Briefing 86

Biofuels and local food security

What does the evidence say?

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Key messages

- People worry that using crop-based biofuels to increase the volume of low-carbon fuels could worsen hunger in poor countries by pushing up global food prices and endangering local food security.
- ODI research finds that existing evidence does not allow us to state categorically that biofuels projects in developing countries worsen local food security.
- Existing studies suggest that the impact of biofuels on food security may not differ markedly from that of other agro-industrial crops. Other factors may be more important than the crop itself in avoiding negative outcomes: the way that land is made available for projects; the project design and the models of production used; the use of existing safeguards and best practice in project design and land acquisition.

As EU governments debate how to increase the volume of low-carbon fuels in the energy mix, they must ensure that adding more biofuels does not worsen hunger in poor countries. Last September, the European Parliament voted to cap the proportion of crop-based biofuels to meet renewable energy targets at 6% of fuel in transport by 2020, down from a target of 10%. But the European Council blocked the proposal and decisions on the future of EU biofuels policy are on hold, pending agreement on whether more caution is justified by evidence of negative impacts, including on food security. While modelling research indicates that rising demand for biofuels can increase global food prices (HLPE, 2013) available evidence does not provide a robust basis for a strong statement about the impact of biofuel projects on local food security in developing countries.

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This ODI Briefing is based on two longer reports: 'Scoping report on biofuels projects in five developing countries', Anna Locke and Giles Henley, May 2013 (www.odi.org.uk/biofuels-land-agriculture); and 'A review of the literature on biofuels and food security at a local level: assessing the state of evidence', Anna Locke and Giles Henley, January 2014 (www.odi.org.uk/biofuels-lit-review).

Background

Over the past five years, there have been growing concerns that food production and food security will be undermined by crop-based biofuel production, with some arguing that land, labour, water or other factors of production will be switched to biofuel production or that existing volumes of food crops will be switched from food to biofuel markets.

Others, however, argue that increased demand for sustainable biofuels will encourage investment in agricultural production and that there could be synergies between biofuel and food production by bringing investment into relatively undeveloped areas with poor access to input and output markets.

Evidence for both of these arguments is mixed and inconsistent. At the time of our analysis in early 2013, published data suggested that anywhere between 7.2 million hectares (GRAIN, 2013) and 18.8 million hectares (Anseeuw et al., 2012) had been allocated to biofuels projects in Africa alone. Although some of the variation in figures can be explained by differences in the time period covered and the stringency of the inclusion criteria, the large discrepancy in numbers published on areas allocated to biofuels makes it difficult to make strong statements about the impact of biofuels on land use.

In addition, most of the analysis published to date focuses on the impact of biofuels policies in developed countries on global food prices. Where research examines the impacts of biofuels production on food security in the developing countries targeted by projects, this is more commonly done through modelling, with no triangulation of the modelling outputs with findings on the ground.

A further challenge is that few studies apply a consistent methodology to define and measure food security in their analysis.

Recent reports by ODI researchers (Locke and Henley, 2013; Locke and Henley, 2014) seek to address gaps in the evidence by assessing the status of biofuel projects in developing countries and reviewing evidence on the impacts of biofuel production on local food security.

Research questions

To understand the scale of impacts, we focused on three questions.

- How much land has been acquired officially in key developing countries for biofuels and how much of that land is being cultivated for biofuel feedstocks, according to original project plans?
- What evidence is available on the impacts of biofuel projects on the food security of nearby communities?
- Do these impacts differ according to the investment models followed by the projects and do the impacts of biofuel projects differ markedly from other commercial agricultural investment?

To answer these questions, we gathered data from four countries in Africa (Ethiopia, Mozambique, Tanzania and Zambia) and one in Southeast Asia (Indonesia) that are often referred to as important destinations for biofuel projects. We looked at how much land has been allocated officially to biofuels projects in these five countries and how the area of land earmarked for biofuels projects compares to land actually under cultivation of biofuels feedstocks.

To explore how biofuel production affects local food security, we reviewed primary research in journals and grey literature on food security and biofuels projects in developing countries, drawing on longer-term research on sugarcane and oil palm. We looked at two main models of biofuel feedstock production: small-scale outgrowers linked to nucleus estates that produce the same feedstock or that supply commercial processing plants, and large-scale, commercial plantations.

We used the conceptual framework for food security first agreed by the 1996 World Food Summit, and developed further by the 2009 World Summit on Food Security, which describes the four pillars of food security as *availability, access, utilisation*, and *stability*, and highlights the centrality of nutrition in the concept of food security. Further discussions have emphasised the role of the health environment on food security, and this is also reflected in our analytical framework for food security.

Key findings

The area of land under biofuels projects at national level is smaller than global data from recent years indicate. While the number of new biofuel projects that were announced grew rapidly between 2005 and 2008, few of these materialised, and of those that did, many failed. In-country investigations at the end of 2012 suggest that less land had been allocated to biofuels projects in three of the four countries (Zambia was the exception) than suggested by the published databases. Of this land, only a tiny proportion has actually been cultivated (Figure 1): the global financial crisis and the poor economic viability of projects prevented many projects from taking off and surviving.

However, the scope of our study does not allow us to know what proportion of land allocated was previously planted to food crops or used for foraging, nor what has happened to land that was allocated but has not been cultivated.

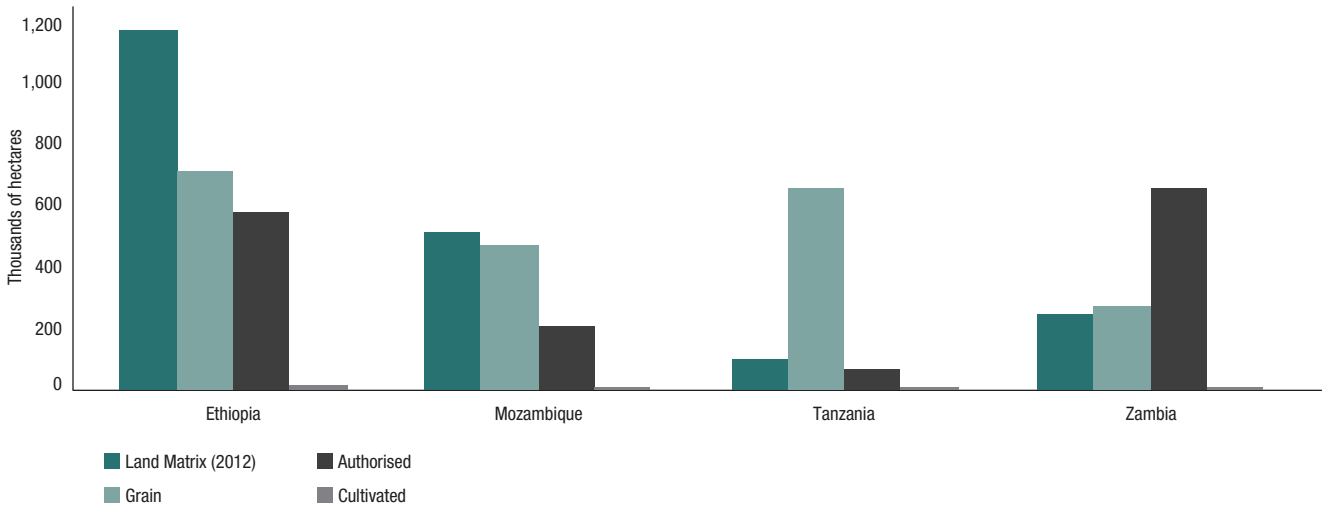
The big picture is less clear on whether or not biofuel projects have led to changes in food security of nearby households, on balance, and on the distribution of those impacts. This is, in part, because different studies focus on different areas in terms of geography, crop and target population. In addition, studies define food security in different ways. Few studies use or attempt to measure the balance of all four pillars of availability, access, utilisation and stability of food. The studies reviewed also evaluate benefits and losses at different points of a project's lifetime, some looking only at the establishment phase, others analysing impacts of projects far beyond the establishment phase without factoring in initial results. **But there are some important common findings.**

The impact of biofuels feedstocks on food security may be similar to that of other commercial crops. It is not necessarily the fact that it is a biofuel feedstock that matters. What seems to matter is the production model used; the timing of impact measurement; the profitability of production; and the terms and conditions under which entitlements to land, wages and prices are defined and productivity is raised.

But biofuels do have some specific characteristics that can make their initial impacts more marked and unpredictable. These are linked to the high level and pace of interest in producing biofuels feedstocks, and the initial emphasis on the use of an untested and unproven crop, such as jatropha.

The models of production and the timing of impact assessments matter. The effects on food security of feedstock

Figure 1: Areas of biofuel crops published, authorised and cultivated in four African countries



Note: Timeframes for datasets are different. Land Matrix data ran to 2011, GRAIN data to 2013. Information for authorised and cultivated categories was collected at the end of 2012. Revised data published by the Land Matrix in 2014 reduced the area under biofuel deals in Mozambique and Ethiopia, and raised this in Zambia and Tanzania. As far as we know, the area under cultivation has not changed since the end of 2012. Source: ODI (2013).

production or longer-standing sugarcane and oil palm production under outgrower schemes have been broadly positive. An important caveat is that not all groups benefit equally, and some may lose out. One example of this is Indonesia, where experiences from small-grower schemes suggest that where project development involves transferring rights and reallocating land within communities, disadvantaged groups of people gain less or lose out to the better-off. For some of the outgrower schemes reviewed, however, the impact of biofuel projects – whether positive or negative – was negligible: farmers dedicated a small portion of their land to growing biofuels, and often opened up new land for production rather than diverting land away from food production.

Studies indicated that large-scale plantations present a high risk to the food security of local communities during the establishment phase, as their access to land for foraging and food production is often reduced. Low project profitability during this phase may mean that projects have to defer promised compensation to a later date, resulting in local communities losing out.

Over time, however, the limited number of studies available on plantations suggested that projects improve the livelihoods of their employees. Again, however, these benefits are not shared by all of those people affected by the project, and some households invariably lose out. For example, indigenous people in Indonesia who once occupied land that was later planted to oil palm were less likely to be employed than immigrants from other islands.

Contractual terms in the models are important. Companies relying on outgrowers are often the only buyers that outgrowers can sell to and therefore have strong market power. How much they charge for services and pay for outgrower production is very likely to determine how much outgrowers benefit from the relationship.

Contractual terms may also determine the other crops that outgrowers can produce and whether they can combine food and biofuel crop production on the same land. In Indonesia, a company's original restrictions on intercropping food crops with young stands of oil palm had a negative impact on farmers' food availability (production) and access, as the immature palm stands did not generate enough income to buy in food.

Much depends on having a profitable business. For sugarcane and oil palm – the only cases where we have enough evidence to gauge what has happened over time – the results are often positive for outgrowers and estate workers because of the high returns to cane for sugar production and oil palm, particularly when compared to a crop such as jatropha, which has been unprofitable. Whether these higher incomes are transformed into higher levels of food consumption and better nutrition is, however, less clear-cut.

An uncertain market environment for biofuels could undermine profitability and have a knock-on effect on local food security. However, creating a stable and profitable market for biofuels does not reduce the risks of negative impacts on food security if projects are designed and implemented without taking into account the welfare of affected communities.

The way land is made available for projects is crucial. The ability of farmers to open up new land in the biofuel outgrower schemes we studied depended on additional land being available for cultivation. Where this was possible for outgrowers, they were able to cultivate new land and supply the nucleus estate without necessarily transferring land out of other uses. Companies sometimes played a part by providing equipment to prepare land that would not otherwise have been cultivated. However, the distribution of impacts can be very uneven: other villages in the project area with less surplus land suffered because they could not meet both the company's needs for feedstock and their own needs for food.

In the literature on plantations, with the exception of one project in Ghana, research indicated that at least some proportion of local communities experienced decreases in their food production as a result of biofuels projects, usually through the loss of land for agriculture production or foraging. These

impacts resulted largely from poorly implemented transfers of land and the lack of negotiations with local communities, with companies providing little or no compensation in the form of alternative land, employment or payments for community members to sustain their livelihoods.

Women are more vulnerable to the negative impacts on food security. Women were identified as the most common losers because they did not gain from employment and they lost their existing food and income sources from foraging and home-gardening activities when these were transferred to plantations.

Policy implications

'Biofuel projects' is a poor category of analysis for the prediction of food security outcomes. Spurred by attractive market conditions, biofuel projects have attracted levels of investor interest that appear unwarranted, given the high rate of project failure. But this aside, our analysis does not suggest that biofuel projects merit special status in terms of their impact on local food security.

Instead, a stronger focus is needed on individual project design and safeguards. If projects transfer control of land out of the hands of local communities, they need to follow best practices in consultation and in gaining consent, ensuring that compensation payments do not undervalue important resources and that measures are in place to safeguard communities' access to food and incomes. Useful points of reference include the FAO's *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security* (VGGTs) (FAO, 2012) and guidance provided by the Roundtable on Sustainable Biomaterials and the FAO's BEFS project (see FAO, undated).

In outgrower schemes, it **makes sense** to a**llow farmers to intercrop cash crops with food crops, and to use the inputs supplied for the cash crops for other crops or to deliberately supply these inputs for other crops on credit.**

Ensuring that women do not lose access to the resources they depend on is particularly important for all projects, where, for example, land is used that women might have used for a food crop or a home garden.

Overall, more and better quality evidence is needed to assess the impact of biofuel investment projects on food security and to determine whether there is a case for changing biofuels regulations. The starting point would be to use a more comprehensive and consistent analytical framework to assess the balance and distribution of different impacts on food security, with more use of counterfactuals and the selection of control groups or comparison points. While case studies are useful in gathering a more detailed analysis of impacts, more data from baseline surveys and longitudinal studies would provide better information on before-and-after impacts of biofuels projects, as well as allowing for the analysis of different impacts that emerge over time and across target populations.

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