Food security, climate change & biodiversity
The role of European agriculture in a changing world

BirdLife International
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Executive summary

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EXECUTIVE SUMMARY

Climate change, biodiversity loss, hunger and poverty, rural development and regulation of world trade are all challenges that face global agriculture and areas in which the choices made by the European Union will play a vital role. While further research is still needed to better understand the complex mechanisms linking agricultural production, food consumption, environmental degradation and social problems, much scientific evidence is already available and can help inform EU decision makers.

BirdLife believes EU policies on food, the environment and agriculture should be based on the following principles:

- Whilst Europe should remain one of the world’s major food producers, it urgently needs to support developing countries in increasing their agricultural productivity, particularly of small-holders and the poorest farmers;
- Within Europe, we must find ways of maintaining sustainable food production by urgently addressing the environmental problems (degradation of soils, biodiversity loss, water over-abstraction and pollution, contribution to climate change) caused by current unsustainable agriculture production methods;
- Projected dairy and meat consumption patterns are likely to be unsustainable in terms of their climate change impacts and wider environmental effects. Extensive grazing systems, and their multiple benefits, should be promoted as the optimum model in Europe instead of intensive, cereal-feed based systems;
- Finally, we should improve the stability and resilience of EU ecosystems so that they have a better chance of adapting to climate change and can keep delivering the essential services on which our societies depend. The conservation of soil, water and biodiversity resources and the maintenance of healthy agro-ecosystems is key to maintaining EU agricultural productivity and long-term food security.
INTRODUCTION

The 2007-2008 spike in the prices of agricultural commodities has sent agriculture back into the headlines after many years of being seen (at least in the developed world) as a subsidy-dependent industry in decline. It is still too early to say whether the recent commodity price spike (more recently followed by a slump) is a temporary phenomenon or the beginning of a new era for agriculture, but it is posing a whole range of questions for policy-makers worldwide. Widespread talk of a “food crisis” is focusing minds on very real and urgent problems such as the plight of many millions of undernourished people around the world and the harmful impact of misguided EU and US policies supporting biofuels. At the same time, the issue is already being manipulated in an attempt to resurrect a “productivist” and “protectionist” agenda, leading countries down a road which is potentially highly damaging for poor people and the environment.

The gathering climate crisis is also driving home the message that sustainability is a global issue and that no country will escape the impacts of climate change. A new policy area is emerging at the intersection of agriculture, energy, trade, development and climate change, breaking well established boundaries between sectors and problems that used to be treated in separate compartments.

BirdLife International is working to stem the global collapse of biodiversity, a problem that, together with the intrinsically linked climate crisis, represents one of the biggest challenges to mankind. Agricultural expansion at the expense of natural habitats coupled with agricultural intensification and the degradation of agro-ecosystems are by far the most important causes of the biodiversity crisis and contribute significantly to increased climate change. Addressing these problems is a long-standing BirdLife priority.

BirdLife’s work in Europe, and in particular its campaign for a true reform of the Common Agriculture Policy (CAP), is nested within a wider global strategy and is based on a deep understanding of global issues and cooperation between grassroots organizations in both the “Global North” and “Global South”.

Previews of the World Bank facilitated International Assessment of Agricultural Science & Technology for Development (IAASTD)*, due for publication in 2009, offer a refreshing assessment of the often negative environmental and social impacts of intensive farming systems and the urgent need to shift toward more sustainable world farming, where the multi-functional aspects of agriculture are recognised and inherently valued and protected.

This document attempts to dispel some of the myths, and raise awareness of many of the issues, around agriculture, the environment, “food security”, climate change and global sustainability. It initiates a wider discussion around some of the “tough questions” posed from different quarters in the context of the current debate.

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*International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) report agreed to at an Intergovernmental Plenary Session in Johannesburg, South Africa in April, 2008.
QUESTIONS:

1. IS THE WORLD RUNNING OUT OF FOOD?

The world is not running out of food. The average adult requires 2500 calories (cal) per day - global food availability in 2003 stood at 2800 cal per person and is projected to rise to 3050 cal by 2030\(^2\). Although these figures do not take food wastage into account (in many developed countries, calories are effectively lost when unused food is thrown away and in developing countries, food is regularly lost through inefficient harvesting, transport and storage methods), current global food production should be sufficient to feed everyone in the world, even with increasing population and consumption levels, at least until 2030.

What are the reasons for world hunger and higher food prices?

At the moment, and for the near future, the root of the problem is that many people cannot afford food because of poverty. Poverty has many causes including lack of access to credit and secure land tenure, poor governance and infrastructure and lack of access to health care and education. These problems are compounded in many parts of the developing world by the high proportion of household income spent on food (see Table 1) and the extremely low productivity of many farmers, who are often among the poorest of the poor. More than three-quarters of the poor — defined as those living on less than US$1 per day — live in areas where agriculture often makes up 50–90% of household income\(^3\). EU and US subsidies have, through the dumping of agricultural surpluses on the world market, contributed for decades to the depression of developing countries’ rural economies and are partially responsible for the long-term slump in productivity of poor farmers\(^4\). Real food prices are in fact close to where they were in 1970.

Table 1: Proportion of income spent on food in various countries.

<table>
<thead>
<tr>
<th>Developing countries</th>
<th>Expenditure share of food (%)</th>
<th>Developed countries</th>
<th>Expenditure share of food (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guatemala</td>
<td>38,9</td>
<td>USA</td>
<td>9,8</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>62</td>
<td>Francia</td>
<td>16,3</td>
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<tr>
<td>Botswana</td>
<td>21,8</td>
<td>Germania</td>
<td>10,4</td>
</tr>
<tr>
<td>India</td>
<td>33,4</td>
<td>Regno Unito</td>
<td>11,8</td>
</tr>
<tr>
<td>Indonesia</td>
<td>26,7</td>
<td>Giappone</td>
<td>19,0</td>
</tr>
<tr>
<td>Pakistan</td>
<td>41,5</td>
<td>Grecia</td>
<td>17,8</td>
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<td>Sudfrica</td>
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<tr>
<td>Giordania</td>
<td>39,7</td>
<td>Svizzera</td>
<td>11,0</td>
</tr>
</tbody>
</table>


\(^2\) FAO 2002, World Agriculture
\(^4\) Oxfam Briefing Note (August 2004) An End to EU Sugar Dumping?
The recent spike in food prices (following decades of price decline) have complex reasons that are not easy to disentangle:

- short-term supply problems (e.g. bad harvests, particularly in Australia due to drought and Typhoon in Bangladesh);
- policies promoting the use of agricultural land for the production of biofuels;
- high energy prices (modern agriculture heavily depends on fossil fuels for fertilizers, pesticides, machinery and transport);
- speculation on futures markets – capital leaving the housing and credit markets may be used to “gamble” on the commodities market, at least partially driven by global biofuel mandates and targets;
- a low and declining level of food stocks, partly due to the EU moving away from intervention systems;
- “panic reactions” from key food producing countries that have imposed export bans and tariffs in order to buffer their own consumers from price increases (but at the expense of those countries depending on imports).

These short-term causes interact with longer-term developments:

- changing consumption patterns in many Asian countries (more meat and dairy consumption leading to much higher use of cereals for feed);
- falling public investment in agricultural research and development since the 1970s and a corresponding fall in the rate of productivity gains.

The OECD and FAO predict that food prices will stabilise but at a higher level than in the 1990s, before prices began to peak. This is not inherently negative as it may help restore the profitability of farming and curb food waste, however it will put greater pressure on the world’s most vulnerable populations - a problem that must be addressed.

Although there are many issues surrounding food availability, it is clear that food is not running out and that there is no justification for policy responses motivated by panic and based simply on the objective of boosting global agriculture production. There are however very important problems to be addressed: poverty, low productivity of poor farmers, unsustainable consumption patterns and oil dependency as well as future impacts from climate change.

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Figure 1: Food commodity prices, 1971–2007 with projections to 2017


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2. HOW CAN THE EU SUPPORT GLOBAL FOOD SECURITY?

Europe must undoubtedly remain one of the world’s major food producers as an important component of both European and global food security. However, with only 11% of global cereal production even a significant increase at the EU level would have a relatively minor impact on supplies at a global scale - Europe cannot "feed the world". On the other hand, what it does with its exportable surpluses can have a significant impact, and indeed lessons from Europe’s recent history suggest that boosted production may even exacerbate hunger in the world. The CAP of the 1960s to 1990s led to huge surpluses, which were partly destroyed and partly dumped below production cost on poor countries’ markets. This dumping, combined with import tariffs, has contributed to keeping millions of poor farmers in poverty and prevented the development of productive agriculture in many countries, which are now struggling to cope with the sudden increase in cost of imported food. Europe thus needs to consider carefully its food trading balance with the rest of the world (as recent biofuel policy illustrates) and urgently needs to support developing countries in increasing their agricultural productivity, particularly that of smallholders and the poorest farmers (as highlighted in the recent IAASTD report). This productivity increase must be pursued in a sustainable way such that valuable natural resources are not destroyed over time, but rather are protected and enhanced.

Boosted production does not necessarily mean huge amounts of land will need to be converted to agriculture. The FAO estimates that increased food demands will primarily be met through increased productivity (70%) with increased cropping and expansion of agricultural land accounting for just 10% and 20% respectively. Increased productivity will, in many areas, require an increase in the use of nutrient inputs: the UN has identified a ‘soil fertility crisis’ in many areas of Africa following years of farming and erosion related depletion and the current application of nutrient inputs, especially in comparison to levels of use in developed countries, is exceptionally low. Agricultural intensification can be pursued in a sustainable way and it is possible to boost productivity without a massive increase in the manufacture or application of chemical fertilizers. In many African countries, moving to organic, or low input farming models, with organic (i.e. animal derived) nutrient inputs and crop rotations, could lead to a significant increase in productivity compared to the current situation, without harming the environment. Such an approach would also reduce dependence on fossil fuels and the pollution of other food sources such as rivers and coastal waters from farming activities. In other areas, such as more temperate climates for instance, this approach may be less suitable and the development and application of sustainable production techniques may be more challenging.

Improving the rates of post-harvest losses is also a key factor to improving food availability. In Southeast Asia, post harvest rice losses are estimated to range between 10-37% of the total harvested through handling, drying, transport etc.

As long as agriculture and infrastructure investments are combined with proper land planning and conservation policies, increasing the productivity of small farmers is also a way to lessen the pressure on remaining natural habitats, such as rainforests and wetlands, that are often being degraded by the constant need of a mushrooming population to clear more land for highly unproductive agriculture. Any agricultural expansion that does occur must not take place at the expense of natural or semi-natural habitats.

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4 In Sub-Saharan Africa, fertilizers are applied at an average rate of 8kg/hectare. In Europe average applications are upwards of 200kg/hectare
5 UN Conference on Trade and Development & the WTO (2007) Organic farming and climate change
Within Europe, we must find ways of maintaining sustainable food production whilst urgently addressing the huge environmental problems caused by current agricultural production methods. In many parts of Europe, we are assisting the rapid degradation of soils, biodiversity loss, water over-abstraction and pollution and pesticides misuse through intensive farming practices that are unsustainable in the long term. Addressing these problems would not only benefit human health, biodiversity conservation and social and economic stability, it would also safeguard the agro-ecosystem functionality that is vital for the long-term maintenance of agricultural production itself, and thus food security.

A further problem the European Union should address is the loss of agricultural land due to soil sealing (the covering of soil surfaces, generally through urban development and transport infrastructure). Although no comprehensive and updated figures are available, it has been estimated that, in EU15 Member States, about 9% of the total land area has been sealed. This problem is particularly severe in Belgium, Denmark and the Netherlands, affecting 16-20% of the surface and along Mediterranean coasts which have been widely built-up\(^\text{13}\). Sealing results in the creation of a horizontal barrier between the soil, air and the water, and thus causes disruption of water fluxes, increased flood risks, reduced groundwater recharge, increases water pollution and biodiversity loss (due to habitat loss and fragmentation)\(^\text{14}\). Food production is negatively affected by soil sealing, which occurs mainly on highly productive agricultural land in floodplains and along the coasts. There is, therefore, a compelling case for the development of a consistent EU land use planning framework, with appropriate restrictions on further soil sealing.

Finally, the EU should immediately abandon its counterproductive biofuels policy, which is currently diverting agricultural commodities away from food without clear and significant greenhouse gas savings, harming people, biodiversity and the climate at great expense to taxpayers and consumers (see Question 5).

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3. WHERE DOES EUROPE GET ITS FOOD? WHAT ARE THE CONSEQUENCES FOR THE ENVIRONMENT AND PEOPLE IN DEVELOPING COUNTRIES?

Most of the EU's food needs are met through domestic production (see Figure 2). At the same time, the EU is both the world's biggest food importer and exporter. For example, in 2006 the EU exported $79.64 billion's worth of food products and imported $96.19 billion's worth\(^{15}\). Export of processed and high value added food, such as Champagne wine, Roquefort cheese and Parma ham, is an important sector of the EU economy and is vital for employment and social cohesion of many regions. Similarly, some EU imports represent a key source of income and employment in many developing countries (e.g. bananas from Kenya and coffee from Ethiopia).

![Figure 2: Self sufficiency of the EU for certain foodstuffs\(^{16}\)](image)

Unfortunately, significant social problems (such as extreme poverty, gender inequality, poor working conditions or insecure land tenure) affect a lot of farming in developing countries. Nevertheless, there is no evidence that barring developing countries' products from wealthy countries' markets brings any social benefits. In fact, fair trade, commercial labelling and quality systems have been shown to bring real change to production practices and concrete improvements to rural welfare\(^{17}\). In Kenya, for example, voluntary standards have helped reduce production costs by reducing the use of chemicals and fertilizers in the horticulture sector, directly helping the individual farmer, and in many cases aiding community development by providing management, health and safety training\(^{18}\). It is also worth noting that EU agriculture is not free of social problems. For example, vegetable and fruit production in parts of the EU has been linked to the use of unregistered migrant labour and poor working conditions\(^{19}\).

\(^{15}\) WTO Statistics (2006)
\(^{16}\) Source: http://ec.europa.eu/agriculture/publi/capexplained/cap_en.pdf
In terms of environmental effects, we do not believe that the majority of food production, either within or outside the EU, can be regarded as sustainable. The EU does have stricter rules in many areas (e.g. pesticides use) than other parts of the world, but it also has much more intensive agriculture, and hence is a much greater strain on natural resources. The EU has also already lost most of its natural habitat and is continuing to lose semi-natural habitats at an unacceptable rate.

The environmental footprint of food also varies hugely both inside and outside the EU. The sustainability of food production can only be properly understood through full life cycle analysis (LCA) studies, tracking back all inputs and outputs linked to a particular production method. Much of the public debate tends to focus on the impact of transport (food miles) which in reality accounts for a relatively small share of food related greenhouse gas emissions and depends crucially on the mode of transport, while too little attention is given to the impacts of agricultural production itself. It is, for example, unclear whether it is more sustainable to grow vegetables locally in heated and lighted greenhouses in northern countries or import (and therefore transport over long distances) the same products from southern countries, where water consumption and habitat destruction may be bigger issues. Another example is livestock production in the EU, which relies, to a large extent, on imported feedstocks and is therefore as intrinsically linked to tropical deforestation as meat produced directly in tropical countries. For example, in 2007, the EU imported over 32 million tonnes of animal feedstuffs (mainly soya cake) from non-EU countries. Over 79% of these animal feedstuffs were supplied by Argentina and Brazil. Soy expansion is a major driver in the destruction of the Pampas, Cerrado and Amazon biomes.

These considerations suggest that while a broad self-sufficiency in food does exist in the EU and is certainly welcome, policies seeking to arbitrarily isolate the EU from the world food market would be unjustified and potentially counter productive. What is needed are policies that aim to increase the environmental and social sustainability of both home grown and imported food.

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20 Food Climate Research Network, Centre for Environmental Strategy & University of Surrey (Sep 2008) Cooking up a storm: Food, greenhouse gas emissions and our changing climate.
21 FEFAC Feed & Food Statistical Yearbook 2006
4. WHAT WILL CLIMATE CHANGE MEAN FOR AGRICULTURE AND FOOD SECURITY AND WHAT WILL THIS MEAN FOR THE ENVIRONMENT?

Climate change has already started to alter ecosystems and agricultural conditions, and will increasingly do so over the coming decades. This will be manifested through gradual changes of, for example, rainfall amounts and patterns, temperature and the timing of seasons, all of which will affect agricultural capacity and yield. More frequent extreme weather events and the potential increase in invasive and damaging alien species may also significantly impact agricultural production.

The impacts will vary widely between regions and over time. For example, some regions will first see an increase in productivity because of higher temperature and carbon fertilization but later will face declining yields as drought, heat stress and extreme events take their toll. Although there is considerable uncertainty surrounding this area, most models indicate, in the longer term (around 2050) a significant decline in the world’s agricultural productivity with seasonally dry and tropical countries likely to be worst hit by even small local temperature increases. Comparatively, Europe seems to be relatively less vulnerable, which may mean the EU will have to account for a higher percentage of world agricultural production in the future. Water shortages will hit ever more regions of the globe, including within Europe. The Mediterranean region faces huge challenges and potential collapse of agricultural systems heavily dependent on irrigation from ever more depleted aquifers and rivers. Food security may therefore become a real issue towards the middle of this century if action is not taken to drastically cut greenhouse gas emissions globally, including from agriculture itself.

Climate change has been identified as one of the major threats facing biodiversity and will negatively affect the size of habitats and ecosystems, as well as the abundance and distribution of certain species. Impacts on birds are already evident, with nesting taking place earlier in the year for many species and drier summers affecting food availability for certain birds, resulting in fewer chicks. A severe impact on a species’ food chain could easily lead to its extinction.

Other environmental impacts include rising sea levels, projected to rise between 18 and 59 cm by the end of the century, which will drastically affect the world's coastlines, as well as reduced rainfall in certain areas leading to the loss of natural habitats through desert expansion.

Climate change has been identified as the biggest environmental challenge facing the world. Changing weather patterns will not only have negative impacts on habitat and species distribution but will drastically alter the way food can be grown in certain regions.

Picture 1. Climate change is expected to significantly increase the risk of extinction for species like the Dartford warbler (Sylvia undata), whose limited range makes them particularly vulnerable to climatic changes.

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25 Intergovernmental Panel on Climate Change (2008) Climate Change and Water IPCC Technical Paper VI
5. HOW IS EUROPEAN FARMING CONTRIBUTING TO CLIMATE CHANGE?

Concentrations of greenhouse gases (GHG) produce an increase in the average surface temperature of the Earth. It is estimated that agriculture accounts for around 9% of GHG emissions in the EU (compared, for example, with 21% from transport), most of which arise from synthetic nitrogen fertilizer production and application and from livestock methane emissions. Synthetic nitrogen fertilizer (as opposed to animal manure for example) is produced through an extremely energy intensive process, usually based on the burning of natural gas. When fertilizer is applied, it gives rise to significant emissions of nitrous oxide ($\text{N}_2\text{O}$), a greenhouse gas almost 300 times more powerful than carbon dioxide ($\text{CO}_2$). Even best practice management of fertilizers and soils results in losses of $\text{N}_2\text{O}$ into the environment, but it is clear that many farmers are failing to use fertilizers optimally. Often, more fertilizer is used than is actually needed, or is applied inappropriately (e.g. too closely to watercourses, during wet weather etc) with the excess polluting rivers, coastlines or being lost to the atmosphere. The issue is compounded when countries, such as the UK, fail to properly implement legislation to reduce water pollution caused by nitrates from agricultural sources (the European Nitrates Directive).

The livestock sector is the main source of methane ($\text{CH}_4$) emissions, a gas about 30 times as climate-harmful as $\text{CO}_2$. Methane is emitted mainly by ruminants (cows and sheep), both directly as a by-product of digestion, and indirectly through the fermentation of sludge.

If emissions from outside the EU linked to food produced for the EU market were to be included (such as during the production of fertilizers in Russia or deforestation in the Amazon for the production of animal feed) these figures would be much higher.
6. HOW CAN FARMING RESPOND TO THE CHALLENGE OF CLIMATE CHANGE?

IN THE EU:

In order to mitigate and reduce the impacts of climate change, the first priority for the EU must be a swift and significant reduction in GHG emissions. The use of inorganic nitrogen fertilizers can be reduced by converting more land to organic farming or conventional mixed farming systems, but also by implementing more sophisticated applications of fertilizer based on “nitrogen budgets”. This would also bring great benefits for biodiversity and water quality.

The climate change impacts connected to meat and dairy consumption are highly variable but GHG emissions can be significantly reduced through better management practices. In seeking to reduce livestock emissions, other environmental costs and benefits should be taken into account. Extensive grazing, for example, might not always be the lowest emission option, when calculated on a per cow basis for example (although significant research still needs to be conducted to identify the emissions of different livestock systems), but it does bring proven benefits in many cases for biodiversity, landscape quality, animal welfare and product quality when compared to intensive livestock systems. Many highly intensive models may also claim lower emissions than they are actually responsible for because they ignore the land use emissions linked to feed production, such as deforestation and ploughing of natural grasslands in Latin America.

Reducing EU agricultural dependence on heavy machinery, pesticides and transport, could also give a relatively minor but nonetheless important contribution to emission reductions, while buffering farmers from the impact of soaring oil prices. In tackling farming related emissions, a full life-cycle analysis (LCA) approach should be pursued. Emissions are not only caused directly, but also indirectly, for example by inducing land use change elsewhere, or from the treatments required to provide drinking water free from agricultural pollutants. A core component of EU intensive livestock operations for example, is soy based feed, one of the key drivers of deforestation in Latin America.
Policies that support sustainable agricultural practices such as reduced pesticide and fertilizer use (via Pesticides legislation and the Nitrates directive) must be fully utilised and applied robustly. Policies that disadvantage extensive grazing systems, such as the Common Agricultural Policy, must be reformed as a matter of urgency. New market tools may also be employed to this end: input taxation, labelling of low-emission products etc.

The second priority is to increase the stability of EU agro-ecosystems, so that they have a better chance of coping with the impacts of climate change, and keep delivering the essential services on which our societies depend. The conservation of soil, water and biodiversity resources and the maintenance of healthy agro-ecosystems is also key to the long-term maintenance of EU agricultural productivity. The EU should heavily invest in environmental conservation, ecosystem restoration and the sustainable management of natural resources. For example, wetland restoration can play a vital role in water purification and flood risk reduction.

Finally, European policy should assist farming in adapting to the level of climate change that is unavoidable. This can include measures such as research, training, advisory services and in justified cases capital investment in areas such as water use reduction, pest and alien species control, erosion prevention etc, many of which are already or will be addressed in Rural Development Programmes, but are in need of a greater budget allocation.

DEVELOPING COUNTRIES:
For developing countries, the urgent need to increase local agricultural productivity must be pursued in a sustainable way, mitigating rather than contributing to climate change, and tackling existing issues of agricultural degradation such as reduced soil fertility in Sub-Saharan Africa. Key to this is the sharing of knowledge and technology from wealthy countries, but also building on local and traditional knowledge from within developing countries themselves. A more holistic approach to farming systems, able to improve crop productivity while providing important environmental goods, includes:

- Integrated pest and weed management: based on improving the stability of agro-ecosystems through accurate pest/weed monitoring and, as a last resort, the use of direct control techniques (including mechanical, biological and chemical control). The main goal of IPWM is to support agricultural productivity while significantly reducing or eliminating the use of chemical pesticides. Some models suggest that a large scale conversion to organic in developing regions would have positive effects on local food security;

- Integrated nutrient management: This approach seeks to ensure an optimum balance of nutrients within the soil, primarily by supporting biological nitrogen fixation, appropriate soil management to control erosion and leaching, adding organic matter, using other sources of nutrients only if needed and with the best timing;

- Conservation tillage: aimed at reducing soil disturbance, this approach consists of a range of practices from non-inversion tillage (ploughing replaced by ripping), to minimum tillage (similar to harrowing) or even no-tillage (direct drilling on stubble). If implemented in ways that do not lead to increased herbicide use, conservation tillage could potentially increase carbon sequestration in soils, reduce levels of erosion and soil compaction, favour soil biodiversity and nutrient cycling, and increase water use efficiency;

- Use of cover crops, buffer strips and mulch to reduce erosion and water loss and improve soil fertility and stability;

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• Agro-forestry: based on a combination of trees and livestock or crops on the same piece of land, this approach can create more diverse and self-sustaining agro-ecosystems, diversify income sources, maximise the use of rainwater, nutrients and sunlight, and therefore increase the total productivity of land;
• Aquaculture: by incorporating fish or other aquatic organisms into farm systems, this approach could, if pursued sustainably (i.e. stocking herbivorous and not carnivorous fish) provide an alternative source of protein, potentially substituting land-hungry livestock systems.
• Water harvesting: by improving rainwater retention systems, this approach could allow the irrigation and cultivation of drier areas. This would however need to be done very carefully in ways that do not cause environmental damage (as is the case with large dams) or encourage the over-abstraction of water;
• Sustainable extractive systems: whereby resources from coastal fisheries and forests are harvested within natural carrying limits and incorporating local knowledge;
• Conservation and enhancement of local genetic resources: although the development of new crop varieties and animal breeds have been among the most important factors leading to an increase in agricultural production over the last decades, globally widespread genetic resources have failed to suit many developing regions, where local environmental conditions are harsh or where the required chemical inputs or technology are not available. Therefore, the conservation, valorisation and enhancement of local genetic resources, along with the associated knowledge to use and maintain them, will be a key challenge in tackling food security in developing countries.

Although there will probably be scope for a sustainable increase in the use of chemical fertilizers and plant protection products in some developing regions where current use is extremely low, research and development projects should give preference to strategies which do not rely on costly external inputs. Under dry or water constrained conditions, which are likely to increase in the face of climate change, such systems can be shown to outperform conventional agriculture35.

According to the World Agriculture Report (IAASTD), the capacity to respond to environmental stresses can be particularly enhanced by the development and application of both traditional and local knowledge systems and new technologies. Environmental degradation constrains production and will limit the ability of agricultural systems to adapt to climatic and other global changes in many regions. Therefore, the IAASTD concludes “sustainable agricultural practices are part of the solution to current environmental change”36.

36IAASTD report (2008) pg 21 Global Summary report for Decision Makers
7. CAN BIOENERGY HELP US FIGHT CLIMATE CHANGE WITHOUT HARMING THE ENVIRONMENT AND OUR FOOD SECURITY?

Bioenergy has the potential to make a real contribution to the renewable energy mix which Europe must adopt to reduce global warming. Biomass use for heating and biogas production from waste are examples of bioenergy technologies that could provide an important increase in sustainable energy production. However, to realise this contribution bioenergy must be produced sustainably: resulting in significant savings (of at least 60% emission savings compared to fossil fuel equivalents) and avoiding negative impacts on biodiversity and the wider environment. These conditions must apply to both the production of the biomass and the way in which that biomass is then processed to produce energy. Acknowledging that there are limits to the amount of bioenergy that can meet these conditions is also crucial. Because of the requirement for most biomass to be grown on land and its large volume to energy ratio, even a very small contribution to energy production can trigger huge pressure on land resources. This can lead to pressure on food markets, land conflicts and further agricultural expansion at the expense of natural habitats.

BirdLife is particularly concerned about the current biofuels rush that is being driven by expensive public subsidies and European targets. This is despite well-documented negative social and environmental impacts, very questionable GHG balances and the availability of much more carbon and cost-efficient technologies and activities to both deliver emissions reductions from transport and to use land and biomass for climate mitigation.

Bioenergy can be part of the solution, rather than an added problem under the following conditions:

- No specific incentives for inefficient technologies such as biofuels. Incentives should be directed in a technology neutral way to any renewable energy that can demonstrate significant GHG savings and guarantee wider sustainability;
- Strong safeguards, including robust mandatory standards and certification systems to ensure the full environmental and social sustainability of bioenergy;
- Prioritisation of biomass from waste streams and where synergetic effects for biodiversity, natural resource protection and the climate can be achieved e.g. by establishing strips of short rotation coppices in large arable areas or along water courses, or by using mixed cropping systems which do not need pesticides or mineral fertilizers;
- Strong and sustainable land planning policies, including at global level (currently lacking), to halt the expansion of agriculture into natural habitats whilst optimising production on already cleared land.
8. THE EUROPEAN PRODUCTION OF FOOD: WHAT WOULD A SUSTAINABLE MODEL LOOK LIKE?

As one of the most developed global economies, with one of the highest population densities, the European Union is placing unprecedented pressure on its own land. In the 21st century, land itself is one of our most precious resources, needed for food, materials and energy, tourism, recreation and housing while at the same time storing carbon and supporting both biodiversity and human activities.

What is required is a greater focus on overall sustainability and a more careful approach to land planning and management, with a range of policies that maximize the societal benefits obtained from land. A sustainable use of natural resources is an essential premise for a long-term agricultural productivity, as well as for the provision of other goods and services.

Highly productive agriculture has a future only if it uses natural resources in a much more sustainable way. The conservation of water resources and soil fertility, along with a reduction in GHG emissions, are crucial to enable a lasting productivity. Functional biodiversity associated with farmland provides a number of agro-ecological services (e.g. pest control, pollination, nutrient cycling) supporting crop production. The capacity to boost this component of biodiversity should be investigated in order to reduce the reliance of farming systems on chemical inputs, and therefore increase the sustainability of agriculture. A highly connected network of wildlife habitats will be needed to enable functional biodiversity, as well as other valuable species, to survive in intensively cultivated agricultural landscapes and in a changing climate. Therefore, every farm should be obliged to establish at least 10% of its agricultural area as “Environmental Priority Areas”, which include landscape features, extensive grassland or fallows. Proper monitoring and planning beyond the farm’s boundaries should ensure that such networks are sufficiently connected. Diversification of production types, healthy soils, long-term availability of high-quality water resources and a rich functional biodiversity are the best insurance against a changing climate, epidemics and fluctuating commodity prices in a global market.

Conversely, some types of relatively “unproductive” (but sustainable) agriculture must continue. There is sound justification for specific support of High Nature Value farming systems for the benefit of farmland biodiversity, landscapes, historical heritage and traditional high quality food, which are fundamental components of the cultural identity of each European region. Although often spatially aggregated, these systems can be adequately targeted by public support only if relevant conditions at farm level are set. Conversely, the abandonment of agricultural land may not always be negative. In many marginal areas, wild grazers can replace livestock in grassland landscapes, or forests and other natural ecosystems (e.g. wetland, floodplains and coasts) can be restored either by specific projects or by spontaneous ecological succession.

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9. DOES EXTENSIVE, NATURE FRIENDLY FARMING IN THE EU CAUSE ENVIRONMENTAL DAMAGE ELSEWHERE BY DISPLACING PRODUCTION?

Given the complex nature of international commodity trade it is difficult to isolate the impacts of land use in one region on another. While evidence is gathering that large-scale production of biofuels leads to displacement of food production to other parts of the world, and adds pressure on forests and other natural habitats, no evidence suggests that improving sustainability of EU production would lead to significant production displacement. Conserving EU High Nature Value farming systems on marginal areas often implies maintaining current production patterns, rather than a reduction in levels of intensity.

Environmentally friendly farming systems make a more efficient use of energy and natural resources, and if properly implemented, would not significantly affect crop yields39. A recent study, based on IFPRI's40 global food model, concludes that large scale (i.e. around 50% of agricultural land) conversion to organic farming in developed countries (Europe, USA, Canada) may be possible without severe negative effects on global food production41. This study also underscores the point that global food production is not the only determinant of food security, which instead depends on local agricultural production in food insecure regions. It is questionable therefore, whether a drive for more sustainability in European farming would shift problems to other parts of the World. What is evident is that current patterns of unsustainable use of natural resources in developed countries are undermining the basis for a lasting agricultural productivity42 43 44.

40 International Food Policy Research Institute
10. HOW DOES MEAT AND DAIRY CONSUMPTION AFFECT BIODIVERSITY AND THE ENVIRONMENT?

The livestock sector is responsible for the majority of environmental impacts from farming. A much bigger area of productive land is needed in order to supply the same amount of calories through meat than through plant-based food. It is estimated for example that it takes 4.5 plant-derived calories to produce one calorie of egg or milk and nine plant-derived calories to produce one calorie of beef or lamb meat. Around 30% of the earth’s land mass is now dedicated to feeding livestock. Although a significant portion of this is represented by extensive grazing of natural habitats, animal feed is consuming a major share of the world’s arable land and the opening up of new grazing land is a major factor in tropical deforestation. Soybean cultivation for the EU livestock sector requires about 10.57 million hectares of land, the equivalent of the combined arable land of Italy and the Czech Republic. Of this, about 5 million ha are cultivated in Brazil and 4.2 million in Argentina.

Global figures indicate that livestock production is the biggest driver of habitat clearance and degradation and that increasing meat and dairy production is probably the biggest single cause of biodiversity loss.

When forests are cleared for pasture or grasslands are ploughed to grow animal feed, large quantities of CO2 are released, which is then compounded by the methane released by ruminants such as cows and sheep. Livestock is estimated to account for 18% of global GHG emissions.

High income growth and urbanization in parts of the developing world, and particularly in the two biggest developing countries, China and India, are leading to a rapid switch of diet, following the western model of high animal protein content. World demand for both meat and milk is expected to double by 2050 (See Figure 4). Under current consumption patterns, meat and dairy represent one of the main sources of strain on the world’s ecosystems.

Figure 4. Past and projected food consumption of livestock products.

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46 FAO (2006) Livestock’s long shadow. FAO
48 FAO online statistical database: http://faostat.fao.org/
49 FAO (2006) Livestock’s long shadow. FAO
51 FAO (2006) Livestock’s long shadow. FAO
Per capita consumption of animal proteins in developed countries is significant, both in absolute and in relative terms. The over consumption of meat and dairy products has been linked to some of our biggest public health problems such as obesity, cancer and heart diseases\(^{53}\) \(^{54}\) \(^{55}\). In relative terms, someone in the developed world consumes almost 30% more calories than someone in a developing country and 60% more than people in least developed countries\(^{56}\).

The benefits of eating less meat and dairy overall have been demonstrated on both sustainability and health grounds, but it is equally important to ensure the meat we do consume is derived from sustainable production systems, for example beef from cattle extensively grazed on marginal land that can be easily degraded by cultivation. Extensive grazing represents the basis of much of Europe’s High Nature Value farming systems that are so important for biodiversity conservation and carbon sequestration. More sustainable, and healthy levels of meat and dairy consumption should be aimed for, whilst trying to ensure that what is produced comes from high quality and sustainably managed extensive grazing systems. Increasingly, evidence is emerging that grazing animals produce meat of higher nutritional value and improved health qualities than animals raised on artificial feed \(^{57}\) \(^{58}\), and that milk quality is higher from animals grazing on semi-natural biodiversity rich grasslands rather than on fodder crops\(^{59}\). While such products tend to be more expensive, eating less but of higher quality is a strategy that can deliver a win-win for both health and sustainability. Redirecting the livestock sector toward sustainable extensive grazing would also mean major improvements for animal welfare.

On a broader consumption related issue, consumers in developed countries must also address high levels of food waste. Every year, households in the UK waste 6.7 million tonnes of food, a third of the total food bought, 61% of this food waste is avoidable and could have been eaten if it had been managed better\(^{60}\). Wasted food also has climate change implications, as every tonne of food thrown away is responsible for 4.5 tonnes of CO2 equivalent emissions\(^{61}\). Reducing food waste not only makes economic sense, it is also a relatively simple way of reducing GHG emissions.

\(^{56}\) FAO STAT. Food security statistics
\(^{60}\) WRAP (2008) The Food We Waste
\(^{61}\) WRAP (2008) The Food We Waste
11. IS THERE A ROLE FOR EUROPEAN INTERVENTION IN FOOD PRODUCTION AND SUPPLY?

There is a clear role for European intervention to address market failure in production systems. Governments need to provide support for positive public goods through measures such as agri-environment schemes and to reduce negative externalities through instruments such as regulation.

Similarly, there is a role for European intervention to ensure that social objectives around food regarding affordability and health are met. However, these objectives are probably best achieved through different policy instruments, such as welfare systems and education, than food market intervention.

However, it is less clear if other types of involvement in food markets could produce positive results. Experience suggests that governments’ attempts to micro-manage markets are doomed to fail. In the past, the CAP was based on the EU setting a fixed price for every agricultural commodity and then trying to manage supply and demand through a combination of tariffs, production quotas and export subsidies. This led to an unjustified burden on taxpayers, massive overproduction, environmental degradation and negative impacts on food security in developing countries.

Although the evidence for the efficacy of establishing food reserves is mixed, the International Food Policy Research Institute (IFPRI) has proposed a minimum physical grain reserve for humanitarian assistance and a virtual reserve and intervention mechanism to ease markets under speculative situations. Participating countries in the virtual reserve would commit funds to intervene in the grain futures markets to help smooth out fluctuations in food prices. However, more research would be needed to investigate the feasibility of such an instrument.

12. SHOULD THE EU PROTECT ITS FOOD SECTOR FROM IMPORTS?

As seen above, there is little ground for always considering EU production as more sustainable than non-EU production. Current environmental standards do not offer a credible justification for protectionism. Social considerations also do not provide a case for protectionism, as EU imports of agriculture products do offer in some cases a vital opportunity for development to poor countries and poor farmers and exports of food products make up a large part of income for many farmers in the EU.

At the same time, it is clear that imported foodstuffs can be a driver for environmental destruction as exemplified by the clearing of natural habitats for soybean cultivation and beef production in Latin America and for palm oil in South-east Asia. Imports extend the footprint of EU consumers to overseas countries, while exports do the opposite. It seems clear that if trade is to become a vehicle for sustainable development, rather than for harm, it needs to happen within a solid framework of common rules. Current WTO rules to a large extent ignore the way products are produced, which is needed in order to determine the sustainability of a product. Ideally, trade rules should be harmonized with environmental and social rules in order to guarantee a true level play field to all producers. In order to tackle global sustainability issues such as biodiversity and climate, we will need in the coming years to forge a new system of global governance.

As different countries or blocs (such as the EU) have different levels of environmental protection legislation there is a risk that environmental concerns could be misused for protectionist ends. This would be counterproductive as it would encourage countries like Brazil, India or China to see environmental concerns as an instrument that hurts their industries rather than as a shared common interest. The road forward should be through the negotiation of multilateral agreements, rather than through closure or trade wars. Defining sustainability standards in this context will be a difficult and contentious task, especially as some developing countries see European criticism of deforestation as hypocritical, when some EU Member States are still destroying the few remnants of primeval forest left on their territories.63 64 However, potential avenues could include:

- a “new deal” where the EU offers free market access in exchange for agreed environmental and social standards;
- a honest definition of minimum standards, applicable to local conditions;
- compensation mechanisms to account for land use choices (such as the proposed REDD mechanism);
- transparent labelling and information about production methods and sites;
- redefinition of the “green box” to exclude untargeted public payments and to render easier the use of support for ecosystem services.

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65 Reduction of Emissions from Deforestation and Degradation - a mechanism currently under discussion in the negotiations for a post-Kyoto climate agreement that would create a system for paying forest countries (especially in the tropics) for reducing emissions from forest degradation and deforestation.
CONCLUSIONS

An overview of the facts suggests that the world is producing sufficient levels of food and is capable of doing so in the near future. Food insecurity is currently an issue of income and access, not of overall production. On the other hand, and in the longer term, real concerns do exist over the sustainability, and productivity, of the world food system, especially under more severe climate change scenarios. Europe should maintain its agricultural production base, and continue to provide the bulk of EU consumption needs. In developing countries, agricultural productivity needs to increase substantially in order to support a growing global population but should be done in a way that spares the world’s remaining natural habitats.

There is no justification for an immediate intensification of EU agriculture production or new production subsidies in order to combat the global food crisis. This would only lead to further degradation of natural resources at the cost of biodiversity and long-term agricultural productivity. Europe’s role cannot be to feed the world, but it does need to reduce its global footprint by changing its land-use related production and consumption patterns and to support sustainable agricultural practices providing a broad range of public benefits.

Over time, substantial increases in agricultural production in developed countries, supported by market-distorting incentives, have led to the degradation of natural resources and to an uneven effect on food security. Despite impressive yield growth in developed countries, hunger, malnutrition and food insecurity remain high, affecting millions of people, particularly in South Asia and Sub-Saharan Africa.

Biodiversity provides ecological services (such as pollination, pest regulation, nutrient cycling, microclimate regulation) that support agricultural production. Only a water, soil and climate-friendly agriculture will be able to secure lasting productivity. The conservation and enhancement of farmland biodiversity will therefore play a key role in ensuring food security, especially in the context of changing climatic conditions.
BirdLife International is a global Partnership of conservation organisations that strives to conserve birds, their habitats and global biodiversity, working with people towards sustainability in the use of natural resources. BirdLife Partners operate in over 100 countries and territories worldwide. BirdLife International has 42 Partners in Europe and is active in all of the EU Member States. http://europe.birdlife.org

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