

Adjusting Biofuel Policies to Meet Social and Rural Development Needs: Analysing the Experiences of Brazil, India and Indonesia

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This brief examines the social dimensions of the rapid expansion of biofuels as a key element of 'green economies' in the making. It compares three different contexts (Brazil, India and Indonesia) in the developing world, where biofuels have been often promoted under the arguments of poverty alleviation, social inclusion and rural development. The assessment reveals a general mismatch between the social discourse and the biofuel policy instruments adopted. Benefits to poor people in rural areas have been very limited, and far too often they have been left worse off after being incorporated in biofuel production chains under disadvantageous conditions. Better outcomes depend crucially on: (i) building on traditional livelihoods, rather than attempting to replace them; (ii) involving social movements in policy- and decision-making to ensure due consideration of the needs and interests of poor people in rural areas; and (iii) inserting provisions that allow smallholders to climb up the value chain, thus addressing the inequality structures that keep poor people poor.

I. Introduction: Asking Social Questions about the 'Green Economy' of Biofuels

Biofuels have emerged in recent years to become one of the most topical and controversial items on the sustainable development and 'green economy' agendas. On the one hand, biofuels can help reduce reliance on fossil fuels and thus greenhouse gas emissions that lead to climate change, improve energy security and promote rural development. On the other hand, their rapid uncontrolled expansion has brought their environmental benefits into question and raised many socio-economic concerns related to large-scale land acquisitions, smallholder displacement and food security. Global production increased six-fold from 18 billion litres to more than 107 billion litres between 2000 and 2011, and it continues to rise (REN21, 2012).

This *Policy Research Brief* investigates the social dimensions of biofuel policies, comparing the cases of Brazil, India and Indonesia to understand how they have affected rural development.

II. Social Dimensions of Biofuel Policy and Production

Brazil

Brazil's experience with biofuel policies and commercial production dates back to the 1930s, when the first fuel ethanol blending mandates¹ were put in place. About 95 per cent of Brazil's biofuel production consists of sugarcane-ethanol, which comes primarily from large estates (Goldemberg et al., 2008). Smallholders participate little in this sector. Some at the frontiers may replace mixed farming for sugarcane cultivation to become suppliers to the industry, but a large number sell their lands and move to a city, resulting in greater consolidation of land ownership.² Hundreds of thousands of jobs are created, but these are mostly seasonal migrants³ employed on manual sugarcane harvesting, working under rather degrading, health-damaging and job-insecure conditions.⁴

Meanwhile, experiences demonstrating the feasibility of small-scale distilleries and pilot examples of local ethanol utilisation face limitations in terms of financial resources, technology, infrastructure and access to markets. For instance, meeting technical standards incurs technology and transaction costs that small-scale producers are often unable to afford without some form of help. As a consequence, small and medium-size sugarcane growers are normally bound to sell their production to large processing mills. These industries, in turn, sell ethanol to Brazilian or foreign fuel distributors, capturing all the value added.

Brazilian ethanol policy does little to shift this situation of uneven allocation of benefits and burdens. Its policy instruments consist basically of regulatory and economic incentives to the sugarcane agroindustry, such as tax exemptions, facilitated credit through public banks, and an ethanol blending mandate of 18–25 per cent in all petrol sold in the country. There is, therefore, no transformative element that could reduce inequality. Instead, the biofuel policy just provides state support to an established agroindustry which may well contribute to economic growth and to the increase of renewable energy supplies but which perpetuates the daunting land ownership and income disparities of the country. It would be an exaggeration to say that

the ethanol policies *cause* these problems, but by giving public support to the sector while not envisaging any structural change, Brazil's ethanol programme can be seen as socially neglectful at least. Moreover, the rapid expansion of sugarcane over smallholders and indigenous peoples' lands (for example, the Guarani-Kaiowá in Mato Grosso do Sul state) has added new social problems to the existing ones.

Brazil has attempted to fill that social gap through its biodiesel policy: the National Programme on the Production and Use of Biodiesel (PNPB). The main feature of this policy is a social labelling initiative which offers an incentive for biodiesel industries to incorporate smallholders in the production chain. Those biodiesel industries that direct at least 30 per cent (10 per cent in some regions) of their annual feedstock-purchasing expenditure to smallholders are awarded a *social fuel seal*. Incentives include tax reductions and more favourable credit terms at public banks.

The programme, however, had rather negative social outcomes in its first few years. Castor bean, a non-edible oilseed, was chosen as a 'smallholder-friendly' feedstock, as it grows on marginal soils and without external chemical inputs. However, the use of low-quality seeds under suboptimal conditions resulted in very low yields. Moreover, incorporating individual subsistence farmers with little or no previous experience in cash-cropping under contract terms proved challenging. Finally, although the policy dictated that companies must provide technical assistance, this assistance was often inadequate or insufficient to improve yields or to build smallholders' capacity. Contracted prices were often below market prices, in an attempt by the industry to make feedstock-purchasing economical, but this meant that some farmers with access to other buyers would opt to sell their seeds elsewhere. Once the industries saw this arrangement becoming economically unviable, smallholders were abandoned, and those with the least market access (the most vulnerable) were left with seeds that they had been asked to grow but which could not be used for subsistence or sold elsewhere.

A revision of policies in 2008/2009 reformed the biodiesel programme, and many of the shortcomings were addressed. A major change was the creation of Petrobras Biofuels in 2008 as a subsidiary of Brazil's state-controlled oil company and its engagement with smallholders. Five key changes are worth noting. Petrobras has:

- supplied castor seeds of higher quality and explored other crops such as sunflower;
- improved the technical assistance on offer and fostered the creation of smallholder cooperatives to build organisational capacity;
- purchased feedstock at above-market prices and with flexibility to increase it in case market prices go up; and
- more strongly promoted mixed food-and-feedstock cultivation rather than feedstock monocultures, to safeguard food security; and
- the policy in place now requires that a representative social movement/organisation sign the contract along with the smallholders to increase their bargaining power.

Although some limitations remain (see Section III), outcomes have improved significantly.⁵ The number of smallholder

households involved in the programme quadrupled between 2008 and 2010 to more than 100,000, and the value spent by biodiesel industries on feedstock acquisitions from smallholders increased five-fold to about R\$1.2 billion (US\$635 million) in 2010 (Gomes et al., 2010).⁶

India

Like Brazil, India's fuel ethanol programme builds on an existing agroindustrial sector that already produced ethanol for purposes other than fuel (industrial, medical, beverages etc.). It counts in particular on a 5 per cent blending mandate and on a number of tax incentives to sugarcane mills.

The industry argues that by receiving additional governmental support it can transfer such gains to the more than 5 million sugarcane growers, mostly smallholders in the states of Uttar Pradesh, Maharashtra and Orissa. However, it is debatable to what extent this policy really serves rural development purposes. It is clear that an industry with higher revenues *might* transfer *some* of those gains up the production chain, but there is no focused perspective on reducing income inequality. It is the industry that continues to capture all the value added and which now benefits from additional incentives and the opportunity to sell to a new market.

India also launched an ambitious National Biodiesel Mission in 2003, aiming at replacing 20 per cent of the country's total diesel consumption by 2012. It has attempted to build entire new production chains centred on the cultivation of non-food crops on 'marginal lands', i.e. lands of suboptimal soil and water conditions that are not used by intensive agriculture.⁷ The policy rests on the estimation that there are 13.4 million hectares of such lands available for feedstock cultivation, and provides economic and regulatory incentives (e.g. tax reductions, credit provision through national banks, facilitated access to land) to private companies willing to develop industrial plantations or to engage in contract farming schemes with smallholders.

The government has also made such feedstock cultivation eligible for its National Rural Employment Guarantee scheme (NREGA), which provides up to 100 government-paid days of manual labour per year to rural workers. The main crop of choice has been *jatropha curcas*, known to some parts of India (e.g. Rajasthan) and which has received much praise for its alleged capacity to resist pests and yield well even on degraded soils, under water stress and without fertiliser inputs.⁸

Reality, however, has proven to be starkly different. *Jatropha* yields under suboptimal growing conditions seem to have been highly overestimated. Indian farmers who traditionally grew *jatropha* as a fence crop knew of its growth limitations without inputs but were not consulted in the decision-making process. Additionally, *jatropha* monocultures were often unwelcome because what official statistics designated as 'marginal lands' were, in reality, often under some form of traditional use by rural populations, such as shifting cultivation, pastoralism or use for fuelwood and medicinal plants.⁹ However, fuzzy land ownership patterns have made it possible for the government to claim large tracts of such lands (or to hand them over to private companies) and put

jatropha monocultures in place. This has often resulted in what many civil society organisations perceive as massive land grabbing.¹⁰ This reportedly led to a boycott from some farmers who joined the programme to benefit from NREGA payments but then sabotaged the plantations, either removing the roots of jatropha saplings before ‘planting’ them or returning to the field later and uprooting them.

Meanwhile, farmers who were persuaded to go into jatropha cultivation—mainly those who were unfamiliar with it—entered buy-back contracts, and most were abandoned when yields proved disappointing. This resulted in the reduction of local food production (e.g. groundnut in the state of Tamil Nadu)¹¹ and larger exposure to food insecurity, often leaving poor people in rural areas worse off.

Once the difficulties above became visible, the Indian government lowered its expectations and adopted instead the goal of replacing 20 per cent of total liquid fuel consumption with biofuels by 2017, but the challenges remain.

Indonesia

Indonesia has also put in place blending mandates to create a captive biofuel market and has provided economic and regulatory incentives to private agribusiness, aiming to create employment at feedstock plantations and establish contract farming schemes between industry and smallholders.

Those incentives have included tax exemptions, direct subsidies to fuel ethanol and biodiesel producers and facilitated conditions for land investments, such as faster acquisition of land use permits and longer duration of concessions. The original goal was to replace, between 2006 and 2010, 5 and 10 per cent of the country’s petrol and diesel consumption, respectively.

Indonesia’s sugarcane sector, however, remains reluctant to produce fuel ethanol, despite the subsidies. As such, Indonesia’s biofuel production consists primarily of palm-oil biodiesel. Half of the country’s oil palm plantations are owned by private companies, 10 per cent by the government and 40 per cent by smallholders (Sheil et al., 2009).

However, independent smallholders can hardly afford the high start-up costs of cultivation and bear four years without income before the oil palm matures; therefore, most smallholders work under contract farming schemes, with a company providing the start-up costs. Most cultivation takes place under the so-called ‘nucleus-plasma schemes’ negotiated between rural communities and a private company once the latter has obtained the necessary land use licences from the government.

The land is then divided between industry and smallholders, normally 70 per cent (the ‘nucleus’) rented to the company and the remaining 30 per cent (the ‘plasma’) retained by the smallholders, who are then integrated through a feedstock-supplying scheme. This is seen as advantageous to smallholders because oil palm cultivation requires relatively little labour and provides them with a regular income that is superior to what could be obtained from other crops (Feintrenie et al., 2010; Rist et al., 2010).

Consultation with local stakeholders also reveals a number of other drawbacks. First, the financial compensation offered by the companies for acquiring 70 per cent of the land is frequently perceived as too low; in a sense, farmers agree to concede it for lower than they would due to an eagerness to earn an income and escape poverty—a situation of powerlessness and vulnerability. Second, farmers frequently assume that the ‘nucleus’ will come back to them after the contract, when in reality it becomes government property. Third, smallholders’ lack of bargaining power sometimes becomes an issue and exposes their vulnerability to the company’s terms and demands, especially in remote areas where farmers have less experience and only one mill is available. And fourth, oil palm expansion has in some regions (e.g. Jambi Province, Sumatra) replaced rice cultivation (Indonesia’s main staple crop), making smallholders—and the country as a whole—more vulnerable to food price volatility.

Finally, Indonesia too has attempted to deploy jatropha cultivation on ‘unused’, ‘available’ lands. As in India, the government has distributed jatropha seeds and encouraged contract farming schemes between smallholders and the private sector. But, as elsewhere, yields have been disappointing, biodiesel industries have opted for purchasing (cheaper) palm oil as a feedstock,¹² and smallholders growing jatropha have been left with no markets to absorb their production.

III. Limitations, Pitfalls and Opportunities for Biofuel Policies

All three countries have adopted a two-tiered approach to biofuel production, relying on established agricultural sectors and attempting to promote non-food crop cultivation on ‘marginal’ lands, trying to incorporate those lands and the poor people therein into an integrated formal rural economy. For that, governments have assigned a protagonist role to the private sector. New regulations have largely facilitated conditions for investment; fiscal incentives and the abundant offer of public credit have provided economic incentives to sway agroindustries into feedstock cultivation and biofuel production, and blending mandates have been put in place to ensure that there will be a captive market for biofuels.

A first important limitation of this approach is trying to promote rural development by simply expanding corporate-owned plantations and the jobs they create. While employment is essential, one must look at: (i) the quality and, in particular, the work conditions in those jobs; (ii) the self-employment and traditional forms of subsistence that might be eliminated as those plantations expand; and (iii) their inherent limitations when it comes to creating structural change and reducing inequality. While those jobs might indeed *alleviate* poverty, inequality structures remain, not only in terms of income but also of land ownership, power, decision-making and control over production.

Similar structural limitations are present in the contract farming schemes being promoted. Although they may provide smallholders with an income, they do not address equity issues, as the contracting industries systematically

retain most or all value added while leaving smallholders perpetually as suppliers of raw materials (or primary products). Much as this kept many countries, former colonies, in a state of underdevelopment, a similar approach also keeps raw material suppliers in a state of underdevelopment.

Moreover, there are pitfalls and risks associated with establishing contract farming on non-edible feedstock crops, particularly when these crops take years to mature and have little other use, as is the case of both jatropha and castor. It should not be overlooked that in all three countries smallholders contracted to plant these crops were abandoned and left to bear the consequences.

These have arguably been cases of 'adverse incorporation', i.e. instances of inclusion under disadvantageous conditions.¹³ This reinforces the point that rural development policies, when misconceived, may easily leave poor people worse off.

Better policies can improve rural development outcomes significantly, such as through support for organisational capacity and creation of cooperatives; participation of social movements in contract negotiation to improve bargaining power; mixed production with food crops rather than as feedstock monocultures; and flexibility to adjust prices according to market signals.

Still, the issues of persistent inequality, power imbalance and lack of structural change remain. Addressing these would require poor people to climb up the biofuel value chain. In other words, some degree of locally owned rural industrialisation seems necessary. This has been attempted in some cases in Brazil where smallholder communities growing castor under contracts have started negotiating for local, community-owned vegetable oil extraction, meaning that they would start selling castor oil instead of seeds, obtain higher revenues and keep the seed-cake for other uses. This, of course, requires further political will and appropriate policies, such as additional technical support, financial resources and stimulus for organisational capacity, and it seems to be the necessary step forward if rural development goals are to be taken seriously.

IV. Conclusions

Developing countries characteristically emphasise the social aspects of sustainability, and their attempt to promote a 'green energy economy' through biofuels has been no different. Nevertheless, biofuel policies seem focused much more on building (renewable) energy supplies quickly. They have hardly taken the complexity of rural poverty into account or included instruments to promote structural change. The plantation jobs created do not address structural roots of poverty and inequality, and the rushed, top-down experimentation with jatropha and castor under risky contract terms led to many instances of adverse incorporation that ended up increasing smallholders' vulnerability.

This assessment has shown that the design of biofuel policies matters significantly to the outcomes of biofuel production on rural development, and the example of policy revision in Brazil illustrates how they can lead to tangible benefits for poor people in rural areas. Three elements appear to be crucial:

- the mixing of feedstock with food production, to safeguard food security, reduce vulnerability and strengthen existing livelihoods rather than replace them;
- the empowering of smallholders by including social movements at the negotiation phase when setting contract-farming terms; and
- provisions for having smallholders gradually ascend in the biofuel value chain, with capacity-building for developing locally owned seed-oil extraction and eventually other steps in the chain.

There is an active role to be played by social movements in improving smallholder collective organisation and strongly articulating their position at the political level. Governments putting forth biofuel policies, in turn, should avoid hasty and top-down grand schemes such as the Indian National Biodiesel Mission and instead develop such strategies in more participatory ways, in partnership with those who are to be helped. Given that biofuel programmes have been initiated and conducted largely by governments through public policies, they are accountable and should be even more responsive to the needs of poor people in rural areas, not only for the sake of equitable development but also as a matter of effective democracy.



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1. Blending mandates consist of policies that determine an obligatory mixing of a certain percentage of biofuels in liquid fossil fuels commercialised (ethanol in petrol and biodiesel in mineral diesel).
 2. For the case of small dairy farmers in São Paulo state, see Novo et al. (2010).
 3. Such seasonal migrants normally stay away for the largest part of the year. In Brazil, the wives left behind become known as 'widows of living husbands' (Biondi et al., 2009).
 4. See Novaes (2007).
 5. See Zapata et al. (2010).
 6. Although Petrobras purchases castor bean from smallholders, this feedstock is not being used for biodiesel manufacturing but instead sold at more profitable markets, such as to oleochemical industries. In turn, Petrobras purchases (cheaper) soybean oil for biodiesel. Regardless, this integration of smallholders remains an outcome of the biodiesel policy.
 7. See, for instance, Kumar et al. (2009) and Ministry of New and Renewable Energy (2009).
 8. See, for instance, Jain et al. (2010) and Silitonga et al. (2011).
 9. See also Rajagopal (2008).
 10. See GRAIN (2008).
 11. See Ariza-Montobbio and Lele (2010).
 12. For a comparison, while acquiring seeds for 1 litre of jatropha oil costs about INR8000 (US\$0.90), raw material for 1 litre of palm oil costs about INR5000 (US\$0.56) (US Department of Agriculture, 2011).
 13. See Hickey and Du Toit (2007) and McCarthy (2010).

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