# A FORESEEABLE DISASTER:

## The European Union's agroenergy policies and the global land and water grab

# A FORESEEABLE DISASTER:
## The European Union's agroenergy policies and the global land and water grab

by Helena Paul, Econexus
July 2013

Editor: Jenny Franco
Design: Ricardo Santos
Print: Jubels

Acknowledgements: The author would like to thank Almuth Ernsting of Biofuelwatch and Martha Jane Robbins for editorial assistance.

**Helena Paul** has worked for more than 25 years on issues related to indigenous peoples' rights and tropical forests; biodiversity, including agricultural biodiversity; oil exploitation in the tropics; patents on life and genetic engineering (GE); and corporate power in general. Since 2006 she has worked on agrofuels and their implications for food sovereignty, biodiversity, climate, soil and water, land rights and human rights, plus the application of genetic engineering and synthetic biology to generations of biofuels, crops and trees. She has co-authored a number of papers and a book, *Hungry Corporations*, published by Zed Books.

Published by Transnational Institute, FDCL and Econexus for Hands off the Land Alliance

The **Hands off the Land** project aims to raise awareness about land grabbing amongst the European public, politicians, policy makers, students and professionals. The project presents case documentation, fact sheets and thematic studies of transnational land grabs in Mali, Mozambique, Zambia, Colombia and Cambodia.

For more information contact:
**tni@tni.org**
**office@fian.at**
**fian@fian-nederland.nl**
**fian@fian.de**
**info@fdcl-berlin.de**
**igo@igo.org.pl**

Produced with financial support from the European Commission.
The views expressed herein are those of TNI/FIAN/IGO/FDCL and not of the EC.

**HANDS OFF THE LAND**
TAKE ACTION AGAINST LAND GRABBING

a joint project of TNI, FIAN International, FIAN Netherlands, FIAN Germany, FIAN Austria, IGO in Poland and FDCL in Germany.

# Table Of Contents

# Executive summary


On the eve of the new millennium, the EU embarked upon a major agroenergy and bioeconomy experiment. More than ten years on, the evidence from science, academia, and grassroots voices is clear: **most of the claims initially made for agroenergy as a truly renewable alternative to fossil fuels are flawed**. Indeed, reports and research continue to demonstrate problems with the policy's most basic assumptions. Worst of all, the creation of an EU market for industrial agrofuels has been shown to have a negative impact on the land and resource rights, livelihoods, and food security of local populations, especially in the global South. These same concerns hold true for agromass. But despite the accumulating evidence, the European Commission (EC) is persisting with its agroenergy policies, resolutely refusing to-drop targets that were demanded by industry from the outset to provide security of investment in the sector. The reason why so many sound arguments against agrofuels and agromass are being ignored, is that behind the EC's promotion of agrofuels and agromass is a powerful industrial lobby that includes the motor industry, the oil industry and the various energy industries. The grand plan for a bioeconomy appropriates renewable biological resources to facilitate a market-based, techno-centric response to unsustainable energy patterns.

Critically analysing the origins, claims, and effects of the European Union's (EU) transition to a new bioeconomy, this report aims to contribute to challenging this strategy. It highlights how EU policy is contributing to a reordering of land and land use, with a particular focus on Africa. One aspect of the non-renewable nature of agroenergy with special relevance to this paper is that it requires more land per unit of energy than other forms of energy supply. To date the EC has proposed that EU agrofuel policy can be amended or adjusted to actually reduce emissions and not have negative impacts on third countries. This merely helps to perpetuate a policy that is based on false assumptions and claims, a policy that has failed on its own terms. Civil society needs to increase the pressure and shift the onus to the companies to prove that they are not destroying forests and livelihoods. Our primary obligation in Europe is to reduce energy consumption, in particular that which has an impact on other regions, and change our current energy dense development model. Agroenergy does not qualify as renewable energy and the EU agroenergy policy framework should therefore be dismantled.

# 1 Introduction

Shortly before the new millennium began, the EU embarked upon a major agroenergy and bioeconomy experiment, where numerous mandates, targets, incentives, and other instruments are being deployed across Member States' transport, heating, electricity, and energy sectors to promote agrofuels and agromass agroenergy. The EU began with agrofuel as the first major step toward an envisioned overall shift: from fossil resources to agromass as a source not just of energy and fuel, but also of food, feed, fibre and chemicals. This is the so-called 'bioeconomy' — and it is the leading technological version of the 'green economy' regime first promoted by the United Nations Environment Programme (UNEP) and the Rio+20 process.[1]

More than ten years into this experiment, the evidence from science, academia, and grassroots voices is emerging ever more clearly: most of the claims initially made for agroenergy as a genuinely renewable alternative to fossil fuels are flawed. Life cycle assessments of agrofuel greenhouse gas emissions that include the effects of indirect land use change show that the supposed emissions savings claimed for agrofuels are greatly overestimated; and when all impacts are considered, they are generally worse than the fossil fuels they replace. Meanwhile, the creation of an EU market for industrial agrofuels has been shown to have a negative impact on the land and resource rights, livelihoods, and food security of local populations, especially in the global South. These same concerns hold true for agromass, which, although still in the early stages of development, nonetheless has the potential to be even more destructive.

Following the bioeconomy path would render the EU still more dependent than it already is on imported agromass resources, whether from wood, crops, seaweed, 'residues' or others. The bioeconomy path also does not mean less reliance on fossil fuels, but is set to develop alongside their continuing use, with negative implications for the global South and for planetary resources of biomass overall. Such a path is completely unsustainable. Biodiversity cannot be reduced to agromass and providers of food cannot be reduced to contract commodity producers.

Despite the accumulating evidence, however, the European Commission (EC) is persisting with its agroenergy policies, resolutely refusing to change targets that were demanded by industry from the outset to provide security of investment in the sector. This is especially striking in view of the fact that it has become increasingly clear that agroenergy, particularly on a large scale, is not actually renewable. Rather than heed the evidence, the EC has instead responded to criticism with a combination of measures that many observers regard as wholly inadequate, since they rely on voluntary adherence to sustainability criteria and on as yet unrealised (and unrealistic) 'advanced' technologies such as second-generation agrofuels, among others.

Today we are at a critical juncture. The two directives which are the cornerstones of the EU agrofuels policy – the Renewable Energy Directive (RED) and the Fuel Quality Directive – are beginning their bi-annual review processes, and post-2020 policy and targets are already being formulated. At the same time, and apparently without reference to the unfolding failure of agrofuels, EU incentives and support for biomass is steadily rising. In this context, it is essential that these agroenergy policies and their underlying assumptions continue to be challenged. Only by exposing the 'frictional encounters' between proclaimed benefits and real life experiences with agrofuels and agromass projects, can the EU's bioeconomy strategy be opened up to scrutiny and subjected to fundamental re-evaluation, and, its agroenergy targets be withdrawn.[2]

By critically analysing the origins, claims, and effects of the European Union's (EU) transition to a new bioeconomy, this report aims to contribute to challenging this strategy. A central part of the discussion focuses on the failure of the EU's agrofuels policies to deliver the low-carbon, sustainable, and pro-rural development outcomes envisaged for them. It highlights ways in which EU policy is contributing to a reordering of land and land use especially in Africa. In seeking to influence the EU's agroenergy policies, it is imperative to understand why so many sound arguments against agrofuels and agromass are being ignored, in spite of the mounting evidence. Behind all the EC's assumptions, claims and evasions regarding agrofuels and agromass, lies an extremely powerful industrial lobby that includes the motor industry, the oil industry and the various energy industries. The report will therefore also examine how the constellation of forces that make up the agroenergy lobby have managed to steer EU policy to their benefit. This agroenergy lobby has been able to succeed due to their alignment with the EU's grand plan for a bioeconomy,

understood here as a managerial project based on the capitalistic appropriation and conversion of renewable biological resources to facilitate a market-based, techno-centric response to unsustainable energy patterns.

More generally, the EU sees in its promotion of the bioeconomy a chance to secure a global leadership role. Yet in presenting the bioeconomy as the ultimate win-win strategy, the EU is closing the door to genuine alternatives and much bolder policy decisions to reduce energy consumption and prioritise the exploration of a less energy dense development path for Europe. Only by tackling this overarching narrative can the EU's policy lock-in with respect to agrofuels and agromass be overcome.

From the outset, it is useful to clarify key concepts and terms that will be used here. The report focuses on large-scale agrofuel/ agroenergy production and use, rather than biofuel/biomass for local use under local control. For this reason the terms agrofuels, agroliquids, agroenergy and agromass are used throughout, except when quoting or citing industry documents that refer to biofuels, bioliquids, bioenergy or biomass. Box 1 summarises the meanings of the different terms used.

Box 1. **Terms and definitions**

*Biomass* refers to biological material derived from living, or recently living organisms. It is both animal and vegetable derived material, timber, crops, agricultural and forest residues, human and animal waste. The term may be applied to the total mass of all living things within a specific area habitat etc.

*Agromass* refers to vegetation, mostly wood, or vegetable residues (eg: solid residue of palm fruit after the oil is extracted) used as a fuel_or source of energy, especially if cultivated for that purpose.[3]

*Agrofuel* refers to liquid fuel. Some analysts extend the term to include biogas from animal waste or landfill sites as agrofuel, but this is not the case here. Biodiesel is derived from seeds or fruits (oil palm, soya, canola/rape); bioethanol is mainly derived from sugarcane or maize, plus wheat. The terms next-, second-, and third- generation agrofuels all refer to numerous processes that convert solid agromass to liquid fuels, including the use of fermentation, heat, pressure and chemicals. These processes are sometimes referred to as 'biomass to liquid' (or BtL).

*Agroliquid* refers to agrofuel used in power stations (eg: for heating and electricity).

# 2 What is the European Union policy on agroenergy?

## 2.1 The Renewable Energy Directive

Adopted by the European Parliament on 23 April 2009, the EU Renewable Energy Directive (RED) mandates that 20% of overall energy use at the EU level, and 10% of energy use in the transport sector at the Member States level, must come from renewable sources by 2020.[4] The directive instructs member states to develop and adopt National Renewable Energy Action Plans (NREAPs) specifying how they will reach and implement RED targets (Article 4). Although the 10% transport target was supposed to be met using a range of technologies including so-called 'advanced' second-generation agrofuels (see Box 2), efficiency gains, and renewable electricity, analysis of the NREAPs shows that in practice it will be met almost exclusively through first-generation agrofuels.[5]

Box 2. **Second-generation agrofuels**

The RED supports the development of so-called second-generation agrofuels. First-generation agrofuels are made from plant or animal oils and from the fermentation of starch and sugar feedstocks, many of which are edible (soya, rape, oil palm, sugarcane and corn). By contrast, second-generation agrofuels are derived from a much wider range of sources and processes.

Basic claims have been made for second-generation agrouels that make them seem more possible/feasible than they may be in reality. First, they can be made using the whole plant (or tree), including material often classified as waste, such as bark, stalks and stubble, and not just the seed. This requires breaking down the tough cell walls composed of the basic constituents of plant material, cellulose and lignin, and has been proving more difficult to achieve than expected. Second, they can also be derived from sewage, slurry and municipal waste. Third, second-generation agrofuels can also be made from algae, although recent reports suggest that, like other so-called advanced fuels, algal fuels are not yet able to provide more energy than is required to produce them.[6] But one basic problem with all second-generation agrofuels evidently continues: all still require more energy to produce than can be saved by using them.

The two main ways to produce second- (and third-generation) agrofuels are: (i) biochemical including ligno-cellulosic and biobutanol; and (ii) thermal including agromass gasification. *Biochemical* methods separate two vital constituents of plant cells, cellulose and lignin, using heat, pressure, acid or a combination of all three. Cellulose is broken down into fermentable sugars by enzymes and then fermented into fuel by microorganisms. Lignin can be used directly as fuel or is touted as a potential source of chemicals currently derived from oil. *Thermal* methods involve controlled combustion (pyrolysis) or gasification to break the agromass down into bio-oil, bio-char and synthesis gas (often called "syngas") consisting of carbon monoxide, carbon dioxide and hydrogen. However, biomass pyrolysis is unproven, and exists only at demonstration scale. Biomass gasification presents serious risks to workers and nearby residents (including explosion risks, fires and issues over venting dangerous pollutants into the atmosphere to prevent explosions). Even though unproven, bio-char is touted as a 'soil improver'. Bio-oil and syngas can in theory be used for heat and power but they require further energy-intensive treatment to produce transport fuel. Additionally, bio-oil can be used as shipping fuel. Both methods therefore involve energy inputs that render their energy and emissions balance unfavourable.

Genetic engineering biotechnology and synthetic biology are being actively researched as a means to reduce the energy inputs by, for example, modifying enzymes to help digest and break down the cellulose more quickly and cheaply. Biocatalysis involves research into the use of enzymes and whole cells to catalyse chemical reactions in industrial processes with promises of reduced production costs. There is considerable investigation into microorganisms that can potentially be metabolically engineered to produce fuel. When asked about the potential impacts of any escape into the wider environment, researchers generally claim that they will not survive outside production installations, or that they can be deliberately weakened or prevented from reproducing through the use of terminator or genetic use restriction technologies (GURTs).

In sum, technologies for the production of second-generation agrofuels are proving to be more expensive, difficult and risky to develop than originally projected. This is due to feedstock costs, major technical uncertainties in relation to the different processes involved and the fact that neither oil nor carbon prices are high enough to stimulate investment in the industry. As noted in a document from Purdue in January 2013: 'No commercially viable biorefineries exist, to date, for converting lignocellulosic biomass to fuels'.[7] Indeed in the same month, a federal appeals court in the US struck down the US mandate to blend millions of gallons of cellulosic ethanol into petrol on the grounds that the fuel was not available.[8] This is the case even though the concept of such biorefineries has been promoted and funded in many parts of the world for several years. Predictably enough, the response was to increase the US mandate, and to further stimulate the search for such fuels.[9]

The RED targets are set to trigger a substantial increase in the production and use of conventional agrofuels and their associated feedstocks. The NREAPs indicate a tripling of agrofuel use in the EU in 2020 compared to 2008 levels[10], with 72% coming from biodiesel and 28% coming from bioethanol.[11] This would make the EU the largest importer of agrofuels, with 41.5% of its projected 38.3 billion litres of agrofuel use in 2020 expected to come from non-EU sources.[12] In reality, this share is likely to be higher since it is unclear whether the figures also include imported feedstocks used for 'domestic' processing into agrofuels or refer only to imports of processed agrofuels.[13] Nevertheless, it is clear that various EU member states are expecting high levels of dependency on imported agrofuels by 2020, including Denmark (100% dependency), the United Kingdom (87.7%), Ireland (70%), Greece (67%), the Netherlands (61.8%) and Germany (58.7%).[14] In conjunction with the issuing of the RED and in anticipation of the vast increase in agrofuel production and use this would trigger, the EC also issued the 2009/30/EC Fuel Quality Directive, which allows biofuels to count towards the greenhouse gas reduction target and includes changes to technical specifications to increase the limit of agrofuels blended with fossil fuels from 5% to 10%.[15]

Article 17 of RED (and also Article 7(b) of the Fuel Quality Directive) established sustainability criteria, which came into effect in December 2010 and cover only environmental aspects (see Box 3) Significantly, these criteria do not rule out importation of agrofuels that fall short. It is still perfectly legal to import non-compliant agrofuels into the EU, although in theory they will not count towards the target and the importer will, at least on paper, not benefit from the incentives provided.[16]

The EU criteria have many serious weaknesses that point to fundamental, if not fatal flaws, in the policy. First, they take no account of the integrity of landscapes, waterscapes or ecosystems. These are systems that cannot simply be exploited to suit production priorities without risking negative impacts on their other vital functions. Second, the greenhouse gas (GHG) targets address only direct emissions, not those resulting from the effects of indirect land use change (ILUC), whereas the emissions from ILUC may be very large, thus cancelling out any benefit from using agrofuels. Third, and perhaps most damagingly, under the EU criteria, companies, as well as being able to choose from a range of voluntary certification schemes, can provide reports from a consultant of their choice and paid by them, to say whether standards are being met. There are no provisions for independent auditing and verification. This means the standards rely entirely on corporate self-regulation – there are no authoritative public regulatory processes or institutions involved.

> *The same group of inspection, verification and certification companies offer energy and timber companies a wide range of verification and certification services. Conflicts of interest and lack of independent regulatory oversight are thus inherent in voluntary as well as mandatory certification and standards.*[17]

Meanwhile, one aspect completely missing from both directives is social sustainability criteria e.g. land and resource rights, labour conditions, food security, rural development etc. The Commission rejected inclusion of these social aspects due to the '... difficulty to verify the link between individual biofuel consignments and the respect of these particular criteria'.[18] Instead, the Commission has left the monitoring of the impact of agrofuels on social sustainability to a review process and to voluntary certification schemes. However, this does not mean that developing social criteria would be any kind of solution, in view of all the issues noted above, such as self-reporting and the absence of independent auditing and verification. There are also additional complexities such as the

Box 3. **RED Environmental Sustainability Criteria**

1. Greenhouse gas emission savings from agrofuel/agroliquids consumption should be at least 35%, increasing to 50% by 2017, and 60% after 1 January 2018.
2. Agrofuels/agroliquids cannot be produced from raw materials obtained from land with high biodiversity value.
3. Agrofuels/agroliquids cannot be produced from raw materials obtained from land with high carbon stock.
4. Peatlands cannot be converted unless it can be demonstrated that this does not involve draining previously undrained soil.
5. The cultivation of agricultural raw materials should conform to the minimum requirements of good agro-environmental practices as specified in Council Regulations (EC) No 73/2009 – relating only to EU farmers.

Source: Laura German, L. and Schoneveld, G. (2011) Social sustainability of EU-approved voluntary schemes for agrofuels: Implications for rural livelihoods. Working Paper 75. CIFOR, Bogor, Indonesia.

tensions that often exist between central governments and local communities in source countries.

Instead of social criteria, Article 17 of the RED sets out a review process by which the impact of EU agrofuels policy on social sustainability factors will be reported on:

> *…The Commission shall, every two years, report to the European Parliament and the Council on the impact on social sustainability in the Community and in third countries of increased demand for biofuel, on the impact of Community biofuel policy on the availability of foodstuffs at affordable prices, in particular for people living in developing countries, and wider development issues. Reports shall address the respect of land-use rights. They shall state, both for third countries and Member States that are a significant source of raw material for biofuel consumed within the Community, whether the country has ratified and implemented each of the following Conventions of the International Labour Organisation…*

This social impact review is absolutely integral to the continuation of the RED and indeed its wider agroenergy experiment because it allows the EU to claim that any negative impacts resulting from its agrofuel policy can be managed and mitigated. As the European Commission has affirmed, '[t]he biofuel policy will ensure that unsustainable practices will be detected and corrective action will be taken if appropriate. This relates to food prices as well as to environmental and broader economic impacts.'[19] Yet this approach is itself fundamentally flawed. By tackling only the perceived 'excesses' of the EU agrofuels policy through a reactive rather than preventative approach, significant environmental and social harm is simply allowed to continue.

The first EU monitoring report was originally due at the end of 2012, but finally appeared on 27 March 2013.[20] The European Commission's Renewable energy progress report is very brief, but was published on the same day as another 450-page report, produced for the Commission, called *Renewable energy progress and biofuels sustainability*.[21]

The Commission has already indicated it does not intend to review the agrofuel target in 2014, when it is due to table a review of the legislation, and presents itself as immovable on this issue. And even though the EC acknowledges it will not actually meet the target, it refuses to reduce it; rather it proposes simply to fail to meet the target by 2020. Furthermore, industry has made it clear that it wants additional long-term targets to be set for 2030 and 2050, while the EC plans to set a target for 2030 by the end of the current mandate in 2014.[22] The setting of rolling targets would make it more difficult to challenge the first target, which is precisely what industry wants. Still further from the minds of the Commission or of industry is to question whether agroenergy should be defined as renewable energy, which the evidence increasingly suggests it is not, certainly not at industrial scale.

## 2.2 Beyond agrofuel: the spectre of agroliquids and agromass

The early discussion of agroenergy was mainly about agrofuels for transport, which have tended to grab the headlines. However, there are other increasingly important 'renewable energy' resources in use in Europe, which are connected mainly with electricity and heating, and include agroliquids and agromass, mainly wood. Here, the UK experience is especially illustrative (see also Box 4 below).

### 2.2.1 Agroliquids

A number of power stations and combined heat and power (CHP) plants in Europe use agroliquids, which are derived from many of the same crops as agrofuels for transport. They are used for co-firing with coal, including for starting up coal-fired power stations, or where the stations are designed to burn liquid fuel in diesel engines. Palm oil is the cheapest agroliquid available in large quantities, although there is plenty of evidence to indicate that palm oil extraction causes grave damage to ecosystems and local communities (for more on oil palm's worldwide impact, see Section 4.2, this report). Experience in Germany and Italy shows that palm oil is by far the most likely type of agroliquid to be burnt in power stations. The UK plans to burn up to 500,000 tonnes of agroliquid in UK power stations and campaigners point out that, if all this was from palm oil, it would require the conversion of 110,000 hectares of land to oil palm plantations.[23] Nonetheless, on 25 July 2012, the Department of Energy and Climate Change in the UK declared its intention to continue to subsidise agromass and liquid agrofuels.[24] Burning agroliquid for electricity and heat will mean yet more land grabbing, human rights abuses, destruction of biodiversity and ecosystem resilience, and carbon emissions from deforestation as oil palm plantations continue to spread around the tropical countries of the world. EU-27 imports of palm oil fell in 2010, but rose again to 5.3 MT in 2011, approaching 2008 and 2009 levels once more.[25]

### 2.2.2 Agromass

Agromass could become an even greater problem than agrofuels and agroliquids if all that is promised and promoted

comes to fruition. Of course we should always bear in mind that unrealistic projections and the creation of artificial markets have been a feature of the whole agroenergy industry from the start and agromass may follow the same pattern, although the current appetite for woody biomass shows no sign of diminishing. Agromass includes so-called wastes and residues from agriculture and forestry (for example, waste products from oil palm plantations: oil palm shells, empty fruit bunches, palm fronds, trunks, palm kernel shells and mesocarp fibres[26]). It may also include municipal solid waste and, potentially, sewage. But the main focus is on wood chips and pellets for which current and projected demand is shooting up. Although wood pellets are ideally meant to be made from sawdust, rapid increase in demand means that 'waste wood', roundwood and forest residues are increasingly likely to be used[27] as well as agricultural crops such as miscanthus and other grasses plus agricultural residues. However, the contribution from the latter is currently small, while the advantages of wood pellets are strongly promoted: they are said to be easy to use, compact, energy dense, and can be fed into power stations automatically. It is claimed that they can thus accompany or replace coal quite easily without costly adaptation, although the truth is that additional measures are required, as RWE npower discovered when they experienced a fire at Tilbury power station in the UK in February 2012.[28] Woodchips can only be burned in dedicated biomass plants. There are incentives in many EU countries to use agromass, for example in the UK and the Netherlands, both of which are already major importers of wood pellets.[29] In July 2012, the UK announced increased support for using agromass and switching coal-fired power stations to agromass.[30] The EU is said to be a world leader in co-firing coal and biomass due to the support it provides for this approach.[31]

To date, the EU has not developed criteria for agromass, partly because countries such as Sweden and Finland, which produce close to 20% of their energy from agromass, object to binding criteria. Now some interests are developing their own criteria. For example, the European Biomass Association hosts the European Pellet Association, which has developed the ENplus trademark:

> *The aim of the European Pellet Quality Certification (PellCert) is to create and implement an ambitious and uniform certification system for pellets in Europe, called "ENplus", which will be used both by the heat and the power markets, for intra European trade but also for imports. In addition, sustainability criteria are currently being designed to be part of or additional to ENplus and create an "ENplus GREEN" scheme.*[32]

In addition, the Initiative Wood Pellets Buyers (IWPB), an industry consortium consisting of major energy companies (including GDF Suez, RWE-Essent, Eon, Drax, Vattenfall), are also developing their own criteria.[33] In November 2011, the Dutch power and gas exchange APX-Endex launched the first EU agromass exchange in Amsterdam, which 'will serve as a platform for trade in standardized industrial wood pellets'.[34] Thus the emergence of a global trade is being encouraged ahead of any real assessment of the likely impacts.

Beyond the source related issues, are problems related to agromass burning, which are briefly summarised here:

- Air pollution from agromass reduces air quality/life expectancy.
- Most agromass imported into the EU is from the US, Canada, and Russia. There is already evidence of damage to biodiverse, carbon-rich, old-growth forests in Canada and the US, which raises serious questions about management and supervision of production as well as traceability.[35]
- There will have to be a major increase in imports of agromass into Europe to fulfil projected levels of use. As one EU policy paper notes, much of this will come in future from developing countries.[36]
- Impacts on global forests just of European demand are already becoming significant, without taking into account increasing demand from other industrialised and emerging industrial nations.
- There are unique issues when dealing with solid agromass – e.g. imported wood pellets caught fire at Tilbury in February 2012.[37] Spontaneous combustion and noxious fumes are two of the problems that can arise if pellets are not managed properly, as noted above.
- Links with other initiatives could provide perverse incentives. Currently the definition of forests includes plantations: potentially new plantations could earn offset credits and the wood could then be used for agromass electricity, so earning more credits. This is a particular risk for example in regions where illegal logging takes place, followed by the development of plantations to produce wood pellets for export. There are also risks of perverse synergies between the programme Reducing Emissions from Deforestation and Forest Degradation (REDD) and the expansion of plantations destined for export agromass.
- In September 2011, grave concerns were expressed that the dash for agromass could threaten the EU's own emission reduction targets: 'The Scientific

Committee of the European Environment Agency argues that EU assumptions about biomass are based on a serious accounting error: "legislation that encourages substitution of fossil fuels by bioenergy, irrespective of the biomass source, may even result in increased carbon emissions – thereby accelerating global warming"'.[38] Assumptions that wood is a carbon neutral source, power stations burning at only 30% efficiency, higher emissions per unit of energy due to the lower energy density of wood than coal, the failure to address land use change and flawed and unverified accounting are just some of the reasons.

Box 4. **Agromass for electricity: The case of the UK**

In the UK, agromass is currently supplied from 74% domestic feedstocks and 26% imported, but is expected to shift to 81% imported agromass by 2020, and possibly even closer to 100% for large installations, with major increases in demand, to meet the RED. If this happens, it will obviously have serious impacts. And unfortunately, renewable energy subsidies are definitely encouraging this kind of transformation in the UK, in other EU countries and globally, in some 40 countries around the world.[39]

The projected figures for agromass use in the UK are chilling:

- If all proposed UK agromass power plants are built, up to 81.6 MT of agromass would be needed.
- By comparison, global wood pellet production stood at 14.3 MT in 2010 and consumption is increasing rapidly worldwide.[40]
- Note that 1 tonne of pellets requires 2 green tonnes of agromass.

The UK says it will introduce criteria ostensibly meant to tackle this problem:

> *'From October 2013, the UK is also set to become the first country in the EU, and indeed worldwide, to introduce mandatory biomass sustainability standards for all subsidised bioenergy.'*[41]

However, there are serious questions as to whether such criteria would actually address the issues or merely legitimise the trade, providing certification for the logging of old growth forests and evicting communities for plantations, often illegally.

# 3 How did we end up with such a policy?

In light of all the problems associated with the RED just outlined, it is worth revisiting the question of how we ended up with such a problematic policy to begin with. The following section sets out the history of the EU's agroenergy policies as they crystallised around the agrofuels targets contained in the RED. Tracing the evolution of the EU's agroenergy policies raises real concerns as to the manner in which the EC decided on a renewable energy policy and then failed to deal with scientific uncertainty and the assessment of risk as the counter-arguments emerged. That the EC pushed ahead with the promotion of agroenergy production and use without investigating the full impact of such a strategy subverts the EC's own guidelines on the precautionary principle and reveals a fundamental breakdown in the EU's science/policy interface.

## 3.1 Preparing the way

In the late 1990s, the EC began to issue papers proposing agrofuels. Agrofuels were identified as a key source of energy for the future in a 1997 White Paper, *Energy for the Future: Renewable Sources of Energy*.[42] This document argued that biofuels would need specific incentives, such as subsidies and tax breaks, and proposed indicative targets to stimulate renewables, along with harmonisation of standards and support from the Fifth Framework Programme for Research, Technological Development and Demonstration. It also noted that biomass overall could provide a major part of the growth in renewables. At no point did it try to define renewables, presenting them instead merely as a series of opportunities to exploit:

> *'...reducing dependency on energy imports and increasing security of supply. Development of renewable energy sources can actively contribute to job creation, predominantly among the small and medium sized enterprises which are so central to the Community economic fabric, and indeed themselves form the majority in the various renewable energy sectors. Deployment of renewables can be a key feature in regional development with the aim of achieving greater social and economic cohesion within the Community'.*

The first directive appeared in 2003 and proposed an agrofuel target of 5.75% for the transport sector by 2010.[43]

In December 2005 the EC adopted a *Biomass Action Plan* to promote all aspects of energy from 'forestry, agriculture and waste materials'.[44] It reviewed how fuel standards could be changed to encourage 'the use of biomass for transport, heating and electricity generation', and also encouraged research into so-called second-generation agrofuels – 'liquid fuels from wood and waste materials'.

In this plan, the EC made the following claims: (i) that agrofuels and agromass can promote rural development, provide jobs for up to 300,000 people and improve energy security by diversifying sources of energy supply; (ii) that deploying them can help to reduce greenhouse emissions and thus tackle climate change; and (iii) that use of agrofuels may even lead to lower oil prices by reducing demand. It also claimed that all this can probably be secured without additional pollution or damage to the environment.[45] The underlying assumptions included the idea that agromass is a genuinely renewable source of energy and that Europe could produce much of the supply itself. However, it was thought desirable also to import, on the pretext that this would help third countries to diversify their agriculture and find new markets.

In 2006 the EC adopted a strategy for agrofuels that stressed the need to provide incentives to promote their production and use, including targets.[46] This paper also included giving priority to the development of an industry-led 'biofuel technology platform' as key private-sector allies in the promotion of agrofuel production and use. Accordingly, the European Biofuels Technology Platform (EBFTP), a powerful advocate of agroenergy, was created.[47]

In an EU summit in March 2007, the European Council accepted the recommendations set out in the European Commission's Communication of January 2007 on a Renewable Energy Road Map which laid the groundwork to draft the RED.[48] The idea was to demonstrate a political commitment to tackle greenhouse gases and climate change through a new energy policy by 2009 that would include:

- a binding overall target of 20% renewable energy use in the EU gross final consumption by 2020; and
- a 10% binding minimum target for renewable energy use in the transport sector for each country for 2020.

It is critical to note that this political commitment, which would find its way into the articles of the RED, was made before any impact assessment had been conducted on the effects of such a policy.[49] Subsequent impact assessments carried out in 2008 as part of the drafting of the RED highlighted the potential negative effects of the RED targets in relation to land use change.[50] But by this point the EC was unable (or unwilling) to go back on its prior commitment.

The lasting consequences of such a policy lock-in cannot be overestimated. Not only did such a position contradict the EC's own principles and guidelines on the collection and use of expertise, but the entire agroenergy project became subject to a process of 'policy-based evidence gathering' whereby 'evidence appeared only able to influence the final policy choice when its findings coalesced with the political imperatives driving the target'.[51]

This is despite the fact that from before its announcement in March 2007, right through to the issuing of the RED in April 2009 and its coming into effect in December 2010, an increasing number of organisations and academics began to question the wisdom of agrofuels. Scientists such as Searchinger and Fargione questioned the assumption that agrofuel is a low-carbon energy source, noting that if agrofuel production displaces the production of food to other land or involves clearing forest and peatland, it incurs a carbon debt.[52] In an interview with the Nature Conservancy in 2008, Fargione said:

> *'All the biofuels we use now cause clearing of natural ecosystems for agriculture. Adding energy production to our current and growing demand for food production inevitably requires more land to be converted to agriculture, whether or not the biofuel is grown directly on that land. So biofuels either directly or indirectly cause land clearing, which releases carbon to the atmosphere and contributes to global warming. This is the biofuel carbon debt'.*[53]

They also calculated the carbon debt incurred by emissions from different kinds of land use change/conversion. Moreover, in the midst of the 2007-2008 food crisis, studies by the World Bank, the International Monetary Fund (IMF), and the International Food Policy Research Institute (IFPRI), amongst others, pointed to agrofuels as one of the key factors contributing to food price inflation.[54] Finally, agrofuels were recognised as heavily implicated in the global land grab.[55]

However, even before such evidence began to accumulate, NGOs were questioning agroenergy; the *'Call for an immediate moratorium on EU incentives for agrofuels, EU imports of agrofuels and EU agroenergy monocultures'* was launched in January 2007 and was signed by more than 200 organisations from around the world:

> *'The undersigned call for an immediate moratorium on EU incentives for agrofuels and agroenergy from large-scale monocultures including tree plantations and a moratorium on EU imports of such agrofuels. This includes the immediate suspension of all targets, incentives such as tax breaks and subsidies which benefit agrofuels from large-scale monocultures, including financing through carbon trading mechanisms, international development aid or loans from international finance organisations such as the World Bank. This call also responds to the growing number of calls from the global South against agrofuel monocultures, which EU targets are helping to promote'.*[56]

Despite these early concerns, the EU forged ahead with drafting the RED. As noted above, these actions clearly show how, from the start, the EU decided to adopt a strategy for agroenergy and set targets to provide industry with a secure environment for investing without any detailed investigation of whether such a policy was sound or not. This in turn demonstrated the power of the agrofuels lobby, and behind it, the forces pushing for the bioeconomy.

## 3.2 The agrofuels lobby

Given that the EU produced its first major document on renewables in 1997 (as explained earlier), it is instructive to look at biodiesel figures from 1997 onwards, remembering that the EU biodiesel industry is currently the largest in the world. In 1997, EU biodiesel production stood at some 475,000 metric tonnes (MT), but in 1998 it declined to 389,000 MT. However, thereafter it climbed strongly, especially in 2005 (the year of the biomass action plan) and 2006. By 2009 it had reached 9,046,000 MT and 9.5 MT in 2010, declining to 8.5 MT in 2011.[57]

These figures reveal clearly an intimate interaction between signals from the European Commission and the development of the industry, which was evidently eager to secure a guaranteed investment horizon to ensure its future profitability. As the 1997 document shows, the creation of a mandated agrofuels market was from the beginning the core option for the EU's renewable energy strategy, plus a suite of subsidies, tax breaks, and other incentives given to the agrofuel industry (see Box 5), estimated to have cost the EU taxpayer €4 billion in 2008[58], rising to €10 billion in 2011.[59] The main beneficiaries of agrofuel subsidies have been agrofuel producers. The scale of the industry lobby was revealed in May 2013, through an access to information application from Euractiv, which indicated that in October 2012, the biofuels industry deluged the Commission with messages about the damage that would be done to the industry by including a factor for Indirect Land Use Change (ILUC) in biofuel accounting:

> *One missive from the European Biodiesel Board accused the Commission of "purposely causing the death of the whole EU biodiesel industrial sector."*
>
> *It says the ILUC proposal would result in "closing hundreds of production sites worth many billions euros of recent investments and driving to the immediate loss of*

*50,000 direct and 400,000 indirect employments in the EU biodiesel production chain."*[60]

Meanwhile the smaller ethanol industry in Europe has not been slow to call for a separate ethanol target of 8% for conventional and 2% for 'advanced' ethanol, plus the setting of targets beyond 2020, claiming that ethanol does not contribute to the problems highlighted by critics of biofuels.[61] Currently most ethanol used in the EU is produced in the EU and far less of it is used than biodiesel, hence we do not focus on it in this report. However, it is worth noting that the balance is now shifting, partly due to the ILUC debate highlighting the land footprint of EU biodiesel, and imports of ethanol are increasing, mainly from the US and more recently, from Brazil. However, shifting from biodiesel to ethanol would not address the problems of agroenergy.

Large European agrofuel corporations would not have been able to influence EU energy policy to the degree they have, had it not been for their alignment with a much broader coalition of forces which make up the agrofuels lobby group. These include biotech and agrofuel companies, large multinational agribusinesses, car manufacturers, oil companies, forestry companies, and corporate funders.

Agribusiness interests and the car industry were foremost in influence when it came to setting the 10% renewable energy target in the EU transport sector. The European farm lobby had been vigorously opposed to changes in the EU sugar regime under the 2006 Common Agricultural Policy reform that reduced the guaranteed sugar price by 36% and opened up the European sugar market to global competition.[64] Securing an outlet for European sugar producers by re-routing subsidies through the creation of a guaranteed market for agrofuels made from sugar-based ethanol was seen as a political strategy to win over an extremely powerful interest group.[65] Meanwhile, the European car industry used agrofuels as a pretext to argue against the EU's proposed CO2 emissions level, offering a higher limit and claiming that agrofuels could fill the gap. It is alleged that in return for the car industry's support for EU emissions reduction targets, evidence that questioned the greenhouse gas savings of agrofuels was not given equal treatment in the debate leading up to the 2009 directive.[66]

A picture thus emerges of a policy formulation process in which, in the words of David Laborde, author of various EC-commissioned reports on agrofuels, 'policy markers inside and outside Europe are doing agrofuels for other reasons than environmental ones'.[67] This explains why agrofuels policy continuously pre-empted the evidence base needed to justify it. Indeed, as Laborde also said, "we started to make a policy without knowing the effect it would have.... We are now discussing the land use effect after saying for ten years that we need biofuels to reduce emissions," and he goes on to say: "It was a serious mistake."

Box 5. **The agrofuel subsidy and incentive regime**

The agrofuel subsidy and incentive regime encompasses a range of measures including:

- Market transfers in the form of mandatory blending rates and tariffs on agrofuel imports.
- Budgetary support including the 2009/96/EC Energy Taxation Directive which allows member states to reduce or exempt excise duties on agrofuel production and use. This is estimated to have amounted to a total of EUR 2.8 billion in 2007 and 2008 in foregone revenue.
- Subsidies for energy crop growth, subsequently cut back but still existing in member states.[62]
- Investment aids and subsidies for agrofuel production facilities.
- Support for agrofuel distribution and consumption including reduced registration fees and free parking for high blend agrofuel compatible cars, 'green' public procurement schemes, and funding for filling stations that provide high blends or pure agrofuels.
- Funding for agrofuel research and development.

Across the agrofuel value chain - from production, to storage and transport, to consumption – a range of support mechanism are in place to ensure the promotion and uptake of agrofuels. Most recently, *Biofuels - At What Cost? A review of costs and benefits of EU biofuels policies* (IISD), shows the support rate for biofuels in 2011 (around €10 billion as noted above) was more than half the turnover of €13-16 billion in that year.[63]

Sources: Jung, A., P. Dorrenberg et. al (2010) & Aubry (2011 and IISD 2013)

# 4 Three years on: Why reject this policy

## 4.1 Fundamental problems with agrofuels and agromass

As shown earlier, between the time of the EC's first announcement of its intention to produce a directive on 'renewable energy' and the resulting directive's final entry into force, many well-researched objections to the claims and assumptions about agrofuels and agromass were aired. Since December 2010, numerous reports and research have emerged that continue to demonstrate the serious flaws in the policy's most basic assumptions. These are briefly summarised here.

### 4.1.1 Agrofuels and agromass are not carbon neutral and incur a decadal carbon debt

It has long been conveniently assumed that agrofuels are carbon neutral or at least low-carbon and qualify as renewable on the basis that agromass that is gathered will grow again. However, the emissions from burning the agromass as fuel are not currently counted. In addition, there are also major emissions, not just from felling the trees themselves, but also from destroying plants, mosses and related biomass including soils, that would otherwise have continued to absorb and sequester carbon.[68] Soils are a major carbon sink, second only to the oceans. Yet forest clearance, plantation establishment, residue collection and harvesting all have a major impact on soils, non-wood agromass and forest biodiversity, which is discounted by commercial interests and policy makers. None of these are taken into account when assuming that agrofuels are carbon neutral.

Thus carbon emissions from land conversion to grow agromass are likely to be higher than the emissions saved by using agromass instead of fossil fuel. Also, when wood is burnt for energy it releases carbon emissions that may take 35-50 years or more to be captured by the re-growth of the forest. [69] Even if the up-front emissions can be balanced by recapture in the end, it will take decades at a point when we need sharp and immediate emission cuts.

### 4.1.2 Reducing forest carbon stocks may well outweigh any fossil savings

The argument is often made that old forests should be cleared and replaced because young forests sequester more carbon as they grow. However, there is actually considerable carbon sequestration in old growth forests, much of which is held in forest soils, as noted above. Other forest ecosystem functions and services would also be lost; homogeneous plantation forests lack structural complexity and therefore have fewer niches for biodiversity. Forests are also a source of clean water and they help to regulate and absorb rainfall and water flows. A 2012 paper states, '... that such an increase in agromass harvest would result in younger forests, lower agromass pools, depleted soil nutrient stocks and a loss of other ecosystem functions'.[70] The authors also note that, 'Owing to the peculiarities of forest net primary production humans would appropriate ca. 60% of the global increment of woody biomass if forest biomass were to produce 20% of current global primary energy supply....' An additional complexity is that as levels of atmospheric CO2 increase, this will in turn increase emissions of CO2 from forests. It is just these kinds of interactions that are often ignored, but which could take us to critical tipping points sooner than expected.[71]

### 4.1.3 Agromass dilemmas: less energy-dense; limits to expansion

When agromass is burned, it is less energy-dense than fossil energy sources, which have been heated and compressed within the earth's crust over millions of years:

> *Per unit of energy, the CO2 emissions would typically even be higher than those of a fossil fuel-burning power plant because (i) biomass contains less energy per unit of carbon than petroleum products or natural gas do and (ii) biomass is usually burned with a lower efficiency than fossil fuels.*[72]

Yet we are already close to the limits of land available for exploitation:

> *Indeed, current harvests, while immensely valuable for human well-being, have already caused enormous loss of habitat by affecting perhaps 75% of the world's ice- and desert- free land, depleting water supplies, and releasing large quantities of carbon into the air.*[73]

### 4.1.4 How much can we really take from the biosphere? The need for precaution

Humans constantly take biomass from the biosphere, while natural processes are constantly renewing that material. Some argue that we are already taking more from the biosphere than is naturally replaced each year. According to the Global Footprint Network, we are using the equivalent of 1.5 planets to provide resources and deal with our waste and are therefore already in a state of what they describe as 'overshoot'.[74] A useful guide in the case of biomass use is the

attempt to measure human appropriation of net *primary productivity (NPP) – called HANPP.*[75] HANPP looks at the impact of land conversion and the harvesting of agromass on net primary productivity, the amount of biomass produced each year by living organisms. It reveals the size of the economy and its demand for biomass relative to the ecosystems that provide it. Clearly, the increased demand for biomass caused by the shift to agroenergy will have a major impact on this net primary productivity balance.

> *Frequently cited bioenergy goals would at least double the present global human use of plant material, the production of which already requires the dedication of roughly 75% of vegetated lands and more than 70% of water withdrawals.*[76]

The combination of the growing energy density of development and its demand for energy, in the context of increasing population and growing expectations, could thus easily take us to the point of overshoot in relation to agroenergy alone. *We may not have the full scientific information yet, but this is exactly the kind of situation where the precautionary principle should be applied. Indeed Schulze et al. argue that to* meet a 20% target *using* woody biomass would entail a major increase in our appropriation of NPP, taking us closer to the planetary limit, without even considering all the other uses and roles of woody biomass:

> *Consequently, the maximum HANPP is about 30% of the total NPP; hence, the proposed HANPP of 18–21% already represents ca. 60% of the global increment of woody biomass.*[77]

### 4.1.5 Indirect land use change is not currently included

Direct land use change is easy to understand: an area is converted to agrofuels from forest or grassland or from another crop. Indirect land use change means that production of a crop in one area is displaced by a new crop or other activity, for example, urbanisation. The displaced crop is still in demand and therefore needs to be planted somewhere else. An early example of this related to maize ethanol production in the US displacing soya production from the US to Brazil.[78] More recently it has been argued that using European rapeseed for biodiesel is increasing European demand for palm oil, which is linked to deforestation and the destruction of peatland in Indonesia[79], with major impacts on biodiversity and local communities.

> *According to one recent study [ ] this means that millions of hectares of highly biodiverse areas could "legitimately" be destroyed and 95 million tonnes more CO2 could be emitted as a result of EU biofuel targets even if all biofuels met the full EU standards...*[80]

This issue has (unsurprisingly) proved contentious, as it is potentially another deadly blow to the emissions balance of agrofuels. In the EU, politics trumped justice, climate and ecology in September 2011 and action on indirect land use change (ILUC) was deferred yet again:

> *...the commissioners have now agreed to postpone action until 2014, the last year of the mandate of the current Commission. Only then will they make their proposals to attach specific CO2 values to each type of biofuel – deferring any impact from new measures until 2016 at the earliest.*[81]

### 4.1.6 Many agroenergy crops, trees and organisms are also invasive species

That many agroenergy crops are invasive species was already pointed out during the development of the RED. However, the directive only mentions invasive species once, in paragraph 78 of the preliminary non-binding section of the document. A new report came out in 2011, highlighting the risks from a number of popular agrofuel crops, including reed canary grass, Napier grass and giant reed.[82] It mentions that the desired characteristics of agrofuel plants – e.g., their capacity to thrive with little water and nutrient in degraded areas – is also characteristic of invasive species. It notes the tremendous cost to the US economy from invasive plants alone – some US$34.5 billion annually – and the serious impacts on biodiversity and ecosystems of invasive species.

The invasive potential of algae (here microalgae rather than seaweed), which are often touted as a potential second-generation agrofuel, is considerable as they are very fast growing and highly adaptable. It is often claimed that they can be contained, either within installations, or by genetically engineering them not to be able to survive outside those installations. However, such claims are purely theoretical and do not take adaptability into account. All living organisms have a vested interest in adapting in order to survive. In the case of algae, their minute spores could spread easily and rapidly over a large area and their adaptive capacity is also likely to be considerable.[83] If algae ponds were defined as 'contained use' this would clearly not be secure. This is particularly important because of the additional risks posed by genetically modified microalgae, currently under development on the pretext that they will offer speedier growth and more efficient fuel production.[84]

Invasives may also be hosts for serious diseases. For example, the highly invasive vine, kudzu, a major problem in the US, is a host for Asian rust (phakopsora), which attacks soya plantations. Invasive plants compete with native plants for nutrients and water. They can rapidly create their own monocultures strangling and crowding out other plants, as is the case with the kudzu vine.

In summary, the foregoing examples indicate that **all the assumptions initially made about the benefits of agroenergy have been shown to be optimistic. Agroenergy from agrofuel and agromass constitutes a dangerous diversion, and using agromass actually causes an up-front spike in carbon emissions at exactly the time when we should be reducing them sharply.** Agroenergy is a very dangerous path to take in the effort to address climate change and peak oil, as it could well accelerate climate change, biodiversity loss and overexploitation of the planet's net primary productivity. Perhaps most important, **continuing agroenergy promotion and development draws policy attention away from efforts to reduce energy consumption.** Yet we continue to be told that adjustments such as focusing on particular 'good' agroenergy sources rather than 'bad' ones are the solution.

But in addition to these fatal flaws in the policy itself, there are a number of other major issues that the EU's 'renewable energy' policies raise, but then fail to address at all. As will be discussed in the next section, many of these have to do with its impact on land and water allocation and use in particular. Considering that land and water are finite resources with growing pressures and multiple propositions for their use, attention to who has access and rights to them and how they are used is more urgent than ever. But land cannot simply be reduced to an abstract measurement of hectares for exploitation. Human activity can range from enhancement of biodiversity and ecosystem functions to their wanton destruction, and while ecosystem resilience is crucial for humanity's survival, ecosystems are currently being degraded at an unprecedented rate.[85]

## 4.2 Agroenergy promotion: A key driver in global land grabbing

The EU seems to assume that its agroenergy policy has little impact on the global South. In January 2011 the Commission essentially dismissed any link by claiming that 'most of the crops used for biofuel production in the EU are produced in the EU'.[86] This may have been true in 2008 — the year for which the EU *Biofuels Baseline* was devised. Produced by a consortium of organisations involved in consultancy, academe, research, rural development for the EC and the EU more generally for monitoring the impacts of the RED and biofuels, the *Biofuel Baseline* is meant to provide the baseline data on biofuel production, consumption, origin of feedstocks and some environmental and social aspects and impacts of biofuel production on food prices and land use, in order to assess future changes.[87] The Biofuels Baseline noted that in 2008: (i) "*The total gross land use associated with EU biofuel consumption in 2008 is estimated to be 7 Mha [million hectares], of which 3.6 Mha in the EU and 3.3 Mha in third countries"*[88]*;* but that (ii) "[w]*hen accounting for the by-products, the* ***total net land use in third countries decreases to 1.4 Mha*** *and the land use in the EU decreases to 2.1 Mha, so that the total becomes 3.6 Mha [emphasis added].*[89]

Leaving aside the issue of co-products for the moment, it is important to point out that since this 2008 baseline was established, ever more agrofuel feedstock is being imported from outside the EU, with both the continuing reliance on agrofuels and the new and rapidly expanding reliance on agromass for electricity. It is likely that this upward trend will continue for years to come and perhaps even sharpen, pointing further to the need for a precautionary approach. Yet the Commission refuses to acknowledge what is now widely accepted: that agrofuels have been and still are one of the key drivers of the 'global land grab' (see Box 6).

Returning to the issue of co-products, what the EU's agroenergy policy proponents downplay is that the effect on third countries of the EU's dependence on agroenergy imports may be intensified when they involve co-products. Claims for co-products are well summed up here:

> *Our biofuel and animal feed co-products reduce greenhouse gas emissions, improve food and energy security, and reduce European demand for animal feed imports that contribute to global deforestation pressures.*[90]

Co-products are different commodities produced from the same crop and they come in several forms. They may be residues from harvesting, such as shells from the production of oil palm, or what is left of corn or wheat after ethanol production, which is then turned into animal feed. They are also an important part of the discussion about the balance of greenhouse gas emissions from biofuel production, since they can be used to apparently reduce land use and hence emissions for each product separately. The EU is heavily dependent on imports of animal feed and (as outlined above) is increasingly dependent on agrofuel for energy. For example, EU imports of soybean oil stood at 750,000 tonnes in 2011, most of it from Argentina[91], while soybean meal imports were just over 21 MT. Palm oil imports were 5.2 MT[92] in 2011, while imports of palm kernel meal for feed were 2.25 MT and palm kernel oil 600,000 tonnes. In each case, meal and residues are used as animal feed – and in the case of oil palm residues is also burned for heat and power in coal power stations. Extracted palm oil now increasingly finds a market as fuel in addition to being used for cosmetics, food, etc.

### Oil Palm's worldwide impact

Oil palm almost certainly originated in West Africa where it has been cultivated for its edible oil for thousands of years, but it was taken to Asia, where it became a major commercial crop. It covers huge tracts of land in Malaysia

Box 6. **Agroenergy expansion as 'green grabbing'**

Land grabbing for agroenergy due to the targets and subsidies agroenergy attracts in the EU and elsewhere is a critical driver in a broader global picture of land appropriation. Players include companies that invest and speculate in land and its products, companies that produce the commodities, and perhaps most problematic, large-scale initiatives such as the African agricultural growth corridors that seek to reorder large areas of land by establishing infrastructure for the development of industrial export agriculture. The companies may be facilitated and protected by the latter, which involve governments, corporations and international institutions and millions of hectares. Not all land that is grabbed is immediately turned over to production, and instead may be held as a speculative asset against future developments such as rising prices as available land dwindles. Some have called this type of land grabbing as 'green grabbing' – or the grabbing of land for environmental and conservation reasons.

For example, Green Resources, a private Norwegian company working in Tanzania, Mozambique and Uganda, describes itself as a 'plantation, carbon offset, forest products and renewable energy company'.[93] It has some 25,000 ha of plantation and plans 100,000, but claims to hold an additional 300,000 ha in reserve. Most of the trees it plants are alien species such as pine and eucalyptus.[94] It claims that 75% of its plantations are FSC certified and that it registered the world's first forestry project based on the voluntary carbon standard (VCS) in 2009 and began to receive carbon offsets in 2010. In 2012, the EU co-financed a project for Green Resources to expand its Tree Growing Associations in Tanzania to include Mozambique in the project called: 'Sustainable Wood and Charcoal Production in Rural Mozambique and Tanzania'.[95] According to REDD Monitor, reporting on visits by Timberwatch in 2010, villages involved the project in Tanzania lost part of their land, under 99 year leases granted to Green Resources, and claim they are not receiving the benefits and jobs they were promised.[96] This is just one example of land grabbing that combines plantations, bioenergy production and carbon offsetting.

and Indonesia, where, in 2011, half the plantations were owned by Malaysia, Singapore, the US and Belgium, according to WALHI (Wahana Lingkungan Hidup Indonesia / Friends of the Earth Indonesia).[97] However, in recent years, industrial plantations have been established in Africa, especially Nigeria, the Democratic Republic of Congo and Ghana, plus Cameroon and Uganda. Liberia and Gabon are also experiencing landgrab for oil palm.[98] According to the Inter Press Service, writing in May 2011, 'Most of the exploiters are European Union-based companies.'[99] Now oil palm is being promoted in Brazil through the government programme 'Sustainable Production of Palm Oil', which according to one report, is targeting 'abandoned and degraded land' of which it claims some 50 million ha exist.[100] Ecuador and Colombia both have long experience of oil palm plantations with major expansion in recent years, and Peru also has large plantations,[101] plus Guatemala, the Philippines, and Chiapas in Mexico. A paper from 2012 illustrates the deforestation, biodiversity loss and loss of community lands caused by the establishment of oil palm plantations, particularly on peatlands in Indonesian Borneo, even after years of campaigns against this practice which leads to major emissions of CO2.[102] Not only do these emissions cancel out any benefit from agroenergy derived from oil palm planted on it, but:

> *Burning palm oil, the most widely used biofuel for electricity generation, causes more greenhouse gas emissions than fossil fuels once the direct and indirect impacts on forests and peatlands are taken into account.*[103]

## Soya from South America

Soya is a major crop in Argentina that began to be planted there in the 1970s and was given a tremendous stimulus by the introduction of genetically modified (GM) soya, first planted in Argentina in 1997. Since then, GM soya monocultures have spread across the country, totalling some 19 million ha by 2009. National food production has suffered major disruption as a result. Thousands of families have lost their land and been displaced to Buenos Aires and other urban centres and those who stay are being seriously affected by agrochemicals sprayed from the air. Moreover, forests such as the Chaco have suffered major clearance since the advent of GM soya monocultures. The impacts on agriculture include the emergence of many different varieties of herbicide tolerant weeds that necessitate the use of additional chemicals, plus compacted and contaminated soils and water pollution.[104] GM soya monocultures have now spread to Paraguay, Uruguay, Brazil and Bolivia, with serious impacts on biodiversity and the physical and social health of rural communities there.[105] The spread of GM soy was depicted in Syngenta's much criticised advertisement of 2004, which showed these five countries as the 'United Republic of Soy'. Such an image serves to illustrate the power-politics dimension of such 'colonisations by crop'.[106]

In the UK, the report on the Renewable Transport Fuel Obligation (RTFO) by the now closed Renewable Fuels Agency of the UK says that for biodiesel in 2009-10:

> *The feedstock with the largest estimated gross crop area is soy with just over one million hectares. Soy made up an estimated 38% of the fuel and 77% of the land used*

*for UK biofuels – similar proportions to those reported in Year One. In Year Two, an estimated 75% of soy came from Argentina. This represents nearly 830,000 ha of land, or five percent of the total Argentinean soy crop. When accounting for the soymeal co-product, the net land requirement in Argentina for biodiesel supplied to the UK was approximately 156,000 ha or just under one percent of the total Argentinean soy crop.*[107]

Thus co-product figures can be used to apparently reduce the impact of each of the separate products on land-use, and thus greenhouse gas emissions, especially if those products are utilised in different sectors, eg: livestock and energy. Some would say that this is positive because it means the land is yielding more than one product. However, this argument only takes account of the advantages provided by the twin demands, without considering the stimulus it provides to expanding monocultures at the expense of biodiversity and communities. It also takes no account of whether using crops to burn and feed to animals that are either food crops, or are replacing food crops, is desirable and what impact it has on the availability of food for human beings.

Due to the high demand for both fuel and feed, a wider variety of crops are being explored for agrofuels and simultaneously, research is being carried out on the possibility of feeding the residues to animals after detoxifying them, adding missing nutrients and treating them in different ways, even though the impact on animal health and wellbeing of feeding them with ethanol residues is often negative and also has implications for environmental and human health.[108] Crops include camelina, jatropha, oil palm, castor, sugarcane, maize, sorghum, cassava and other, as well as algae. Cellulosic agrofuels represent a greater challenge, but stubble and pongamia are being studied, for example, in the ongoing effort to develop animal feed co-products and thus provide further justification for both agrofuels and the co-products.[109]

It is clear that since the 2008 baseline was established, ever more agrofuel feedstock is being imported from outside the EU, and that this upward trend is very likely to continue for years to come. The Commission, however, refuses to acknowledge that agrofuels – and its own agrofuel policy — have become an important driver of land grabbing, and therefore have some responsibility to bear for the resulting impacts, elaborated below.

## 4.3 Impacts of the policy on land, water and people

### 4.3.1 Impacts on land allocation and use

The current phase of land-grabbing for production and speculation first came to international attention in 2008 and continues apace. This global phenomenon is discussed broadly and at length elsewhere and need not be re-examined again here.[110] What is important to stress here is that a number of factors have coincided to create this situation, among them fears about climate change, energy and food security. Such insecurity has led some countries and companies to seek land abroad for food and energy crop production. Others have decided that built property is no longer a safe haven or a good investment for their money and see land as a new investment opportunity, especially in regions where it is considered under-priced, such as Africa. Regardless of the reason, little heed is paid to ecosystems and the need to conserve their resilience. While land grabbing is taking varied forms and is difficult to quantify accurately, its impacts on communities, on biodiversity including agricultural biodiversity and related knowledge and practices as people are displaced, and on water, soils, forests and other ecosystems, is often devastating.

We have hardly begun to understand the full extent of it, because of the rapid, international nature of land grabbing and the factors that stimulate it. According to GRAIN, a small international organisation that works to support small farmers and social movements in their struggles, EU biofuels mandates have already prompted companies to grab 17 million hectares of land around the world, a figure that could rise to over 40 million hectares by 2020.[111]

Some say that it is perfectly possible to absorb this extra land use by bringing what they call 'degraded' land into production, using 'marginal' land and applying 'sustainable intensification'.[112] However, the *State of the World's Land and Water Resources for Food and Agriculture (SOLAW)* notes that, 'in too many places, achievements have been associated with management practices that have degraded the land and water systems upon which food production depends'.[113] Many sources have reported that growth in rates of production is levelling out, while levels of land degradation are rising. The media release for the report notes that 25% of land (which includes all land types, not just arable) is highly degraded. Another 8% is moderately degraded, 36% is stable or slightly degraded and 10% is ranked as 'improving'. Planting in marginal desert areas, e.g. Sudan, could easily tip fragile land into terminal desertification processes.[114] Furthermore, land described by outsiders as marginal or degraded is often used by local communities, frequently on a shifting or long rotation basis that may be better suited to its fragile nature.

The EU's agroenergy and bioeconomy experiments are not just helping to stimulate land grabbing, but are promoting a major reordering of land and water access and use in the global South, not dissimilar to the enclosures that took place in the UK previously, for example, where many of those who were driven off the land became labour for emerging industries or were forced to leave the countryside and even the country itself altogether. Current patterns of land use such as

shifting cultivation or other traditional forms of cultivation and use, already seriously threatened and often completely misunderstood, may be rendered impossible across wide areas, threatening the livelihoods of local communities that do not wish to collaborate with this externally imposed re-ordering. Any existing local patterns of water use will also be adversely affected; indeed, the threat to water may be even more serious. Pastoralism and seasonal grazing, often well adapted to local conditions when operating according to traditional practice, are already under great pressure, which this reordering will certainly increase.

Local agriculture systems are also under threat, for instance, in Zambia, Chitemene and the more recent Fundikila[115] or Mambwe mound cultivation system developed by local people.[116] Small farmer innovation, often combining new and traditional ideas, is insufficiently acknowledged but vital.[117] Such systems are often dismissed as unable to accommodate population increase, but have tremendous potential, especially in a context of participatory, bottom-up innovation. However, the intention of the corridor projects discussed below is to impose top-down intensive agrochemical use plus irrigation on 'smallholders', even though in the long term, history clearly illustrates that these are not sustainable and lead to increased emissions, contamination, degradation and waste of soils and water. Indeed the increasing 'efficiency' of agricultural methods and machinery under the guise of 'sustainable intensification' has the potential to greatly accelerate this process of destruction. We urgently need research based on collaboration with small farmers, who produce 70% of our food in spite of years of unfavourable policy decisions.

### 4.3.2 Impacts on water allocation and use

Water grabbing is a major emerging issue and the broad impact of over-extracting or polluting water with chemicals is increasingly serious, especially in the global South. Although many agroenergy projects have been promoted on the basis that the crop (jatropha, for example[118]) can be grown on marginal land with little water, in reality both water and good soil are required, frequently with the addition of inputs such as fertilisers and pesticides in order to attain acceptable yields. Demand for water is increasing greatly and this includes extending irrigation to new areas, especially in Africa. Irrigation brings its own risks; a major one is the salinisation of soils, while ecological impacts include loss of biodiversity in the area and damage to ecosystems downstream.[119] Social impacts can include increased incidence of disease and inequity plus negative impacts on land use patterns, land tenure and the displacement of communities. Women may be further disadvantaged by the developments of which irrigation is a part, for example, the movement from subsistence farming to production of cash crops for export.

In the journal *Environment Research Letters*, scientists published data claiming the identification of huge new reserves of groundwater in Africa, where some 300 million people already lack access to clean drinking water.[120] Much of this water was deposited up to 5,000 years ago and will not speedily be replenished due to decreasing rainfall. The scientists warn that such water must be cautiously used. The rapidity with which seemingly vast reserves of groundwater can be depleted and contaminated by injudicious use can be seen in Libya, where the Libyan Arab Jamahiriya is under great pressure:[121]

> *Current annual rates of groundwater withdrawal in the sub-region are 407 per cent of the recharge rate in Egypt, and 560 per cent in Libya (UNDP and others 2000). Exploitation of groundwater resources over the past ten years has led to a reduction in water pressure levels at the oasis of the western desert. Overextraction from the delta shallow aquifer has led to increased water salinization and a rapid inland advance of the saltwater interface.*[122]

Climate change and the alteration of rainfall patterns due to land-use change, especially deforestation for crops, infrastructure and human settlement, is likely to lead to increased pressure on these groundwater resources. The *Biofuels Baseline* mentions the greater water-use required to produce agroenergy crops as compared with fossil fuels.[123] It would be disastrous if information about groundwater reserves in Africa were used to justify water grabbing for agrofuels, whether for growing or processing them. Yet the planned agricultural growth corridors in Africa include proposals for large irrigation projects (for more on agricultural growth corridors, see Sections 5.1 and 5.2, this report). The reports produced by the European Commission must pay careful attention to the impacts of this additional water use on top of the current demands of agriculture, which already uses some 70% of global fresh water withdrawals.

### 4.3.3 Impacts on local communities and vulnerable and marginalised groups

The impacts of land grabbing for agrofuels on local communities are severe and difficult to reverse. Land leased or sold for agrofuel production is often cleared of people immediately. Once divided from their land, people lose local varieties adapted to local conditions and related knowledge, etc. Often it seems that agrofuel projects are undertaken without proper understanding of the challenges involved. They may fail, but those who really pay the price are local people and the environment. As noted above, people also lose access to land where they gathered food in emergencies and upon which they may rely as a source of materials and of medicines, or to

raise a little cash. This land concentration and expropriation quickly reduces local communities to landless labourers or accelerates flight to already overcrowded cities where they become consumers instead of producers.

Supporting 'smallholders' and ensuring their land rights is also a prominent theme of discussion among promoters of projects such as the Agricultural Growth Corridors of Mozambique and Tanzania. It is vital to realise that traditional land use patterns are quite different from the kind of process promoted by companies seeking to turn local communities into outgrowers for their projects. For example, jatropha and oil palm both require labour so it is convenient for companies, but not necessarily beneficial for local people, to contract them as outgrowers. Although people may be attracted by the idea of signing contracts to obtain loans to set themselves up, the reality is that they are the ones who take all the risks and have to repay the loans. The companies meanwhile dictate all the terms, while local people may lose access to water or land that used to be a common resource.

Meanwhile, although they are the majority of African farmers, women are often worst affected by 'modernisation' of agriculture because in many societies they still have limited rights to land and may well lose those should they be widowed.[124] They often face discrimination under both customary practice and law, as well as gender-based violence.[125] Women often have the task of gathering fuel, fodder, medicine, water and food and may rely more on access to common land for this purpose, as well as for additional resources such as the shea nut of Africa, which they can gather, process and sell[126] to pay for their children to go to school, for example. This means they will be more adversely affected by the loss of common resources that frequently occurs with the shift to contract farming for industry. They may also be marginalised in changes from subsistence agriculture to cash crops, where men commonly take control. In addition, women are often assigned the worst jobs in cash crop production, such as spraying chemicals with inadequate or no protective clothing and often little access to water to wash off residues (and often with very little instruction and no information on health risks, and no access to health care).

Women are increasingly being left as the sole carers for family, as men leave to find work in cities or extractive industries, or as relatives are decimated by AIDS. Yet women are central to household food security and the health of their children. They are also the main users of locally adapted livestock breeds[127], and frequently the seed-keepers in their communities, using locally adapted seed that has been handed down, along with skills in selecting and storing it. The impact of hybrid, input-dependent crops on women is to deprive them of an essential resource. In discussing the role of women, advisers often look at solutions in terms of access to markets and jobs, which does not always correspond to the true importance of their role. What the woman mentioned here needs, for example, is protection of her rights to save, exchange and hand down seeds and knowledge, not access to hybrid and patent protected seeds:

> *The crops she grows today are from seeds that have been handed down from generation to generation, over decades, she says. Other seeds come from exchanges with neighbouring farmers. 'My seeds are very important to me. I hope the day will never come when I have to buy seeds from a shop.'*[128]

### 4.3.4 Generating or escalating violent conflict

As an important driver of land grabbing, EU agrofuel policy is contributing to both the escalation of old and generation of new violent conflicts over access to and control of land and water. 'Ominously, these land acquisitions often occur in nations already riven by conflict, and so the volatile mix of factors at play—land, food insecurity, and poverty—could well trigger more strife.'[129] Land grabs frequently take place in countries where conflicts are recent or ongoing. Some of these countries are also food insecure and likely to be severely affected by climate change and increasingly extreme weather events. Clearly as the availability of land and water diminish through enclosure and exclusion by land grabs, local communities will be driven into conflict with each other over what remains.

In Honduras, oil palm plantations in the Aguan Valley have increased from 40,000 ha in 1990 to 120,000 ha in 2011, of which some 70% is exported. This has displaced people and food crops and is just the latest stage in a long struggle for land rights in Honduras that has cost lives and led to increasing militarisation of the area. Yet support for oil palm development has come from the World Bank, while the Clean Development Mechanism approved an oil palm biogas project for carbon credits.[130]

In Ethiopia's Gambella region, the UK's Department for International Development was accused by a local farmer of funding projects in which people were violently evicted from their land.[131] According to the International Work Group for Indigenous Affairs:

> *The scale of the land grab is massive and is not only taking place in Gambella but also in South Omo, Afar and Oromia. According to Human Rights Watch, in a span of three years, the government has leased out at least 3.6 million hectares of land, an area the size of the Netherlands. An additional 2.1 million hectares of land is available through the federal government's land bank for agricultural investment.*[132]

The land, once cleared of people, is being leased to investors. Large-scale irrigation projects are also being undertaken in connection with a hydroelectric project on Lake Turkana. Great disrespect is shown to the pastoralists and others in the region, who are accused of leaving the land 'idle', so as to justify seizing it. Additionally:

> *Land is alienated to foreign companies and local elites, and peasants are promised development and employment opportunities. This is a consent building mechanism and makes dispossession appear as if it was consented by the dispossessed themselves. But where this is not easy, as many cases in rural areas show, the state intervenes on behalf of investors. We argue that the present phase of accumulation in the rural areas requires the application of force and violence to extinguish real and perceived resistance.*[133]

## 4.4 Inadequacy of the RED criteria in addressing these problems

In spite of all the impacts of the land grab on people, soils, water, food security and sovereignty, the EU's environmental criteria, as already noted, only cover land with 'high biodiversity value', highly biodiverse grasslands, and 'land with high carbon stock' as well as forests and peatland. They do not consider water or ecosystem coherence nor do they include any social criteria and there is no consideration whatsoever of how people use land and why. For example, shifting cultivation and pastoralism may in fact be the best way to use 'marginal' land. A particularly dangerous aspect of EU policy is its focus on so-called 'marginal, idle, degraded, unused land' for agrofuels on the basis that this will not compete with food production. Policymakers are looking to 'free up' land for agrofuels through a focus on so-called 'marginal land', for developing through what is now being called 'sustainable intensification'. It has been suggested that planting such land to agrofuel crops could help reclaim the land and even reduce the ILUC factor.[134]

Under the RED, the production of agrofuels on 'degraded' or contaminated land is supposed to attract a bonus, in order to promote the use of degraded land, although this has not yet been activated since the definition of 'degraded' has not been agreed. However, the EC has already consulted on extending the concept to 'idle' land. Those proposing the development of agromass criteria now wish to see the concept of a 'degraded land' bonus for liquid agrofuels extended to agromass. This is a clear indication of the separation of EU policy-making, under corporate pressure for incentives, from on-the-ground realities. Outsiders may not recognise how land is used and classify it as degraded, hence justifying agrofuel development, which may degrade the land and water supply still further as well as displace local people. The idea that intensification of land use could 'free up' land for production sounds attractive as a generalisation, but takes no account of the particular circumstances in each region, including land use patterns and land rights whether recognised or not.

Meanwhile, in many parts of the world, the majority of local people depend on the land for their livelihoods; here we have taken examples from Africa.[135] But many do not have any legally recognised right to that land, which in some countries is vested in the state. It is also unusual for collective use of land to be recognised in law or understood in policy-making, yet land is quite often managed collectively, sometimes according to well-defined rules e.g. pastoralists.[136] In Africa, close observers believe that an estimated 65% of the land is held, managed and used collectively.[137] Such use may be seasonal or on a long cycle that enables the land to recover in between. The arrangements may be 'invisible' to the Western eye. People may also depend on collecting food, fodder and materials from forests and other land (which may appear marginal to outsiders), during droughts or simply to supplement income.[138]

In this context, land titling, however, positive it may sound, is only part of the answer because without the right policy context it can easily lead to the land being sold or taken over, either voluntarily or under pressure, resulting in concentration of land in the hands of the most powerful players. More subtly, it may also facilitate the shift from traditional land use, involving collective, shifting and nomadic practice, to industrial agriculture.

> *Shifting cultivation means that local people's livelihoods depend on access to considerably larger areas of land than what is under cultivation at any given point in time. As a typical low-input agricultural system, it is adapted to areas of low population density and subsistence farming. But this also means that local people's acquire 'user rights' over larger areas than may be evident if assessments only take into account currently cultivated plots.* [139]

Titling of collective land is unusual – instead it is mostly done on an individual basis. Large commercial interests and institutions such as the World Bank and United Nations' Food and Agriculture Organization (FAO) increasingly speak of their desire to help smallholders and of the importance of land titling.[140] But their reasons for doing so may not be the same as those of advocates for local communities. Indeed, unless titling takes place in a context of bottom-up agrarian reform, it may have a negative impact on local people. The *Biofuels Baseline* mentions titles mainly in the context of inequality in rights between men and women without discussing titles in an overall policy context. It does not mention agrarian reform at all.[141]

# 5 Is this responsible investment?

Governments, banks, corporations and international institutions are collaborating to create new investment contexts. In this context, it is important to be wary of the World Bank's controversial Principles for Responsible Agricultural Investment (PRAI). In July 2009, Taro Aso, briefly prime minister of Japan, wrote:

> *I will also make a new proposal to promote responsible foreign investment in agriculture, in the face of so-called "land grabs"... We think a regulatory approach is not desirable...We believe non-binding principles would promote responsible investment and sustainable farmland management.*[142]

The result was a set of seven voluntary principles developed by the G8, G20, FAO, World Bank, the EU, Japan and others.[143]

In April 2010, 130 organisations, including organisations representing farmers, pastoralists and fisherfolk, denounced the PRAI in a statement, 'Stop land grabbing now! Say NO to the principles on responsible agro-enterprise investment promoted by the World Bank'.[144] Soon afterwards, the UN's Special Rapporteur on the Right to Food publicly criticised PRAI.[145] According to the Campaign for the Reform of the World Bank, 'The World Bank's RAI principles are an attempt to legitimise corporate land grabs and the expansion of an industrial model of agriculture that is destroying people's livelihoods and the planet.'[146] Meanwhile, the FAO's Committee on World Food Security has commenced the process of developing its own principles for 'responsible agricultural development' (CFS-rai), ostensibly working with farmer and peasant organisations from around the world in a participatory process that will result in a document later in 2013, although it remains to be seen what this process will yield. It is against this politically contentious backdrop that we now turn to examine the rise of 'agricultural growth corridors'. Here we touch on a few examples with a particular focus on Africa, although there are certainly many similar cases in Africa, Asia and South America.[147]

## 5.1 Agricultural Growth Corridors

The 'agricultural development corridor' approach was first launched in 2009 at the Economic Forum (WEF), which has since hosted several meetings and developed initiatives to promote the idea. For example, most recently, 'The New Alliance for Food Security and Nutrition' launched at the G8 in 2012, arose from the same source as the corridors and Grow Africa: it is part of the World Economic Forum's New Vision for agriculture, and involves many of the same corporations and institutions. The basic aims of the Alliance are: to identify land for investors; to help the private sector to control and promote agricultural inputs and seeds and put a stop to the distribution of 'free and unimproved' seed; and to mobilise public services to assist investors. It is part of the process of reordering land and people for the corporations involved.

The growth corridor projects are of particular concern because they involve millions of hectares and many players; governments, international institutions and the private sector. Individual companies stand to benefit from the institutional and infrastructural arrangements that only governments can establish. As well as legal frameworks and the development of infrastructure, these include defining land as degraded or unoccupied, or converting it to government land, to favour investment. The EU and EU states are just part of this effort to set up conditions across a wide swathe of Africa to facilitate exploitation of resources: land, water, minerals, crops and seeds. Agroenergy is just part of this bigger picture, but the incentives it enjoys in Europe help it to play a leading role.

Private investors obviously prefer to enter the field once infrastructure and policies are in place to reduce risk and boost profits, so a primary aim of the corridor projects is to establish the infrastructure (road, rail, irrigation, storage and processing, port terminals) to facilitate the large-scale transformation of agriculture from extensive subsistence to intensive and export-driven and thus to attract investment. Such projects speak of 'last mile' infrastructure, i.e. linking smallholders and local communities into the network. These are not the only large-scale projects to establish infrastructure as the basis for commercial farming enterprises in Africa, for example there are other large-scale projects in Ghana[148], but they exemplify the approach. Current African agricultural growth corridors include: Beira Agricultural Growth Corridor (BAGC), Nacala and Zambezi in Mozambique and the Southern Agricultural Growth Corridor of Tanzania (SAGCOT).

### Interests involved in the corridors

Yara, the international fertiliser company from Norway, is playing a major role in the launch of the corridor projects.[149] Other players include: Alliance for a Green Revolution for Africa (AGRA), The New Partnership for Africa's Development (NEPAD) and TransFarm Africa, a project of the Aspen Institute that promotes private sector involvement and

infrastructure. There are also three UK based development companies. Prorustica Ltd. is an international development consultancy whose website proclaims 'Public Private Partnerships - the answer to African agricultural growth'.[150] InfraCo focuses on the development of infrastructure services (e.g. irrigation) by securing funding and reducing risks for companies.[151] AgDevCo is a not-for-profit agricultural project development company, which acts as an investor to develop agriculture enterprises at an early stage, seeking to provide 'transformational benefits' for smallholder farmers and communities. AgDevCo was central in developing the final proposal for the BAGC,[152] while InfraCo was responsible for producing the 'investment blueprint' called *Delivering the Potential*. Major companies include Monsanto, Dupont, Syngenta, Unilever, General Mills, SAB Miller, and Rio Tinto. The Norwegian Embassy, USAID and FAO are also involved.[153]

### Patient capital for infrastructure

The lack of infrastructure and storage facilities is often cited as a major barrier to agricultural development and food security in Africa. However, as with land titles, the policy context is vital to determining who will benefit, especially in regard to peasant farmers. As noted above, private capital is not interested in investing in infrastructure, although companies are happy to be paid to build it. A major aim of these projects is to provide a context where private capital will be attracted to invest. Hence there is a need for patient capital, i.e. capital invested with no prospect of a quick return. Such capital is similar to the 'start-up' capital called for by private interests in other forums such as climate negotiations. South Africa is also planning massive infrastructure development and plans to use pension funds as patient capital. This is an issue in urgent need of careful, transparent discussion.[154] Pension funds in the Organization for Economic Cooperation and Development (OECD) countries alone totalled over 20 trillion USD in 2011, so they represent a crucial resource and the public must be properly engaged in the debate as to how they are used.

### Focus on smallholders

Promoters of these projects, along with the World Bank and FAO, constantly emphasise how they want to help smallholder farmers gain access to credit, farm inputs and protection for their land rights and speak of major benefits for smallholder farmers and local communities. However, the development of ports and other major infrastructure suggests that production is more likely to focus on 'flex' crops for food, feed, fibre and fuel, in response to international markets, with local communities in the role of contract farmers and outgrowers.[155]

## 5.2 Agricultural growth corridors in practice

### Mozambique

Mozambique is deeply involved, with three corridors under development (Beira, Nacala and Zambezi) and three more potential corridors in the south of the country.[156] The BAGC was launched in 2010.[157] This project covers some 10 million ha of land, of which 1.5 million are farmed by subsistence farmers and just 25,700 ha are in commercial farming, of which sugarcane made up 22,000 ha. The aim is to increase irrigation from 1,200 ha to 200,000 ha by 2030. The World Bank has funded the PROIRRI irrigation project at USD$70 million for the Beira and Zambezi Corridors. The EU and Japan have contributed funds to upgrade the port of Beira. The Beira project includes several firms producing agrofuel: Principle Energy, Sun Biofuels, Enerterra, Grown Energy Zambeze and Envalor.[158] Based on information from 2010, Principle Energy intends to produce sugarcane for ethanol on some 20,000 ha of irrigated land in Dombe,[159] likely to be exported from Beira port. Zambeze Grown Energy and Enerterra have 15,000-18,000 ha each for sugarcane and jatropha respectively.[160] But it will be interesting to see what has actually transpired with these projects on the ground since then.

The region has already experienced quite large-scale commercial exploitation and was alienated from the original population,[161] through the impact of the Mozambique Company, established in 1891 with British, German and South African investment. It used forced labour and foundered when it was not able to deal with rebellions.[162] The role of such companies as the Mozambique Company, the Africa Company and the East India Company in the past offer warnings about current developments such as the agricultural growth corridors, if we choose to heed them.

There are two other corridors in development in Mozambique: the Nacala Agricultural Growth Corridor of approximately 7 million hectares and the Zambezi Agricultural Corridor. The availability of water in Mozambique, particularly in the Zambezi region, is a major attraction, as is potential access to major markets such as China and the EU. Indeed, in 2010, Brazil, Mozambique and the EU signed an agroenergy pact involving Brazilian companies, land and labour in Mozambique and EU markets.[163] The government of Mozambique has identified three further potential corridors in the south of the country.[164]

Nacala is currently farmed by at least 3 million peasant farmers and expulsions have already begun. Within the corridor, the Pro-Savana project of Nampula province is being promoted on the basis that the area resembles the Cerrado

region of Brazil, where Japan co-operated with Brazil to promote industrial agriculture over the last three decades[165] with devastating impacts on soils, biodiversity, water resources and local communities.[166] In August 2012 the international peasant organisation, La Via Campesina (LVC), called for 'an immediate moratorium on all large-scale agricultural investments such as the Pro-Savana project in Mozambique'; LVC is demanding (among others): (i) the recognition of common land titles in favour of the communities and (ii) 'the direct involvement of peasants in the definition of agricultural policies based on sustainability, food sovereignty and agroecology'.[167]

### Tanzania

The Southern Agricultural Growth Corridor of Tanzania (SAGCOT), launched in 2011, involves 7.5 million ha, of which 2 million ha are farmed by smallholders. This corridor stretches all the way from Dar es Salaam on the coast to the Zambia border.[168] Some intend it to be a gateway to Malawi, Zambia and the Democratic Republic of Congo.[169] In October 2012, those three countries were accepted as member of SAGCOT.[170] However, the government of Tanzania's '*Strategic Regional Environmental and Social Assessment'* interim report of July 2012 notes concerns about lack of institutional capacity, endemic corruption, the likelihood of conflicts over land, especially in view of the perception that all land is already in use.[171] They are also concerned about the potential for village land described as 'unused or unoccupied' to be redefined as general land, which the government can then hand over to investors.[172] In November 2012, Tanzania announced that it was limiting the size of land-holdings for sugar and rice to 10 and 5,000 ha respectively, but this is still huge by the standards of any small farmer.

## 5.3 Shifting response strategy

The foregoing pages point to fundamental flaws of policy anchored in agrofuels and agromass, and help to illustrate how misguided were the EU's claims with respect to the socio-economic benefits and green credentials of agrofuels and agromass. Many of these issues were known and flagged even before the EU's agroenergy policies, including most notably RED and the FQD, were finalised. The EC attempted to describe if not address some of these problems in the Directives themselves. The directives, however, are living documents in the sense that they have mechanisms for periodic monitoring and review. This means that the EC and

Box 7. **Impacts of one company: Sun Biofuels UK**

The history of Sun Biofuels UK shows how when projects or companies fail, local people are the ones who suffer the consequences. Sun Biofuels came with promises of jobs and services for local people in Tanzania, Ethiopia and Mozambique from the proposed production of jatropha oil for export to Europe.[173] In Ethiopia, Sun Biofuels took over 80% of the shares in the National Biodiesel Corporation (NBC), which obtained 80,000 ha of land leased for 50 years in Metekel Zone in Dandure Woreda. However, the project stopped operations after clearing sixty hectares of land for trial plantation because the land was not suitable for growing jatropha.[174] Sun Biofuels claimed the operating environment was too difficult.[175] The obvious question is this: what happened to the people who were using the land before and what has happened since, in particular to the land that was cleared?

In Tanzania's Kisarawe coastal district, the inhabitants of eleven villages were relocated and Sun Biofuels acquired 8,000 hectares on a 90-year lease, again for the production of jatropha. Villagers say they were promised compensation, jobs on the plantations, and new wells, schools, clinics and roads. They say they received few of these things and were not even allowed to access their gravesites on the land.[176]

At the end of 2011, the company went bust and the project was suspended, with the loss of 650 of the 700 jobs and no information or access to their land for the villagers. In March 2012 an investment firm acquired the project's assets but was having difficulty in finding investors, especially since jatropha, after high initial hopes, has not yielded the profits promised for it. Meanwhile local people have been struggling to regain access to their land.[177] If it has been redefined as general land not village land, they may well not be able to do so.

In Mozambique, in Manica and Gondola Provinces within the Beira corridor, Sun Biofuels Mozambique, established in 2007, has five farms totalling 2,000 ha.[178] In July 2011, it was reported that it had 'exported the first batch of 30 tonnes of Jatropha oil from its fields in the central Mozambican province of Manica, to the German airliner Lufthansa'.[179] However, the trial ended due to lack of certified material according to Lufthansa.[180] In this case Sun Biofuels is simply part of the larger agricultural growth corridor, benefiting from the infrastructure and other support.

the pro-agrofuels coalition more generally have been forced into ongoing defensive manoeuvring in light of the growing body of evidence that calls into question the wisdom of the EU agroenergy experiment. One can witness in the EU's response to these criticisms, a shifting of its strategy from one based on outright denial in the beginning to one based on management and mitigation measures. This section will examine how EU policy has attempted to smooth over the tensions instigated by its agroenergy policies by promising future adjustments and technological innovations to address problems and by framing the debate as being primarily a technical discussion about carbon accounting.[181]

### 5.3.1 Ducking criticism

The latest example of this emerged in September 2012 when the European Commission's long-awaited draft law on ILUC was leaked.[182] The confused and ambiguous draft has managed to infuriate most players. It is important to note that the draft should not be seen as promoting action on ILUC any time soon, as it is only the beginning of a long process of negotiation. Moreover, the content currently:

- Delays action until 2020, when it proposes to limit the extent to which food crop based agrofuels can count towards EU targets to 5% ;
- Only addresses food crops, not crops such as jatropha or castor oil.
- Only proposes reporting on ILUC, not actually accounting for the impacts.
- Proposes to incentivise 'non-land based' agrofuels such as algae. However, the definition of 'non-land based' is arguable.
- Seeks to stimulate use (by double-counting) of what the EC calls advanced or 'low-ILUC fuels', for example next generation fuels from algae, waste and residues, eg: from forestry, all of which are highly contested as regards availability and sustainability.
- Still reinforces the model rather than changing it – and still refrains from openly reducing the target or questioning whether agroenergy is renewable.

During the first part of 2013 two documents were considered by the European Parliament: one for the Environmental Committee (proposing mandatory inclusion of ILUC factors)[183], and one for the Industry, Research and Energy Committee (predictably rejecting the concept of ILUC factors). The latter uses arguments that are entirely contrary to the spirit of the precautionary principle, saying that there is not enough evidence to include ILUC factors. Both indicate that ILUC factors would have a major impact on the EU biodiesel industry because of its high land footprint.[184] In June 2013, 6 committees voted on the EC's proposals for ILUC in the lead-up to an important vote in the Environment Committee on 10th July 2013. The whole European Parliament will then vote in September 2013. However, according to the current timetable, only by 31 December 2017, will the Commission submit a review of policy and scientific evidence on ILUC to the European Parliament and Council.

At the same time, the major droughts of 2012 have provoked calls for agrofuel targets in both the US and the EU to be dropped or at least suspended.[185] An agriculture official of the OECD called for the same thing.[186] Industry responded furiously to the leaked ILUC proposals, claiming they threaten jobs.[187] However, the EU's draft ILUC policy would do nothing to tackle the core problems of agrofuels, particularly in relation to land grabbing; proposing merely to halt agrofuels from food crops would not tackle the problems raised by solid agromass, and merely helps to shift the focus to long-promised but still pending 'next-generation' and non-food based fuels. All these require land and water; their promotion means the continued stimulus for land grabbing and the re-ordering of land-use throughout vast areas of the global South, as discussed above.

In addition to ILUC, there are other ways in which the EC and industry try to deflect criticism. One is through the designation of land in different ways that suggest that it is not being used well, or is lying idle. Then there is the proposition that, through intensifying agriculture in one area, land can be 'spared' for biodiversity etc.

#### (i) The myth of idle land and the 'land saving' hypothesis

The role of the EU's agroenergy policies in triggering land grabbing and undermining food security remains a major point of concern. The EC and industry interests have responded by propagating the myth that agrofuels can be grown on so-called 'degraded', 'abandoned', 'marginal' or 'idle' land where they assume there are no competing claims over land and resource rights. In reality very little land is 'unused' and even if it were, the notion that the intrinsic environmental value could be overwritten by the production of energy crops shows the simple error of this argument. As mentioned above, the EU proposed a bonus for using degraded land, but has not yet agreed a definition.

More recently, the discourse has shifted to a focus on yield increases, sustainable intensification and climate smart agriculture for efficiency savings, with the use of co-products as a way to minimise the demand for land created by the EU's

agroenergy policies. This 'land spared/sparing' hypothesis, barring the co-products issue, has been around since the days of the Green Revolution. The current term being used is 'sustainable intensification'. The idea behind it is that by intensifying production in one area, it becomes possible to conserve other areas for biodiversity and carbon benefits, for which of course offsets may be available, so enhancing the attraction.

Its failure in examining the ways in which agricultural intensification undermines the resource base upon which it depends while pushing other land users onto more marginal and vulnerable lands has been extensively documented. Moreover, the idea that producing more on less land can spare forest does not hold when energy and food prices are rising.[188] While some suggest that refinery by- and co-products such as distillers grains may theoretically substitute for the land requirements associated with the production of soya based feeds, for instance, the reality is contingent upon relative market prices of co-products versus traditional feeds and other competing uses for co-products, plus levels of demand. Indeed, co-products can help to actually increase the pressures on land, by providing additional potential outlets for products and therefore the impetus to increase production or extend exploitation. This is especially the case if co-products are not properly addressed in EU policy. Fundamentally, it is untenable to talk about reducing the EU's land footprint on the basis of such minor adjustments.

## (ii) The illusion of sustainability schemes

Since July 2011, the EC has recognised a number of voluntary schemes through which agrofuel operators may gain access to the financial incentives granted under the RED (see Box 8). But these voluntary sustainability schemes are no more convincing than the sustainability criteria in the directives. Although some of the schemes include social sustainability, they do not adequately address the issues. There are gaps in procedures, unclear monitoring and compliance rules and no provisions for independent verification. Under these conditions, developing social sustainability schemes risks merely providing false reassurance rather than preventing abuse. In the UK, for example, investigations have revealed what appear to have been fraudulent claims regarding used cooking oil during the time that it attracted a bonus, which highlights the fact that claims made, certainly in the UK, are not being verified. Certification without independent verification is a self-regulation scheme with no oversight whatsoever. It is potentially worse than nothing, as it may provide unfounded reassurances, for example to members of the public, as well as rewarding agrofuels that make false claims. There are also indirect social impacts from the incentives for biofuels that are not considered at all, for example from the speculative development and near collapse of jatropha production worldwide.

Box 8. **Voluntary schemes to access financial incentives under RED**

- 2BSvs - French industry scheme covering all types of agrofuels
- Bonsucro EU - Roundtable initiative for sugarcane based agrofuels, focus on Brazil
- Greenergy - Industry scheme for Greenergy covering sugar cane ethanol from Brazil
- ISCC - German (government financed) scheme covering all types of agrofuels
- RSB EU RED - Roundtable initiative covering all types of agrofuels
- RSBA - Industry scheme for Abengoa covering their supply chain
- RTRS EU RED - Roundtable initiative for soya based agrofuels, focus on Argentina and Brazil
- Ensus voluntary scheme under RED for Ensus bioethanol production
- Red Tractor (Red Tractor Farm Assurance Combinable Crops & Sugar Beet Scheme)
- SQC (Scottish Quality Farm Assured Combinable Crops (SQC) scheme)
- Red Cert
- NTA 8080[189]

In its perfunctory Renewable Energy Progress Report (27th March 2013) the European Commission notes that: 'Regarding the "social sustainability" of biofuels, the Commission is also required to report on land use rights…', and then states: 'Given the time lags between land acquisition and biofuels production and flaws on the ILC Land Matrix database, it is not yet clear if EU biofuels demand contributes any abuse of land use rights.'

There is another, more subtle form of evasion involved in the EU's approach, which has caught opponents in sterile debates. Its technocrats have managed to turn the discussion about the impact of biofuels on land, people, biodiversity, cultures, rights, food and seed into complex equations for carbon balance sheets:

> *The EU's political accountability is reduced to carbon accounting; in turn it is channelled into expert debates*

> *over modelling methods and uncertainties. Arguments about indirect land-use change (ILUC) became an implicit proxy for wider conflicts over the EU's 10% target. Through the ILUC debate, biofuel critics have been drawn into expert procedures which obscure people's experiences of harm in the global South. By these methods, the EU system can pursue global leadership for 'sustainable biofuels', while depoliticising its global plunder of resources.*[190]

### (iii) The false hope/stimulus of second-generation agrofuels – leading us further down the same path

As has been documented, the greenhouse gas (GHG) savings claimed for agrofuels were fundamentally flawed since they neither utilised a credible life cycle assessment nor factored in the effects of indirect land use change or indirect nitrous oxide emissions, as Crutzen et al. showed as early as 2007.[191] Analyses that have integrated these approaches have shown that increasing agrofuel use to meet the RED targets will generate a net increase in GHG emissions. Yet rather than integrating such approaches, the European Commission has sought to stave off such criticisms through proposing a technological fix in the form of so-called 'second generation' or 'advanced' agrofuels. All too often, this involves recycling old myths about residues and waste as a major source of energy that have been promoted since the beginning of the debate, but which have also been debunked several times.[192] The European Biofuels Technology Platform inadvertently provides a useful summary of the main myths of advanced biofuels:

> *Biofuels produced by *advanced processes from non-food feedstocks (e.g. wastes, agricultural & forestry residues, energy crops, algae). …Generally, these "next generation" biofuels are considered more sustainable as the feedstock and processes used offer greater levels of GHG reduction and do not compete with food crops for land use.*[193]

It also mentions the added attraction that such fuels may be more compatible with 'existing fuel infrastructures'. However, the truth is that none of these claims are well-founded.

The EU claims to support the development of such second-generation agrofuels through its environmental sustainability criteria, whereby GHG reduction targets become more stringent over time. However, second-generation agrofuels remain something of a chimera, since techniques to convert raw material into fuel are proving more problematic that at first promised (see Box 2 above). Current projections show that 92% of the 10% RED member state transport target will be met by conventional agrofuels like biodiesel[194] and under the International Energy Agency (IEA) baseline scenario, conventional agrofuels are expected to dominate up to 2050.[195] Furthermore, second generation agrofuels cannot be assumed to be sustainable given that they still set up competition with food crops for land and water.[196] Finally, the projection of future generation agrofuels helps to extend the agrofuel myth, providing an excuse for locking in to agrofuel policy rather than addressing energy consumption directly, which the European Commission has no intention of doing.[197] In sum, the EU's management and mitigation measures do not address the fundamental flaws of the EU's agroenergy policies and will not protect local societies and ecologies from their harmful effects.

## 5.3.2 Promoting the bioeconomy

In tracing the trajectory of the EU's agroenergy policies, it is clear that the EU commitment to agroenergy is part of a much grander design: namely the transition to the bioeconomy. The bioeconomy is based on the theory that energy-dense, non-renewable fossil oil resources can be replaced with agromass resources that are less energy dense. We are assured that agroenergy is just the first step in the move towards an economic model based on '…the sustainable production of renewable resources from land and aquatic environments and their conversion into food, biobased products and bioenergy as well as the related public goods'.[198] It thus seeks to encompass a vast array of resources and sectors including agriculture, forestry, fisheries, food, and pulp and paper production, as well as parts of the chemical, biotechnological and energy industry.[199]

Yet the bioeconomy is evidently not really about replacing fossil resources, especially now in light of so much promotion of the potential contribution of unconventional fossil fuels (e.g., tar sands and fracking gas), but rather more concerned with supplementing fossil fuels, diversifying energy resources, and enabling corporations in a number of sectors to diversify their activities or enter new areas of activity. The biorefinery does not signal the end of the oil refinery, but simply a diversification of the refinery concept. According to the ITRE committee, the bioeconomy can offer: 'sustainability, competitiveness and the reduction of import dependency in terms of both energy and raw materials'.[200] Thus the ambition of the bioeconomy reflects the aspiration of Europe to secure its 'global leadership through techno-scientific advance' and to secure its access to a wide diversity of resources, not move away from fossil energy.[201]

This can clearly be seen in EU documents such as Horizon 2020, a research and innovation programme 'for fostering

smart, sustainable, and inclusive growth across Europe to deal with major societal challenges' which is to run from 2014 to 2020 with an 80 billion euro budget.[202] The bioeconomy features prominently as one of the flagship programmes that is meant to enable Europe to take on a leadership role. These kinds of visioning exercises, in which the bioeconomy is presented as 'a key element for smart and green growth in Europe', are part of an intellectual drive to sell the bioeconomy to a European public and industry. This relates to both the promise that the bioeconomy is said to represent and the dangers meant to ensue if this promise goes unfulfilled. Thus the European Commissioner for Research, Innovation and Science proclaimed that 'By 2020 biorefining could generate globally over 225 billion Euro per year across the whole biomass value chain - i.e., from agricultural inputs and biomass production, up to biomass trading, biorefining inputs and biorefining outputs'.[203] Meanwhile, the risk of losing out to companies abroad if the EU fails to keep up with the bioeconomy strategies of both the US and China is raised.[204]

However, more than just a visioning exercise, the EU's development of a bioeconomy also opens major opportunities that are already mobilising significant industry players, resources, and investment. The strategy, *Innovating For Sustainable Growth: A Bioeconomy For Europe*, was officially launched by the European Commission in February 2012.[205] Its action plan includes, amongst others, 'the setting up of networks with the required logistics for integrated and diversified biorefineries, demonstration and pilot plants across Europe'.[206] This is already being met with enthusiasm by the European Biofuel Technology Platform, biotechnology companies, and other industries that stand to gain, such as the pulp, paper and timber industries. The EC explicitly seeks to tap into the existing and emerging agrofuel and agromass lobby groups with the Renewable Energy and Fuel Quality Directives' targets, both informing the '*Bioeconomy for Europe'* strategy paper and action plan along with the promotion of business opportunities for bio-based products through the Lead Market Initiative. We need to recall the enduring impact of the EU's visioning on agrofuels back in 1997 when considering the likely impacts of this plan.

Abengoa, one of Spain's largest multinationals and Europe's largest agrofuel producer, is already taking advantage of this business opportunity. It claims to be working on first and second-generation bio-ethanol, electricity and animal feed from sugar; it is also involved in GM biotechnology, seeking, among other things, to modify enzymes so as to be able to treat cellulose in a more 'energy efficient' way in order to produce second generation ethanol.[207] The EU's transition to a bioeconomy thus appears to follow the familiar path to that of its agrofuel strategy, based on win-win visions and new technologies, but old patterns of corporate control, plus sustainability schemes. If anyone hoped that the bioeconomy might create a different pattern of business dominance, they are due a disappointment. Indeed it appears that the big oil corporations such as Chevron and BP 'dominate partnership networks, which connect nearly 80% of the 753 firms active in alternative fuels', according to Lux Research.[208] It certainly should not come as a surprise that the oil industry tends to dominate the thinking in the development of the bioeconomy. After all, the classic refinery, where heavy crude oil is cracked and refined into petroleum and other more valuable products such as ethylene and liquid petroleum gas is the basic model for the bioeconomy. The latter simply substitutes agromass and other biomass for oil as the basic raw material for the fulfilment of its many promises.

We must be careful to look beyond the immediate threats from agrofuel and agromass towards the greater threat posed by the emerging bioeconomy that seeks to use agroenergy merely as a building block towards a complex of industries projected to use agromass as the source for a huge range of co-products. Even though many of the claims and projections may prove to be delusory, they help to lock European development into a scenario of continued energy dense development based on so-called 'renewable energy' in addition to fossil. We must also beware of the arguments that increasing the efficiency of agromass processing will address many of the issues. In the 19th Century, William Stanley Jevons showed, in what has come to be known as the Jevons Paradox, that increased efficiency does not reduce but may help to increase demand; 'It is a confusion of ideas to suppose that the economical use of fuel is equivalent to diminished consumption. The very contrary is the truth…'.[209] Jevons argued that increased efficiency would lead to increased investment and more production, which would rapidly make up for any increase in efficiency, a conclusion that was widely ridiculed at the time.[210] This suggests rather strongly that the bioeconomy may not be the answer to the need to reduce consumption of fossil fuels, since we may already be appropriating more of the planet's net primary production of biomass than can be sustained over the long term. In the end, the bioeconomy symbolises the transformation of biomass, which is also biodiversity, into raw materials and resources for industrial exploitation, detaching them from locality, from land, people and knowledge, and, once again, using (flawed) carbon accounting as the justification for this appropriation.[211]

# 6 What is to be done?

## 6.1 EU obligations regarding the impacts of its agroenergy policy

When discussing agroenergy or forests with different officials of the European Commission, it can easily appear that they are deliberately avoiding any discussion of competing claims or contradictions between the objectives of different departments. When it comes to development issues, there are clearly very different opinions about the impact of the EU's agroenergy policy on third countries. For example, on the subject of woody agromass, the Directorate-General for External Policies, in a paper for the European Parliament, concludes:

> *The developing countries most likely to export woody biomass to feed Europe's demand are west and central African countries as well as Latin American countries. While clear links between the increasing EU demand for wood for energy generation and impacts in developing countries, both negative and positive, need to be drawn on a project level, the additional demand for biomass worldwide will have macro effects. The rising demand for woody biomass energy is likely to raise the global price for wood, thus adding pressure on forests and other ecosystems and driving land use conflicts. More specific risks include deforestation when natural forests are replaced by monoculture plantations and long term impacts on local food and energy security.*[212]

In the face of high uncertainty and the potential for very serious impacts, the EU urgently needs to adopt a genuinely precautionary approach to the issues.

Although the EU has not ratified the International Covenant on Economic Social and Cultural Rights (ICESCR), it should bear in mind the Maastricht Principles on Extraterritorial Obligations of States in the area of Economic, Social and Cultural Rights (ETO Principles)[213], especially Principle 3, which indicates that states should respect economic, social and cultural rights in territories outside its jurisdiction.

However, the EU has committed itself to the Sustainable Energy for all Initiative (SEFA),[214] established by UN Secretary General Ban Ki-moon; The EU held its own EU Sustainable Energy for All Summit in April 2012.[215] The title may sound laudable enough, but the core risk is that it will lead to industrialised country governments including EU member states using it to open up opportunities for their large corporations to develop energy infrastructure in the global South, instead of genuinely assisting Southern countries to democratically develop and implement their own visions of sustainable energy and avoid mistakes made in the past. Agroenergy and bioeconomy developments, led by export markets, with so-called 'trickle-down' benefits for developing countries, are a serious risk.[216]

Some large environmental organisations were slow to respond to the challenge of the agrofuel target because their energy campaigns were heavily committed to 'renewable' energy including agroenergy, and they had welcomed initial proposals to promote it. This meant that there was a long period during which these organisations did not respond clearly to the challenges made to the concept of agrofuels as a source of renewable energy, losing valuable time. Indeed, a member of the UK government claimed in 2011 he was confused about the position of NGOs, because they had begun by advocating agrofuels and only later began to oppose them. Development organisations sometimes took stronger positions, especially on social issues, but because large organisations often wish to 'sit at the table' they tend to confine their responses to the issues offered for discussion by politicians. There is also the endless quandary about whether to try and improve policies by working inside the process or to take a strong stand against them from the outside. Certainly it helps if all players can collaborate where possible, but on agroenergy there have been profound differences in approach, which have delayed and blurred a clear response.

## 6.2 Implications for advocacy

This paper has presented a broad picture within which EU policy and targets on 'renewable energy' play a key catalytic role. This is the case whether the impact is direct land use change, from the production of agrofuels and agromass to feed Europe's unlimited appetite for energy, or whether it is indirect land use change, for crops displaced by agromass production for energy and the new bioeconomy. EU agroenergy policies and targets are not reducing emissions; instead they promote land grabbing, biodiversity destruction and human rights abuses. In the context of the contemporary global land-grabbing phenomenon, they are also playing a key role in the large-scale reordering of land use and land-based social relations in many parts of the global South. They are part of the push to capture and convert small 'subsistence' farmers to contracted outgrowers at the service of large corporations engaged in export agriculture. Where people are displaced from their land, where they lose their locally saved and

adapted seeds and related knowledge, agricultural biodiversity is lost and food security is undermined. It is essential for the EC to recognise these fundamental flaws and to confront its own lack of policy coherence without further delay.

Civil society needs to increase the pressure and shift the onus to the companies to prove that they are not destroying forests and livelihoods. The EC should be challenged to justify the definition of agroenergy as a source of renewable energy. This should not be the job of the critics of the policy. The time has come for frank speaking. NGOs have so far tended to focus only on issues that the EC is prepared to consider and on working within the EC's own timetable. This needs to change. It would be dangerous to continue to assume that EU agrofuel policy can be amended or adjusted to actually reduce emissions and not have negative impacts on third countries. This merely helps to perpetuate a policy that is based on false assumptions and claims, a policy that has failed on its own terms. There is no point in having a complex agroenergy policy framework with targets, subsidies and other incentives, plus environmental and social criteria, along with an ILUC factor, if the fundamental truth about agroenergy is that it is not renewable and never will be. The whole agroenergy policy framework should therefore be dismantled.

Our primary obligation in Europe is to reduce energy consumption, in particular that which has an impact on other regions, and change our current energy dense development model. We therefore have to shift the underlying perceptions fostered by big energy, that reducing energy consumption means reducing our standard of living in Europe. This means changing the way we perceive the relationship between energy consumption and development. We should focus on the reduction of demand — that unpleasant issue governments prefer to avoid, because they fear it will make them unpopular. But we have to face the news that we have gone above 400 parts per million of CO2 in the atmosphere and respond by exploring creative ways of reducing consumption. We need to show how reducing our energy consumption can be an exciting research and development agenda, full of opportunities and useful synergies, as well as promoting justice and equity, decentralisation and local control.

One aspect of its non-renewable nature of especial relevance to this paper is that agroenergy requires more land per unit of energy than other forms of energy supply. Policy-makers therefore have to understand that even if we were to reduce fossil fuel use in transport to a major degree, we still cannot look to agrofuels to fill even a small part of the gap, because any increase in agrofuel use has a major impact on land use intensity, from ethanol at some 5 times the intensity of fossil oil to soy biodiesel at some 20 times.[217]

In order to dismantle the policy framework, we have to insist that large-scale agroenergy does not qualify as renewable energy and we must overhaul the Renewable Energy and Fuel Quality directives. We must intensify the call for the 10% agrofuel target to be dropped, to send a clear signal to the world not to invest in agrofuels for export to Europe. As part of this call, we need to make the public in the EU aware that agrofuel is added to every litre of petroleum they buy in most of Europe and they currently have no choice in this or the source of the agrofuel, even though the impacts of this policy may be devastating to ecosystems and communities in the global south. There should be an immediate moratorium on imports of agrofuel and agromass to Europe as well as a moratorium on large-scale agromass monocultures within the EU. We must also end the incentives, subsidies, targets that make up this artificial market.

Furthermore, the 20% target for renewable energy in Europe should not include biomass, otherwise whatever might be gained by dropping the 10% agrofuel target could be more than lost through the ongoing conversion to co-firing with fossil and constructing agromass power stations (e.g., those designed to burn wood, 'residues' from agriculture and forestry, waste etc.). We also need to look critically at domestic heating that uses these same resources, and which has the potential to be highly problematic due to issues with regulation of supply and correct usage as well as air pollution. At the same time we have to raise awareness that the corporate agroenergy push is just the first step towards corporate dreams of a new bioeconomy that are well beyond the planetary budget. Times are already hard for millions of people in Europe; in this difficult context our development aspirations have to shift. We not only have to learn to live within our reduced financial means, but also within much reduced carbon energy means and we need to treat this, not as a threat, but as a real opportunity for positive change.

# Endnotes

1 Twenty years after the first Earth Summit of 1992, the Rio+20 process was meant to generate fresh collective commitments to sustainable development, and resulted in a document called *The Future We Want*.

2 Franco, J., L. Levidow, D. Fig, L. Goldfarb, M. Hönicke and M.L. Mendonça (2010) 'Assumptions in the European Union biofuels policy: frictions with experiences in Germany, Brazil and Mozambique', *Journal of Peasant Studies* 37(4): 661-98.

3 'Biomass', Available at http://en.wiktionary.org/wiki/biomass

4 The EU Renewable Energy Directive is available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0028:EN:NOT

5 Aubry, S. (2011) *(Bio)Fueling Injustice? Europe's responsibility to counter climate change without provoking land grabbing and compounding food insecurity in Africa. The EuropAfrica 2011 Monitoring Report on EU Policy Coherence for Food Security*. Rome: Terra Nuova. Report available at http://www.europafrica.info/en/publications/biofueling-injustice

6 On algae's potential as biofuel see: http://phys.org/news/2012-08-genetically-algae-biofuel-pose-potential.html ; For a less optimistic view see Lux Research report 'Pruning the Cost of Bio-Based Materials and Chemicals' https://portal.luxresearchinc.com/research/report_excerpt/10979 Lux Research's cost model indicates that algae cultivation remains a cost-intensive loser, yielding a 48% loss overall and calling into question its long-term prospects. The problem lies in the high capital costs for growing algae at industrial scale, which amount to $202,000 per hectare.

7 Tyner, W. (2013) 'Aviation and Second Generation Biofuels: Economic and Policy Issues', available at http://extension.purdue.edu/renewable-energy/pdf/Tyner_aviation_biofuels_Jan_2013.pdf

8 Robert, F. (2013) 'Court Strikes Down EPA renewable fuel rule', available at http://news.sciencemag.org/scienceinsider/2013/01/court-strikes-down-epa-renewable.html

9 'Despite court ruling, EPA raises biofuel estimate', available at http://www.guardian.co.uk/world/feedarticle/10638646

10 Bowyer, C. and B. Kretschmer (2011) 'Anticipated Indirect Land Use Change Associated with Expanded Use of Biofuels and Agroliquids in the EU – An Analysis of the National Renewable Energy Action Plans' IEEP. Available at http://www.foeeurope.org/sites/default/files/publications/iluc_report_november20101.pdf

11 *Ibid*.

12 German, L. and G. Schoneveld (2011) 'Social sustainability of EU-approved voluntary schemes for biofuels: Implications for rural livelihoods' Working Paper 75. Bogor, Indonesia: CIFOR.

13 Bowyer and Kretschmer (2011).

14 German and Schoneveld (2011).

15 Directive 2009/30/EC of the European Parliament, available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0088:01:EN:HTML

16 European Commission (2011) 'First EU sustainability schemes for biofuels get the go-ahead', available at http://europa.eu/rapid/pressReleasesAction.do? reference=IP/11/901&format=HTML&aged=1&language =EN&guiLanguage=fr

17 Biofuelwatch (2012) 'Sustainable Biomass: A Modern Myth', available at http://www.biofuelwatch.org.uk/2012/biomass_myth_report/

18 EuropeAid in Franco *et. al* (2010) 'Assumptions in the European Union biofuels policy', p.2

19 European Commission in Aubry, S. (2011) *(Bio)Fueling Injustice? Europe's responsibility to counter climate change without provoking land grabbing and compounding food insecurity in Africa. The EuropAfrica 2011 Monitoring Report on EU Policy Coherence for Food Security*. Rome: Terra Nuova. Report available at http://www.europafrica.info/en/publications/biofueling-injustice

20 Report and progress of the European Commission's Renewable energy available at http://ec.europa.eu/energy/renewables/reports/reports_en.htm and http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52013DC0175:EN:NOT

21 Report for the European Commission (2013) 'Renewable energy progress and biofuels sustainability', available at http://ec.europa.eu/energy/renewables/reports/doc/2013_renewable_energy_progress.pdf

22 Lewis, B. (2012) 'EU energy chief against higher biofuel target for now', available at http://www.reuters.com/article/2012/02/07/eu-biofuels-idUSL5E8D725N20120207

23 Biofuelwatch (2012) 'Open letter against ROCs for biomass and bioliquids', available at http://www.biofuelwatch.org.uk/2012/rocs_open_letter/

24 Biofuelwatch (2012) 'DECC announcement on ROCs: continued subsidies for biomass' available at http://www.biofuelwatch.org.uk/2012/decc-announcement-on-rocs-continued-subsidies-for-biomass/

25 Indexmundi (2013) 'EU-27 Palm oil imports by year', available at http://www.indexmundi.com/agriculture/?country=eu&commodity=palm-oil&graph=imports

26 Borneo Post (2012) 'Sabah set to be oil palm biomass devt centre', available at http://www.theborneopost.com/2012/05/17/sabah-set-to-be-oil-palm-biomass-devt-centre/#ixzz221bXDduC

27 IEA Bioenergy (2011) *Global Wood Pellet Industry, Market and Trade Study*, available at http://www.bioenergytrade.org/downloads/t40-global-wood-pellet-market-study_final.pdf

28 RWE (2012) 'Tilbury Power Station, Information on Fire Incident', available at http://www.rwe.com/web/cms/mediablob/en/1717860/data/1295424/1/rwe-npower/about-us/our-businesses/power-generation/tilbury/tilbury-biomass-conversion/Tilbury-Fire-Feb-2012.pdf

29 For the Netherlands, see the report published in June 2013 by the NGO SOMO, *From whence the wood? Supply chain transparency and the origin of solid biomass for electricity generation in the Netherlands*, Amsterdam: SOMO, available at http://somo.us2.list-manage1.com/track/click?u=3a4764d9ac4a3e122869556b6&id=4c034c542d&e=5702c11600

30 Harvey, F. (2012) 'New subsidy rates for reneable energy

announced', available at http://www.guardian.co.uk/environment/2012/jul/25/subsidy-rates-renewable-energy ; see also Hayes, J. (2012) 'Drax to invest £700m in biomass conversion', available at http://www.yorkpress.co.uk/news/selby_tadcaster/9846535.Drax_to_invest___700m_in_biomass_conversion/?ref=rss

31 Energy Global 'Support mechanisms for co-firing biomass in coal fired power plants', available at http://www.energyglobal.com/news/coal/articles/Support_mechanisms_for_co_firing_biomass_in_coal_power_plants_IEA_Clean_Coal_Centre.aspx

32 ENplus certified pellet producers and traders, available at http://www.enplus-pellets.eu/pellcert/

33 Initiative Wood Pellet Buyers, see http://www.laborelec.be/ENG/initiative-wood-pellet-buyers-iwpb/ and IWPB Sustainability principles: Report 1 (Draft)

34 Beckaman, K. (2011) 'Dutch launch world's first biomass exchange', available at http://www.europeanenergyreview.eu/site/pagina.php?id_mailing=220&toegang=ec8ce6abb3e952a85b8551ba726a1227&id=3339

35 (2011) *Woody Biomass for Energy: NGO Concerns and Recommendations*, available at http://www.fern.org/sites/fern.org/files/NGO%20Report%20on%20Biomass%2011%20April%202011.pdf; Scheck, J. (2013) 'Europe's Green-Fuel Search Turns to America's Forests', available at http://online.wsj.com/article/SB10001424127887324082604578485491298208114.html

36 DG for external policies (2012) *Impact of EU bioenergy policy on developing countries*, available http://www.ecologic.eu/files/attachments/Publications/2012/2610_21_bioenergy_lot_21.pdf

37 BBC News (2012) 'Tilbury power station blazes as wood pellets catch fire', available at http://www.bbc.co.uk/news/uk-england-essex-17177035

38 Opinion of the EEA Scientific Committee on Greenhouse Gas Accounting in Relation to Bioenergy, available at http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas/view

39 'The information site for the new guaranteed payments for renewable electricity in the UK', see http://www.fitariffs.co.uk/

40 IEA Bioenergy (2011) Global Wood Pe*llet Industry, Market and Trade Study, available at http://www.bioenergytrade.org/downloads/t40-global-wood*-pellet-market-study_final.pdf; for 2011 and 2012 figures for pellet imports EU, see http://www.carbonedge.com.au/cms-articles/eurpoean-wood-pellet-imports-continue-to-increase.phps;

41 Biofuelwatch (2012) 'Sustainable Biomass: A Modern Myth', available at http://www.biofuelwatch.org.uk/2012/biomass_myth_report/

42 European Commission (1997) *White Paper for a Community Strategy and Action Plan*, see http://www.blt.bmlfuw.gv.at/projekte/BLT_072713/Biofuels_in_the_EU/COM%2897%29599.htm and document at http://europa.eu/documents/comm/white_papers/pdf/com97_599_en.pdf

43 European Commission 'Biofuels and other renewable energy in the transport sector', available at http://ec.europa.eu/energy/renewables/biofuels/biofuels_en.htm

44 Euopean Biofuels Technology Platform (2007) 'Newsletter 1', available at http://www.biofuelstp.eu/newsletters/070216news.html

45 Summary of Biomass Action Plan 2005, available at http://europa.eu/legislation_summaries/energy/renewable_energy/l27014_en.htm

46 'Communication from the Commission - an EU Strategy for Biofuels', available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52006DC0034:EN:NOT

47 'European Biofuels Technology Platform – an overview', available at http://www.biofuelstp.eu/overview.html

48 (2006) 'Renweable Energy Road Map, Renewable energies in the 21st century: building a more sustainable future', available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2006:0848:FIN:EN:PDF

49 Sharman, A. and J. Holmes (2010) 'Evidence-based policy or policy-based evidence gathering? Biofuels, the EU and the 10% target', *Environmental Policy and Governance* 20(5): 309-21.

50 *Ibid*.

51 *Ibid*.

52 Fargione *et al.* (2008) 'Land Clearing and the Biofuel Carbon Debt', *Science* 319(5867): 1235-38, available at http://www.sciencemag.org/content/319/5867/1235.abstract; Searchinger *et al.* (2008) 'Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change' *Science* 319(5867): 1238-40, available at http://www.sciencemag.org/content/319/5867/1238.abstract

53 The Nature Conservancy (2008) 'Climate Change and Energy', available at http://heartland.org/policy-documents/climate-change-and-energy

54 Charles, C. (2012). *Should We be Concerned about Competition between Food and Fuel? Analysis of biofuel consumption mandates in the European Union and the United States*. Geneva: IISD.

55 Aubry, S. (2011) *(Bio)Fueling Injustice? Europe's responsibility to counter climate change without provoking land grabbing and compounding food insecurity in Africa. The EuropAfrica 2011 Monitoring Report on EU Policy Coherence for Food Security*. Rome: Terra Nuova. Report available at http://www.europafrica.info/en/publications/biofueling-injustice

56 Econexus 'Call for an immediate moratorium on EU incentives for agrofuels, EU imports of agrofuels and EU agroenergy monocultures', available at http://www.econexus.info/call-immediate-moratorium-eu-incentives-agrofuels-eu-imports-agrofuels-and-eu-agroenergy-monocultur-0; Econexus 'Organisations calling for a moratorium on agrofuels' available at http://www.econexus.info/organisations-calling-moratorium-agrofuels; see also 'Agrofuels: Towards a Reality Check in Nine Key Areas, EcoNexus and 9 other organisations', available at http://www.econexus.info/publication/agrofuels

57 'EU Biodiesel industry, previous production statistics', available at http://www.ebb-eu.org/prev_stats_production.php; http://www.ebb-eu.org/stats.php#

58 Aubry, S. (2011) *(Bio)Fueling Injustice? Europe's responsibility to counter climate change without provoking land grabbing and compounding food insecurity in Africa. The EuropAfrica 2011 Monitoring Report on EU Policy Coherence for Food*

*Security*. Rome: Terra Nuova. Report available at http://www.europafrica.info/en/publications/biofueling-injustice

59 Charles *et. al* (2013) 'Biofuels—At What Cost? A review of costs and benefits of EU biofuel policies', available at http://www.iisd.org/publications/pub.aspx?id=2780

60 Euractiv (2013) 'Biofuels industry sent 'three mails an hour' in ILUC lobby offensive', available at http://www.euractiv.com/energy/biofuels-industry-sent-mails-hou-news-519531

61 ePure (2013) 'ePure calls for a separate target for renewable ethanol in petrol', available at http://www.epure.org/sites/default/files/pdf/130312%204%20158%20%20ePURE%20Press%20Release-%20ePURE%20calls%20for%20a%20separate%20target%20for%20renewable%20ethanol%20in%20petrol.pdf

62 See for instance Natural England 'Energy Crop Schemes', available at http://www.naturalengland.gov.uk/ourwork/farming/funding/ecs/default.aspx

63 Charles et al. (2013) 'Biofuels—At What Cost? A review of costs and benefits of EU biofuel policies', available at http://www.iisd.org/publications/pub.aspx?id=2780

64 Sharman, A. and J. Holmes (2010) 'Evidence-based policy or policy-based evidence gathering? Biofuels, the EU and the 10% target', *Environmental Policy and Governance* 20(5): 309-21.

65 Nelson, A. (2012) 'Conventional biofuels like biodiesel increase carbon dioxide emissions and are too expensive to consider as a long-term alternative fuel, a draft EU report says' http://www.euractiv.com/climate-environment/eu-report-questions-conventional-news-512076

66 *Ibid*.

67 *Ibid*.

68 Haberl *et al*. (2012) 'Correcting a fundamental error in greenhouse gas accounting related to bioenergy' *Energy Policy* (2012).

69 Neslen, A. (2012) 'EU carbon target threatened by biomass 'insanity', available at http://www.guardian.co.uk/environment/2012/apr/02/eu-renewable-energy-target-biomass

70 Schulze *et. al* (2012) 'Large-scale bioenergy from additional harvest of forest biomass is neither sustainable nor greenhouse gas neutral', *Bioenergy* 4(6): 611-16.

71 (2012) 'Rising Carbon Dioxide in Atmosphere Also Speeds Carbon Loss from Forest Soils', available at http://www.thinktosustain.com/ContentPageSustain.aspx?id=%201365#.UCILOJ3ltHm

72 Haberl *et al*. (2012) 'Correcting a fundamental error in greenhouse gas accounting related to bioenergy' *Energy Policy* (2012).

73 Opinion of the EEA Scientific Committee on Greenhouse Gas Accounting in Relation to Bioenergy, available at http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas/view

74 Global Footprint Network 'World Footprint', available at http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/

75 (2012) 'Global human appropriation of net primary production (HANPP)', available at http://www.eoearth.org/article/Global_human_appropriation_of_net_primary_production_%28HANPP%29

76 Haberl *et al*. (2012) 'Correcting a fundamental error in greenhouse gas accounting related to bioenergy' *Energy Policy* (2012).

77 Schulze *et. al* (2012) 'Large-scale bioenergy from additional harvest of forest biomass is neither sustainable nor greenhouse gas neutral', *Bioenergy* 4(6): 611-16.

78 Nepstad *et al*. (2008) 'Interactions among Amazon land use, forests and climate: prospects for a near-term forest tipping point', *Phil. Trans. R. Soc. B* 27 363(1498): 1737-46, available at http://rstb.royalsocietypublishing.org/content/363/1498/1737.full

79 Bailey, R. (2013) 'The Trouble with Biofuels: Costs and Consequences of Expanding Biofuel Use in the United Kingdom', available at http://www.chathamhouse.org/sites/default/files/public/Research/Energy,%20Environment%20and%20Development/0413pp_biofuels.pdf

80 Biofuelwatch (2012) 'Sustainable Biomass: A Modern Myth', available at http://www.biofuelwatch.org.uk/2012/biomass_myth_report/

81 Taylor, S. (2011) 'Commission to fudge CO2 effects of biofuel', available at http://www.europeanvoice.com/article/imported/commission-to-fudge-co2-effects-of-biofuel/72062.aspx

82 Glaser, A. and P. Glick (2012) *Growing Risk: Addressing the Invasive Potential of Bioenergy Feedstocks*. Washington, DC: National Wildlife Federation. Available at http://www.nwf.org/News-and-Magazines/Media-Center/Reports/Archive/2012/04-04-12-Growing-Risk.aspx

83 *Ibid*.

84 'Unchecked GM bacteria and Algae set for Environmental Release', available at http://www.gmeducation.org/environment/p149672-unchecked%20gm%20bacteria%20and%20algae%20set%20for%20environmental%20release.html

85 Here, only land issues outside the EU will be addressed, although there are clearly serious issues within the EU-27, involving similar problems of lack of access to land, unrecognised rights, land grabbing and major competition for fertile land.

86 Cited in Aubry (2011), p.7. Excerpt from European Commission (2011) 'Recent progress in developing renewable energy sources and technical evaluation of the use of biofuels and other renewable fuels in transport in accordance with Article 3 of Directive 2001/77/EC and Article 4(2) of Directive 2003/30/EC'.

87 This consortium consisted of: Ecofys, Winrock, Agra CEAS Consulting (joint venture between Imperial College London and Informa plc), Chalmers University and IIASA (International Institute for Applied Systems Analysis).

88 Ecofys (2011) 'Biofuels Baseline 2008', p. 90, available at http://ec.europa.eu/energy/renewables/studies/doc/biofuels/2011_biofuels_baseline_2008.pdf

89 *Ibid*., p. 93.

90 'Ensus, greener food + fuel', available at http://www.ensusgroup.com/

91 Index Mundi (2013) 'EU-27 Soybean Oil Imports by Year', available at http://www.indexmundi.com/agriculture/?country=eu&commodity=soybean-oil&graph=imports

92 Index Mundi (2013) 'EU-27 Palm Oil Imports by Year', available at http://www.indexmundi.com/agriculture/?country=eu&commodity=palm-oil&graph=imports

93 'Green Resources', available at http://www.greenresources.no/Company.aspx

94 'Plantations: tree Species', available at http://www.greenresources.no/Plantations/TreeSpecies.aspx

95 'Village Afforestation', available at http://www.greenresources.no/Development/VillageAfforestation.aspx

96 Lang, C. (2012) 'Green Resources' carbon plantation in Tanzania. Curse or cure?', available at http://www.redd-monitor.org/2012/05/02/green-resources-carbon-plantations-in-tanzania-curse-or-cure/

97 Antara News (2011) 'Half of Indonesia's oil palm plantations foreign-owned', available at http://farmlandgrab.org/post/view/19299

98 York, G. (2012) 'Land rush leaves Liberia's farmers in the dust', available at http://www.theglobeandmail.com/news/world/land-rush-leaves-liberias-farmers-in-the-dust/article4570938/

99 Godoy, J. (2011) 'AFRICA: Development Agencies Support Harmful Oil Palm Production', available at http://www.ipsnews.net/2011/05/africa-development-agencies-support-harmful-oil-palm-production/

100 PWC (2012) *Overview of palm oil industry landscape in Indonesia, 2012 Update*, available at http://www.pwc.com/id/en/publications/assets/Palm-Oil-Plantation-2012.pdf

101 See for example Index Mundi (2013) 'Colombia Palm Oil Production By Year', available at http://www.indexmundi.com/agriculture/?country=co&commodity=palm-oil&graph=production

102 Carlson *et. al* (2012) 'Committed carbon emissions, deforestation, and community land conversion from oil palm plantation expansion in West Kalimantan, Indonesia' PNAS, available at http://www.pnas.org/content/early/2012/04/19/1200452109.full.pdf+html

103 'Urgent briefing to MPs: Bioliquids and the Draft Renewables Obligation (Amendment) Order 2013', available at http://orangutans-sos.org/documents/669/669.pdf

104 Joensen, L. and H. Paul (2005) *How Producing RR soya is destroying the food security and sovereignty of Argentina*, available at http://www.econexus.info/publication/argentina-case-study-impact-genetically-engineered-soya

105 See for instance: Paraguay Sojero by Grupo Reflexión Rural, Argentina http://www.grr.org.ar; document available at http://lasojamata.iskra.net/en/node/12

106 See for instance Gaudin, A. (2004) 'United Soy Republic?', available at http://www.lapress.org/articles.asp?item=1&art=3798

107 Renewable Fuels Agency (2011) *Year Two of the RFTO*, p. 49, available at http://webarchive.nationalarchives.gov.uk/20110407094507/http://www.renewablefuelsagency.gov.uk/yeartwo,

108 Philpott, T. (2012) 'Why the Ethanol Boom Means More E.Coli Burger', available at http://www.motherjones.com/tom-philpott/2013/05/why-ethanol-boom-means-more-e-coli-burgers

109 FAO (2012) *Biofuel co-products as livestock feed - Opportunities and challenges*. Roma: FAO. Available at http://www.fao.org/docrep/016/i3009e/i3009e00.htm

110 See for instance Borras, S.M., *et al.* (2011) 'Towards a better understanding of global land grabbing: an editorial introduction' *Journal of Peasant Studies* 38(2): 209-216 or also Borras, S.M. and J.C. Franco (2012) 'Global land grabbing and trajectories of agrarian change: a preliminary analysis' *Journal of Agrarian Change* 12(1): 34-59.

111 GRAIN (2013) 'Land grabbing for biofuels must stop', available at http://www.grain.org/article/entries/4653-land-grabbing-for-biofuels-must-stop

112 Renewable Fuels Agency (2008) *The Gallagher Review of the indirect effects of biofuels production*, p. 37, available at http://webarchive.nationalarchives.gov.uk/20110407094507/renewablefuelsagency.gov.uk/reportsandpublications/reviewoftheindirecteffectsofbiofuels

113 FAO (2011) *The State of the World's Land and Water Resources for Food and Agriculture* (SOLAW). Rome: FAO and London: Earthscan. Available at http://www.fao.org/news/story/en/item/95153/icode/

114 UNEP (2007) *Sudan: Post-Conflict Environmental Assessment*, chapter 8, pages 166-71. Nairobi: UNEP.

115 The Zambian (2005) 'Chitemene, Fundikila and Hybrid Farming', available at http://thezambian.com/2005/02/26/chitemene-fundikila-and-hybrid-farming/

116 Siame, J.A. (2006) 'The Mambwe mound cultivation system', available at http://www.agriculturesnetwork.org/magazines/global/ecological-processes-at-work/the-mambwe-mound-cultivation-system

117 Find Your Feet (2012) *Recognising the unrecognised: farmer innovation in Northern Malawi*, available at http://www.asfg.org.uk/Farmer%20Innovation%20Study%20-%20FINAL.pdf

118 Via Campesina and UNAC Mozambique (2009) *Jatropha! A socio-economic pitfall for Mozambique*, available at www.uniterre.ch/doc/2009/ReportJatrophaJAandUNAC.pdf

119 FAO (1995) *Environmental impact assessment of irrigation and drainage projects*, Chapter 4: 'Major impacts of irrigation and drainage projects', available at http://www.fao.org/docrep/V8350E/v8350e09.htm

120 McGrath, M. (2012) 'Huge water resource exists under Africa', available at http://www.bbc.co.uk/news/science-environment-17775211

121 Handwerk, B. (2010) 'Underground "Fossil Water" Running Out', available at http://news.nationalgeographic.com/news/2010/05/100505-fossil-water-radioactive-science-environment/

122 UNEP 'Africa Environment Outlook', available at http://www.unep.org/dewa/africa/publications/aeo-1/153.htm

123 Ecofys (2011) 'Biofuels Baseline 2008', p. 505, available at http://ec.europa.eu/energy/renewables/studies/doc/biofuels/2011_biofuels_baseline_2008.pdf

124 Eide, A. (2008) *The Right to Food and the Impact of Liquid Biofuels (Agrofuels).* Rome: FAO, available at www.fao.org/righttofood/publi08/Right_to_Food_and_Biofuels.pdf

125 SAGCOT (2012) *Strategic Regional Environmental and Social Assessment (SRESA) Interim Report*, p. 34, available at http://www.sagcot.com/uploads/media/Interim_Report_-_SAGCOT_SRESA_Final_12_02.pdf

126 'Shea nut and butter production in Burkina Faso', available at http://en.wikipedia.org/wiki/Shea_nut_and_butter_production_in_Burkina_Faso

127 FAO (2012) Invisible Guardians: Women manage livestock diversity. Rome: FAO. Available at http://www.fao.org/docrep/016/i3018e/i3018e00.htm

128 Palitza, K. (2012) 'South Africa's Smallholders Lose Battle for Seed Security', available at http://ipsnews.net/news.asp?idnews=107523

129 Kugelman, M. (2012) 'The global land rush: Catalyst for resource-driven conflict?', available at http://sustainablesecurity.org/article/global-land-rush-catalyst-resource-driven-conflict

130 Food First (2012) 'Three Peasants Slain in Honduras Land Dispute, EFE', available at http://www.foodfirst.org/en/Honduras+land+grabs; Latin America Herald Tribune (2012) 'Honduras Land Conflict Claims Another Victim, EFE', available at http://laht.com/article.asp?ArticleId=537537&CategoryId=23558

131 BBC (2012) 'Ethiopian man threatens action over UK 'link to abuse'', available at http://farmlandgrab.org/post/view/20985

132 International Work Group for Indigenous Affairs (2011) 'Update 2011 - Ethiopia', available at http://www.iwgia.org/regions/africa/ethiopia/864-update-2011-ethiopia

133 Let's Talk Land Tanzania (2012) 'Land grabbing in a post investment period and popular reactions in Rufiji River Basin', available at http://letstalklandtanzania.com/s/land-grabbing-in-a-post-investment-period-and-popular-reactions-in-the-rufiji-river-basin/#.UF8gqBh387A

134 Renewable Fuels Agency (2008) *The Gallagher Review of the indirect effects of biofuels production*, p. 13 and 37, available at http://webarchive.nationalarchives.gov.uk/20110407094507/renewablefuelsagency.gov.uk/reportsandpublications/reviewoftheindirecteffectsofbiofuels

135 African Biodiversity Networks (2007) *Agrofuels in Africa – The impacts on land, food and forests, Case Studies from Benin, Tanzania, Uganda and Zambia*, available at http://www.biofuelwatch.org.uk/docs/ABN_Agro.pdf

136 Davies, J. and M. Nori (2008) 'Managing and mitigating climate change through pastoralism', *Policy Matters* 16.

137 African Biodiversity Network (2007) 'A new scramble for Africa's remaining collective territories', available at http://africanbiodiversity.org/abn_old/resources.html

138 Nyari, B. 'Biofuel land grabbing in Northern Ghana', available at www.biofuelwatch.org.uk/docs/biofuels_ghana.pdf

139 Kaarhus, R. (2011) 'Agricultural Growth Corridors equals Land-grabbing? Models, roles and accountabilities in a Mozambican case', presentation available at http://www.future-agricultures.org/panel-a-session-summaries/7541-panel-2-environment-carbon-grabs-

140 see for example Deininger, K. (2011) 'Land Rights and the World Bank Group: Setting the Record Straight', available at http://blogs.worldbank.org/developmenttalk/land-rights-and-the-world-bank-group-setting-the-record-straight; World Bank (2012) 'Land and Food Security', available at http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTARD/0,,contentMDK:23284610~pagePK:148956~piPK :216618~theSitePK:336682,00.html; FAO, IFAD sign agreement to promote smallholder financing, see http://www.fao.org/news/story/en/item/169727/icode/; FAO (2012) *Trends and Impacts of Foreign Investment in Developing Country Agriculture*, available at http://www.fao.org/fileadmin/templates/est/INTERNATIONAL-TRADE/FDIs/Trends_publication_12_November_2012.pdf;The State of Food and Agriculture (2012) *Investing in Agriculture - for a better future*, available at http://www.fao.org/publications/sofa/en/

141 Ecofys (2011) 'Biofuels Baseline 2008', p. 505, available at http://ec.europa.eu/energy/renewables/studies/doc/biofuels/2011_biofuels_baseline_2008.pdf

142 Aso, T. (2009) 'The world must learn to live and farm sustainably', available at http://farmlandgrab.org/post/print/6018

143 (2011) ' Why so-called Responsible Agricultural Investment must be stopped', available at http://www.tni.org/article/why-so-called-responsible-agricultural-investment-must-be-stopped

144 GRAIN (2010) 'Say NO to the principles of "responsible" agro-enterprise investment promoted by the World Bank', available at http://www.grain.org/bulletin_board/entries/4224-stop-land-grabbing-now

145 De Schutter, O. (2010) 'Responsibly destroying the world's peasantry', available at http://www.project-syndicate.org/commentary/deschutter1/English

146 (2012) 'Farmers demand World Bank, Wall Street stop grabbing their lands at opening of the Bank's annual conference in Washington, DC', available at http://farmlandgrab.org/post/view/20362

147 For example, see GRAIN's report (2013) 'Land grabbing for biofuels must stop', available at http://www.grain.org/article/entries/4653-land-grabbing-for-biofuels-must-stop

148 'AgDevCo', available at http://www.agdevco.com/news.php

149 Yara 'Agricultural Growth Corridors', available at http://www.yara.com/sustainability/how_we_engage/africa_engagement/growth_corridors/index.aspx

150 'Public Private Partnerships, the answer to African agricultural growth', see http://www.prorustica.com/

151 'InfrCoAfrica, Creating viable infrastructure investment opportunities in developoing countries', available at http://www.infracoafrica.com

152 'AgDevCo', available at http://www.agdevco.com/

153 Agricultural Growth Corridors: Presentation by Sean de Cleene, Vice President Business Development, Yara International and Vice Chair Kilimo Kwanza Growth Corridors Executive Committee, Tanzania, available at www.acpbriefings.net/wp-content/uploads/2010/08/De-Cleene.pptx

154 Patron, C. (2012) 'Stiglitz gives nod to SA's ambitious build plans, available at http://www.bdlive.co.za/articles/2012/04/20/stiglitz-gives-nod-to-sa-s-ambitious-build-plans

155 See Borras, S.M., J. Franco, S. Gómez, C. Kay and M. Spoor (2012) 'Land grabbing in Latin America and the Caribbean' *Journal of Peasant Studies* 39(3-4): 845-72 for 'flex crops'.

156 Africa Matters Ltd (2012), 'presentation', available at http://www.slideshare.net/AfricaMattersLtd/agriculture-presentation-13340400

157 http://www.beiracorridor.com/

158 BAGC Investment Blueprint by InfraCo, launched 2010 at WEF, see http://www.beiracorridor.com/?__target__=resource-centre

159 Principle Energy 'Projects Overview', available at http://www.prinenergy.com/output/page185.asp

160 World Bank (2010) 'Prospects for Growth Poles in Mozambique' available at http://docs-files.com/view.php?view=http://siteresources.worldbank.org/INTMOZAMBIQUE/Resources/FINALMozambiqueGrowthPolesAUG19.pdf&keyword=prospects%20for%20growth%20poles%20in%20mozambique&count=

161 Kaarhus, R. (2011) 'Agricultural Growth Corridors equals Land-grabbing? Models, roles and accountabilities in a Mozambican case', presentation available at http://www.future-agricultures.org/panel-a-session-summaries/7541-panel-2-environment-carbon-grabs-

162 See http://en.wikipedia.org/wiki/Mozambique_Company

163 Reuters (2010) 'EU, Brazil, Mozambique to sign bioenergy pact', available at http://af.reuters.com/article/topNews/idAFJOE66B0SL20100712

164 Africa Matters Ltd (2012), 'presentation', available at http://www.slideshare.net/AfricaMattersLtd/agriculture-presentation-13340400

165 Aso, T. (2009) 'The world must learn to live and farm sustainably', available at http://farmlandgrab.org/post/print/6018

166 Fred Pearce (2012) *The Landgrabbers: The new fight over who owns the earth*. Eden Project Books.

167 Via Campesina (2012) 'Land Grab compromises Food Sovereignty in Southern Africa', available at http://farmlandgrab.org/post/view/20909

168 See for example, pages 7 and 23 of The Tanzania SAGCOT Investment Blueprint, available at http://www.sagcot.com/uploads/media/Invest-Blueprint-SAGCOT_High_res.pdf

169 For more on the corridors, see for example, Paul, H. and R. Steinbrecher (2013) *African Agricultural Growth Corridors: Who benefits, who loses?* Available at http://www.econexus.info/sites/econexus/files/African_Agricultural_Growth_Corridors_&_New_Alliance_-_EcoNexus_June_2013.pdf

170 Daily News Tanzania (2012) 'Three neighbours to join SAGCOT', available at http://www.dailynews.co.tz/index.php/local-news/10075-three-neighbours-to-join-sagcot

171 SAGCOT (2012) *Strategic Regional Environmental and Social Assessment (SRESA) Interim Report*, available at http://www.sagcot.com/uploads/media/Interim_Report_-_SAGCOT_SRESA_Final_12_02.pdf

172 *Ibid*.

173 Carrington, D. (2011) 'Biofuels boom in Africa as British firms lead rush on land for plantations', available at http://www.guardian.co.uk/environment/2011/may/31/biofuel-plantations-africa-british-firms

174 Lakew, H. and Y. Shiferaw (2011) 'Current biofuels development status in Ethiopia', available at http://lissanonline.com/blog/?p=625

175 Osterath, B. (2011) 'A threat for Africa?', available at http://www.writingscience.de/artikel/biofpr_a_threat_for%20_africa.pdf

176 The Guardian (2011) 'Sun Biofuels have left us in a helpless situation. They have taken our land – video', available at http://www.guardian.co.uk/environment/video/2011/nov/09/biofuel-tanzania-video

177 Sapp, M. (2012) 'Lions Head struggles to restart Tanzanian jatropha venture', available at http://www.biofuelsdigest.com/bdigest/2012/03/23/lions-head-struggles-to-restart-tanzanian-jatropha-venture/; Action Aid Tanzania (2011) 'Impact Of Biofuel Investment In Kisarawe District', available at http://letstalklandtanzania.com/s/impact-of-biofuel-investment-in-kisarawe/#.UGBNQxh387B; Levidow, L. and H. Paul (2010) 'Global Agrofuel Crops as Contested Sustainability, Part I: Sustaining What Development?', Capitalism Nature Socialism, 21(2) 64-86.

178 'Sun Biofuels Mozambique – About us', available at http://www.sunbiofuelsmz.com/joomla/site-map/aboutusm1

179 Biofuel Digest (2011) 'Sun Biofuels commences shipment of jatropha oil from Mozambique, available at http://www.biofuelsdigest.com/bdigest/2011/07/26/sun-biofuels-commences-shipment-of-jatropha-oil-from-mozambique/

180 AllAfrica (2012) 'Mozambique: Lufthansa Ends Biofuel Trial', available at http://allafrica.com/stories/201201130343.html

181 Levidow, L. (2013) 'EU criteria for sustainable biofuels: accounting for carbon, depoliticising plunder', *Geoforum*, 44(1): 211–23, available at http://www.tni.org/sites/www.tni.org/files/download/ll_eu_criteria_biofuels_geoforum_2013.pdf

182 Reuters (2012) 'Exclusive: EU to limit use of crop-based biofuels - draft law', available at http://www.reuters.com/article/2012/09/10/us-eu-biofuels-idUSBRE8890SJ20120910

183 EurActive (2013) 'Parliament report flags major changes to EU biofuels proposal', available at http://www.euractiv.com/energy/lepage-report-flags-major-change-news-519171

184 European Parliament Committee on Industry, Research and Energy (2012) 'Draft opinion', available at http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-%2f%2fEP%2f%2fNONSGML%2bCOMPARL%2bPE-508.012%2b01%2bDOC%2bPDF%2bV0%2f%2fEN

185 Keatin, D. (2012) 'Drought puts squeeze on EU biofuel policy', available at http://www.europeanvoice.com/article/imported/drought-puts-squeeze-on-eu-biofuel-policy/75052.aspx

186 EurActive (2012) 'OECD agriculture official urges end to biofuel mandates', available at http://www.euractiv.com/cap/oecd-news-514884

187 Fediol (2012) 'Press Release: Leaked iLUC proposal is a threat to many thousands of jobs in the biofuels chain and weakens oilseed crushers' food and feed supply', available at http://www.fediol.eu/data/1347982964FEDIOL%20Press%20Release%20on%20iLUC%20Proposal%20-%2017092012.pdf

188 Cooney, D. 'agriculture and forests, from sparing to sharing', available at http://blog.cifor.org/1224/agriculture-and-forests-from-sparing-to-sharing/#.UZuU6oJ387A

189 European Commission 'Biofuels sustainability schemes', see http://ec.europa.eu/energy/renewables/biofuels/sustainability_schemes_en.htm

190 Levidow, L. (2013) 'EU criteria for sustainable biofuels: accounting for carbon, depoliticising plunder', *Geoforum*, 44(1): 211–23, available at http://oro.open.ac.uk/35761/

191 Crutzen *et. al* (2008) '$N_2O$ release from agro-biofuel production negates global warming reduction by replacing fossil fuels', Atmos. Chem. Phys. 8: 389-95, available at http://www.atmos-chem-phys.net/8/389/2008/acp-8-389-2008.html

192 For example: Bentsen, N.S. and C. Felby (2012) 'Biomass for energy in the European Union – a review of bioenergy resource assessments' Biotechnol Biofuels 5(25). Available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3458922/

193 European Biofuels Technology Platform 'Advanced Biofuels in Europe', available at http://www.biofuelstp.eu/advancedbiofuels.htm

194 Nelsen, A. (2012) 'EU report questions conventional biofuels' sustainability', available at http://www.euractiv.com/climate-environment/eu-report-questions-conventional-news-512076

195 Gerasimchuk, (2012) *State of Play on Biofuel Subsidies: Are policies ready to shift?* Geneva: IISD.

196 *Ibid*.

197 This perspective was made clear during a conference entitled "Europe, Africa and Food Security: European policies, biofuels and land grabbing: A dialogue between European authorities, Member States and Civil Society", which was held on *28 February 2012 at the House of Dutch Auditorium,* Philippe de Champagnestraat, 23 in Brussels. During this conference, Ruta Baltause (DG Energy) unequivocally told the audience during her speech that there will be no discussion of the target because industry would not like it. When this author spoke to her afterwards, she said that trying to reduce energy consumption in the EU was impossible.

198 European Commission (2011) *Proposal for a regulation on establishing Horizon 2020, - The Framework Programme for Research and Innovation (2014-2020),* Brussels: EC. Available at http://ec.europa.eu/research/horizon2020/pdf/proposals/com%282011%29_809_final.pdf .

199 (2012) 'Commission adopts its Strategy for a sustainable biofuel growth in Europe', available at http://europa.eu/rapid/press-release_MEMO-12-97_en.htm

200 ITRE Newsletter (2013), available at http://www.europarl.europa.eu/document/activities/cont/201304/20130424ATT65038/20130424ATT65038EN.pdf

201 Levidow, L. (2013) 'EU criteria for sustainable biofuels: accounting for carbon, depoliticising plunder', *Geoforum*, 44(1): 211–23, available at http://www.tni.org/sites/www.tni.org/files/download/ll_eu_criteria_biofuels_geoforum_2013.pdf

202 European Commission (2011) *Proposal for a regulation on establishing Horizon 2020, - The Framework Programme for Research and Innovation (2014-2020),* Brussels: EC. Available at http://ec.europa.eu/research/horizon2020/pdf/proposals/com%282011%29_809_final.pdf.

203 Máire Geoghegan-Quinn European Commissioner for Research, Innovation and Science "Innovating for sustainable growth: A Bioeconomy for Europe" Press conference Brussels, 13 February 2012, available at http://europa.eu/rapid/press-release_SPEECH-12-93_en.htm

204 Nielsen, K. R. (2012), 'Biofuels pioneer urges Europe to protect bioeconomy lead; New strategy is a start, but policy-makers must do more to avoid losing technological lead to US and China, warns Novozymes exec', Business Green. Available at http://www.businessgreen.com/bg/news/2152047/biofuels-pioneer-urges-europe-protect-bioeconomy-lead

205 European Commission (2012) *Innovating for Sustainable Growth: A Bioeconomy for Europe*. Brussels: EC. Available at http://ec.europa.eu/research/bioeconomy/pdf/201202_innovating_sustainable_growth.pdf

206 *Ibid*.

207 'Abengoa', see http://www.abengoa.es/corp/web/es/index3.html

208 Lux Research Alternative Fuels Intelligence service 'Mapping Empires, Goldmines, and Landmines in the Alternative Fuels Network', at http://www.luxresearchinc.com

209 William Stanley Jevons (1866) *The Coal Question, 2nd edition*.London: Macmillan, pp.140-41.

210 Perelman M. (2009) 'Scarcity and Environmental Disaster: Why Hotelling's Price Theory Doesn't Apply', *Capitalism Nature Socialism*, 18(1): 81-98.

211 Levidow, L. (2013) 'EU criteria for sustainable biofuels: accounting for carbon, depoliticising plunder', *Geoforum*, 44(1): 211–23, available at http://www.tni.org/sites/www.tni.org/files/download/ll_eu_criteria_biofuels_geoforum_2013.pdf

212 DG For External Policies (2012) *Impact of EU bioenergy policy on developing countries*, available at http://www.ecologic.eu/files/attachments/Publications/2012/2610_21_bioenergy_lot_21.pdf

213 Available at www.maastrichtuniversity.nl/humanrights (September 2011) and cited in Aubry, S. (2011) *(Bio)Fueling Injustice?* Rome: Terra Nueva.

214 http://www.sustainableenergyforall.org/

215 Europaid (2012) 'EU Reaffirms Commitment to Sustainable Energy for All during EU summit', available at http://ec.europa.eu/europeaid/what/energy/sustainable/se4all_en.htm

216 Biofuelwatch (2012) *Sustainable Energy for All – or Sustained Profits for a Few?* Available at http://www.biofuelwatch.org.uk/2012/sefa/

217 McDonald *et. al* (2009) 'Energy Sprawl or Energy Efficiency: Climate Policy Impacts on Natural Habitat for the United States of America' *PLoS ONE* 4(8), available at http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0006802

All links accessed on July 1st 2013.

# EcoNexus

**EcoNexus**, founded in 2000, is a small environmental justice organisation with scientific expertise. It specialises in researching emerging technologies with the potential for severe negative impacts on biodiversity, ecosystems and society, ranging from genetic modification, synthetic biology and geoengineering to bioenergy and the bioeconomy. It also highlights the role of corporations in promoting these technologies.

**www.econexus.info**

FDCL

The Center for Research and Documentation Chile-Latin America e.V. (FDCL - Forschungs- und Dokumentationszentrum Chile-Lateinamerika non-profit registered association) exists since 1974 and is a center for information and communication for individuals and groups that wish to inform themselves or get involved with Latin America-related issues. It is well known far beyond the borders of Berlin.

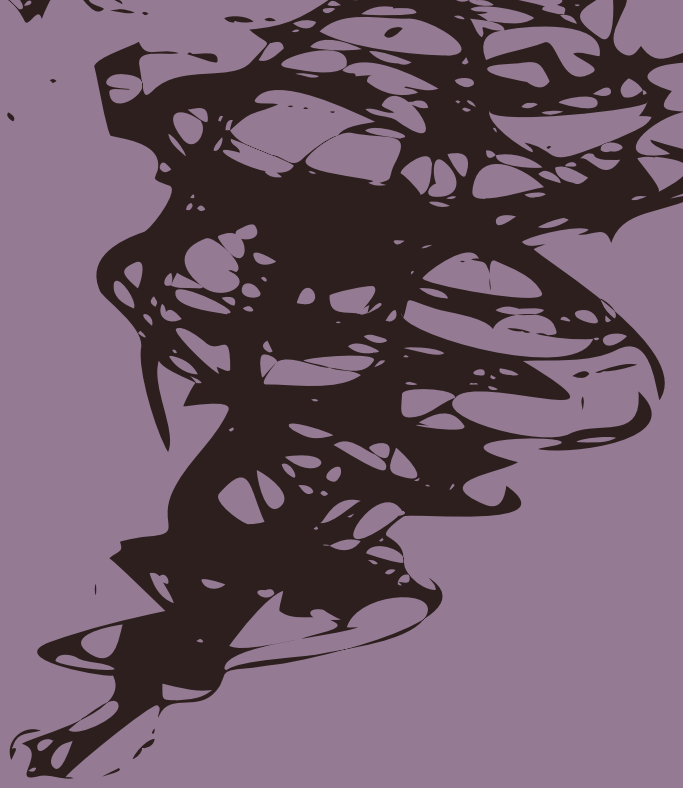
**http://fdcl-berlin.de**

TNI

The **Transnational Institute** was founded in 1974. It is an international network of activist-scholars committed to critical analyses of the global problems of today and tomorrow. TNI seeks to provide intellectual support to those movements concerned to steer the world in a democratic, equitable and environmentally sustainable direction.

**www.tni.org**

For more information contact:
**tni@tni.org**



On the eve of the new millennium, the EU embarked upon a major agroenergy and bioeconomy experiment. More than ten years on, the evidence from science, academia, and grassroots voices is clear: **most of the claims initially made for agroenergy as a truly renewable alternative to fossil fuels are flawed**. Indeed, reports and research continue to demonstrate problems with the policy's most basic assumptions. Worst of all, the creation of an EU market for industrial agrofuels has been shown to have a negative impact on the land and resource rights, livelihoods, and food security of local populations, especially in the global South. These same concerns hold true for agromass. But despite the accumulating evidence, the European Commission (EC) is persisting with its agroenergy policies, resolutely refusing to-drop targets that were demanded by industry from the outset to provide security of investment in the sector. The reason why so many sound arguments against agrofuels and agromass are being ignored, is that behind the EC's promotion of agrofuels and agromass is a powerful industrial lobby that includes the motor industry, the oil industry and the various energy industries. The grand plan for a bioeconomy appropriates renewable biological resources to facilitate a market-based, techno-centric response to unsustainable energy patterns.

Critically analysing the origins, claims, and effects of the European Union's (EU) transition to a new bioeconomy, this report aims to contribute to challenging this strategy. It highlights how EU policy is contributing to a reordering of land and land use, with a particular focus on Africa. One aspect of the non-renewable nature of agroenergy with special relevance to this paper is that it requires more land per unit of energy than other forms of energy supply. To date the EC has proposed that EU agrofuel policy can be amended or adjusted to actually reduce emissions and not have negative impacts on third countries. This merely helps to perpetuate a policy that is based on false assumptions and claims, a policy that has failed on its own terms. Civil society needs to increase the pressure and shift the onus to the companies to prove that they are not destroying forests and livelihoods. Our primary obligation in Europe is to reduce energy consumption, in particular that which has an impact on other regions, and change our current energy dense development model. Agroenergy does not qualify as renewable energy and the EU agroenergy policy framework should therefore be dismantled.