Drynet Position Paper
The Biofuel Boom and its Consequences for Drylands

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I. Introduction

The rise of biofuels as an alternative to fossil fuels has transformed the food and energy production and trade regimes the world over within a short span of about two years. The impact of biofuel production is already so widespread that it has become impossible to overlook when assessing national and international policies regarding food security, environmental preservation, energy needs, trade and investment and land rights.

The biofuel boom has been driven to a large extent by the blending targets and trade, investment and agriculture policies of industrialised countries. Blending targets were originally set within the framework of renewable energy policies under the claim that their deployment would significantly reduce Greenhouse Gas (GHG) emissions. However, well-to-wheel studies or Life Cycle Analyses[1] (LCA) show that most biofuels contribute little to climate change mitigation when emissions from the entire production process are incorporated – and several actually lead to higher emissions than the fossil fuels they replace. Given the continued adherence of industrialised countries to blending targets, it is clear that the real interest in biofuels has to do with energy security, in the context of volatile oil prices and unpredictable regimes. Another major motivation in Europe and the US has been the boosting of their own declining domestic agricultural sectors. In particular, the EU has set a mandatory target of 10% biofuel use in its transport sector by 2020. In this context, we need to keep in mind that this is a fraction of an ever-increasing total, that currently under 2% biofuel is used in the EU's transport blend, and that the EU is expected to have to import about two-thirds[2] of the biofuel needed to meet the 10% target. The US has its own equally ambitious targets. The artificial demand created by these blending targets and by the evergrowing quest for energy to maintain the excessive consumption levels of industrialised countries is one of the main drivers of large-scale unsustainable production in the South. This is already undermining local

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[1] Life Cycle Analyses are used to calculate net GHG emissions savings when emissions from land use change, processing and inputs have all been included. See *Whither EU Biofuel Policy? The flaws of a target-based approach*; Both ENDS Policy Note; July 2008 and references therein.
[2] European Environment Agency draft report, July 2008

food security and energy security and accelerating the depletion of environmental resources. Moreover, its impact can be expected to escalate in the near future.

If local needs can be adequately prioritised, the production of biofuel feedstock can also benefit poor dryland countries. In particular, many dryland countries are energy-deficient and can greatly benefit from small-scale community programmes for the off-grid generation of electricity in rural and remote areas. In principle, biofuel production for export could alleviate poverty and even enhance food security by supplementing farmer's incomes. However, the benefits to local communities are limited by the trade and investment policies of industrialised countries, and most of the profits are captured by a few transnational companies. Most importantly, the case of biofuel feedstock production on drylands is a particularly sensitive one in light of the prevailing poverty levels, food insecurity and scarce environmental resources. In this context, it is of particular concern that the most recent wave of investments in biofuel production has specifically targeted drylands. A large number of these projects have involved the production of *Jatropha Curcas*, and have resulted in the appropriation of land from poor communities. Their implementation has been facilitated by the lack of land tenure security - and by policies based on exaggerated claims and partial truths regarding the potential of Jatropha and other dryland crops for large-scale biofuel production on 'marginal' lands. The EU's Renewable Energy Directive, for example, has identified land normally referred to as 'marginal', 'wasteland' or 'idle' as most suitable for the production of bioenergy - claiming that this will not undermine food security. However, the sustenance and livelihoods of the poorest communities depend heavily on precisely these types of land, and are being seriously undermined.

II. Access to Land and Food

The impact of large-scale biofuel production on the current (and worsening) food crisis has been widely acknowledged. Biofuels have contributed to the threat to food security via various channels - both direct and indirect. The diversion of food crops towards biofuel production as well as the competition generated for land and other resources (water, fertiliser, etc.) between energy crops and food crops seriously undermine food security. Furthermore, biofuel production has also led to the destruction of forests, grasslands and other natural ecosystems that constitute a crucial food-source for the poor.

The World Bank[4] has reported a doubling of food prices in the last three years and a 40% rise during the last year[3]. Apart from generating direct competition with food production, global biofuel production has had a significant indirect impact on the recent hike in world food prices. Various studies by the WB (World Bank)[4], IMF (International Monetary Fund)[5] and FAO (Food and Agriculture Organisation)[6]

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[3] As of September 2008, before the financial crisis.

[4] D. Mitchell, *A Note on Rising Food Prices,* World Bank 2008: a 65% contribution of biofuels to the rise in food prices was also estimated here; later a 'leaked' World Bank study (The Guardian, July 3 2008) reported a 75% contribution of biofuels to the price hike.

[5] A 50% contribution estimated in S. Johnston, *The (Food) Price of Success,* Finance and Development, Vol 44 No. 4, IMF, December 2007.

[6] *Soaring Food Prices: Facts, Perspectives, Impacts and Actions required;* FAO Report HLC/08/INF/1 (2008).

estimate that the contribution of biofuels to soaring food prices ranges from 30% to 75%. By contributing to the reduction in global buffer food reserves, biofuels have triggered financial speculation in grains in deregulated world food markets. This effect has considerably magnified the hike in food prices[7]. Furthermore, biofuels (being food crops used as oil substitutes) link food prices to oil prices, thus amplifying the upward trend and volatility of food prices.

Obviously it is the world's poor who will bear the brunt of this food crisis, and about half of the 923 million people suffering from hunger worldwide live on marginal, dry or degraded land. Moreover, the majority of dryland countries are net food importers. They are thus doubly affected: firstly by soaring global food prices and secondly by the diversion of staple food crops to biofuel production in exporting countries[8]. In order to stave off the dire consequences of the impending food crisis, national strategies will need to prioritise local food production via small-scale sustainable and low-input agriculture, natural regeneration and the securing of markets for small farmers. **Access to land is a fundamental precondition to realising the potential role of agriculture in reducing poverty and promoting long-term food security.** Land tenure reform and the official recognition of customary land rights should lie at the core of any strategy directed at improving food security. Instead, the recent hike in commodity prices (and thereby in land prices) has, in combination with a skewed global trade regime and corporate agriculture interests, incentivised a 'scramble to supply' in which companies and investors rush to buy up new land, displacing vulnerable communities with poorly protected land rights. In addition, the scale of demand generated by the biofuel blending targets of industrialised countries skews the production system in favour of large-scale producers.

Adding fuel to the fire: the appropriation of 'marginal' land

In particular, drylands have been targeted by the most recent wave of land takeover for large-scale biofuel expansion. This involves land often labelled as 'wasteland', 'idle', 'under-utilised', 'marginal', 'sleeping' or 'abandoned' by governments and large private investors[9]. These distinct terms are being used interchangeably to indicate land that is unproductive and thereby unused, a serious misconception in itself. In most developing countries, the nutrition and livelihoods of the poorest communities depend precisely on these types of land.

The term 'marginal land' generally denotes areas with unsuitable (suboptimal) conditions for crop production, due to soil and climate constraints[10]. It has recently come into wide global usage in connection with the properties of *Jatropha Curcas*

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[7] *Food Crisis in the Age of Unregulated Global Markets*; Food First / Institute for Food and Development Policy (April 2008).

[8] For example, US corn subsidies led to the dumping of surplus corn on Mexico, leading many Mexican farmers to abandon corn cultivation, and creating dependency on imported corn. The subsequent diversion of corn to biofuel production by the US then led to a food crisis in Mexico.

[9] *Agrofuels and the Myth of the Marginal Lands;* A briefing by the Gaia Foundation, Biofuelwatch, African Biodiversity Network, Salva La Selva, Watch Indonesia and EcoNexus, September 2008.

[10] Jongschaap, Corré, Bindraban and Brandenburg; *Claims and Facts on Jatropha curcas L.; Global J. Curcas evaluation breeding and propagation programme,* Report 158; Plant Research International, Wageningen UR (2007).

(see Box 1), a classic dryland biodiesel feedstock often touted as a panacea for the problems experienced in the production of other biofuels. A major claim is that it will not interfere with food security since it grows on marginal land, where most food crops cannot. Similar claims have been made about other crops like Pongamia, Castor Bean and Sweet Sorghum. Though Jatropha can be considered a drought tolerant species, and is able to grow on so-called marginal land, its oil yield is advantageous only on agricultural land - where it directly competes with food production. Marginal lands will always have lower crop - and energy - yields. Their deployment for energy crops creates a demand for larger amounts of land, and incentivises its appropriation from poor communities. In many cases,

Box 1 ***Jatropha Curcas***[10]

Jatropha Curcas or 'physic nut' is the classic dryland biofuel feedstock. It is a drought resistant shrub belonging to genus Euphorbiaceae that produces oil containing seeds. Its native and natural distribution area is the Caribbean region and adjoining parts of South and Central America. It is now found abundantly in many tropical and sub-tropical regions throughout Africa and Asia. From the Caribbean, where the species was already used by the Mayas, Jatropha was most likely distributed by Portuguese ships via the Cape Verde Islands and Guinea Bissau to other countries in Africa and Asia. Its traditional and successful application at a small scale includes soil water conservation, erosion control, as protective hedgerows around arable land and housing, and as firewood and green manure. Due to its toxicity, its oil is not edible but has been traditionally used in the manufacture of soap, insecticide and medicine.

Claims

More recently, many claims have been made regarding the potential for growing Jatropha on and reclaiming marginal lands: namely that it grows well under saline conditions, has low nutrient requirements, uses little water, provides high oil yields, requires low labour input, does not compete with food production and is resistant to pests and diseases.

Reality

Jatropha grows in semi-arid and arid tropical areas and can therefore be considered drought-tolerant. It has considerable potential and value for small-scale production in its natural environment. However, the above claims are no longer valid in the context of large-scale Jatropha monocultures and high oil yield production. Especially the claims of low nutrient requirement, low water use, low labour inputs, the nonexistence of competition with food production, and tolerance to pests and diseases are definitely not true in combination with high yield production[10]. The positive claims on the high oil yields of Jatropha seem to have emerged from incorrect combinations of unrelated observations, often based on measurements of singular and elderly Jatropha trees. Moreover, the extrapolation of such measurements to larger areas with Jatropha as a monoculture crop (or in intercropping systems) ignores the growth reduction in such systems occurring from competition for natural resources such as radiation, water and nutrients. Though Jatropha can reclaim marginal land, and improve the soil by reducing wind and soil erosion, in a monoculture (or intercropping system) it can lead to soil exhaustion.

Jatropha has been effectively employed as a fence around homesteads, gardens and fields for protection from browsing animals - it is highly toxic to livestock and humans. Its large-scale cultivation on lands crucial for grazing thus raises serious concerns.

Jatropha has considerable potential for small-scale cultivation for carbon sequestration and oil extraction. Its oil can either be used directly for energy generation or it can be further processed (transesterification) into biodiesel. Small-scale community initiatives on multifunctional platforms using unrefined Jatropha oil show considerable promise (see section IV). The residue ("seedcakes") remaining after the seeds are pressed for oil can be used as fertilizer or as feedstock for biogas for cooking and power generation.

Jatropha is a highly invasive plant[19] and tends to form dense stands that replace useful indigenous plants in disturbed land and natural habitats. Its introduction into new areas needs to be preceded by a risk assessment of invasiveness in the new habitat.

marginal land is the only kind of land accessible to the poor. The FAO has also recently stressed these concerns[11].

The image of marginal lands as unproductive and useless has been propagated by various commercial interests to authorize the appropriation of land from poor and vulnerable communities. **Marginal land, though not suitable for large-scale food production, constitutes a vital source of livelihood[12] for poor and indigenous communities. It is used for subsistence farming (millets, barley, sorghum etc.), herding and grazing, collecting building material and gathering wild products for food and medicine.** Moreover, marginal lands are strategically crucial to the lifestyles and livelihoods of pastoralists: as part of their migratory routes and vital dry season grazing and livestock corridors. The intrusion of Jatropha plantations into pastoral land is particularly problematic, since Jatropha is poisonous for livestock. The diversion of grazing land to biofuel cultivation[13] also undermines livestock maintenance and dairy production and directly affects local nutrition levels, especially those of children. Less animals also means less manure, and therefore less soil fertility and renewal – and less food security. Many of the countries that have enthusiastically embraced the biofuels agenda host significant numbers of pastoralists.

Soybean[14] (see Box 2) cultivation on the drylands of South America has been expanding further. The large-scale export-oriented nature of its production is to a large extent determined by Northern trade policies and is dominated by mega-agribusiness companies (see section V). Soy has displaced food cultivation for local

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11 http://www.fao.org/bioenergy/home/en
12 Lorenzo Cotula, Nat Dyer and Sonja Vermeulen, *Fuelling exclusion? The biofuels boom and poor people's access to land*; FAO and IIED, 2008.
13 *Fuelling Cars by Starving People*; Navdanya, India (2008).
14 *Soja Doorgelicht: De schaduwzijde van een wonderboon*, Nederlandse Soyacoalitie (2006).

consumption, with small farmers compelled to sell or rent their land to agribusiness companies. In Argentina, as soy fields increased by 141% between 1995 and 2004, the percentage of undernourished Argentinean children simultaneously increased from 11% to 17%.

The term wasteland is somewhat ambiguous when used in connection with the properties of Jatropha and other drought-resistant and hardy species, since it generally indicates land that is unused[10], set-aside or unoccupied - usually without reference to the quality of its soil. However, in most cases, the term 'unoccupied' merely indicates the absence of formal land titles. Effectively, much of this land is inhabited by and crucial to the livelihoods of indigenous, pastoral and other poor local communities, and governed traditionally by communal or customary law. Over 70% of African land is still communally owned. In many cases, National Governments do not recognize customary laws on land ownership. In other instances where they do, the existence of dual legal systems (statutory and customary) leads to lack of clarity regarding the actual rights of local communities. The result is that community rights are all too easily subordinated to private sector expansion. There have also been many cases of direct takeover of customary lands by private investment companies from indigenous communities via a combination of falsification, misinformation and coercion - at any rate, without their free prior and informed consent[15].

Communal lands are integral to the livelihood strategies of the poor[16] and constitute a large fraction of their household incomes (see Box 2). 'Marginal lands' are often likely to be worth far more to poor people than their market values reflect. Then again, amongst the poor, it is women[16] who stand to lose the most from this appropriation of marginal land. They tend to be allocated the most marginal lands for growing subsistence crops or medicinal herbs. As well as being most at risk (due to less secure access to land) and with more to lose (due to greater reliance on marginal lands), women may also have less to gain from biofuels, since cash crop production is usually dominated by men.

***Box2* Appropriating the Commons**

The last year or two have witnessed an unprecedented scale of land grabbing from local communities for biofuel production. Below we cite a few examples from drylands:

India: The UK company D1 Oils Plc, the world's largest commercial Jatropha cultivator, is reported to be targeting around 350,000 ha of land in India[13] for Jatropha plantation during the next four years. The company recently entered into a partnership with British Petroleum for producing crude Jatropha oil. It has also tied up with Labland Biotech and is shifting to improved hybrid seed varieties - raising serious concerns regarding seed monopolies. The land appropriated was being used by local communities: for agriculture by tribals in

[15] *Biofuel land grabbing in Northern Ghana*: RAINS Ghana and the African Biodiversity Network - this case involves the Norwegian biofuel company Biofuel Africa, a subsidiary of Biofuel Norway - see www.biofuel.no
[16] Oxfam Briefing Paper 114; *Another Inconvenient Truth: How biofuel policies are deepening poverty and accelerating climate change* (June 2008) and references therein.

Chhatisgarh and small farmers in Maharashtra, by pastoralists and livestock herders in Rajasthan. These lands[16], in large part classified as Common Property Resources (CPRs), have been shown to contribute up to a quarter of poor household incomes – with the poorest households being most dependent on them. Natural Bioenergy Limited (NBL), a joint US-Austrian venture[12], has also been granted 120,000 ha in the state of Andhra Pradesh for Jatropha cultivation.

Argentina: With the continued rise of global soy prices, soy production has spread beyond agricultural lands to the so-called marginal lands in the North of the country[9]. The indigenous Wichi community in Salta province are currently resisting deforestation for soy monoculture cultivation in the Chaco dry forests. Soy producers have also evicted the indigenous Guaraní community in Jujuy province. The violent land conflict that started in these areas is set to continue with new plans on Jatropha development in the region.

Ghana: Recently, the Norwegian biofuel company BioFuel Africa - a subsidiary of BioFuel Norway - claimed legal ownership of 38,000 ha of land in Kusawgu district for Jatropha production, by deceiving an illiterate chief to sign it away with his thumbprint. Though this case is now being contested by RAINS[15], 2600 ha had already been deforested by the time they could come to the aid of local communities. The acquisition of large tracts of communal land for biofuel production continues in Northern Ghana.

Tanzania: Sun Biofuels Tanzania Ltd, a subsidiary of British Sun Biofuels plc, is about to invest[16] $20m on 8200 ha for Jatropha cultivation in Kisarawe district, part of a plan to plant more than 40,000 ha. Although uncultivated, this land is used by local village inhabitants for charcoal-making, firewood and collecting fruits, nuts and herbs. Although the investment deal is in its final stages, confusion persists as to the compensation actually being accorded to local communities. To date the villagers do not know how much land they are conceding to Sun Biofuels - and how much they are getting for it. The land includes a waterhole which is the only place to collect water in the dry season; they also collect clay there to build houses. There have been several irregularities in compensation payments and in allowing access to the waterhole as originally promised. The same company is planning to plant 18,000 ha in Lindi region. Farmers who currently grow cassava, rice and maize are being encouraged to become Jatropha outgrowers. Several international mega-investments are underway in Tanzania’s Jatropha sector including by D1 Oils Plc (UK), PROKON (Germany) and Diligent Energy Systems (Netherlands) – the last being one of the few companies that does seriously consider local interests.

Ethiopia: The German biodiesel producer Flora Eco-power Holding AG was granted 13,000 ha in Oromia State for castor bean plantation, 87% of which is located in the Babille Elephant Sanctuary. Sun Biofuels has taken over several thousand hectares of communal pastureland in Wolaita, Southern Ethiopia[9], for Jatropha plantation.

Biofuel feedstock production on marginal land indirectly accentuates both socioeconomic and gender disparities. The irreversibility of land takeover (in most cases) has severe long-term repercussions for poverty, local food security and access to water. It is also leading to high rates of migration, thus augmenting the ranks of the urban poor - one of the most vulnerable groups in terms of food security.

In the context of the rapid expansion of biofuel feedstock production onto drylands, the protection of food security should be assigned the highest priority, and facilitated especially by:

- **Securing the land rights of local communities**
- **Strengthening the viability of small-scale farming and initiatives on soil renewal and regeneration.**

III. Water and Natural Resources

Due to their fragile ecosystems and scarce resources, drylands are specifically threatened by the depletion of water and soil nutrients and the environmental degradation that results from large-scale commodity production. These factors in turn further undermine food production and security.

The high degree of water use involved in the production of biofuel feedstock is of paramount importance to drylands. The production of biomass for food and fibre in agriculture already requires about 86% of global freshwater use[17]. Mounting evidence has prompted a nearly universal declaration[29] of the existence of a 'global water crisis'. Global water needs for growing food alone have been estimated to double between now and 2015, causing further degradation of ecosystems. By 2020, from 120 million to 1.2 billion people in Asia, 75 to 250 million in Africa and 12 to 81 million in Latin America may be affected by water stress and water shortages[18]. It is expected that by 2050 there will be water shortages in more than 70 countries, including 35 in Africa. The demand for energy from biomass is likely to place additional and extreme stress on global water resources. The 'water footprint'[19] of energy from biomass has been shown to be 70 to 400 times larger than that of a mix of energy from nonrenewable sources. A shift from fossil energy to biomass energy and the associated need for substantially more water is likely to raise a conflict between 'water for food' and 'water for energy'[17].

Water depletion by energy crop cultivation can to some extent be controlled domestically: by controlling irrigation licenses according to water availability and setting regulative priorities for food over biofuel production. However, more than thirty percent of countries meet thirty percent or more of their domestic water needs from sources in neighbouring countries. International trade flows in agricultural commodities also lead to flows of 'virtual water'[20]. **The export of biofuel feedstock out of drylands effectively entails the export of water, drylands' scarcest resource.** This problem needs to be tackled at the catchment level as well as at the level of international trade (see section V).

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[17] Gerbens-Leenes, P.W. Hoekstra, A.Y. and Van der Meer. Th. (2008), *The water footprint of energy from biomass: A quantitative assessment and consequences of an increasing share of bio-energy in energy supply*, Ecological Economics, doi:10.1016/j.ecolecon.2008.07.013.
[18] *South Africa's Biofuels Strategy: greenwashing agribusiness interests;* ACB Briefing Paper No. 3, 2008.
[19] The water footprint of a product is the volume of fresh water used for its production.
[20] The volume of water used to grow a crop, but not contained in the final product, is its 'virtual water' content.

Apart from water depletion, the obstruction of access to water is a crucial issue for drylands: the appropriation of communal lands for biofuel production often involves the appropriation of water sources (see Box 2), located on those lands.

Large-scale biofuel feedstock monocultures lead to the depletion of resources that are already scarce on drylands (besides water: also nutrients and organic matter) and the destruction of grassland and dry forests. Over-use of land that is already 'marginal' is likely to result in long-term or permanent ecological damage such as salinisation, soil erosion, further loss of soil fertility and the increased risk of drought and desertification. High rates of water evaporation make dryland soils particularly susceptible to salinisation.

The removal of biomass from the soil for biofuel production has especially negative consequences for drylands: it leads to the depletion of soil organic matter (SOM). SOM is essential for soil renewal, the retention of water and nutrients - and thus for soil fertility and food production, especially in the face of climate change and the increasing occurrence of drought. The new 'second generation' of biofuels could escalate SOM depletion, and marginal lands and drylands are being specifically targeted for its production: from lignocellulosic material extracted from waste and from plants (switchgrass, woody material). The yield of second generation feedstock is indeed likely to be higher and the water-use lower, since entire plants will be used for the production of bioethanol, instead of merely their starch or sugar content. However, this very fact raises serious concerns for drylands regarding the removal of SOM that is normally returned to the soil (as stems, leaves, roots). The production of second generation biofuel from waste could minimize interference with food production - and be a welcome development. The case of plants specially cultivated for feedstock is quite different however, since their production also takes up land.

The large-scale plantation of Jatropha on drylands has been facilitated by exaggerated claims regarding its ability to grow on marginal and degraded land without competing for water and nutrients. Although Jatropha can survive droughts and nutrient shortages, it requires land and a considerable amount of water and other inputs to produce a fair yield[21] (see Box 1).

Grown on a small scale and as intercropping or hedgerows, Jatropha can be a useful source of bioenergy - as well as sequester carbon and serve a host of other purposes (see Box 1). However, its introduction into new areas should be preceded by a risk analysis since it can be very invasive. It has been listed as a high risk species in many regions[22], and risk assessment protocols are needed for countries with little experience in addressing biological invasions. The introduction of invasive species can result in diminished livelihoods, reduced development and the loss of biodiversity.

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[21] J. Struis: *Shinda Shinda, Option for sustainable bioenergy: a Jatropha case study,* RIVM (2008).
[22] The 'Global Invasive Species Programme' lists *Jatropha Curcas* as a species already known to be invasive in Australia, South Africa, United States, Pacific Islands and Puerto Rico. Its cultivation and introduction has been abolished in some regions of Australia.

The rise of large-scale Soy production in South America has occurred at the cost of valuable forest and savannah[14], sometimes indirectly (via the displacement of agricultural or cattle-grazing land to forest margins). The fragile and extremely biodiverse Cerrado and Chaco are most at risk, and play an important role in the water-cycle and in climate-regulation. Deforestation followed by soy plantation leads to four times more water evaporation than with the original growth. Desertification is a serious threat for these areas that have long dry seasons in any case. Deforestation in South America is twice the world average, and still higher in Soy producing countries. The cultivation of Soy and many other biofuel feedstocks involves the intensive use of chemicals, leading to air and water pollution and serious health problems.

A large fraction of present (first generation) biofuels are already based on genetically modified (GM) plants. GM plant material is potentially invasive, both in terms of plants being engineered for qualities that give them competitive advantage, and in terms of contamination via gene transfer to other crops. Such issues are again of particular concern given the fragility of dryland ecosystems. In addition, the impacts of patented seeds and the dependency generated by crops that require specific inputs to grow have kept Africa (with the exception of South Africa) and some other regions relatively GM-free so far. With the advent of biofuels, biotech companies seek to change this situation. The production of second generation bioethanol from lignocellulosic plant material will most likely involve the genetic engineering of plants to reduce their lignin content and thus improve access to the cellulose needed for bioethanol. But lignin also provides the rigidity necessary for trees to stand and protects them from pest attack[23]. The leakage of these traits into natural ecosystems can have disastrous consequences. Such developments are in violation of the widely accepted precautionary principle.

Detailed Environmental Impact Assessments need to be carried out before the large-scale plantation of monocultures for biofuel in drylands - with emphasis on water depletion, land degradation, soil erosion and biodiversity loss. Water footprint assessment should be mandatory. Risk assessment of invasiveness, monitoring and contingency planning should be mandatory as well in the case of projects involving the cultivation of non-native species for biofuel feedstock.

IV. Energy Security: for whom?

Worldwide, 1.6 billion people lack access to electricity[24] and 2.4 billion people, mostly in rural areas of developing countries, lack access to modern fuels for cooking and heating. In Sub-Saharan Africa, more than 500 million[24] people live without electricity. The expansion of the electricity grid is often not affordable for poor rural communities. Electricity from renewable energy sources such as small hydro, solar and wind energy systems also has high capital costs. This leads to excessive dependence on traditional solid biomass (firewood, charcoal, agricultural residues,

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[23] R. Maynard and P. Thomas; *The next genetic revolution?* The Ecologist, March 2007.
[24] *Small-Scale Production and Use of Liquid Biofuels in Sub-Saharan Africa: Perspectives for Sustainable Development;* United Nations Department of Economic and Social Affairs; DESA/DSD/2007/2.

animal waste). In some African LDCs, traditional biomass currently accounts for 70 to 90% of the primary energy supply. Dryland populations are particularly affected since they constitute a large proportion of the world's poor and have comparatively limited access to alternative forms of biomass (firewood, agricultural residue etc.). Moreover, the unsustainable use of fuelwood accelerates deforestation and leads to soil erosion, desertification, flooding and biodiversity loss. It also has negative repercussions for human health – cooking on traditional stoves is a major source of indoor air pollution, which is responsible for more deaths of women and children than malaria and tuberculosis combined[24]. Women and children are also generally responsible for collecting wood and dung for fuel. This accounts for up to one-third of their productive time, which could be spent on education and other activities.

There is thus a huge potential for innovation in biomass use for clean cooking fuel and for generating rural electricity from biogas and biofuel. A number of NGOs in Africa, such as TaTEDO in Tanzania and the Mali-FolkeCenter are experimenting with small-scale community projects involving Multifunctional platforms[16] that use unrefined Jatropha oil for agricultural processing and electricity generation. Five countries in West Africa (Burkina Faso, Ghana, Guinea, Mali and Senegal) are part of a UNDP programme that supports such projects. Rural communities can also derive income by utilising by-products of the process for soap, fertilizer etc. (see Box 1). The benefits of such initiatives are likely to be particularly felt by women - in terms both of better health conditions and the reduction of time spent on unpaid activities.

Apart from the acute energy needs of poor countries, biomass/biofuels are more efficiently used near their source of production - transporting them over long distances creates significant extra emissions. Direct local (off-grid) use of clean biomass and biofuel is more efficient for heat or electricity generation, especially in areas without piped supplies of gas or oil. Such modes of decentralised production and consumption have the added advantage of locating the entire value chain in the local economy[16], thus maximising incomes.

Furthermore, the local use of biomass/biofuel enhances domestic energy security and protects poor countries from volatile global oil markets. Instead, many energy-deficient poor dryland countries are increasingly entering into ventures that involve large-scale biofuel feedstock production for export - while importing oil for their domestic energy needs. **Biofuel plantations are expanding at accelerating rates into the rural areas of poor dryland countries, where energy poverty is highest - but the feedstock is transported away for export. These patterns are incentivised by the targets and policies of industrialised countries, designed to guarantee their own energy security in light of soaring oil prices.** Fiscal reform is also needed in developing countries where tax structures often encourage the use of imported oil over domestically produced biomass/biofuel.

Small-scale community projects to meet local and rural bioenergy needs should be prioritised over the export of biofuel feedstock.
Investment is needed in appropriate technology and infrastructure to meet the energy needs of dryland countries.

V. Trade and Investment: Who Benefits?

Many would claim that poor producers will benefit from high commodity prices. Firstly, most dryland countries are net food importers and need to prioritise local food production to protect their economies from soaring food prices. Secondly, drylands in particular stand to suffer disproportionately from large-scale commodity production for export - given the paucity of arable land and water resources, the high degree of dependence on marginal land on the part of the poorest communities and the risks of further and irreversible land degradation.

Finally - and this aspect will be the focus of this section - global trade, investment and liberalization policies have resulted in patterns of commodity production that have been of little - or indeed negative - benefit to local producers. Industrialised countries tend to retain highly protectionist domestic agricultural and trade sectors, while compelling poor countries to open up their markets prematurely and face competition with foreign products and investment. Pressure is exerted on developing countries to liberalize via many channels: via structural adjustment plans of IFIs (International Financial Institutions: World Bank, IMF etc.), under the auspices of the WTO[25] and under bilateral and multilateral Free-Trade Agreements. Furthermore, WTO-endorsed policies like tariff escalation encourage the production of raw material in the South in order to feed Northern industries, and result in most of the value of the end-product being created in the North.

The biofuel industry has three primary sources[7] of foreign investment: agribusiness, energy/petrol companies and banks/investment funds. In general, agribusiness corporations, that already control the global production of food commodities also dominate biofuel production from food crops. Global Soy production is controlled by 'the big four', the ABCD of agribusiness: ADM, Bunge, Cargill and Dreyfus. The large-scale mechanised cultivation involved in producing Soy for export requires huge investments and offers little scope for local value addition and benefit. Tariff escalation ensures that most of the value-adding activities take place in the industrialised world. The biofuel boom brings a double bonus to these corporations: from the biofuel trade itself and from its contribution to the price hike in commodities. Though rising prices due to biofuel demand can in principle benefit small-scale farmers, concentration further up the value chain usually implies their dependence on the same large companies for both the purchase of their inputs and the sale of their harvest – thus creating a debt trap. Labour conditions on plantations also tend to be very bad, with many cases of human rights abuses reported[14]. In the case of pure energy (non-food) crops like Jatropha, investment has been dominated by energy and oil companies based in industrialised countries (see Box 2 and references therein) seeking to compensate for dwindling global oil supplies.

Moreover, both the EU and the US are currently initiating and expanding trade agreements with a host of developing countries, like the Economic Partnership Agreements (EPAs) between the EU and ACP countries[26], Free Trade Agreements

[25] For example via the NAMA (Non-agricultural Market Access) clause.
[26] African, Caribbean and Pacific countries

(FTAs) and Bilateral Investment Treaties (BITs). These new deals concern far-reaching liberalization of trade, investment, government procurement and competition law which has so far been rejected by developing countries in the WTO - and which will exacerbate the skewed nature of international trade and increase the comparative advantage and profits of companies based in industrialised countries.

Foreign Direct Investment (FDI) concerns investments by a firm in a foreign country to acquire land or other real assets with the aim of maintaining control over the management. It involves both ownership and control of the foreign entity by the company. Many developing countries are entering into BITs with industrialised countries in order to attract foreign investment – for example, the ACP countries have initiated 179 BITs with the EU. Firstly, signing a BIT is no guarantee of attracting investment - Brazil, that has not signed a single BIT, received more foreign investment in 2006 than all 48 sub-Saharan African countries combined, that had signed over 540 BITs. Secondly, though FDI initially brings in foreign capital, it also has a tendency to lead to 'decapitalisation' over time via the outflow of profit and investment income. As a result, the developing world has become a net exporter of capital to the developed world[27]. Lastly, when foreign investment does not work in public interest, governments need to step in and renegotiate contracts or regulations. However, when they do so, developing countries that have signed BITs can find themselves hauled in front of international tribunals by European or US companies. BITs enable foreign investors to enforce their rights via international arbitration tribunals[28] that are characterised by lack of transparency, unfair process and an aggressive interpretation of the treaties on the basis of commercial law rather than public interest.

The Caribbean region has concluded an EPA with provisions on investment, and other ACP countries (Africa and Pacific) have committed to negotiate similar provisions during 2008. These provisions include the opening up of the manufacturing, forestry and logging, agriculture and mining sectors. The deals specify regulations on land ownership and pose the risk that if a government wants to change the rules in the future to provide more protection for local land ownership, it will be very difficult to do so.[28] **National governments should have full flexibility to choose an investment model that can change with time to suit changing conditions.**

The trade and investment policies of industrialised countries retard the development of poor countries by discouraging their indigenous infant industries, lead to their dependence on high added value imports, and thus facilitate effective financial flows from poor to rich countries. They also incentivise the channeling of profits to large corporations and agribusiness rather than to local producers.

In order to incorporate sustainability criteria into the trade regime, a uniform classification of biofuel is needed. In any case, the WTO does not admit any social

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[27] *Why Investment Matters: The Political Economy of International Investments* by Kavaljit Singh
[28] Oxfam Briefing Paper 110; *Partnership or Power Play?* (April 2008).

criteria, like the impact on food security. The criteria developed so far are hugely inadequate: those of the EU currently include only GHG savings and biodiversity.

However, sustainability criteria and other supply-side measures are only control measures and cannot provide the long-term solution. Policies at the demand-side need to change: the biofuel blending targets and trade policies of the industrialised world. Reducing consumption, increasing energy efficiency and investing in real renewables like solar, geothermal and wind energy are the most sustainable ways of achieving energy security - and should be prioritised by rich countries.

Trading Water
International trade in biofuel feedstock causes additional virtual water flows and needs to be accompanied by water governance[29] at the global and catchment levels. To control the export of virtual water from drylands, regulation at the international level will be indispensable. 'Virtual water accounting' is a useful tool for estimating the flow of water between countries via trade as well as for tracking its social, economic and environmental consequences. These estimates need to be incorporated into decision-making. An international water regime, along the lines of the 'International Virtual Water Trading Council' proposed for addressing water distribution problems through a multilateral agreement, could also address the biofuel trade. Agreements to reduce 'water footprints' could provide incentives for countries to create water-efficient trade regimes for biofuel feedstock. Voluntary regulation of the biofuel industry by linking water-use efficiency to corporate social responsibility goals could be an effective supplementary action.

Trading Carbon
Biofuel production projects are being considered for inclusion in the Clean Development Mechanism (CDM) of the UNFCCC - offering potential for economic benefit via carbon credits for the reduction achieved in GHG emissions or for carbon sequestration. CDM projects have been controversial lately since the ambiguity in baseline estimation for ensuring additionality[30] has often lead to more emissions instead of less. Precise information and Life Cycle Analysis[1] of specific biofuel commodities should be a prerequisite for biofuel inclusion in the CDM. Precise LCA for Jatropha, for example, is extremely difficult due to the high degree of variation in reported data of fruit harvests[21]. Moreover, the authorization of CDM projects on drylands must be subject to UNCCD-determined sustainability criteria. Apart from environmental impact, the impact on local food security and livelihoods needs to play a fundamental role in the assessment of CDM projects. So far, CDM credits have mainly benefited large-scale projects in China and India. The UNFCCC should make additional funds available in order to facilitate the access of small-scale producers to CDM projects, most of all in Africa. This issue is particularly relevant for drylands

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[29] *The Development of Biofuels within the context of the Global Water Crisis;* Sustainable Development Law and Policy Nbr VII-3 (May 2007).
[30] Additionality means that the project would generate carbon credits for the GHG savings it achieves over and above what would have taken place in its absence.

where large-scale biofuel production for export can bring about long-term damage - and demands prioritisation by the UNCCD.

Special mandatory standards need to be introduced for the production of biofuels on drylands. They should be based on the analysis of long-term consequences for food security, land rights, local incomes, long-term environmental and water depletion, local energy security and effective capital flows (including virtual water) out of drylands. These standards should be defined under the auspices of the UNCCD and mainstreamed into the trade (WTO, UNCTAD) and climate change (UNFCCC) regimes. They should be developed in consultation with local communities, civil society, governments and all other stakeholders in order to maximise local benefit.

VI. Concluding Recommendations

Though the direct short-term gains in terms of revenues from the export of biofuel may be significant, they need to be balanced against the long-term consequences of large-scale export-oriented production - which can be especially severe for drylands. Long-term sustainability will require policy change at the demand-side, in the industrialised world. However, immediate measures need to be taken in dryland countries to prevent an escalation of negative impacts.

- Based on the considerations and conclusions of the above sections, Drynet calls upon the UNCCD to include a biofuel strategy within the framework of its Ten Year Strategic Plan (2008-2018) in order to address the urgent concerns voiced in this paper.
- To this end, we recommend the appointment of a special council that comprises local, regional and international civil society, networks of local producers, dryland experts and scientists, as well as representatives of dryland national governments.
- The council should monitor the expansion and impact of investment in the biofuel industry in drylands.
- The council should also advise the governments of dryland countries on the allocation of priorities regarding food production, biomass/biofuel production for local needs - and possibly for export.

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