Overseas Development Institute

Briefing Paper 48

March 2009

Biofuels: Could the South benefit?

The risks linked to Northern targets for biofuels should not overshadow Southern opportunities

Key points

- The production of biofuels to meet Northern targets will mean small increases in poverty and in prices for some food staples
- There are opportunities for domestic biofuels industries in the South exist that could create new jobs in rural areas
- Socio-environmental standards should be promoted to protect the rights of the poor to land and freedom from exploitation

Overseas Development Institute

ODI is the UK's leading independent think tank on international development and humanitarian issues.

ODI Briefing Papers present information, analysis and key policy recommendations on important development and humanitarian topics.

This and other ODI Briefing Papers are available from www.odi.org.uk

In recent years, biofuels have been hailed as a way to cut greenhouse gases (GHGs), reduce dependence on fossil fuels, and help farmers expand their markets. This, plus the desire to become more energy secure and less dependent on imports, led most OECD countries and some developing countries to promote biofuels, setting targets for production and offering tax breaks and subsidies to producers. Today, however, these policies are being questioned. Biofuels, some argue, will have little impact on GHGs and, by using arable land for their production, will increase food prices, as well as poverty and hunger. The 2007/08 food price crisis has been described as a by-product of the increased demand on food markets as a result of biofuel promotion policies. Since late 2007, many have argued that there is a link between biofuel expansion and rising food prices, affecting access to food for poor households.

Is this true? And if so, how can the negative impacts of biofuel production be reduced, while preserving the positives?

This briefing paper synthesises recent debates, focusing on socio-economic factors. To what extent were biofuels to blame for the food price spike? What opportunities do biofuels offer for the poorest farmers in the developing world? What are their socio-environmental risks? The paper concludes with policy recommendations to reduce the risk and maximise the opportunities for developing countries.

Powered by vegetable oil, this US bus promotes sustainability. But are biofuels the answer?

Impacts of biofuels on food prices and poverty

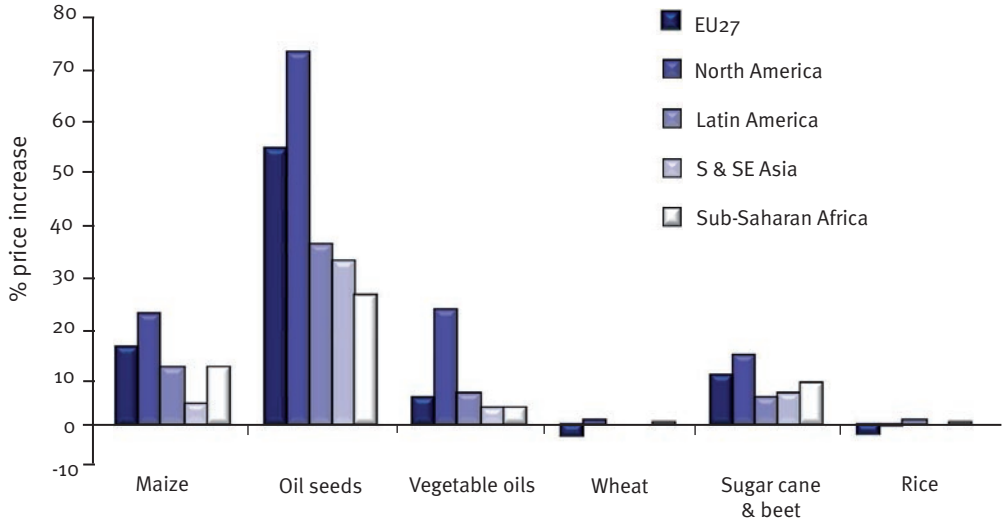
The recent food price rise has been blamed on: progressive food stock depletion since the end of the 1990s; growing consumption of grains in Asia; demand for biofuels; oil prices; exchange rates; and speculation on food markets. While each played some role, increased demand for biofuels has been highlighted, especially in relation to the prices of maize, oilseeds such as rape and, to a lesser extent, sugar.

There is a consensus that a significant share of the price rises related to the growth of biofuel production (39% for maize, around 20% for rice and wheat, according to one of the most rigorous studies (IFPRI, 2008). But looking ahead, what would be the impact on food prices in the medium term if biofuel production were to expand to meet the targets set in the European Union and the USA? The EU target is to replace 10% of transport fuels with biofuels by 2020, while the US is aiming for around 15%.

A Computable General Equilibrium model captures important interactions within economies. Using this to simulate the effects of increasing biofuel production to meet the targets shows:

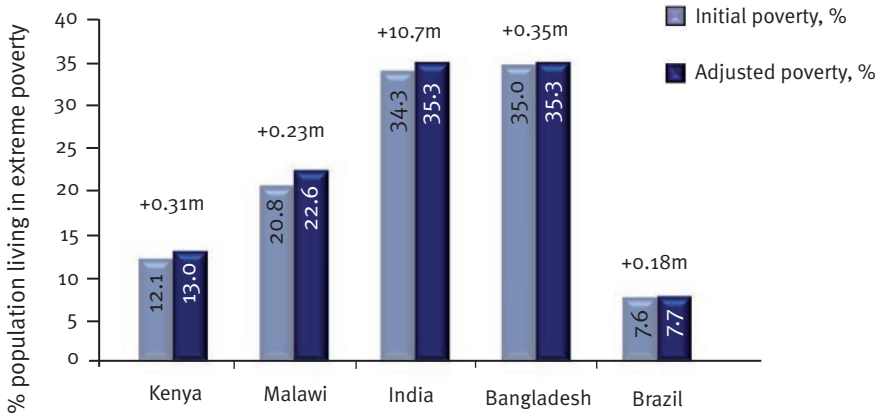
- Increased biofuel production would keep pushing up the prices of some major staple

Figure 1: Price changes resulting from a 10% substitution of fossil fuel for transport by biofuel in the EU and North America (against 2001 prices)



These figures use a Computable General Equilibrium (CGE) Model which allows for a vast range of adjustments of demand and supply for each product. While any type of biofuel could be used as a substitute for fossil fuels, according to the market conditions, the large increase in the price of oil seeds shown in Figure 1 reflect their relative importance as biofuel feedstock. The major factors in the regional price variations are: transport costs, border and customs measures, and market imperfections.

Figure 2: Impact of projected price rises on poverty in selected countries



The estimations of price rises in Figure 2 are based on the predictions of the CGE results presented in Figure 1, as well as the PovCal methodology of the World Bank and FAO data on household level food budgets. With a 2% poverty increase, Malawi, where both rural and urban poor are net food buyers, would be the most affected in this group of five countries.

Source: Wiggins et al. (2008).

foods, but not to a large extent. Freezing or cutting production would tend to reduce prices. If production were frozen at 2007 levels, for example, the price of wheat and sugar would fall by around 4% and the price of maize by around 14% by 2015. The future impact of biofuel production is largely restricted to the prices of maize and oilseeds and to a lesser extent to sugar (Figure 1). Effects on the prices of other key staples, such as rice and wheat, or products such as vegetable oil, are expected to be minor.

- An expansion of biofuels should help to stabilise oil prices. This would cut future foreign exchange expenditure for net oil importers, including many developing countries. Despite that potential gain, countries with low incomes and food deficits would see a loss of up to 1% of GDP growth as a result of the food price rise.
- Biofuel-led food price rises would have negative but relatively limited impacts on poverty in developing countries (Figure 2).

Contrasting with earlier causal analysis of the food price rise (Mitchell, 2008), the General Equilibrium Model estimates predict the future expansion of biofuels production and use will have a limited – although harmful – impact on poverty and the economies of some poor countries, with some people more affected than others, such as the urban poor and those in rural areas who buy much of their food.

However, the small scale of the impact means that compensatory policies are feasible. Exploring the economics of future feedstock markets and the potential socio-environmental consequence of further biofuel expansion can help to shape policy recommendations to limit the impact on the poorest and allow farmers in the South to benefit from the potential opportunities.

Opportunities for poor southern farmers

A gross margin analysis for selected feedstock and different production systems shows that the oppor-

tunities are highly significant. Assuming oil prices at $65 a barrel, small farmers producing sugar cane or palm oil for biofuel can earn between $7 and $16 per day (Figure 3). Under these assumptions, the potential returns for producing sugar cane or palm oil production for biofuels outstrip anything that their traditional markets can offer (rarely more than $5 a day for a smallholder). However, the expansion of palm oil production, in particular, is a cause for concern, as this expansion is often at the expense of rainforest and, therefore, biodiversity.

Growing feedstock for biofuels can offer profitable economic returns to poor southern producers. The question is how to transform this natural comparative advantage into real economic gains? Approaches such as outgrower schemes might sometimes be effective to transform such opportunities into pro-poor benefits.

Energy for the South?

Biofuels present major opportunities for southern markets, but they need development. They could, for example, help many developing countries save on oil imports. As many as 36 developing countries could meet all their current transport oil needs by using no more than 10% of their unused land for biofuel production. Many of these are among the Least Developed Countries (LDCs).

Biofuels could also be used to generate electricity. There is, as yet, no large-scale demonstration of cost-effectiveness, but the potential for local generation merits serious consideration.

Ensuring that the poor benefit requires a national or regional biofuel system. This means large-scale investments in processing, collection and distribution networks, as well as adaptations to vehicles. Governments need to establish a consistent and coherent policy, and standards and regulation frameworks that allow investors to commit long-term funding.

Access to Northern markets – the trade barriers

Southern farmers wishing to export crops to the north for biofuels may find their path blocked by protectionist barriers. The EU, for example, imposes a tariff that, in early 2007, was the equivalent of a 52% charge to imported ethanol, while the US tariff was equivalent to 28%. These are strong deterrents to exports from the world's most efficient ethanol producer: Brazil, which produces ethanol at the lowest cost per ton. The consequence is limited trade: in 2007, only around 8% of ethanol and 12% of biodiesel were traded.

It is difficult to justify high Northern tariffs on imports, when biofuels produced in the south are more competitive and more effective when it comes to reducing GHG emissions (e.g. box 1). While LDCs are exempt from these tariffs, particularly through the

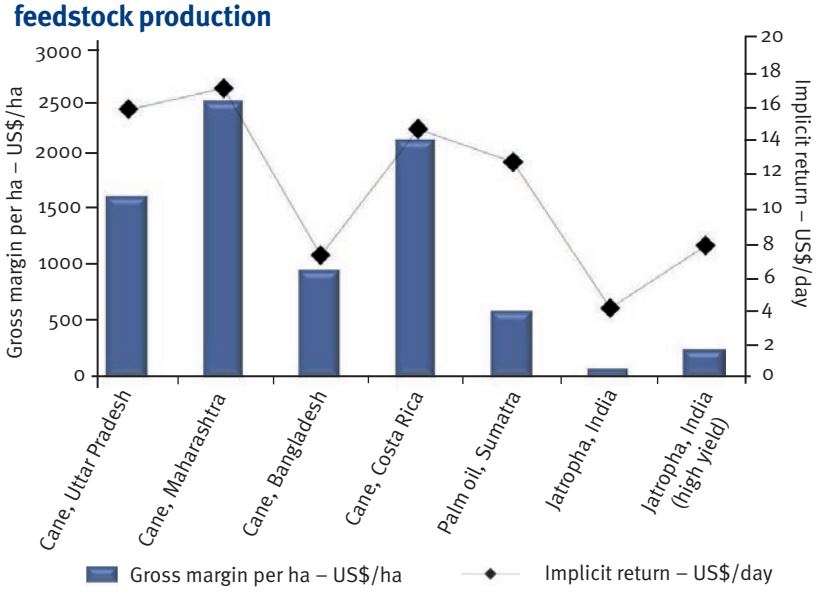
Box 1: Are biofuels actually green?

The amount of greenhouse gases (GHG) saved varies from one biofuel chain to another and according to the type of land converted to biofuel production.

Fuel chain	Assumed country of origin	GHG saving* compared to fossil fuels	Carbon payback (years)**	
			Grassland	Forest
Palm to bio diesel	Malaysia	46%	0-11	18-38
Soya to bio diesel	USA	33%	14-96	179-481
Sugarcane to bio ethanol	Brazil	71%	3-10	15-39
Wheat to bio ethanol	UK	28%	20-34	80-140

*Compared to fossil fuels, excluding the impact of land-use change. Fuel chains from tropical production are often more effective in reducing GHGs, especially if grass lands are converted. The production of crops such as palm oil often results in forest clearance.Sugar cane is rarely grown on forest fringes and its expansion is less likely to contribute directly to deforestation.
** Years of feedstock production for biofuels so that GHG emissions due to associated land use change can be paid back through biofuels rather than fossil fuel use.
Source: Gallagher Review of indirect effects of biofuels production (2008).

Figure 3: Gross margin and marginal returns in biofuel feedstock production



Source, Wiggins et al. (2008). Estimates are based on oil prices of $65 per barrel, with feedstock farm gate prices calculated accordingly. Implicit returns are estimated as gross margin per working day.

Box 2: Supporting domestic biofuels in the South

There is considerable potential and opportunity for development of biofuels in some developing countries. To stimulate this, donors should:

- Support governments in formulating biofuel policy, including setting standards and regulations to guide the industry.
- Support pilot projects to develop local energy systems based on biofuels.
- Fund and support the interchange of experiences across the South.
- Encourage joint ventures between biofuel importers in the EU and potential exporters in the developing world — provided that they meet set standards and codes of behaviour.
- Fund research into second and third generation technology, looking for technologies appropriate to remote rural areas

Anything But Arms initiative in the EU, exporting other products is often a better option for LDCs.

Brazil can produce ethanol at low cost, with – under available estimates – lower GHG emissions than temperate biofuels. Other developing countries may have similar potential. Why not extend tariff free or low tariff access to those countries? When the argument is based on socio-environmental considerations, related criteria could be incorporated into trading arrangements with developing countries. When barriers are more political, the mobilisation of public opinion should help to balance lobby interests with sustainable and equitable development imperatives.

Protecting the poor

Will biofuel production in the developing world lead the poor to lose access to land and increase inequalities? There are risks, although the evidence is limited. Sadly, these issues are not specific to biofuels. In societies with high inequality, with few guaranteed rights for the underprivileged, abuses occur, especially when new opportunities arise.

There are similar concerns over labour conditions. Although this is not specific to production for biofuel, there are allegations that workers in plantations of sugar cane or oil palm receive inadequate wages for seasonal and insecure jobs. These problems are exacerbated by a combination of labour markets where many seek the few jobs on offer, plus a lack of political will to implement labour codes. Biofuel development could cause unprotected farmers to lose their land and expose them to the risk of exploitation. The challenge is to find ways to prevent abuses and strengthen the rights and protect the land of the poor and vulnerable.

Governments, civil society and responsible private enterprises can work together to enforce codes and standards that complement policies on land, labour and the environment. Decentralised roundtables have demonstrated their ability to bring together key stakeholders in the industry, including producers, foster local solutions, and strengthen ownership by key players. Producers responsible for around 40% of palm oil production are, for example, reported to be engaged in the Roundtable for Sustainable Palm Oil, even though this is only a few years old. Roundtables have the potential to change perceptions and establish the implementation of good practice in the sector as a whole, rather than just in 'certified' production.

Will technology change the picture?

Second generation biofuel technologies are being developed that would, potentially, make it possible to produce biofuels from such materials as wood, crop residues, grass and even algae. They may have far more potential in terms of energy production than current technologies and, above all, would not have a direct impact on food markets. It will take time, however, before these technologies become viable commercially, with most experts predicting no major production within the next 10 to 15 years.

Policy recommendations

Further biofuel expansion in the North will mean a small increase in global food prices and poverty. On these grounds alone, there is reason to reduce the targets in OECD countries. If, on the other hand, current levels are maintained, targeted social protection policies should compensate the poorest for the negative impacts.

This review confirms that biofuels do present opportunities to create jobs and boost rural incomes in the South. Aid and trade policies should be adapted to stimulate these opportunities and protect the environment for poor farmers and rural workers. It is recommended that:

- Northern countries should reduce barriers to biofuel imports, regardless of the country of origin.
- Donors should support the development of Southern biofuel industries though funding for a comprehensive range of institutional, commercial and technical developments (Box 2).
- The implementation of socio-environmental standards across the sector should be promoted though inclusive processes, such as decentralised roundtables, to ensure the ownership of key stakeholders.

Written by Henri Leturque, ODI Research Officer (h.leturque@odi.org.uk) and Steve Wiggins, ODI Research Fellow (s.wiggins@odi.org.uk).

References

Ivanic, M. and Martin, W., 2008, 'Implications of higher global food prices for poverty in low-income countries', Policy Research Working Paper, World Bank.

Mitchell, Donald, 2008, 'A Note on Rising Food Prices', Policy Research Working Paper 4682, Development Prospects Group, World Bank.

Rosegrant, Mark W., 2008, Biofuels and Grain Prices: Impacts and Policy Responses, Testimony for the U.S. Senate Committee on Homeland Security and Governmental Affairs, May 7, 2008

Renewable Fuel Agency, 2008, The Gallagher Review of the indirect effects of biofuels production.

Wiggins, Steve, Enrica Fioretti, Jodie Keane, Yasmeen Khwaja, Scott McDonald, Stephanie Levy & C S Srinivasan, 2008, Review of the indirect effects of biofuels: Economic benefits and food insecurity, Report to the Renewable Fuels Agency.

Photo credit: flickr/Dave Neubert (www.davidneubert.com)

odi

Overseas Development Institute

111 Westminster Bridge Road, London SE1 7JD

Tel: +44 (0)20 7922 0300

Fax: +44 (0)20 7922 0399

Email: publications@odi.org.uk

ISSN 0140-8682

Printed on recycled paper, using vegetable-based inks