of other states, such as Australia with which an agreement was signed in August 2012 (EU 2012), and at the subnational level, as is the case with California in the US. The ETS entered its third phase in January 2013, which led to the generalised use of auctioning replacing free allocations, while more gases and sectors were also covered. The aviation sector joined the system in 2012 prior to the start of the third phase. This meant that operators flying to and from the EU were subject to the system's rules, including international airlines. This new inclusion was controversial, leading to diplomatic arguments between the EU and third countries such as the United States and China, which were unwilling to buy carbon allowances. After intense international pressure, the EU decided in November 2012 to suspend the rule for international aviation (EC 2012e). The International Civil Aviation Organisation is now expected to present options for establishing an international agreement on emissions from the aviation sector.

The progress of the ETS has been subject to strong criticism since its introduction, and doubts have been cast on the system as a whole. In particular, the low carbon price (below 10 euros/tonne of CO_2) as a result of the economic crisis, the use of international credits under the Kyoto flexible mechanisms, other carbon reduction measures, particularly the renewable energy target, and the surplus of allowances – in particular those given to Eastern European countries – reduce the market incentives of the whole system. In order to tackle the issue of surplus allowances and help make the system work again, the Commission has proposed the removal of some of the over-allocated emissions in a process called "back loading" (EC DG Climate Action 2012). This controversial measure, if adopted by the Parliament and Council, will temporarily remove 900 million emissions credits from the system in 2013-5, although they are scheduled to be released back in 2019-20. The proposal was rejected in a vote by the EP on 16 April 2013 and has now gone back to the EP's Environment Committee for further consideration. Further reforms to tackle the loopholes and for a more efficient carbon market are undergoing discussion (EC 2012d and 2012a).

3 See http://climateactiontracker.org/countries.html.

For emissions from sectors not covered by the ETS (such as housing, agriculture, waste and transport excluding aviation), member states have committed to binding annual national targets, in order to achieve a 10 percent reduction overall compared to 2005 levels by 2020 (EU 2009a).[4] The policies needed to achieve these are the responsibility of each member state.

Discussions on the EU's long-term low carbon strategy are on-going. A Commission proposal for an Environment Action Programme, which includes an objective on low carbon growth, is currently being considered by the EP and the Council (EC 2012b). The EU Commissioner for Energy, Günther Oettinger, called in an interview last year for a reform of the EU climate and energy policies to be concluded before the next EP elections in June 2014 (Van Renssen 2012). However, this would seem an ambitious timetable, and it is more likely that discussions on the post-2020 targets will only be begun under the current Commission and will then be adopted in the second half of 2014 or 2015. In February 2013, President Barroso indicated that the EU should move towards a higher target when he stated that "[b]y 2030 global greenhouse gas emissions need to be reduced by 40% to be on the right track towards the agreed target to constrain atmospheric warming to 2°C" (Barroso 2013).

Given its prominent contribution to European GHG emissions, the European energy sector is a first target for reform in order for the EU to meet its emissions reduction goals. Without adequate investment in low carbon technologies and a rethink of the current use of energy sources, the current targets and other stated climate ambitions could clearly be missed. Similarly, the agricultural sector must face major changes in order to become more resilient to the impacts of climate change and to contribute to its mitigation. The next two sections will present the on-going reforms and remaining challenges for the European energy and agricultural sectors, in light of their impact on, and vulnerability to, climate change and the environment.

2. EU Energy Policy

Energy has historically been at the heart of the EU institutions with two of the three founding treaties, the European Coal and Steel Community (ECSC) Treaty and the EURATOM Treaty, focusing on the development of particular energy sectors. Via the Lisbon Treaty, energy policy for the first time became an area of joint EU-member state competence, including in the external dimension of supply security (Article 194(1) TFEU). The Treaty sets out the four main aims of the EU's energy policy: a) ensuring the functioning of the internal market; b) ensuring the security of energy supply in the Union; c) promoting energy efficiency and energy saving and developing new and renewable forms of energy; and d) promoting the interconnection of energy networks (Braun 2011). However, despite this new degree of harmonisation, member states retain the right to determine their energy mix. Therefore, there is already a considerable challenge in balancing the priorities of these four aims while also managing the concerns and requirements of member states.

At the start of the 2010s, the over-riding issue affecting the energy sector is the economy, which is leading to a flat, or in some sectors, a declining energy demand. Between 2008 and 2011, energy consumption fell by 6 percent and by 3 percent in the electricity sector (Eurostat 2013b and 2013c). This lack of growth is affecting investment, in particular in the power sector, with overcapacity in some countries leading to lower electricity market prices. As a result, relatively little new generating capacity is being built across the EU. The only sector that has been booming in the last few years is that of renewable energy construction. An analysis by the European Wind Energy Association (EWEA) shows that nearly 166 gigawatts (GW) of wind and solar power were added

4 See the EC DG Climate Action webpage on *Effort Sharing Decision*, http://ec.europa.eu/clima/policies/effort/index_en.htm.

to the EU power grid between 2000 and 2012—outpacing the 121 GW of natural gas additions. Total installed nuclear capacity in the EU declined by 15 GW, joining the rapidly declining trend of coal- and oil-fired power plants (EWEA 2013:8). In 2011, for the first time, European investments in renewable energies were higher than those for conventional fuels (Oettinger 2013).

The strong growth for renewables is due to the binding target that should see 20 percent of the EU's energy needs met by renewable energy by 2020, constituting part of the 2009 Climate and Energy Package. As renewable sources that generate electricity, as opposed to heating or transport, are the most advanced technologically, this sector is expected to lead the way, resulting in a 30-37 percent contribution by 2020, up from 14 percent in 2000 (EC 2011f:5).

While the support for renewable energy is linked to a low carbon agenda, it is not its only "selling point". Increasingly, renewable energies are also portrayed as technologies which are important for local economies and employment, as well as potential hedges against price fluctuations for imported fossil fuels. In the last two years, the production of solar electricity in just six member states (Belgium, Czech Republic, France, Germany, Italy and Spain) has increased from 14 terawatt hours (TWh) in 2009 to 43 TWh in 2011, while EU wind power increased from 133 TWh to 174 TWh over the same period.[5] However, the success in implementing renewables is not uniform. In the 2013 progress report the European Commission finds that 13 member states are meeting or exceeding their targets but that the transposition of the 2009 Renewable Energy Directive has been "slower than desirable". In addition, as a consequence of the economic crisis, "current policies" could be insufficient to trigger the required renewable energy deployment in a majority of Member States" (EC 2013b). In a number of countries, for economic reasons, support schemes have been cut dramatically, thereby reducing the rate of deployment of renewable energy.

Within the overall target, it is required that within the transport sector 10 percent of power will come from renewable energy sources. This relies on the use of biofuels. However the environmental justifications for this appear increasingly weak. At best, biofuels are an extremely expensive mitigation strategy: due to the high level of government financial support required, carbon abatements costs are several orders of magnitude greater than alternative strategies to decarbonise transport (Jung et al. 2010, Charles et al. 2013).

In the next decade or so, unprecedented levels of new investment will be needed in the EU power sector in general, with the International Energy Agency (IEA) estimating that, by 2035, 2.8 trillion dollars will be needed to replace retiring infrastructure and power plants and build renewable energy capacity (IEA 2012:194). Much of the retiring capacity will be base load coal and nuclear power plants, and therefore replacing this with variable generation renewable energy requires significant investment in new grids, storage and back-up systems.

The type of investment needed is particularly affected by uncertainties in the gas sector. Both the development of shale gas in North America, and the increase in liquefied natural gas (LNG) importation facilities, have raised expectation in Europe for a new level of security of supply. However, there are many geological, environmental, land ownership, land use and regulatory differences between the EU member states and the US, and therefore there can be no guarantees that the North American shale gas revolution can be reproduced in the EU (Stevens 2012).

5 See "Electricity Generation" in EIA *International Energy Statistics* database: http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=6&pid=29&aid=12. See also BP 2012

Despite climate objectives, coal – both in the form of hard coal and lignite – remains an important part of Europe's current electricity supply, in particular in countries such as the Czech Republic, Germany and Poland. With low carbon prices and relatively low coal prices, this dominance might be set to continue for some years to come. However, the impact of emissions control, and in particular the Industrial Emissions Directive (IED), is likely to significantly curtail the use of coal post-2020. It is currently assumed that around 60 percent of coal capacity (124 GW) in the EU is not in compliance with the IED. This will require either expensive retrofitting in order to reduce sulphur and nitrogen dioxide emissions or power plants will need to be limited to no more than 17,500 hours between 1 January 2016 and 31 December 2023 (BNEF 2012), which will lead to the closure of a significantly number of coal plants.

The continuing use of fossil fuels, and particularly coal, in a carbon-constrained world, is linked to the use of carbon capture and storage (CCS). In March 2007, the European Council endorsed the Commission's intention to stimulate the construction and operation by 2015 of up to twelve demonstration plants using sustainable fossil fuel technologies in commercial power generation. It was then assumed that by 2020 or soon afterwards, CCS would be able to stand on its own feet in an ETS-driven system (EC 2008). However, these plans have not come to fruition and the objective in no longer achievable. In part, this is due to the collapse of the carbon prices, which in the Spring of 2006 reached 32 euros per tonne of CO_2, but as of early 2013 was at around 5 euros. This has both significantly reduced the economic incentive to develop CCS and has reduced some of the funding available for its development, as it was linked to the carbon price. In addition to carbon price uncertainty, there has been a lack of political pressure and industrial will to drive forward EU CCS policies.

Nuclear power remains a significant source of electricity in the EU, providing around 28 percent thereof. However, this figure is dominated by France, which produces around half of the total for the EU. The Fukushima nuclear accident in 2011 had a varied impact on the fortunes of nuclear power across the EU, with some states, such as Belgium, Germany and Italy, moving against its continuing use, while others, such as the Czech Republic, Lithuania, Poland and the United Kingdom (UK), are considering building more stations. While the European Commission and other EU institutions are largely supportive of nuclear power, the divergences of views in member states, and the fact that the choice of energy mix remains within the powers of national governments, keep EU engagement in the overt promotion of nuclear power to a minimum. Despite this fact, the EU is active in its support of nuclear research and development, which receives more funding than all other energy sources combined: in 2013 approximately 990 million euros was allocated to nuclear (fission and fusion), with a total of 415 million for other energy sources (EC DG Research 2012).[6]

The Climate and Energy Package sets out the ambition for the EU to deliver a 20 percent energy efficiency saving compared to current projections (i.e. business as usual), corresponding to a 7.7 percent saving in absolute terms. Energy efficiency was the only non-binding target in this framework. The European Commission has highlighted that EU member states' projections suggest that only half of this target will be achieved (EC 2011c).

Despite its 2020 goals, the EU is increasingly reliant on imports to meet its energy needs. Over the last decade, the reliance on imported energy increased by 6 percent. The extent to which the EU is now reliant on imported oil is now consistently over 84 percent. This increase in import dependency, combined with increasing price volatility in global markets for both oil and gas means that energy security has risen up the political agenda (Eurostat 2013a:29, 33).

6 For details see the webpage *Budget on-line*: http://eur-lex.europa.eu/budget/www/index-en.htm.

In 2007 the Commission expected that, without action, the EU's energy import dependency will rise further to 65 percent in 2030. Reliance on imports of gas is expected to increase from 57 percent to 84 percent by 2030, and reliance on oil imports from 82 percent to 93 percent. In volume terms, this represents a 40 percent increase on today's total energy imports (EC 2007:3). The EU institutions and member states are seeking to increase the coherence of their external energy policy through united action in negotiations with large energy producers (such as Russia), transit countries and countries with significant increases in demand (such as China and India) (EC 2011b).

3. EU Agriculture Policy

The EU climate change policy also affects the agricultural policy of the Union. There are many connections between agriculture, climate change and the environment more generally.

The climate system responds to changes in greenhouse gas concentrations with a lag and, therefore, mitigation measures should be combined with minimising climate change impacts and adaptation measures. Hence, there are two challenges for the agricultural sector. The first one is to reduce GHG emissions and the second is to adapt the activities of the agricultural sector to the changes caused by the impact of climate change.

Agriculture produces less GHG emissions than other economic sectors – it accounts for around 9 percent of the total GHG emissions in the EU. While the sector is a user of fossil fuels, GHG emissions are relatively small, as are its emissions of CO_2. Furthermore, there can be positive effects in the agricultural sector relating to CO_2 because of the growing and cultivating of plants; forests, in particular, can absorb carbon and thus reduce its content in the atmosphere. The amount of carbon removed from the atmosphere through absorption by forest and agricultural land is equivalent to about 9 percent of the EU's total greenhouse gas emissions. Furthermore, it is estimated that the release of just 0.1 percent of the carbon currently stored in European soils would equal the annual emissions from 100 million cars.[7] Therefore although this sector is not included in the ETS, it is a significant contributor to GHG emissions.

The main GHGs associated with agricultural activity are methane and nitrous oxide, largely connected with fertiliser use and stock raising. The summary report published by the EEA in 1996 indicates that in 1990 the largest methane emissions in the EU-27 (33 percent) were from the agricultural sector, then 23 percent from the extraction and distribution of fossil fuels and also from nature and 19 percent from waste treatment and disposal. In 1990, the agricultural sector also produced 39 percent of all nitrous oxide, with nature contributing 29 percent and production processes 19 percent (EEA 1996:45, 75). Nitrous oxide occurs through the microbial transformation of nitrogen fertilizers in the soil, and contributes to nearly half of agricultural GHG emissions. As for methane, it is produced by digestive processes of ruminants – mainly cattle and sheep. These two GHGs have a global warming co-efficient 310 and 21 times larger than CO_2 respectively (EC DG Agriculture 2010).

The agricultural sector, with its dependency on weather conditions, is likely to be the sector most affected by climate change, and therefore the EU needs an adaptation strategy. Already, climate change is causing a large year-on-year variability in crop yields (EC DG Agriculture 2008a). This will particularly affect small holders and subsistence farmers, as they may not have the means to adapt to these new conditions. This could lead to land abandonment and the movement of people from the affected rural areas, thereby disrupting rural

7 See the EC DG Climate Action webpage on *Policies. Forests and Agriculture*, http://ec.europa.eu/clima/policies/forests/index_en.htm.

development. Since the EU lies on several climatic belts, in some areas climate change has also had a short-term positive impact. For example, in the Nordic countries, the growing season of crops has been extended. However, on the other hand, the agriculture of southern European countries suffers from drought, which can also lead to more plant diseases or support the spread of such diseases (EC DG Agriculture 2008b:13). The Joint Research Centre of the European Commission recently published the results of the AVEMAC project, which identified and analysed the impacts of climate change on European agriculture (Donatelli et al. 2012). The report emphasised the varied impacts of climate change and the possible differences between Central Northern Europe and Southern Europe. There may be some positive impacts on yields, where there are no water constraints, such as increased photosynthesis efficiency due to elevated CO_2 concentrations and the improved thermal regime. However, there are many negative impacts, for example the shortening of the main period of growth for grain crops. There will be changes in the classification of areas with climate constraints via static weather indicators. For example, areas in Finland, Sweden and Scotland classified as constrained in 2000 are estimated achieve the status of not constrained by 2030 due to increases in mean annual air temperature (Donatelli et al. 2012:39-42).[8]

In other parts of the world, for example in Africa, excessive dryness will increase the risk of famine, which, in extreme circumstances, will cause the total depopulation of some areas. The direct impacts of climate change on agriculture can also be seen in soil fertility, the increased vulnerability of soil organic matter and higher risks of soil erosion caused by rising temperatures (EC DG Agriculture 2008a:19).

Many directives and measures restricting the use of nitrogen fertilizers in agriculture have been introduced, such as the Integrated Pollution Prevention and Control Directive (1996), the National Emission Ceilings Directive (2001), and the Water Framework Directive (2000). Consequently, during the period 1990-2005, GHG emissions in the agricultural sector dropped by 20 percent (mostly by reducing the number of livestock and the use of nitrogen fertilizers). Experts also confirm that the full implementation of the Nitrates Directive can reduce NO_2 emissions by 6 percent by 2020 (compared to 2000) (EC DG Agriculture 2010). According to the EEA, the changes in GHG emissions in the agricultural sector between 1990-2010 were as follows: -24 percent change in nitrogen oxides emissions, -47 percent in CO emissions and -20 percent in CH_4 emissions (EEA 2012a:fig. 7, 9 and 10).

However, further measures will be needed if the longer term GHG reduction targets are to be met. The main possibilities for agriculture include reduced tillage (changing ploughing techniques can reduce the release of CO_2 because plant residues containing CO_2 will remain in top soil), more effective agricultural practices (such as more efficient use of fertilizers or the use of newly bred varieties of crops) and reducing the methane produced by cattle, by changing the feed, i.e. improved composition of feed or vaccination of cattle. The higher absorption of CO_2 also helps the afforestation of agricultural areas (EC DG Agriculture 2008a and 2008b, EC 2009). The Academy of Sciences of the Czech Republic noted interesting findings related to the soil pH, namely that nitrous oxide emissions are very likely to be related to soil pH: at higher pH nitrous oxide emissions are relatively decreasing, while the proportion of molecular nitrogen is growing. This finding will probably be useful for further research focused on reducing these emissions (Šimek and Cooper 2002, Šimek et al. 2006).

Biofuels are an important linkage between the energy and agriculture sectors. However, there are important issues about the quantity of GHG emissions that are saved as a result of their use. More problematically, these limited emissions savings are only achievable under a special set of conditions in which feedstock production does not trigger significant emissions from land-use change. Emissions from land-use change may occur

8 For more information about impacts on particular crop yields see AVEMAC project: http://mars.jrc.ec.europa.eu/mars/Projects/AVEMAC.

directly, if land of high carbon stock is converted to produce feedstock. Or they may occur indirectly, as biofuels increase aggregate demand for agricultural commodities and lead to the remote expansion of the agricultural frontier. In either case, estimates of emissions from land-use change suggest that they may completely swamp the emissions savings which biofuels offer (Fargione et al. 2008, Searchinger et al. 2008, Timilsina and Mevel 2011, Laborde 2011, Malins 2011), and that therefore the current generation of biofuels can only bring limited climate benefits, while engendering other potential negative environmental impacts.

Large-scale production of biofuel feed stocks can have other environmental consequences. Crops such as sugarcane and maize are water intensive, requiring significant irrigation in many contexts that may have serious consequences in water-scarce regions. Large scale mono-cropping production models threaten biodiversity and are often heavily reliant on agrochemicals which can lead to the pollution of surrounding soils, air and water. In October 2012, the European Commission launched proposals for new rules on the GHG emissions associated with biofuels, including limiting the amount of biofuels by 2020 and ending public subsidies unless they can demonstrate a "substantial greenhouse gas saving" (EC 2012e:3).

3.1 The Context of the CAP Reforms from the Perspective of Environmental Requirements

The Common Agricultural Policy (CAP), one of the first common policies of the EU, was established in 1958 at a conference in the Italian city of Stresa. An agreement in January 1962 then determined how the Common Agricultural Policy will work in practice, and since then, CAP has begun operating. The reason for establishing the CAP was to ensure food sovereignty in Europe and to stabilise food market and prices, as well as to ensure continuous supply and also a sufficient level of income for farmers. By the early 1990s, the CAP focused more on production and intensive farming.

The MacSharry reform in 1992 was the first reform with an emphasis on the protection of environment (EC 1991).[9] Public interest in terms of crop production and animal husbandry increased, as the practice of intensive farming in the EU at that time used a large amount of fertilizer and growth hormones, which entailed a negative impact on the food for the final consumer. So, public pressure regarding the quality of food production and its impact on the environment increased. The 1990s were an important historical milestone, which determined the future direction of the CAP, which focused more on quality than on quantity of production.

At the turn of the millennium, EU farming policy ceased to be a policy of production and began to follow the new trend of sustainable agriculture to a greater extent. The number of environmental requirements and rules included in the CAP started rising. Environmental requirements were eventually accepted. During this time, the CAP was also officially divided into two pillars, the first focused on direct payments and market measures and the second related to rural development issues (Svačinová 2009).

In the CAP reform of 1999, generally known as Agenda 2000, the European Commission introduced the concept of "multifunctional agriculture", which incorporates not only the production function of agriculture, i.e. farming, but also non-agricultural activities such as landscaping, soil and water protection. This concept was aimed at helping farmers to diversify the portfolio of farms, which thereby became less dependent on food production. This style of farming has led to the agriculture sector's greater respect for environmental standards (EC 1999).

9 See the EC DG Agriculture webpage on *The 1992 reform ('MacSharry reform')*, http://ec.europa.eu/agriculture/cap-history/1992-reform/index_en.htm.

The increasing interest of the general public, experts and also governmental and non-governmental organisations in environmental and climate change issues unleashed another wave of environmental requirements within the EU farming policy. The first such step can be seen in the 2003 CAP reform, which is the so called "decoupling" of direct payments (EU 2003).[10] It means that the payments have been decoupled from the volume of production in order to reduce the motivation for farmers to engage in an intensive style of agriculture, which encourages them to use environmentally unfriendly fertilizers to stimulate production. Since 2003 reform, the direct payments are paid per hectare, and not connected to the production itself, so farmers are not only motivated to produce higher yields. This step can be seen as one of the turning moments in agricultural policy, and was initially sharply criticised by farmers, who claimed that it would impact severely on overall production, which is undesirable in terms of world demand for food and rising population (Svačinová 2008).

The second important step towards a stronger linking of agricultural and environmental policies was the creation of a series of rules called "cross-compliance", also included in the 2003 reform. The result was that, for the first time in the history of the CAP, the direct payments and certain other special types of financial support described under the each common market organisation (CMO)[11] were subject to compliance with environmental requirements. These requirements are connected with basic standards concerning the environment, food safety, animal and plant health, and animal welfare, as well as the requirement of maintaining land in Good Agricultural and Environmental Condition (GAEC) (EU 2009b). More specifically, there are rules related to the conservation of wild birds, the conservation of natural habitats, the protection of groundwater against hazardous substances, the protection of waters against pollution caused by nitrates, the marking of pigs, cattle, sheep, and so on (see, for example, UK Dept for Environment 2012).

However, despite the relatively strong integration of environmental and climate policy in the CAP, this trend is insufficient, and in the last reform proposal, European institutions and experts called for a further strengthening of environmental requirements (EC 2011d). This has caused strong resentment among farmers and disagreement between member states. Further, discussion of the forthcoming Multiannual Financial Framework exerts a strong influence upon the negotiations on the future of agricultural policy, as discussed below.

3.2 The Current CAP Reform, Climate Action and Environment – Is the Farmers' Cup of Patience Overflowing?

Since the Lisbon Treaty empowered the European Parliament with the authority of participating in the process, CAP reform has become lengthier than before. The first Communication on the future of the CAP after 2013 was presented to the public by the European Commission in the Fall of 2010. Three years later, all controversial points of the reform are still being negotiated. The Irish Presidency of the EU Council (in power for first half of 2013) has promised completion of the negotiations and approval of the CAP reform (Irish Presidency 2013). However, the Presidency is now facing the difficult task of creating a "transition period" of direct payments for the year 2014, since the entire reform and the new rules will most likely not be approved on time, before the current regime for direct payments officially ends, at the end of 2013.

The main points of disagreement include, amongst other things, environmental issues. The new proposal suggests an innovation related to direct payments scheme. The EC named branded as a "green component" of

10 See *Single Farm Payment (SFP)*: http://europa.eu/legislation_summaries/other/l11089_en.htm.

11 There are several CMOs, each related to the specific product. Some payments under those CMOs are subject to "cross-compliance" rules as well. For example under the CMO for wine, the premium relates to grubbing-up or for restructuring of the vineyard.

direct payments. More precisely it means that 30 percent of the amount of direct payments allocated for each member state shall be paid only if the farmers from that Member State fulfil the environmental requirements falling under the green component. The farmers will automatically receive 70 percent of direct payments to which they are entitled, and the rest only if they follow special environmental requirements described under this "greening component".

There are three main requirements under this "greening component": crop diversification, maintaining permanent pasture and permanent grassland, and creating "ecologically" focused areas. The most complicated measures are the requirements of crop rotation on arable land and maintaining an "ecological focus area" of at least 7 percent of farmland (EC 2011d). Some member states have asked to make this rule on the basis of a voluntary commitment only, as they argue that there are already enough environmental requirements under the CAP, for example "cross-compliance", the so-called GAEC rules, et cetera and that the administrative burden will increase still further. However, EU officials counter that farmers already follow many rules covered in the green component automatically, so the new requirements will not amount to a really significant change.

Greater emphasis on environmental and climate requirements can be seen in the second pillar of the CAP, i.e. rural development policy, where three of the six policy priorities relate to environmental and climate aspects: the first one concerns restoring, preserving and enhancing ecosystems dependent on agriculture and forestry; the second the promotion of resource efficiency and support for the shift towards a low-carbon and climate-resilient economy in the agricultural, food and forestry sectors; and the third the fostering of knowledge transfer and innovation in agriculture, forestry and rural areas (EC 2011e).

The debate about the Multiannual Financial Framework had also a strong influence on the future of the CAP as the European Commission has suggested the reduction of the budget by 9 percent for sustainable growth and natural resources (under Heading 2) (EC 2011a). This has again provoked a strong resentment amongst the agricultural community, and has complicated the negotiation of the CAP reform. In response to this, Paolo De Castro, the Chairman of the Agricultural Committee of the European Parliament, stated that CAP "should be more efficient [and] greener […]. Such ambitious goals entail higher costs. So any further cuts to the CAP budget are simply inacceptable" (EP 2013).

Conclusions

The next three to five years are crucial for the future of EU climate policy, with pressure building for new EU legislation or a clear framework to be in place in late 2014 or early 2015, in preparation for negotiations for a new international climate regime in 2015. The EU will also have to renew its renewable energy targets post-2020, and discussions on the possibility of repackaging the target as a "low carbon energy" target (to enable it to include nuclear and fossil fuel plants with carbon capture and storage) are on-going. A combined low carbon target would almost certainly reduce the contribution of renewable energy and raise new controversies. Simultaneously the discussions on the future of the CAP, with the further development of a centrally-controlled system, are expected to ensure better compliance for meeting climate change objectives. Further, linking the green component with the direct payment system will entail that achieving future objectives is directly connected with payments. This should ensure that the majority of the agricultural sector will use practices with environmental and climate benefits such as the retention of carbon in soil and grassland habitats associated with permanent pasture, the delivery of water and habitat protection via the establishment of ecological focused

areas, as well as various improvements of the resilience of soil and ecosystems through crop diversification.

Attempts to integrate climate and energy policies at the EU level began in 2007, but greater efforts will be needed in particular as GHG emissions must further decrease and greater adaptation of infrastructure is required. On the same basis, the EU also needs to look more closely at how the agricultural sector interacts with climate change and how the EU Agricultural and Climate Policies, acting together, can synergistically reduce GHG emissions. The current reform of the CAP adequately incorporates environmental protection and climate change issues. However, although there is increasing harmonisation between climate change objectives and the CAP, ultimate success will be determined by the overall reform of the CAP, which is still far from assured.

Coordinated action between the three policies and a clear balance between climate and other environmental policies are necessary, in order to avoid competing measures and contradictory objectives. As many renewable energy sources have significant land use and resource use implications, without careful planning, energy supply needs will be, and already are, in conflict with agricultural requirements.

The most immediate areas that should be further addressed relate to biomass and biofuels. To ensure that they are truly effective and sustainable, clear guidelines on their environmental impacts and resource use, both in relation to domestically-grown and imported biofuels, are needed. This will avoid situations like those that occurred for the first generation of biofuels, where at first the production of biofuels was strongly supported, but such production became more and more controversial as the wider implications of their use were understood.

The need for action across these policy areas must be effectively communicated to the main stakeholders and lobbies, such as farmers and energy companies. Presenting the wider environmental and societal benefits of lower GHG emissions is necessary in order to maintain widespread support. While there has been a decrease in some areas in terms of support for EU action on climate change, on the question of support for the EU's renewable energy targets, three quarters of those questioned in a Eurobarometer poll published in 2012 thought that the target was about right or too modest (Eurobarometer 2012:24). This level of public support is a reflection of the wider public understanding of the role of renewable energy in reducing dependence upon imported fossil fuels, and the potential for localised and national job creation. In a similar way, the wider societal advantages of the greening of the CAP must be put forward. Without strong public support, reform of the sectors towards greater sustainability will at best be delayed and at worst, will not be adopted, which could jeopardise attainment of climate targets.

Without radical changes, primarily in the production and use of energy, global GHG emissions will quickly rise to a level that is expected to result in temperatures rising by more than 2°C above pre-industrial levels. Current projections suggest that if current practices continue it is more likely that global temperatures will rise by more than 4°C. If this occurs, it will have a devastating impact on human society and the wider environment. In particular, recent studies suggest "a rapidly rising risk of crop yield reductions as the world warms" and that "large negative effects have been observed at high and extreme temperatures in several regions including India, Africa, the United States, and Australia" (Potsdam Institute 2012:xvi). There is, therefore, a real imperative for the energy sector, which produces the greatest amount of GHG to integrate its efforts with the agricultural sector, which will be the first to suffer the consequences of climate change.

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The Project

In an era of global flux, emerging powers and growing interconnectedness, transatlantic relations appear to have lost their bearings. As the international system fragments into different constellations of state and non-state powers across different policy domains, the US and the EU can no longer claim exclusive leadership in global governance. Traditional paradigms to understand the transatlantic relationship are thus wanting. A new approach is needed to pinpoint the direction transatlantic relations are taking. TRANSWORLD provides such an approach by a) ascertaining, differentiating among four policy domains (economic, security, environment, and human rights/democracy), whether transatlantic relations are drifting apart, adapting along an ad hoc cooperation-based pattern, or evolving into a different but resilient special partnership; b) assessing the role of a re-defined transatlantic relationship in the global governance architecture; c) providing tested policy recommendations on how the US and the EU could best cooperate to enhance the viability, effectiveness, and accountability of governance structures.

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