Policies for the ecological transition of agriculture: the livestock issue

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Review of Agricultural, Food and Environmental Studies (2020) 101:529–538
https://doi.org/10.1007/s41130-020-00135-7

NEWS AND VIEWS

Policies for the ecological transition of agriculture: the livestock issue

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Accepted: 17 November 2020 / Published online: 6 January 2021

Abstract

The new European Commission for 2019–2024 proposed the European Green Deal with renewed ambition for climate and environment policies to achieve carbon neutrality and a toxic-free environment by 2050. Accordingly, the Farm to Fork and the new Biodiversity Strategies, issued in 2020, set quantitative objectives for fertilisers, pesticides and antimicrobials, organic farming and high-diversity landscapes by 2030. Livestock is directly and indirectly responsible for a large proportion of agricultural greenhouse gas emissions with its feed and forage demand, and agriculture and livestock must undergo radical changes to align. The present policy and financial means, including the Common Agricultural Policy, have proved unable to put the EU farm and food sector on the right track. The policy proposals that I defended in the 2019 France Stratégie Report on the CAP employ public economic principles. Reducing polluting inputs and waste with sound innovations in the farm and food sector needs a coherent policy framework. The Green Deal ambition also requires radical changes in income and social surplus distributions as well as in EU consumers' diets, corresponding to far higher taxes and subsidies than usually considered in academic papers.

Keywords Agriculture · Climate · Biodiversity · Policy · European Union · Fiscal federalism

The EU's environmental footprint is well above the so-called planet boundaries (EEA 2019c; Campbell et al. 2017). The agricultural sector contributes to this excess through greenhouse gas (GHG) emissions and negative impacts on biodiversity, air, water and soil. EU livestock production is responsible for a large proportion of these negative impacts, directly through its GHG emissions (methane) and use of antimicrobials, and indirectly by consuming a large share of grain production for feed, inducing soil GHG

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emissions associated with fertiliser and pesticide use. In the EU, 179 million hectares (Mha) of land are agricultural land, of which 60 Mha are permanent grasslands, 12 Mha are permanent crops and 107 Mha are arable land (Eurostat 2020c). Around 60% of arable land is devoted to forage crops such as temporary grasslands, alfalfa and maize, and to cereal and oilseeds for the animal feed industry. Taking into account forage and feed production, livestock production generates three quarters of inventoried agricultural GHG and more than one third of pesticide use. Despite growing global demand for animal products, most EU livestock farms are hardly profitable (Dumont et al. 2019).

While climate mitigation policies excluded agriculture until recently, EU directives have been regulating water and air pollutants from agriculture since the 1990s. To strengthen their disappointing implementation by EU member States (MS), the common agricultural policy (CAP) progressively integrated some of their requirements into its regulations with the so-called cross-compliance in addition to the direct support of environmentally friendly practices and organic farming. Despite these efforts and the improvement of certain environmental indicators, the policy framework, tools and budget are far from being aligned with climate and environmental challenges (Dupraz and Guyomard 2019). The legislative proposals for the future CAP, issued in June 2018 by the European Commission (EC 2018a, EC 2018b), are going one step further with a new payment scheme, the eco-scheme, devoted to the climate and environment, and a new delivery model where each MS assumes greater responsibility for the implementation and success of the CAP. In line with present and past CAPs, the proposals suffer from contradictory objectives including competitiveness, farm income support, rural development, animal welfare, the climate and environment, cheap, healthy food, with no hierarchy among the objectives. In addition, most CAP measures are maintained whatever their past performance, with no changes in policy tools or budget to deliver higher and consistent incentives.

The new European Commission for 2019–2024, presided by Ursula von der Leyen, proposed the European Green Deal (EC 2019) with renewed ambition for climate and environment policies. Issued in May 2020, the Farm to Fork Strategy (F2FS) develops the Green Deal objectives and actions for the food and agricultural sector (EC 2020b) in coherence with the Biodiversity Strategy for 2030 (EC 2020a) and the regulation proposal to achieve climate neutrality in 2050 (EC 2020c), issued at the same time. In her State of the Union address on 16 September 2020, von der Leyen presented reinforced objectives for the mitigation of climate change. Compared with 1990 levels, the cut in GHG emissions must reach 55% rather than 40% by 2030. By June 2021, the Commission will review, and where necessary propose to revise, all relevant policy instruments to achieve these additional emission reductions. Although healthier and affordable food as well as better incomes for farmers are also F2FS objectives, the 2030 quantitative objectives only target agriculture with the reduction of fertiliser use by 20%, the reduction of pesticides and antimicrobials by 50%, 25% of agricultural land to be used for organic farming and 10% in high-diversity landscapes features. The policy and financial means to achieve this highly improved ambition remain questionable. The F2FS mentions the promotion and scaling-up of sustainable production, circular business models, the reduction of food loss and waste, and green finance with regard to carbon pricing in the agricultural sector. Although MSs have already started to devise their National Strategic Plans (NSPs) to implement the future CAP, coordinating and aligning the 27 NSPs with the Green Deal objectives remain a considerable challenge (EC 2020d).

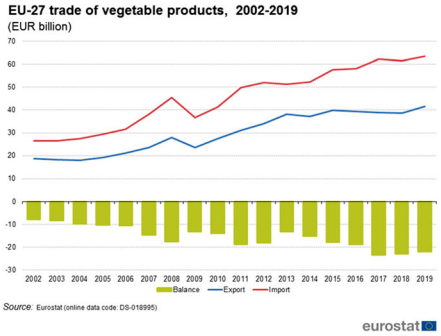
Regarding these new climate and environmental objectives, the EU livestock sector faces enormous challenges. The "EU livestock production facing climate and biodiversity challenges" section will show that the path towards carbon neutrality requires a significant decrease in livestock production. In addition, the reduction objectives for fertilisers, pesticides and antimicrobials will raise feed and livestock production costs and reduce EU livestock competitiveness. Whether the increase in the relative prices of livestock products will accelerate the decline in their consumption in the EU depends on the EU trade policy for grain, feed and livestock products, with a risk of pollution shifts outside the EU. The "The climate and environment in the common agricultural policy" section will discuss the ability of the CAP instruments and budget to meet the climate and environmental objectives that often conflict with each other and with other F2FS objectives (safe, highly nutritional and affordable food, farm income). The "Towards a coherent and efficient policy framework" section proposes policy improvements in accordance with public policy principles including polluter pays and beneficiary pays principles as well as fiscal federalism. The "Ensuring fairness to secure the transition" section concludes with the underestimated social cohesion issues raised by the Green Deal ambition.

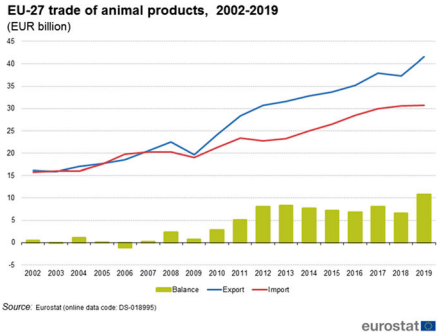
EU livestock production facing climate and biodiversity challenges

According to the 2015 Paris Agreement, the EU current regulation (OJEU 2018) specifies a 40% reduction of greenhouse gas (GHG) emissions in 2030 compared with 1990 levels. The emissions covered by the EU emissions trading system (ETS) must decrease by 43% between 2005 and 2030. For this period, the effort assigned to non-ETS sectors combined is a 30% reduction. Non-ETS sectors include agriculture. Although no specific reduction target is set for agriculture, the EC recently set targets for non-CO2 emissions of methane, nitrous oxide and the so-called F-gases that represent almost 20% of the EU's greenhouse gas emissions. By 2030, these should be reduced effectively by up to 35% compared with 2015 (EC 2020e). The majority of these emissions come from the agriculture sector where emission reduction has stagnated for several years. Although the EC expects that most of the reduction will occur in the energy and waste sector, significant reductions in agriculture are also necessary. In 2017, the inventoried GHG emissions of EU agriculture reached 440 million carbon dioxide equivalent tons (MtCO2eq according to the different gas global warming potential calculated over 100 years), representing 10% of emissions generated in the EU (EEA 2019a). Agricultural emissions mainly stem from 3 gases: methane (55% of agricultural emissions, from farm animal digestion and manure management), nitrous oxide (43%, from nitrogen fertilisation) and carbon dioxide (2%, from liming and urea fertilisation). The UK accounts for 9% of EU emissions, behind Germany (15%) and France (17%). Agriculture is also involved in land use changes with net emissions estimated at 32 MtCO2eq in 2017. EU agricultural emissions declined by 24% between 1990 and 2013 and increased by 4% between 2013 and 2017, with similar trends for emissions from animal production and soil fertilisation. Net emissions of land use change decreased by 30% between 1990 and 2014, and have remained stable since. Up to 2013, the improvement of fertiliser and livestock apparent productivity increased related productions and reduced GHG emissions at the same time. The recent trend shows that this is no longer the case, impeding EU GHG abatement objectives.

Regarding the abatement path of GHG emissions, several scientific papers question the best indicator for the global warming potential (GWP) of methane. Methane (CH4) is a short-lived GHG compared with N2O and CO2. CH4 is continuously destroyed in the atmosphere. Hence, it is true GWP is far higher when CH4 emissions increase, and it becomes a global cooling potential when emissions decrease thanks to the natural decrease of the CH4 stock in the atmosphere (Cain et al. 2019). As a consequence, CH4 mitigation is a powerful means to moderate the temperature increase in the next few decades to 2050. However, CH4 emissions should not be amalgamated with other gases using the usual GWP calculated over 100 years in mitigation strategies because CO2 and N2O do not disappear. Once the atmospheric methane stock is brought to a minimum, no further reduction in methane emissions can compensate these long-lived gases in the long term, leaving us a long way from carbon neutrality.

Because the recent increase in GHG emissions is associated with an increase in livestock production driven by growing global demand (Eurostat 2020a, b), although EU consumption is stable and slightly declining in ruminant meat (Dumont et al. 2019), there is an issue about production and consumption-oriented inventories (Sala et al. 2019). Firstly, the EU inventory according to Intergovernmental Panel on Climate Change (IPCC) guidelines does not take into account emissions associated with the production of imported feed (70% of EU rich-protein feed is imported), and related changes in land use. Secondly, the inventory does take into account the emissions of EU exports. EU exports avoid, by substitution, a part of the domestic production of importers and their related emissions, potentially higher per unit in less favourable production conditions. Hence, from a climate point of view, the desirable reduction in the EU livestock production should accompany a larger decline in EU consumption of livestock products, which is still twice as high as the world average per inhabitant (Dumont et al. 2019).





Despite the remaining—sometimes huge—uncertainties and gaps, ecology and environmental sciences document the links between agricultural pressures and the decrease in natural capital, either in agricultural areas or outside. The streamlining of agricultural landscapes with the enlargement of cultivated plots and the destruction of hedges, ditches and ponds, the decline in natural grasslands and the diversity of cultivated and reared species, and the intensive use of pesticides and fertilisers have been proved as harmful for biodiversity indicators, especially insects, birds and amphibians (Sirami et al. 2019). For example, birds species specific to agricultural areas declined by 57% between 1980 and 2016 (PECBMS 2018). The use of fertilisers and synthetic pesticides also contributes to the chemical pollution of air, water and soil, and

can entail public health problems. Although sales of veterinary antimicrobials have decreased by more than 32% between 2011 and 2017 on average for the 25 European countries for which data were available (EMA 2019), their use remains an issue in relation to antimicrobial resistance, which is an increasingly serious threat to global public health. European ammonia emissions are another threat, being precursors of harmful fine particles contributing to air pollution. Agriculture accounts for over 90% of ammonia emissions through the volatilisation of livestock effluents and the use of synthetic fertilisers. In 2019, only 40% of surface water achieved good ecological status and 38% achieved good chemical status. In contrast, land abandonment by livestock production, especially grazing herds, also induced biodiversity losses in areas less favourable for agriculture, notably wetlands, Mediterranean and mountainous areas (Lemauviel-Lavenant and Sabatier 2018). Over the past few decades, the decline in natural grasslands has accompanied the decline of ruminant herds, linked to the increased productivity of dairy cows. The conversion of grasslands into arable land has provided feed and forage for growing dairy and pork EU productions (20% of world production) and exports (Dumont et al. 2019). Feed and forage cover 60% of EU planted areas. In contrast, ruminant meat production, which uses most grassland, shows a weak economic performance (Veysset et al. 2015). To reconcile the protection of both biodiversity and the climate requires the conservation of grasslands with a further decrease in ruminant heads. Permanent grassland is associated with agro-ecological infrastructure that accommodates both soil carbon sequestration and biodiversity. In addition, reducing fertilisers and pesticides involves reducing grain production, with a larger proportion of arable land used for food than for animal feed in order to meet human nutrition needs with fewer animal products (Van Zanten et al. 2018).

The climate and environment in the common agricultural policy

Integrating climate and environmental objectives and instruments into the CAP has been progressive (Dupraz and Guyomard 2019). Initiated in the 1990s, the abandonment of price support removed public incentives to increase the use of polluting chemical inputs. Its replacement by area payments did not stop farm enlargement and the substitution of labour by other inputs, equipment and pesticides. For ruminants, per head-coupled support partly replaced price support. With the phasing out of milk quotas and further decoupling, coupled support reached its minimum in 2008 (8% of CAP payments) but has increased again to well over 10% since 2013. Since the 1970s, Less Favoured Area (LFA) payments have supported farmers' incomes. These payments have also been justified by the maintenance of open landscapes and the preservation of the associated biodiversity in these areas. Agri-Environmental Measures (AEM) became compulsory for each MS with the 1992 CAP reform. Optional for farmers, AEMs aim to encourage farmers to adopt more environmentally friendly farming practices by compensating for additional costs or lost income. MSs developed a wide range of AEMs supporting extensive grazing, semi-natural landscape features, the reduced use of chemical inputs, and more organic farming to address biodiversity and water quality issues. With the 2013 CAP reform, AEMs become Agri-Environmental and Climatic Measures (AECM), including climate objectives. They now cover around 25% of the EU's agricultural area with only 10% of total CAP

payments, which is nevertheless higher than any other public expenditure targeting the environment. Despite local achievements to protect biodiversity and water, LFA and AEM schemes have not been able to prevent rapid biodiversity decline at the aggregate level (Dupraz et al. 2020).

The 2003 CAP reform introduced the cross-compliance of CAP direct payments based on two requirements: (i) compliance with regulations and directives on environmental protection and human, animal and plant health in the form of Statutory Management Requirements (SMR) and (ii) compliance with rules on Good Agricultural and Environmental Conditions (GAEC). The greening of CAP direct payments introduced as part of the 2013 reform consists in three additional requirements primarily targeting carbon sequestration and biodiversity preservation through a minimal diversity of crops, the maintenance of permanent grassland at national or regional levels, and at least 5% of arable land devoted to ecologically focused areas (EFAs). Because of several exemptions (small farms, organic farming), greening obligations now cover about 70% of the EU's agricultural area. Cross-compliance and greening implement minimal standards adapted to national and regional situations, but have little effect on climate and natural capital degradation. Numerous papers and reports document this failure (Cullen et al. 2018). For example, in the specific case of greening, the 2017 special report of the European Court of Auditors has an eloquent title: "Greening: an increased complexity of the income support scheme and still no benefit for the environment" (ECA 2017). The obligations associated with cross-compliance and greening are modest, and the monitoring rates and the penalties for violations are low. These penalties are not proportionate to the environmental damage but on the farms' historical CAP support, consolidated in basic and green payments, which undermines their economic and environmental effectiveness.

Towards a coherent and efficient policy framework

The CAP is a complex policy framework where conflicting objectives and path dependency have given rise to numerous instruments, administrative layers and conditioned payments without a clear coherence of incentives. In France Stratégie (2019), we tried to design a coherent policy framework based on public economic principles, namely fiscal federalism, polluter pays and beneficiary pays principles.

The principles of fiscal federalism call for the highest federal authority to be responsible for macroeconomic stability, income redistribution in favour of the poorest, and the provision of global public goods. Hence, CAP measures targeting global public goods such as the climate and biodiversity should be implemented at EU level and fully financed by the European budget. The management of local public goods can be decentralised to local authorities to satisfy needs and preferences in their jurisdictions. However, this requires certain conditions—notably, taxing the benefits derived from local public goods is necessary to avoid distortions in the profitability of private investment between different local jurisdictions. By the same reasoning, environmental federalism seeks to avoid environmental dumping due to local policies.

Successive developments in the environmental architecture of the CAP demonstrate progress in complying with the principles of fiscal and environmental federalism. Initially, addressing the global public goods issue with regard to biodiversity, and more

recently the climate, did not respect these principles because AECMs depend on decentralised funding and decisions. Targeting biodiversity and the climate with the cross-compliance and greening that condition the first pillar payments fully financed by the European budget is thus more in line with fiscal federalism. Fiscal federalism also states that local or regional authorities could manage policy instruments that exclusively target local public goods such as water quality and landscapes in an embedded policy framework, avoiding environmental dumping. Accordingly, cross-compliance and greening conditions aim to limit the possibilities of environmental dumping among MSs since every MS must respect a set of common standards. Unfortunately, their heterogeneous translations into national regulations have significantly weakened the implementation of these principles (Dupraz et al. 2019).

In light of fiscal federalism, the main weakness of the current CAP concerns the application of the subsidiarity principle, which does not distinguish between global public goods and local public goods. This allows MSs and their regional authorities to use their EU CAP budget in a self-interested way. They mostly use European co-financing of AECMs to promote their local public goods and their local agricultural development strategy. The targeting of these two objectives rather than global public goods with European funds reveals a flaw in the theoretical consistency of the CAP. Indeed, within the present CAP framework, national and regional authorities have high incentives and face no legal barriers to prevent them from doing this. From the same perspective, respecting EFA greening measures by implementing catch crops and/or protein crops is questionable. These two types of crops make it easy for European farmers to meet their obligations, to the detriment of other EFAs that are more favourable to the climate and biodiversity. When some MSs authorise the use of pesticides on these crops to support the profitability of local sectors, this creates a situation of environmental dumping in the application of the greening conditions.

The CAP is far less virtuous when it comes to subsidising environmental benefits in accordance with the beneficiary pays principle (BPP) and, to an even greater extent, taxing nuisances in accordance with the polluter pays principle (PPP). It does not include taxes aimed at reducing polluting emissions, whether this involves pesticides or veterinary drugs. Although there are subsidies that are a priori climate and/or biodiversity friendly, they do not comply with the BPP in several respects.

The key recommendation is to introduce a European tax on the main determinants of agricultural GHG emissions, namely nitrogen fertilisation and animals. A tax such as this would be the best instrument to minimise the total abatement cost by equalising the marginal costs of GHG abatement between farmers and with other sectors (De Cara and Jayet 2011). There is a large heterogeneity of abatement costs in agriculture (Pellerin et al. 2017) and livestock production (Dakpo et al. 2017), suggesting significant room for improvement using the correct price signal. Nitrogen sources other than synthetic nitrogen fertilisers, i.e. symbiotic fixation and recycling, should be exempted as alternatives to fossil energy resources. For the overall coherence of incentives, coupled support for ruminant livestock should be removed. To avoid distortions leading to geographical shifts of the nuisance from European MSs to countries that would not apply equivalent GHG taxation, equivalently taxing imports is preferable in order to internalise pollution costs in the EU consumer price.

By the same logic, a European tax on pesticides and veterinary drugs calibrated according to their toxicity may contribute to biodiversity and health more efficiently.

Setting the rate of such taxes is a difficult matter owing to the lack of precise and easy-to-gather references on the average and marginal damage caused by the use of these products. A pragmatic solution would be to apply an increasing rate over time until biodiversity indicators show a change in trend. Because of the response delays of ecological processes, the decline in pesticide sales may provide a first signal to adjust the tax rate growth. The administrative costs of the proposed taxes are negligible compared to those associated with conditioned subsidy schemes to reduce polluting emissions such as cross-compliance, greening and many AECMs. In addition, tax incomes can contribute to the CAP budget and make it possible to increase the insufficient payments for permanent grassland, arable crop diversity and agro-ecological infrastructure.

Implementing the BPP would involve allocating payments to indicators better correlated with soil carbon sequestration and the implementation of biodiversity-friendly agricultural practices, systems and landscapes. This would involve payments that are proportional both to the areas targeted and the contributions of each area to environmental benefits. For example, grassland carbon sequestration and flora diversity increase with the age of the grassland, at least for around 50 years. In a simplified manner, permanent grasslands could therefore benefit from increasing payments according to their area and age. The present CAP farm income support is area-based and encourages a higher area per worker, while organic farming and nature-based farming practices need more labour per cultivated area. In coherence with our tax and subsidy proposals, a radical reform of farm income support should target the farm labour force and new skill requirements for the ecologic transition.

Ensuring fairness to secure the transition

Although the F2FS mentions carbon pricing, it is to point out new opportunities for farmers in the circular bio-economy. F2FS primarily develops the technical innovations, waste reduction and recycling as well as heathier diets selected by better-informed consumers rather than economic instruments to obtain these innovations and changes in behaviours. On the agricultural side, pesticide use has been increasing since 2011 despite the rapid development of organic farming. On the food consumption side, per capita consumption of total protein from animal products has remained relatively stable in the EU since 2000 (EEA 2019b). Regardless of the policy chosen, changing these trends will lead to significant adaptation costs and welfare losses, especially for pesticide-dependent farmers and low-income consumers. In North-Eastern France, a 200% pesticide tax would be necessary to halve pesticide use in cereal, oilseed and protein crops, assuming that farmers learn to master low-input production systems (Femenia and Letort 2016). In addition, a pesticide tax would have a detrimental effect on the climate because of land use changes outside the EU (Bareille and Gohin 2020). Significant changes in the average diet would also require quite high tax rates, higher than current reference prices for GHG abatement. Moreover, additional tools such as subsidies for vegetable consumption are required to align climate and nutrition objectives (Bonnet et al. 2020). Combining climate, biodiversity and health objectives will increase the cost of food, already shared by both the consumer and the taxpayer. The Green Deal ambition requires far stronger and sounder interventions from public authorities in the farm and food sector, as well as stronger and

sounder regulations of international trade and social inequalities to promote the EU as a world leader in these fields.

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