

# New paths for biofuels in Africa

After the initial hype and subsequent condemnation, the time now seems right for a sober reappraisal of the meaning of biofuels for development policy. This rethink is especially important in Africa, as the continent has major production potential, but is also at particular risk from negative fallout.

In recent years, the popularity of biofuels has soared skywards, only to decline drastically; today, at last, sober reflection would appear possible. It can safely be assumed that future demand for biofuels will be steady and increasing, although high environmental standards will be stipulated, especially in industrialised nations. Africa has the world's largest land reserves, and it has a great need and much scope for increasing both yields and the sustainability of agricultural production on what to date are overwhelmingly small farms. Africa is therefore in a position to benefit from the expected demand for biofuels abroad, and can also develop its domestic biofuel markets, but needs to learn from past experience in order to use these opportunities wisely. The following analysis is designed to help achieve this.

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## ■ Prioritise poverty reduction and food security

The oft-cited opposition of “food versus fuel” is too simplistic. Just as African smallholders and the rural population as a whole can profit from other cash crops (cotton, coffee, cocoa, tea, cut flowers), so they can benefit from growing raw materials for biofuel production. Cash crop production and job creation in rural areas often,

but not always, bring higher income levels, which are used for food, savings, establishing alternative sources of income, for education, health and other requirements. In many cases, cash crops do not replace food crops, but are grown in addition to them.

**Choose the right crops.** From the smallholder's perspective, crops are well suited to biofuel production if they

- a) can be well integrated into their existing cultivation and labour systems,
- b) can be eaten as well as sold,
- c) do not require any major investment, ongoing expenditure or several years' wait,
- d) generate regular, guaranteed income and/or
- e) have a different risk profile from their current crops, for example in terms of different ecological properties or diversification of demand. For

*Jatropha cultivation can be profitable for smallholders when enough can be harvested and only limited extra work is involved.*



Photo: J. Boethling

### Decentralised energy supply at village level

In Garalo, the NGO Mali Folkecenter has run a generator to supply electricity to households in the village since 2006 (this is a multifunctional platform). The oil used in the generator is extracted from jatropha, traditionally used locally to make soap. Around 200 farmers have now added jatropha to their mixed cultivation systems. Until crop yields are adequate, the village generator will run on diesel for a transitional period ([www.malifolkecenter.org](http://www.malifolkecenter.org)).

instance, provided acceptable yields can be achieved, jatropha cultivation is beneficial for smallholders where it is grown in the form of hedges and small stands mixed with other crops, since cultivation – and especially harvesting, which is spread across several months – can be performed alongside other tasks and incurs little additional effort. Smallholders will generally adopt new crops which fit into their existing operations and where advice, sales and any financing are secured.

Yet it would be even more advantageous for smallholders if for example manioc cultivation, which is widespread in Africa, could be used for the production of biofuels. With several options for the usage and sale of his crop, each grower could then decide on a flexible basis how much of the crop to keep and how much to sell.

**Small farms or plantations?** Unfortunately, the flexibility of crops which can be used for both cash and food represents a major handicap for buyers, as it limits their ability to predict crop supply volumes. This is one of the key reasons why many investors in biofuel facilities in developing countries want to use their own crop production to guarantee that at least the majority of the facility's capacity is utilised – although the cultivation of fuel crops over large areas, using much outside labour, is not desirable, especially as the entire cost of investment and maintenance, and the production risks, must be borne by the investor themselves. Advantages for the investor in producing their own biofuels include guaranteed supply, economies

of scale, modern know-how, the need for extensive coordination between production, processing and sales, the perishable nature of the crops and high uniformity requirements, as well as their own ability to comply with the private standards and state regulations which make access to these markets difficult for smallholders.

Thus the question of whether biofuels are produced on smallholdings, plantations or a combination of the two depends on many factors. In most cases, a combined nucleus-outgrower facility – a combination of plantation and cultivation contracts with farmers – could be the best compromise. In

*Biofuel production would benefit small farmers if the crops they usually grow, such as manioc, were used. Depending on the price situation, they could then decide how much to sell and how much to keep for their own use.*

the end, however, establishing biofuel production in sub-Saharan Africa (SSA) is a political issue. Without political support and widespread acceptance among the local population, a large-scale biofuel project will not survive into the long term.

**Clarify key issues.** In order to achieve this support and acceptance, other key issues require clarification. These are strongly linked to biofuels' impact on poverty and food security, as well as with social balance:

- Is there sufficient backing from national and local governments and traditional elites?
- Have all important user groups been included in the planning process?
- Will there be a managed balancing of interests and a compensation process?
- What production capacity is available in the region, how will food production and availability change, and which effects must be countered?



- Who will any new jobs be for, will local households have priority and is sufficient account being taken of them? Are working conditions fair?
- Can those sectors of society not benefiting directly from biofuel production see any other advantages (improved material and social infrastructure and services such as hospitals, schools, roads, goods available etc.)?
- Are there social security systems which could cushion any negative impacts of biofuels, for example local food price rises?

In the case of especially disadvantaged groups such as nomads, landless women or downstream water users, representation of their interests and the balancing of different interests must receive third party support. This support could come from government, NGOs or donors. Investors should find it in their own interest to garner broad support throughout society for their projects, which will then be better equipped to weather political storms.



Photo: Iatf

### ■ Ensuring ecological sustainability

There are several aspects to the ecological sustainability of growing raw materials for biofuel production: soil, water, climate, biodiversity and invasiveness. Individual impacts depend on multiple factors, such as the choice of crops and/or harvest residues, smallholding or large-scale farm management, direct and indirect changes in land use (see Box), the state of the available land and its biodiversity, water use and pollution, process technology, etc. The following general rules are important:

- Alongside land, water is a key environmental resource in sub-Saharan Africa (SSA), and is under additional strain due to climate change. Major investors in particular have the capacity to organise water storage and irrigation on a large scale. Large irrigation reserves remain in SSA, but their availability must be researched in fine detail at local level.
- At least in industrialised countries, we now pay more precise attention to the actual carbon footprint/ climate balance sheet before we accept a particular type of biofuel and specific production process as worthy of support or inclusion in quotas. The necessary processes and data must be standardised. The inclusion of indirect changes in land use is still a controversial question.
- The impact of biofuel production on biodiversity depends mainly on whether the production is large or small scale and which land is used. Large areas of production could potentially cause the greatest direct damage.
- In future, genetically modified organisms in biofuel production could become more popular. The inhibition thresholds here are lower than for food crops, and the breed-

### Indirect land-use change

Direct land-use change occurs where land not previously used for agriculture is transformed into arable land for energy crop cultivation. Indirect land-use change is where production of food and feedstuffs is displaced by energy crops, and must therefore shift to land not previously used for agriculture. See also:

[http://bdbe.de/downloads/PDF/fachinformationen/ifeu-Studie\\_ILUC/IFEU\\_ILUC\\_english.pdf](http://bdbe.de/downloads/PDF/fachinformationen/ifeu-Studie_ILUC/IFEU_ILUC_english.pdf)

ing advantages are especially clear for perennial crops. National regulation systems must be prepared for this eventuality.

Trusting merely to environmental impact assessments of individual projects is not an appropriate response to the risk aspect, especially for large projects and totally new processes and crops. In addition to the early identification of risks, forward-looking research work should provide worthwhile information to investors, farmers and authorities alike on environmental impacts.

### ■ Private enterprise is crucial

Production on a grand scale can scarcely be envisaged without massive investment by the private sector. Private sector support can take very different forms, although the particular local circumstances in SSA must be taken into account, given that most countries are very poor.

Direct support for biofuel production via subsidies, tax relief or prescribed blending quotas usually founders due to the lack of available funding, and is normally reserved for newly industrialised countries. In poorer countries, subsidies and tax relief place too great a strain on the public purse and ultimately the (predominantly poor) tax payer. Blending quotas over-

### Commercial biofuel production on a contract farming basis

In Arusha, Tanzania the private firm Diligent Tanzania Ltd has run a facility processing plant oil since 2005; this includes a biodiesel unit based on jatropha. There are now around 1,500 contract growers in the region who harvest jatropha seeds from pre-existing or newly planted bushes in hedges or mixed cultivation systems. This close trading relationship with farmers has proved key to building up trust in the working relationship. In less than four years, around 35,000 litres of jatropha oil have been produced on this basis. Most of the oil is currently bought by international fuel consumers (including Boeing and Air New Zealand). Diligent expects to reach its breakeven point in the next few years ([www.diligent-tanzania.com](http://www.diligent-tanzania.com)).

burden the (also often poor) consumer with the cost of transport services or price rises for products.

Support should therefore take the form of a reduction in subsidies for fossil fuels, or targeted assistance for research and consultancy, investment and especially the creation of conditions conducive to investment. This should include preventing overregulation. Targeted support for pilot plants can have major multiplier effects.

#### ■ The state must regulate and coordinate

Because biofuels are a niche product requiring much cross-sectoral regulation and coordination, pro-active state support is indispensable. Even large investors

cannot fulfil all the requirements under their own steam, and in many areas – especially the environment – biofuels have a bearing on public goods.

The state's role in coordination is particularly crucial, for instance in establishing standards for the technical quality aspects of biofuels, checking environmental impact, creating transparent negotiation processes between the various interest groups and presiding over the negotiations, supporting weaker parties and impacted groups, as well as (helping with) monitoring partners' commitments and impacts. Biofuels policy encompasses important additional measures, including improving local food markets and creating social security networks. Regional economic organisations must ensure such rules are harmonised, as in most

individual African countries markets are too small, and there is insufficient capacity for research and quality testing laboratories. There is also a need for international coordination, for example of transboundary water basins and standards for ethanol and engines. The most advanced country in this respect is South Africa, which could therefore act as an anchor country, at least across southern Africa.

Biofuels urgently require the harmonisation of climate, energy, agricultural, trade and development policy. African countries and regions could achieve this best in the context of economic partnership agreements and the EU-African Union partnership. After all, this is a geostrategic area in which cooperation with third countries is important and worthwhile – especially cooperation with Brazil, the world's biofuel production champion. Such cooperation could help avoid fresh conflict in international trade policy.

*This article is a summary of the key findings from the expert meeting 'Biofuels for Development? Lessons learnt and current trends in sub-Saharan Africa' run by DIE, GTZ and InWEnt in Bonn, Germany in late 2009.*

### Zusammenfassung

Die Chancen, dass sich die Produktion von Biokraftstoffen in Subsahara-Afrika sinnvoll für die Entwicklung des ländlichen Raumes nutzen lässt, sind groß. Allerdings gibt es auch etliche Risiken zu meistern. Sehr viel hängt von lokalen Standortgegebenheiten und der Ausgestaltung von Wertschöpfungsketten ab. Am ehesten scheinen Nucleus-Outgrower-Organisationsformen geeignet, die Vor- und Nachteile von Kleinbauern und Großproduzenten in Einklang zu bringen. Insgesamt müssen die regulatorischen, Forschungs- und Beratungskapazitäten der Länder und regionalen Wirtschaftsgemeinschaften gestärkt werden. Aber auch eine angemessene Unterstützung der privaten Akteure und der betroffenen gesellschaftlichen Gruppen, insbesondere der schwächsten Akteure, ist nötig, damit sich das Potenzial der

Biokraftstoff-Produktion für die Entwicklung des ländlichen Raumes nutzen lässt. Die notwendigen Anreize und Mittel sind im Energiebereich möglicherweise leichter zu generieren als in anderen Sektoren: über die Besteuerung fossiler Energien, Exportabgaben und die Reduzierung von Ausgaben für die Einfuhr von Energieträgern wie Erdöl.

### Resumen

Son grandes las posibilidades de que la producción de biocombustibles en el África subsahariana pueda aprovecharse convenientemente para el desarrollo del espacio rural. Sin embargo, existen también muchos riesgos a superar. Mucho depende de las circunstancias reinantes a nivel local y de la estructuración de las cadenas de valor. Las más apropiadas parecen ser las formas organizacionales del

tipo 'productor núcleo – productores por contrato', que logran conciliar las ventajas y desventajas de pequeños agricultores y grandes productores. En general, hace falta fortalecer las capacidades regulatorias, de investigación y de asesoramiento de los países y de las comunidades económicas regionales. No obstante, también es indispensable proporcionar un apoyo adecuado a los actores privados y los grupos sociales afectados, en especial los actores más débiles, para que el potencial de la producción de biocombustibles pueda utilizarse a favor del desarrollo rural. Los incentivos y recursos necesarios son relativamente más fáciles de generar en el sector energético que en otros sectores: a través de la carga impositiva sobre las energías fósiles, derechos de exportación y la reducción de gastos para la importación de fuentes de energía como el petróleo.