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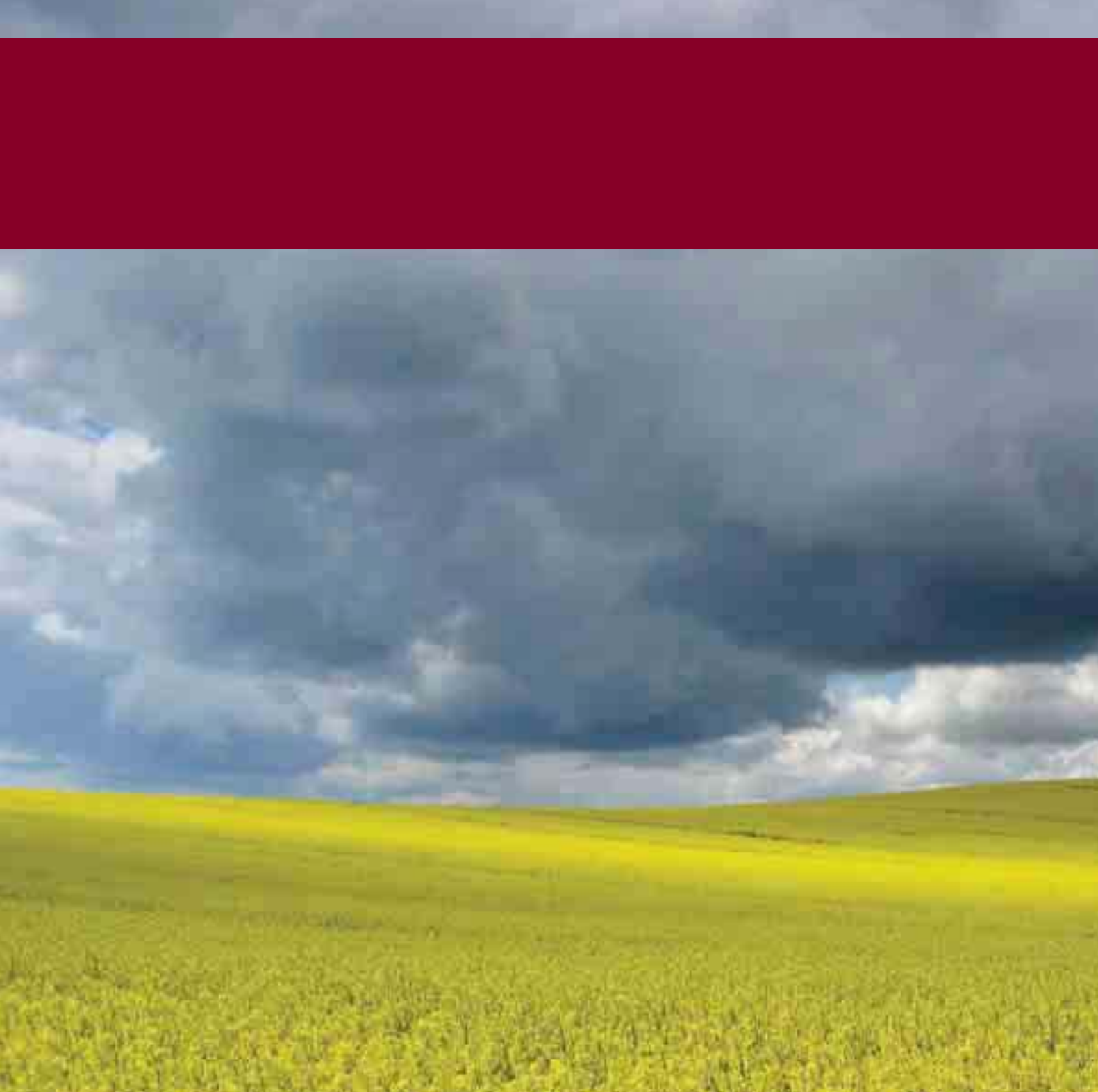
A cool approach to biofuels

Making transport choices that protect the environment



Why all the noise about biofuels?

Ingmar Wesemann (istock)

Climate change is the greatest challenge of our times, and the greatest long-term threat to wildlife and the natural environment. The average global temperature rose by 0.6 degrees Centigrade last century, and is predicted to rise between 1.8 and 4 degrees this century. If we fail to limit further warming to 2 degrees or less above pre-industrial levels, we will open the door to mass species extinctions, widespread human suffering and skyrocketing costs for adapting to climate change. The possibility of a safe climate future is in our hands, and our task is clear. We must tackle climate change effectively, and we must act with conviction now.

As climate change has risen rapidly to the top of the global political agenda in recent years, so too have biofuels. Biofuels are transport fuels derived from crops or organic wastes, which can be mixed with diesel and petrol. There are two main varieties: biodiesel, which is mixed with diesel; and bioethanol, which is mixed with petrol. Biodiesel can be made from a variety of oils, such as palm, soya, cottonseed, oilseed rape, used vegetable oil and tallow. Bioethanol is currently made from sugarcane, sugar beet, wheat and maize. A third type of biofuel, biogas, can be made from breaking down crops, manures and other organic matter using micro-organisms. It requires a specially modified biogas vehicle, whereas biodiesel and bioethanol can currently be used in regular engines at mixtures of up to 5 percent.

Biofuels appear to promise reductions in harmful greenhouse gas emissions, while allowing the business of transporting goods and people to carry on largely as before.

Perhaps because they seemed to offer an 'easy win' in the battle against climate change, European law-makers were quick to pass legislation promoting biofuels in European transport fuel. In 2003, a European Directive called on member states to convert 5.75 percent of their transport fuel to biofuels by 2010[1]; discussions have been underway to increase this target significantly by 2020.

Almost as quickly as biofuels became the darlings of the climate change debate, however, they became controversial. A number of prominent scientific studies in 2007-08 concluded that biofuels are not the silver bullet they first appeared[2]. Their production and processing may itself produce significant amounts of greenhouse gases. The rush to expand biofuel crop production has also come at the expense of priceless wildlife habitats and has played a part in the rise in global food prices.

The RSPB is demanding a critical evaluation of biofuels, and what they can do for us:

- Can biofuels help tackle climate change?
- How much land do biofuels need?
- Can wildlife survive the biofuels surge?
- Can biofuels be sustainable?
- What other green transport choices do we have?

This report explores these questions. We fully recognise the urgent need to tackle climate change, but we need solutions that work. The RSPB is advocating a cool, measured approach to biofuels, which recognises what we already know – that they may backfire for the climate, for people and for wildlife. Government support for biofuels must be at a scale and speed that truly benefits the climate and does not compromise the protection of wildlife and the wider environment, with compulsory high standards that guarantee biofuels deliver of both of these. Policies that actively promote biofuels should be implemented once it can be proved that they can be produced sustainably, but not before.

In the following pages, we explore the impacts of biofuel production, and the transformation needed to ensure that biofuels make a positive contribution to tackling climate change and helping the environment.

[1] 5.75 per cent by energy content, which equals between 6.3 and 8.6 percent by volume depending on relative proportions of biodiesel and bioethanol. The UK Government chose to set a UK target of 5 percent by volume by 2010.
[2] For example Fargione *et al* (2008); Searchinger *et al* (2008); Scharlemann and Laurance (2008).

Andy Hay (rspb-images.com)

The RSPB is calling for:

- Policies and standards that deliver only sustainable biofuels.
- No further biofuels targets in Europe.
- No immediate obligation to include biofuels in UK transport fuel.
- New investment in research and development for truly clean fuels.
- The development of a strategic approach to land use, to help ensure sustainable bioenergy[3].
- Support to help developing countries manage their natural resources, including their wildlife, sustainably.
- Policies to cut emissions from transport in sustainable ways.

[3] Bioenergy is renewable energy derived from organic matter, which includes biofuels for transport.

vario images GmbH & Co.KG (Alamy)

Can biofuels help tackle climate change?

Biofuels are, in theory, 'carbon neutral'. Biofuel crops absorb carbon dioxide as they grow, then release the gas when their products are burned in vehicle engines.

However, the full life cycle of biofuels, from land clearance and planting, growing and harvesting through processing and transport to the point of sale, generates greenhouse gases. Once these emissions are figured in, the greenhouse gas balance sheet can look quite different.

As a result, there is a large range of greenhouse gas savings among different types of biofuel. For example, bioethanol produced from sugarcane can produce significant greenhouse gas savings, if its production does not result in carbon-rich habitats, such as forests and savannahs, being cleared for new croplands. By contrast, ethanol produced from maize, for example, makes far smaller, if any, greenhouse gas savings. Sometimes these fuels produce more emissions in their production, processing and use than their fossil fuel equivalents.

Left: The drive for biofuels is likely to be a key factor in the ploughing up of permanent set-aside, after the EU requirement was set at 0 percent in 2007. Set-aside is a valuable resource for wildlife across Europe.

The greenhouse gas 'balance sheet' for any biofuel depends primarily on:

The chemical inputs used to grow biofuels

If biofuels require large amounts of input to grow, their 'eco-footprint' increases: for instance, artificial fertilisers are energy intensive to produce and release nitrous oxide, a potent greenhouse gas.

The process to convert the 'feedstock' (organic material) into biofuel

Some processes for converting the raw crops into the vehicle-ready fuel

are energy intensive, and may be powered by fossil fuels rather than renewable energy.

The production of co-products such as livestock feeds

Sometimes the feedstock crops used to make biofuels can be used for more than one purpose: both for processing into biofuels and for the creation of high-protein 'co-products'. Such co-products include seedcake from oilseed rape and 'distillers dried grain and solubles (DDGS)', which can be used as livestock feed or burnt to produce heat. Using one crop for both biofuels and livestock feed in this way can reduce environmental impact. For example, it reduces the need for soya meal imports for feed.

Land use change

Direct

If biofuels are grown on land that was previously used for crops, there may be little net change in the carbon balance. However, some biofuels are grown on land that was converted from other uses, such as forest, grasslands or peatlands. Such conversions can release large amounts of greenhouse gases.

The clearance and drainage of Indonesian swamp forest to grow oil palm is just one extremely troubling recent trend. Estimates suggest that it would take more than 420 years for production of biodiesel from palm oil to 'pay back' the carbon debt created when Southeast Asian peatland forest is cleared and drained to make way for planting[3]. In Europe, permanent grasslands are under pressure to be converted to biofuel crops. Permanent grasslands are an important carbon store. Once converted to biofuel crops, scientists estimate that it may take from 17 to 111 years for the greenhouse gas savings to 'pay back' the emissions caused by the land use change[4].

Indirect

It is not only in this direct way that biofuel crops can lead to land use change, with negative consequences for the climate, biodiversity and food prices. Recent evidence indicates that even where biofuels are grown on land already in cultivation, this can lead to the displacement of food crops and other land uses to natural habitats, that are valuable carbon stores. Current life cycle analyses of biofuels do not take this into account[5].

[3] Fargione *et al*, 2008, *Land Clearing and Biofuel Carbon Debt.*
[4] Concawe, EUCar and JRC, 2006, *Well to Tank.*
[5] Searchinger, T. *et al*, 2008.

The RSPB wants to see biofuels that really work for the climate. This means minimum greenhouse gas standards required by law for all biofuels that are sold in the UK and in Europe. We argue that biofuels should deliver emissions savings of at least 60 percent above their fossil fuel equivalents based on full life cycle analysis, which includes the effects of both direct and indirect land-use change. This standard would allow for uncertainty in estimates of greenhouse gas savings and provide better value for the taxpayer or customer, who will have to pay a premium for the supply of 'green' fuels.

We also think that any targets for biofuels should be based not on the volume of biofuel supplied, but on the greenhouse gas savings delivered – this way, we can be more confident that biofuel policies are directed towards their stated goal of reducing harmful emissions.

Is there enough land to grow biofuel crops?

Demand for transport fuels is so large that even seemingly modest targets such as replacing 5 percent of our fuel with biofuels would translate into huge demand for biofuels and therefore land to grow them on. By 2010, 5 percent of the UK's transport fuel demand is estimated at 2.5 billion litres of fuel, which would require between 20 and 30 percent of the UK's land to grow[6].

When we include the EU's aspirations to increase biomass[7] production for heat and power – to meet its renewable energy targets – it is clear that demand for biofuels and biomass will not be met through domestic production alone. The UK Petroleum Industries Association (UKPIA) recently estimated that the 6.5 billion litres required to meet the EU's proposed 10 percent (by energy) target for biofuels would take 60 percent of the UK's arable land. A significant amount of the bioenergy consumed in the UK and EU will therefore need to be imported. Thus the 'land footprint' of our bioenergy demand will be spread across the EU and into countries such as Brazil, Malaysia and Indonesia.

Even if we were to attempt to produce all our biofuels in Europe, this would not necessarily reduce the indirect 'footprint' of those biofuels, since European food needs would then have to be met from elsewhere. Land is a finite resource. Any new use we find for it on a significant scale will inevitably increase the pressure for agricultural conversion at the expense of carbon and wildlife-rich forests, peatlands, grasslands and wetlands.

And wildlife will not be the only victims of increased pressure for land. The OECD, FAO and United Nations Energy have all warned that governments' support for biofuels could have serious negative impacts on food prices, with the world's poorest peoples likely to suffer most as a result[8].

Using uncultivated 'marginal' or 'degraded' land to grow biofuel crops has been put forward as a solution to these problems. However, defining what is truly 'marginal' is not easy. What might be deemed marginal for food crop cultivation might be incredibly valuable for local people – for access to clean water, firewood or livestock grazing, for example – as well as for wildlife.

Today's generation of biofuels requires more room than we have to give them, even under modest aspirations for biofuel use in transport. It's time to start looking at alternative biofuels – as well as alternative ways of reducing greenhouse gas emissions from transport – to solve this conundrum.

[6] www.nfuonline.com/x9763.xml *Accessed 27 February 2008.*

[7] Biomass is any organic matter, eg waste, dedicated energy crops or forestry arisings, and can be used to generate heat and/or electricity or produce biofuels.

[8] UN 2007; Dornbosch and Steenblik, OECD 2007; OECD/FAO 20007; Kojima et al 2007.

The Cerrado of Brazil and Paraguay is one of the worlds most wildlife rich savannahs and is under threat from sugarcane and soya bean production.

Luiz Claudio Marigo (Nature Picture Library)

Can wildlife survive the biofuels surge?

Pete Oxford (Nature Picture Library)

The endangered hyacinth macaw is at massive risk of illegal hunting but has also suffered from habitat loss across its Brazilian range where savannah and its food plant stands have been converted to agricultural plantations following the rise in demand for tropical crops for food and biofuels.

The biofuels rush is contributing to the loss of natural habitats around the world, either directly, when habitats are destroyed to plant biofuel crops; or indirectly, as food crops displaced by biofuels expand into previously unfarmed areas. Valuable ecosystems such as forests, peatlands and grasslands are being cleared, drained and ploughed up to grow biofuel crops. These artificial habitats harbour a tiny fraction of the biodiversity supported by natural habitats[9].

The Cerrado of Brazil and Paraguay is one of the world's most wildlife-rich savannahs and is one such special place under threat from crop expansion. Some 90,000 insect, 40,000 fungi, 550 bird and 150 mammal species have been recorded in the Cerrado. Yet a Conservation International (CI) study[10] says that large-scale soya bean farms, sugarcane plantations and cattle pasture are destroying the area; one driver of sugar and soya bean expansion is the quest for raw material for bioethanol. CI estimates that at current rates of loss the Cerrado will be gone by 2030.

In the Amazon rainforests, a similar picture unfolds. Even as the rainforest continues to reveal astonishing new species, an area equivalent to the size of Jamaica is felled every year[11]. Demand for biofuels will only add to the already enormous pressures on land. Soya prices are rising internationally and offer lucrative earnings for Brazilian farmers, because less soya is being produced in the United States. US farmers are switching from soya to maize at least in part to meet the demands of a booming maize-for-ethanol fuel industry – heavily subsised by the US Government.

Right: The indigenous people of central Sumatra, Indonesia traditionally lived in the forest and used its products sustainably; now they have been displaced by logging and burgeoning palm oil plantations.

Oil palm expansion has already contributed to the eradication of vast tracts of forest in Malaysia, much of it used in foods and cosmetics. Now the surging global demand for palm oil has put extra pressure on Southeast Asian producers to deliver. The potential for oil palm for biofuels to become a major driver of deforestation is enormous. Indonesia recently overtook Malaysia as the world's top palm oil producer: its forest-dependent wildlife is already severely under threat, especially those endangered species hanging on in the last areas of lowland forest. Most of Indonesia's palm oil is produced on the vast western island of Sumatra and much of it on recently cleared rainforest land. Twenty eight of Sumatra's forest-dependent bird species are globally threatened with extinction and have few other refuges beyond Sumatra's forests, should they disappear. The global conservation status of 59 of Sumatra's birds deteriorated between 1994-2000, almost all of them forest species.

[9] Arakrakorn, S *et al* (2006)

[10] Machado, R.B., M. B. Ramos Neto, P. Pereira, E. Caldas, D. Goncalves, N. Santos, K. Tabor, and M. Steininger. 2004. Estimativas de perda da area do Cerrado brasileiro. Conservation International do Brasil, Brasilia.

[11] World Resources Institute, www.earthtrends.wri.org/updates/node/272 *Accessed 18 February 2008.*

David Adam, The Guardian

Rainforest in the shopping basket?

Palm oil is a versatile oil that can be used in food and cosmetic products and blended with other oils to make biodiesel. Palm oil grown in Indonesia and Malaysia tends to have a large 'eco-footprint' because much of it (as much as half of Indonesian palm oil grown in the 1990s[12]) is grown on land that has recently been deforested. Some of this palm oil will end up in European vehicles, as biofuel, as a result of UK and European policies. Even if biofuels are made from European-grown rapeseed, the rapeseed currently used in food products is likely to be replaced with imported palm oil, driving demand indirectly. A recent industry-led initiative involving government and environmental groups, called the Roundtable on Sustainable Palm Oil, devised a certification scheme for 'sustainable palm oil' that excludes palm oil grown on land deforested after 2005. It is a very weak standard, but better than none at all.

[12] Friends of the Earth, Greasy Palms, 2004

Demand for commercial biofuels is likely to drive more extinctions, like the Alagoas curassow (see box, right). These trends will continue until important wildlife sites are designated and actively protected, and their management is adequately funded, particularly in developing countries. For this to be successful, we will need to find innovative ways to reward local people for looking after their forests and other precious ecosystems. For example paying them to protect carbon stocks in trees and soils has the potential to benefit wildlife and local livelihoods too. Consumers in countries like the UK will also need to buy from ethical sources. This means requiring that all biofuels supplied in the UK meet strict sustainability standards that protect wildlife; and that biofuel production does not increase pressure for land, which is already hitting wildlife hard.

Alagoas curassow:
first bird to go extinct because of biofuels?

Brazil's Atlantic forest region has long been renowned as a crucible of biodiversity and species endemism. It has also been under relentless development pressure for decades. Several areas, such as the north-eastern region of Pernambuco and Alagoas, were virtually clear-cut during the 1980s, largely as a result of the drive to extend sugarcane plantations and bolster the Government's ethanol fuel programme.

The Alagoas curassow, *Mitu mitu*, is a large bird with glossy purplish-black plumage, a large bill and red legs, that depended upon the lowland ranges of the Atlantic forests. First recorded in the mid-17th century, it was then 'missing' until its rediscovery in the 1950s, at which time its numbers were already perilously low. The ceaseless clearance of the lowland forests during the ensuing decades, accompanied by pesticide use in new sugarcane areas and some hunting, spelled the death knell for the species in the wild.

The Alagoas curassow has not been reported in the wild for more than three decades now. Some individuals remain alive in captivity, and Brazilian aviculturists are now focused on ways to reintroduce them in the wild, in some small fragments of suitable, protected habitat.


Carlos Sanchez (rspb-images.com)

British and European wildlife is already feeling the strain of increased competition for land. Until recently, European farmers were paid public subsidies to keep set-aside land as a way of limiting production. Although not introduced as an environmental measure, set-aside offered significant environmental benefits: for example it has provided important feeding and nesting grounds for birds. The populations of many of these species, such as little bustard and turtle dove, had been in historic decline and set-aside land gave them a lifeline. Set-aside also acted as a natural fallow, leading to a reduction in the use of agricultural inputs and reduced water pollution and habitat damage. In 2007, partly in response to high world grain prices caused by poor global harvests, and partly to encourage the growth of biofuels, the European Union set the requirement for set-aside land at 0 percent, and has failed to bring in any measures to replace the environmental benefits.

Left: The little bustard is one of the declining species which relies heavily on set-aside in Europe.

European grasslands
ploughed up for biofuels

Germany has invested heavily in the development of biogas from maize and biodiesel from oilseed rape. NABU, the BirdLife International partner in Germany, gathered evidence to show that species-rich permanent grassland in protected areas is being ploughed up in order to grow maize for biogas. It will take many decades before the greenhouse gas savings from the biogas pay back for the emissions created by land conversion – and the loss of wildlife habitat is even more difficult to reverse.

The environmental stakes have been raised by the entry of ten new Central and Eastern European member states into Europe. These countries have a wealth of biodiversity that risks being lost to the intensification of agriculture and the expansion of intensive cereal crops. Already there is evidence of the conversion of permanent grasslands into arable farms in these new member states.


Andy Hay (rspb-images.com)

Spectacular Kenyan wetland under threat

Michel Laplace-Toulouse (www.africanlatitude.com)

White-faced ducks in the Tana River Delta, an area threatened by development of sugarcane plantations.

A flourishing wetland on Kenya's northern coast is under serious threat from plans to grow vast amounts of sugarcane, partly for biofuel production. Developers want to transform nearly 20,000 hectares of the spectacular Tana River Delta into sugarcane plantations, along with sugar and ethanol processing plants.

The area, about 120 miles north of Mombasa, has until now been a highly productive ecosystem that has supported a vast variety of wildlife and provided livestock grazing and seasonal cropping opportunities for local farmers. Farmers grow food crops on the natural flood plains and lake edges, while others bring livestock to graze from drought-affected areas as far away as Somalia and Ethiopia.

The Tana River Delta area is largely untouched by development and teems with wildlife. It is home to more than 345 species of birds including the threatened Basra reed warbler and Tana River cisticola. Twenty two waterbird species are

found there in internationally important numbers. Other wildlife includes two endemic primates, the Tana River red colobus monkey and the Tana River mangabey, which are threatened with extinction.

Development plans, if implemented, would destroy habitat directly as large areas were converted to sugarcane plantation – a wasteland for wildlife. In addition, massive water diversions would be required to irrigate the sugarcane. Up to one third of the Tana River's flow would be diverted, risking poor productivity for local farmers, unsuitable conditions for vulnerable wildlife, and a host of other environmental impacts such as sedimentation and salinisation. There is also scant evidence to show how local inhabitants would benefit from the sugarcane scheme.

The RSPB, its sister organisation Nature Kenya, many other Kenyan organisations, and local people are fighting for national protection for the most critical parts of the Tana River delta and floodplain. We would like to see tracts designated as a Ramsar site and other areas safeguarded for local livelihood needs.

Michel Laplace-Toulouse (www.africanlatitude.com)

Local people from the Pokomo ethnic group depend on Kenya's Tana River Delta for their livelihoods – they grow crops on the floodplains and river edges. They have much at stake in decisions on whether to expand biofuel crops in the area.

Can biofuels be sustainable?

Michael Steden (istock)

The world's wild population of Sumatran tigers is now restricted to fragments of the forest and scrub in Sumatra, Indonesia. The tiger's remaining habitat is under threat from logging and palm oil plantations.

The current biofuels on the market are referred to as first generation biofuels. As discussed, many of them are unsustainable because the greenhouse gas balance sheet may not add up; because the crops may be grown at the expense of wildlife habitat, either directly or indirectly; and/or because of their impacts on food prices.

There are some biofuels, for example those made from waste oils, that offer significant carbon benefits, without the environmental and social costs associated with land-use change. Using waste oils to make biofuels can also provide cost-effective and environmentally sound ways of disposing of such wastes.

It may also be possible to source sustainable biofuels from areas of land that have no significant value for wildlife, ecosystem services or food production, although defining and identifying such areas poses a huge challenge.

However, it will take a great deal of work to put policies in place, to ensure that only sustainably

produced biofuels enter the supply chain. Some standards attempting to deliver sustainability have already been developed, such as the sustainable palm oil standard (see box on page 9), but many biofuel crops, such as sugarcane ethanol, do not yet have any standards and these will take time to bring forward. Once in place, standards can be difficult and expensive to apply, and generally rely on the effective implementation of national legislation to give basic protection to wildlife, resources and people. Very robust third party enforcement of international standards will be required, for these to offer any guarantee of sustainability.

But even with better standards and good compliance, it is difficult to see how the 'knock-on' impacts of many first generation biofuels on habitat, greenhouse gas emissions and food prices could realistically be avoided. Second generation biofuels could offer some solutions as they can be made from a far wider variety of organic substances, including crop wastes. Thus, in theory, farmers would be able to use the same land to grow food and produce crop wastes for biofuel.

Other possibilities include technology for converting biomass such as wood, grass or algae into biofuels. These technologies are all in their research and development phases, and are not yet proven at commercial scale.

Although they have not been fully evaluated for their environmental impact, the greenhouse gas emissions for these second generation biofuels look more favourable. But all will need to be carefully screened and monitored for their impacts on ecosystems, wildlife, and global food supplies.

The RSPB believes that sustainable biofuels could play a significant role in reducing greenhouse gas emissions from the transport sector, given the right safeguards. But the vital work of ensuring their sustainability must start now, and may not be achieved until a new generation of more efficient fuels have been developed and become commercially available.

In the meantime, the Government should restrict its policy support to truly sustainable fuels, which in reality will come from a very limited number of first generation sources. This would release resources to invest in more cost-effective measures to reduce emissions from transport, for example more efficient vehicles and better public transport.

The cost of biofuels to Europe

In Europe, the growth of biofuels is currently subsidised. A 2007 study of government support for biofuels in the EU, found that the cost, in European production subsidies, of saving each tonne of CO_2e (carbon dioxide equivalent) ranges from 215 for biodiesel from used cooking oil, to 600 for biodiesel made from rapeseed [13]. The RSPB is in favour of rational government subsidies to deliver greenhouse gas savings, but investing heavily in the current generation of biofuels to deliver those savings does not make sense.

[13] GSI (2007) Biofuels – at what cost?

What other
green transport choices do we have?

Biofuels are meant to help tackle climate change by reducing greenhouse gas emissions from transport. If many current biofuels are not doing this cost effectively, and bring with them such environmental and social risks, why not encourage other means of reducing transport emissions? Improving vehicle efficiency, encouraging public transport and zero-carbon transport, and better driving habits are all more efficient ways of tackling climate change without the huge sustainability question marks that surround many of today's commercial biofuels.

Vehicle efficiency gains could be made that would dwarf any possible savings from biofuels. The King Review[14] concluded that the potential in this area was so great that carbon dioxide emissions per car could be reduced by 30 percent using technology that is already available or close to market – such as lighter, more aerodynamic vehicles, hybrid technology and Intelligent Speed Adaptation systems.

Far more government investment is needed to encourage a shift from private car use to more sustainable alternatives such as rail or cycling. These alternatives need to be made comfortable, affordable and accessible in comparison to driving. People can feel positively discouraged from making green transport choices. A true step change is needed in Government priorities, so that departments and authorities work effectively together to empower people to leave the car at home.

Whereas current biofuels carry many negative side-effects, promoting alternative green transport choices and planning for more sustainable communities could do quite the opposite. Improved walking and cycling facilities not only tackle climate change effectively, but can help improve social cohesion and public health.

Meanwhile, enforcing the speed limit on motorways or even dropping the speed limit and encouraging drivers to use more efficient driving methods would significantly reduce transport emissions in the UK.


Arne Trautmann (istock)

Right: Encouraging people to walk or cycle instead of drive is a cost-effective way of tackling climate change.

[14] H.M. Treasury. *'The King Review of Low Carbon Cars'. October 2007*

A call for sustainable policies

Chris Knights (rspb-images.com)

The stone-curlew is at risk from loss of set-aside particularly in the UK. In mainland Europe, where it continues to decline, it is also threatened by loss of bare marginal ground, which is at risk from crop expansion, partly due to demand from biofuels.

The current generation of biofuels is unlikely to be able tackle emissions from transport sustainably, and at a significant scale. Used unwisely, they will create further pressure on the Earth's fragile life-support systems. We need a different approach to reducing emissions from the transport sector.

The RSPB is calling for:

Policies and standards that deliver only sustainable biofuels.

- The Government must establish policies that guarantee sustainability of supply. They will need to include tough standards and regular review clauses that take into account both the direct and indirect impacts of production – on the climate, on people and on wildlife. Targets for volumes of biofuel in the fuel supply chain must be dropped in favour of policies which deliver measurable climate benefits, without damaging biodiversity and livelihoods.

- Sustainability standards at the UK and EU levels must be compulsory and provide robust and verifiable safeguards against the damaging impacts of biofuels on biodiversity, soils, water resources, air quality and livelihoods, including impacts from land use change.
- Greenhouse gas standards at the UK and EU level must also be stringent, requiring any biofuels supplied under the Renewable Transport Fuel Obligation or EU laws to deliver at least 60 percent savings in emissions over fossil fuels, taking into account emissions associated with land use change. This will ensure meaningful levels of savings in proportion to public investment, and incentivise producers to develop more efficient biofuels in future.

No further biofuels targets in Europe.

- All European governments (including the UK Government) should resist vigorously the introduction of new biofuels targets or support systems in the EU, until there is evidence that these can be met without damage to the climate, biodiversity, and livelihoods.

No immediate obligation to include biofuels in UK transport fuel.

- The UK Government should suspend domestic targets and associated subsidies for biofuels, until there is clear evidence that these fuels can be produced and supplied sustainably. If it is not possible to monitor and manage the indirect as well as the direct impacts of biofuels on greenhouse gas emissions, habitats and food security, then the Government must scrap biofuel support policies altogether until these issues are resolved.

New investment in research and development for truly clean fuels.

- Sustainable fuels are unlikely to be developed without further investment in research and development. If the Government wishes to invest money and policy energy into biofuels, it should focus its attention on developing a future generation of truly clean fuels and fully understanding the wider environmental and land use impacts these will have.

Right: Hippos are among the threatened species whose Tana River Delta habitat in Kenya is at risk of drainage and conversion to sugarcane plantation, partly for biofuels use.

Migration routes of elephants in Ethiopia have been disrupted by biofuel crop plantations.

Tony Hamblin (rspb-images.com)

The development of a strategic approach to land use, to help ensure sustainable bioenergy.

- Land is a finite resource with an increasing number of demands for its use, including food production, housing and other development, renewable energy supplies, ecosystem services such as flood storage, biodiversity conservation and enhancement, and recreation. To help manage these demands, which are likely to come into greater conflict as climate change gathers pace, the Government must take a more strategic approach to land use policy, working with stakeholders to determine the optimum use for land to deliver public goods. It should also push to ensure a strategic approach is taken in European legislation.

Support to help developing countries manage their natural resources, including their wildlife, sustainably.

- Developing countries, especially those with significant rainforest and savannah habitats remaining, hold some of the world's greatest biodiversity and yet are desperately under-resourced in protecting it. The UK Government should invest now in pilot projects to reward developing countries for reducing emissions from deforestation, and in helping them protect and restore ecosystems and the services they provide for people and wildlife.

Policies to cut emissions from transport in sustainable ways.

We need to reduce emissions from the transport sector to tackle climate change, but at present biofuels have only a small role to play in this. Government must invest in other approaches, which will also have significant benefits for health and communities. We need policies that deliver:

- More efficient car engines – action at the European level to ban the most inefficient cars and increase the overall efficiency of the EU car fleet would reduce emissions significantly.
- The infrastructure to make it safe, affordable and easy for people to walk, cycle and take low-carbon public transport. The potential cross-benefits of improved walking and cycling facilities include improved social cohesion and public health.
- Better, safer and cleaner driving – applying the speed limit in the UK would lower pollution from cars and reduce deaths and injury on the roads.

Further reading:

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The RSPB speaks out for birds and wildlife, tackling the problems that threaten our environment. Nature is amazing – help us keep it that way.

Front cover: Burning rainforest land in Sumatra by Mairi Dupar (RSPB)

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