

Contract farming for biofuels: a literature review

ANDREW W. SHEPHERD

An apparent contributory factor to the upward trend in food prices in recent years has been the rapid explosion in biofuel production in some countries, which has usually occurred as a result of government blending mandates and subsidies. Lacking suitable land in developing countries for large-scale operations, companies seeking supplies of appropriate feedstock have often turned to contract farming as a way of securing supplies. This article reviews the available literature covering this topic, noting that significant difficulties have been experienced with biofuel contract farming operations, with few, if any, real successes. These problems are attributed to a lack of understanding on the part of the companies of the capacities of smallholders, the general lack of experience of biofuel companies with contract farming including suitable price-setting methods, the impact of biofuel production on farmers' food production, and, finally, the lack of appropriate policies. The enthusiasm for subsidizing the sector has contributed to the difficulties. The paper concludes that there is a need to re-examine the costs and benefits of subsidies and their impact on successful commercial operations involving small farmers. Further, companies need to take lessons from experiences with more traditional contract farming operations.

Keywords: biofuels, biodiesel, bioethanol, contract farming, smallholders, market linkages

THE CONSIDERABLE INTEREST IN promoting biofuel production in recent years has, in part, been a result of national government concerns to guarantee fuel supplies in an era of rising prices. It has also been a consequence of biofuel blending mandates adopted by the EU and the USA. Both have exerted upward pressure on food prices (Ewing and Msangi, 2009) but the mandates of the EU are also perceived to offer considerable export potential for developing countries (Balkema and Romijn, 2011) even though only sugar cane ethanol may be presently economically viable without subsidies or mandates (Elbehri et al., 2013). There is concern that the search for 'green' fuel inspired by mandates just transfers environmental problems from the North to the South (Bastos Lima, 2011). Certainly, the 'first generation' biofuels, made from sugars and oils found in crops, are a long way from providing energy security. 'Second generation' fuels that are made from food crop residues, such as stems, may offer greater possibilities, but are proving slow to develop.

With large contiguous land areas being rarely available, companies have often turned to working with smallholders through various forms of contract farming arrangement. Potential benefits of such programmes include reducing the risk of land conflicts and allegations of 'land grabs', and diversification of production risk,

Andrew W. Shepherd (shepherd@cta.int) is with the Technical Centre for Agricultural and Rural Cooperation (CTA), Wageningen, Netherlands.

© Practical Action Publishing, 2013, www.practicalactionpublishing.org
<http://dx.doi.org/10.3362/2046-1887.2013.017> ISSN: 2046-1879 (print) 2046-1887 (online)

where the danger of production loss from disease, pest or drought when using one plantation is much greater than when using dispersed smallholder plots (UNEP, 2008). However, results of such programmes have been mixed, with problems experienced tending to fall into one of several categories: 1) over-optimistic projections of production levels that could be achieved, resulting from unrealistic enthusiasm for the economic viability of the raw material as a biofuel feedstock, and from a lack of appreciation of constraints facing small farmers; 2) the lack of experience of the biofuel companies with contract farming and working with small farmers; 3) neglect of food crops by farmers in order to produce biofuel crops or neglect of the biofuel crop in order to guarantee food production; 4) pricing difficulties; and 5) a lack of clear policies governing the sector.

Contract farming has been widely practised for food, fuel, and other crops for many years. It is playing a growing role in agribusiness (Eaton and Shepherd, 2001) and is attracting increasing attention from donor and other organizations (Prowse, 2012; FAO, 2012; Will, 2013; UNIDROIT, 2013). The approach is not without its problems, but, organized well, contract farming offers an important way in which smaller producers can farm in a commercial manner. In particular, it addresses constraints faced by farmers in obtaining credit for farm inputs and problems in obtaining the inputs themselves. It ensures that farmers are producing in response to market demand rather than producing first and looking for a market later. For companies, it provides investors with the opportunity to guarantee a reliable source of supply, from the perspectives of both quantity and quality. Despite these apparent advantages, however, contract farming does have its critics, most recently the UN Special Rapporteur on the Right to Food (De Schutter, 2011).

Literature review

Biofuel crops

Elbehri et al. (2013) have reviewed the main feedstocks for biofuels. All have some basic problems. While sugar is seen as offering several advantages, it, like oil palm, requires high rainfall levels. Maize has many advantages but has not been much promoted outside the USA because maize is a significant food crop and because rainfed production may soon (if it has not been already) be affected by climate change. Cassava is viable in Asian countries with well-developed value chains but its perishability calls into question its suitability in other regions. Soy is viable as a large-farm crop in the USA, Argentina, and Brazil but appears unsuitable for smallholders. Palm oil is the most efficient source of biodiesel but the environmental and social impact of production expansion is questionable. *Jatropha* has until recently been considered suitable for marginal lands but economic viability may in fact only be achieved if it is grown on top farm land.

Exaggerated yield expectations

Despite the above cautionary observations, there have been over-optimistic expectations on the part of companies regarding economic viability and the

likely production levels that could be achieved by smallholders. This has affected companies' own production as well as that of the farmers they have contracted. In the Philippines a parastatal company and private sector companies all moved away from contracting farmers in indigenous communities to grow jatropha, in favour of developing large-scale plantation schemes (Montefrio and Sonnenfeld, 2013). Contracts had been signed with the farmers despite a lack of clear evidence that cultivation on small, fragmented areas of shifting cultivation lands remote from market access could ever be viable. Many farmers abandoned their plantings because of accumulated debt and non-payment by the buyers. Ariza-Montobbio and Lele (2010) found that in India jatropha yields were much lower than expected and that cultivation was unviable. They concluded that the crop impoverished poorer farmers and that its promotion was 'aggressive and misguided'.

In Ethiopia, following the failure of jatropha to live up to expectations, companies switched to promoting castor beans. Optimistic projections of smallholder yields were based on projections from pilot farms in Israel, China, and India and not on production experiences in Ethiopia. Farmers were told that they could expect yields of 5 tonnes a year when, in fact, actual yields were closer to 1 tonne (African Biodiversity Network, 2010; Moges, 2010). One of the two companies buying castor went bankrupt and many farmers reported having incurred losses. In Tanzania, a company establishing a jatropha scheme relied on available literature on both yields and time taken for the plant to reach maturity. This led to significant overestimate of the first and underestimate of the second variable (Van Eijck, 2009). In Bahia in Brazil, companies set targets on oil crops much higher than warranted by the capacity of the farmers (Schrijver, 2012). Even if the yield estimates were reasonable there is evidence that contracting smallholders with no previous relevant cash-cropping experience presented a major challenge (Bastos Lima, 2011).

Food security implications

A related issue is the competing claims on farmers' land and time for food production. There are examples in the literature of food production by contracted farmers suffering as a result of the contract. This problem is most pronounced when monoculture is promoted and when the crop has a long gestation period, such as jatropha. Where a family farm is unable to carry out all the labour required to meet contractual obligations it is necessary to hire labour for both cultivation and harvest. One common problem is that farmers are paid on delivery of the crop but usually have to pay labourers on a daily basis (Oyuela et al., 2012).

In the Yoro region of Honduras, jatropha was initially promoted under monoculture but the lack of fruit in the first 4–5 years meant that farmers neglected the crop to grow food. As a consequence the contracting company switched to promoting mixed cropping, leaving space between rows of jatropha for food crops (Quinonez et al., 2012). In Brazil, constraints on food production are given as one reason for the breakdown in castor bean contracts (Schrijver, 2012) although Abramovay and Magalhães (2007) argue that the areas planted for bioenergy within family farms are sufficiently small as not to threaten their diversity. In Ethiopia, castor bean contracts

explicitly stated that farmers should not use more than one-third of their land for the crops but, even so, the small size of the plots meant that many farmers reported being unable to produce enough food (Moges, 2010).

Land issues

Difficulties experienced by companies in implementing contract farming arrangements have led some to seek alternatives, such as leasing smallholders' land. In South Africa, for example, a company using canola as biodiesel feedstock chose to rent smallholder land rather than train farmers to grow the crop. Mabiso (2012) found that farmers spoke positively of the arrangement, which freed up time for other activities. However, he notes that the increased availability of time was not fully complemented by the availability of rural employment activities. Less positive experiences come from Indonesia, where oil palm developments under the 'nucleus – plasma' model have involved smallholders handing over 70–80 per cent of their land in return for programme participation (Khairnur and Hermawansyah, 2012). This has exacerbated deforestation as farmers have handed over the most remote parts of their holdings, which are often virgin forests, in order to keep the best lands for their own cultivation (Feintrenie et al., 2010). Research in Brazil also suggests that attempts to promote social inclusion may have been achieved at the expense of deforestation, as well as rural livelihoods and food security (Andrade and Miccolis, 2011).

Trust relations with farmers

Developing trust between farmers and companies is essential for successful contract farming (Eaton and Shepherd, 2001; Da Silva, 2005) but it can be very time consuming and expensive. A company in Tanzania following a 'social business model' to promote jatropha production found that it had to make repeat visits to dispersed farmers in order to recruit new farmers and assure existing ones that it was not a 'fly-by-night' operator. Eventually it went into partnership with an NGO, which meets one half of the extension costs (Balkema and Romijn, 2011). Trust requires companies to honour commitments about input supply but several writers have commented on late delivery of inputs and their alleged poor quality (Bijman et al., 2009; Schrijver, 2012). From the side of the farmer, trust involves not selling outside the contract to another buyer. This does not appear to be a major problem with biofuels, although castor beans grown under contract in Brazil have reportedly been sold for other purposes as there are profitable competing markets (Andrade and Miccolis, 2011).

A particular problem with jatropha production is that it was initially widely, but mistakenly, believed that the crop could grow on degraded land. This led companies and governments to designate specific regions that could be used for the crop. Disappointing yields in Honduras have, however, led companies to concentrate more on the soils, first identifying suitable lands and then selecting participating farmers (Oyuela et al., 2012). This 'land first' approach has also been reported in non-biofuel contracting schemes in India (Narayanan, forthcoming).

In all contractual arrangements pricing can be problematical and biofuels are no exception. Unless influenced by blending mandates the selling price of biofuels cannot exceed the world price for fossil fuels. These can fluctuate considerably and variations on domestic markets can be compounded by exchange rate movements (Van Eijck, 2009). Frequent fluctuations in the price paid to farmers, particularly when prices are going down, can cause considerable mistrust and lead to contract breakdown. Independent supervision is one way of addressing this. The Honduras jatropha industry has established a Technical Committee to oversee quality, pricing, and marketing. Members are the Honduras Agro Energy Corporation (the buyer) and the farmer cooperative. One innovation is that prices to farmers are increased when the world oil price exceeds US\$100 a barrel (Oyuela et al., 2012).

Although there are examples of contract farming practices for tree crops with a long gestation period, sometimes involving a tripartite arrangement with a bank, particularly when governments have subsidized farmer plantings (Höllinger, 2004), there are few if any examples in the literature of where such models have been applied to biofuels, despite the long gestation required for crops such as jatropha. The almost indecent haste with which companies have invested in the industry has left little time to learn lessons from past experiences. Few smallholders can afford to make investments without having any income from the crop for four years (Bijman et al., 2009).

The impact of subsidies

A complication with biofuel contracts is that they have not necessarily been based on purely commercial considerations, because governments have been actively promoting the industry. Brazil is one of the few countries that has deliberately used government support to promote smallholder inclusion through the modality of contract farming (Abramovay and Magalhães, 2007; Watanabe and Zylbersztajn, 2012) by encouraging the production of biofuel crops in poorer regions. Under the country's 'Social Fuel Seal' programme, biodiesel factories gain tax benefits and subsidies when buying a certain amount of primary input from family farms. However, farmer representatives have argued that contracts have been signed by companies primarily to access the tax benefits, with poor delivery of inputs and extension to dispersed farmers (Schrijver, 2012). Where family farmers in Brazil have benefited it is more likely to have been as a result of public subsidies than market forces. Additionally, some observers have argued that companies have fulfilled their family farm quotas by buying from existing soybean smallholders and are thus doing little to promote 'inclusion' of poorer farmers in remote areas (Andrade and Miccolis, 2011). Farmers also report problems in accessing subsidized loans. Such problems may be caused primarily by the fact that family farmers are spread over a large area, making it difficult to provide technical assistance and collect production (Watanabe and Zylbersztajn, 2010). Watanabe and Zylbersztajn (2012) attribute the decrease in family farmers involved in the castor bean programme in Brazil's Minas Gerais state to the weak relationship between farmers and the industry and the lack

of horizontal organization of farmers. Similar tax and subsidy policies are applied to oil palm production in the Amazon region, with farmers being encouraged to plant 10 hectares. According to Gomes and Glass (2012), many farmers have become heavily indebted and have had to sell their land.

Another element of subsidy that distances biofuel operations from pure commercial principles is introduced in many countries when NGOs become involved, similar to the Tanzanian case noted earlier. As these civil society organizations generally operate in a particular sector for a limited period, there are risks to contract viability when they move on to other areas (Bijman et al., 2009). Under parts of the Brazilian programme, the rural trade union movement offsets some of the companies' transaction costs by identifying appropriate family farmers (Watanabe and Zylbersztajn, 2010) and participating actively in the formulation and execution of the contracts (Abramovay and Magalhães, 2007).

Certification

Increasing attention to certification for both food and non-food crops has not neglected biofuels. Companies developing a new biofuel contract programme scheme may face the added complication of having to ensure that their farmers meet certification requirements. Companies have to be sure that the farmers, once certified, will in fact sell their output to the company paying for the certification. Furthermore, the EU's Renewable Energy Directive and certification schemes, such as the Roundtables on Responsible Soy and Responsible Palm Oil, are biased towards industrial-scale producers and do not have mechanisms to fully integrate smallholders, for whom the costs of certification would be considerable (UNEP, 2008; Lee et al., 2011). On the other hand, the Mass Balance Chain of Custody system, which allows certified companies to purchase a share of their feedstock from uncertified smallholders, tends to reduce pressure for smallholder certification (Beall, 2012).

Policy weaknesses

Despite active promotion, many governments lack clear policies for the biofuels industry, a fact noted in the context of Honduras (Quinonez et al., 2012). Reporting on failed contract farming arrangements for cassava and jatropha in the Philippines, Villanueva (2012) notes that despite the 2007 Biofuels Act to promote the industry, which started a rush of foreign and domestic investment in biofuels, existing policies have fallen short of providing the necessary safety nets for small farmers. In numerous countries, the lack of appropriate land tenure legislation and land mapping poses a threat to farmers and this may be exacerbated by biofuel developments (Elbehri et al., 2013). Of particular concern in the Philippines is the fact that many farmers are tenants. Those reluctant to grow biofuel crops often face eviction by their landlords. Van Eijck (2009) notes that unclear taxation arrangements in Tanzania compound difficulties with smallholder jatropha development.

Gender

Last, but not least, contract farming can have significant implications for gender relations. For example, contracts are usually signed with male farmers when much of the work is often done by women. However, the literature reviewed did not highlight this as a major problem for biofuels, although Elbehri et al. (2013) speculate that emphasis on using low-quality land for biofuel feedstock such as jatropha may have damaging consequences for women's agricultural activities, thereby impacting on food production and food security. This is because husbands often allocate the lowest quality land to their wives.

Conclusions and recommendations

Contract farming has of late emerged as an important mode of agricultural production. Despite some difficulties, the general consensus appears to be that it has much to offer, by both ensuring a reliable supply of raw material of requisite quality for companies and addressing credit and input supply weaknesses that small farmers face in many countries. However, the above review does call into question these conclusions in the case of biofuel development. Reasons for this include government policies, the haste with which companies have rushed into biofuels and the lack of attention to their economic viability at smallholder level, the lack of experience of many of those companies with contract farming, and, in some cases, the tendency of the industry to attract 'fly-by-night' operators. Of course, such problems are not unknown in more traditional contract farming activities but they seem to surface with greater regularity in the case of biofuels because companies concerned have made insufficient attempts to learn the lessons from other contract farming operations, despite these being widely available and easily accessible (see, for example, the Contract Farming Resource Centre website).

Before offering significant further support to the biofuels industry, governments should conduct a reappraisal of the costs and benefits of subsidies and other policies, particularly as they affect small farmers. As Hospes (2012) points out, many difficulties faced by small farmers with biofuel production can be traced back to government policies, such as ambitious blending targets, financial incentives to investors, and concentration on one or two crops for large-scale processing, which has favoured monoculture. Government policy may well be a contributory factor to the apparent short-term approach of many entrants into the biofuel business, which, in turn, may explain some of the difficulties with contracting. Based on his experience with managing a jatropha contract farming operation in Tanzania, Van Eijck (2009) argues that governments need to attract investors who will accept a slower return on investment than with other projects. He believes that choosing a biofuel crop already established in the country can be beneficial for a company and that strong management and culturally sensitive field officers are essential. He stresses the need for government support but also highlights the importance of developing strong links with local government.

The contract farming model used may also be important. Eaton and Shepherd (2001) identified the three main types of contract farming as being the centralized model, the nucleus estate model, and the multipartite model. Under the centralized model a company buys only from independent farmers and this has been the main model adopted for biofuel feedstock other than sugar and palm oil, which often employ a nucleus estate approach. However, lacking their own feedstock production, which they would have under a nucleus estate arrangement, and needing to guarantee factory throughput, companies following the centralized model are likely to neglect small farmers in favour of working with larger ones. Not having their own farms they cannot provide extension advice based on experience (Bijman et al., 2009) and, as noted, often resort to yield estimates and extension advice based on unrelated environments. A nucleus estate arrangement may therefore be preferable, although land constraints may make this difficult in many cases. Under the multipartite model a state agency provides technical support and may also provide some of the inputs, as done for biofuel cassava in the Philippines (Villanueva, 2012). However, the general weakness of many government extension services and their own lack of knowledge of many biofuel crops may argue against this model for biofuels.

Before setting up biofuel contract farming operations, companies must give detailed consideration to a number of issues. Do the identified farmers have the capacity to produce the necessary quantities required by the factory? What company support will be required to ensure the targets are met? What are the potential implications of biodiesel contract farming on food production, land tenure arrangements, and gender relations? What support is necessary to farmers growing long-gestation crops? How can trust be built up and maintained between farmers and the companies? What sort of contract is required? These are questions that contract farming companies for food and other crops ask as a matter of course. This review suggests that they have not been given serious consideration by many biofuel companies.

References

- Abramovay, R. and Magalhães, R. (2007) 'The access of family farmers to biodiesel markets: partnerships between large companies and social movements' [pdf] London: IIED <<http://pubs.iied.org/pdfs/G03239.pdf>> [accessed 16 June 2013].
- African Biodiversity Network (2010) 'Biofuels – a failure for Africa', prepared in association with the Ethiopian Society for Consumer Protection and The Gaia Foundation <[www.africanbiodiversity.org/sites/default/files/PDFs/Biofuels%20-%20A%20Failure%20for%20Africa%20\(ABN,%20Dec%202010\).pdf](http://www.africanbiodiversity.org/sites/default/files/PDFs/Biofuels%20-%20A%20Failure%20for%20Africa%20(ABN,%20Dec%202010).pdf)> [accessed 10 May 2013].
- Andrade, R.M.T. and Miccolis, A. (2011) *Policies and Institutional and Legal Frameworks in the Expansion of Brazilian Biofuels*, CIFOR <www.cifor.org/publications/pdf_files/WPapers/WP71CIFOR.pdf> [accessed 2 July 2013].
- Ariza-Montobbio, P. and Lele, S. (2010) 'Jatropha plantations for biodiesel in Tamil Nadu, India: viability, livelihood trade-offs and latent conflict', *Ecological Economics* 70 (2): 189–95 <<http://dx.doi.org/10.1016/j.ecolecon.2010.05.011>>.

- Balkema, A.J. and Romijn, H.A. (2011) *Innovative Business Models for Sustainable Biofuel Production: The Case of Tanzania Smallholder Jatropha Farmers in the Global Value Chain* [pdf], Eindhoven Centre for Innovation Studies <<http://cms.tm.tue.nl/Ecis/Files/papers/wp2011/wp1106.pdf>> [accessed 10 May 2013].
- Bastos Lima, M.G. (2011) *An Institutional Analysis of Biofuel Policies and their Social Implications in Developing Countries* [pdf], Geneva: UNRISD <[www.unrisd.org/80256B42004CCC77/\(httpInfoFiles\)/00303FB7BAB1D319C1257921005030A5/\\$file/6-4%20Bastos%20Lima.pdf](http://www.unrisd.org/80256B42004CCC77/(httpInfoFiles)/00303FB7BAB1D319C1257921005030A5/$file/6-4%20Bastos%20Lima.pdf)> [accessed 2 July 2013].
- Beall, E. (ed.) (2012) *Smallholders in Global Bioenergy Value Chains and Certification* [pdf] Rome: FAO <www.fao.org/docrep/015/i2597e/i2597e00.pdf> [accessed 5 May 2013].
- Bijman, J., Slingerland, M. and van Baren, S. (2009) 'Contractual arrangements for smallholders in biofuel chains: a case study of jatropha in Mozambique', *VII International PENSA Conference, São Paulo, Brazil* [pdf] <www.foodorfuel.org/sites/foodorfuel.org/files/docs/Bijman_et_al_2009.pdf> [accessed 5 May 2013].
- Contract Farming Resource Centre website <www.fao.org/ag/ags/contract-farming/en/> [accessed 2 October 2013].
- Da Silva, C.A. (2005) *The Growing Role of Contract Farming in Agri-food Systems Development: Drivers, Theory and Practice* [pdf] AGS Working Document 9, Rome: FAO <www.fao.org/fileadmin/user_upload/ags/publications/AGSF_WD_9.pdf> [accessed 16 June 2013].
- De Schutter, O. (2011) *The Right to Food: Note by the Secretary-General* [pdf], UN General Assembly, Doc. A/66/262 <www.ohchr.org/Documents/Issues/Food/A.66.262_en.pdf> [accessed 5 August 2013].
- Eaton, C. and Shepherd, A.W. (2001) *Contract Farming: Partnerships for Growth* [pdf], Agricultural Services Bulletin 145, Rome: FAO <www.fao.org/docrep/014/y0937e/y0937e00.pdf> [accessed 16 June 2013].
- Elbehri, A., Segerstedt, A. and Liu, P. (2013) *Biofuels and the Sustainability Challenge: A Global Assessment of Sustainability Issues, Trends and Policies for Biofuels and Related Feedstocks* [pdf] Rome: FAO <www.fao.org/docrep/017/i3126e/i3126e.pdf> [accessed 5 May 2013].
- Ewing, M. and Msangi, S. (2009) 'Biofuels production in developing countries: assessing tradeoffs in welfare and food security', *Environmental Science & Policy* 12: 520–28 <<http://dx.doi.org/10.1016/j.envsci.2008.10.002>>.
- FAO (2012) *Guiding Principles for Responsible Contract Farming Operations* [pdf], Rome: AGS Division, FAO <http://makingtheconnection.cta.int/sites/default/files/CF_Brief_web.pdf> [accessed 5 August 2013].
- Feintrenie, L., Chong, W.K. and Levang, P. (2010) 'Why do farmers prefer oil palm? Lessons learnt from Bungu District, Indonesia', *Small-scale Forestry* 9: 379–96 [online] <www.cifor.org/publications/pdf_files/articles/AFeintrenie1002.pdf> [accessed 2 July 2013].
- Gomes, M. and Glass, V. (2012) 'New partnerships: promise or poison to small farmers? Palm oil biofuel production in the Amazon' in *Biofuel Partnerships: From Battleground to Common Ground?* pp. 20–23 <www.forestpeoples.org/sites/fpp/files/publication/2012/03/finalversion-reportbiofuelsworskhopcordaid.pdf> [accessed 5 May 2013].
- Höllinger, F. (2004) *Financing Agricultural Term Investments* [pdf], Agricultural Finance Revisited, No. 7, Rome: FAO and GTZ <www.ruralfinance.org/fileadmin/templates/rflc/documents/1116343960230_Afr7_E.pdf> [accessed 5 August 2013].

- Hospes, O. (2012) 'Conclusions and recommendations', in *Biofuel Partnerships: From Battleground to Common Ground?* pp. 31–34 [pdf] <www.forestpeoples.org/sites/fpp/files/publication/2012/03/finalversione-reportbiofuelsworskhopcordaid.pdf> [accessed 5 May 2013].
- Khairnur, L. and Hermawansyah (2012) 'Clearing land, fuelling conflict', in *Biofuel Partnerships: From Battleground to Common Ground?* pp. 24–26 [pdf] <www.forestpeoples.org/sites/fpp/files/publication/2012/03/finalversione-reportbiofuelsworskhopcordaid.pdf> [accessed 5 May 2013].
- Lee, J.S.H., Rist, L., Obidzinski, K., Ghazoul, J. and Pin Koh, L. (2011) 'No farmer left behind in sustainable biofuel production', *Biological Conservation* 144 (10): 2512–16 <<http://dx.doi.org/10.1016/j.biocon.2011.07.006>> [accessed 5 May 2013].
- Mabiso, A. (2012) *Participation of Smallholder Farmers in Biofuels Crop and Land Rental Markets: Evidence from South Africa* [pdf] <http://ageconsearch.umn.edu/bitstream/126370/2/Mabiso_a_2011_paper_1633_abstract_10435_0%5B1%5D.pdf> [accessed 16 June 2013].
- Moges, K.T. (2010) *Smallholder Farmers and Biofuel: Farmers' Perspectives in Growing Castor Beans in Ethiopia* [pdf], Master's Thesis, Swedish University of Agricultural Sciences <http://stud.epsilon.slu.se/2327/1/moges_k_t_110303.pdf> [accessed 5 May 2013].
- Montefrio, M.J.F. and Sonnenfeld, D.A. (2013) 'Global–local tensions in contract farming of biofuel crops involving indigenous communities in the Philippines', *Society and Natural Resources* 26(3): 239–53 <<http://dx.doi.org/10.1080/08941920.2012.682114>>.
- Narayanan, S. (forthcoming) 'Geography matters: evidence and implications of spatial selection in contract farming schemes in southern India', in C. da Silva, R. Christy and N. Mhlanga (eds.), *Innovative Institutions, Public Policies, and Private Strategies for Agro-Enterprise Development*, Scientific Publishers, UK.
- Oyuela, D., Erazo, D. and Hernandez, E. (2012) 'Energy crops, partnerships and new opportunities: experiences in the southern part of Honduras', in *Biofuel Partnerships: From Battleground to Common Ground?* pp. 10–13 [pdf] <www.forestpeoples.org/sites/fpp/files/publication/2012/03/finalversione-reportbiofuelsworskhopcordaid.pdf> [accessed 5 May 2013].
- Prowse, M. (2012) *Contract Farming in Developing Countries: A Review* [pdf], AFD <www.afd.fr/webdav/site/afd/shared/PUBLICATIONS/RECHERCHE/Scientifiques/A-savoir/12-VA-A-Savoir.pdf> [accessed 5 August 2013].
- Quinonez, J.A., Moers, P. and Galema, T. (2012) 'Beyond the fuel versus food controversy: the case of Gota Verde in Yoro', in *Biofuel Partnerships: From Battleground to Common Ground?* pp. 14–16 [pdf] <www.forestpeoples.org/sites/fpp/files/publication/2012/03/finalversione-reportbiofuelsworskhopcordaid.pdf> [accessed 5 May 2013].
- Schrijver, A. (2012) 'Same, same, but different: a case study on the impact of biodiesel contracts on family farmers in Bahia', in *Biofuel Partnerships: From Battleground to Common Ground?* pp. 17–19 [pdf] <www.forestpeoples.org/sites/fpp/files/publication/2012/03/finalversione-reportbiofuelsworskhopcordaid.pdf> [accessed 5 May 2013].
- UNEP (2008) 'Biofuel group certification: ensuring that smallholders can participate in biofuel markets', *Bioenergy Issues Paper Series 5* [pdf] <www.unep.org/bioenergy/Portals/48107/doc/issues/issuespaper/Issue%20Paper%205.pdf> [accessed 16 June 2013].
- UNIDROIT (2013) 'Study LXXX A: preparation of a legal guide on contract farming' [online] <www.unidroit.org/english/studies/study80a/main.htm> [accessed 5 August 2013].
- Van Eijck, J. (2009) *Case Study: The Smallholder Model of Biofuel Production in Tanzania* [pdf], GTZ and ProBEC <www.jatropha.pro/PDF%20bestanden/fl06012010085317_Diligent_Case_Study_Mozambique_2009_Vreviewed.pdf> [accessed 5 May 2013].

Villanueva, S.D. (2012) 'Land deals on biofuels: good or bad for smallholders? A case study on Mindanao, southern Philippines', in *Biofuel Partnerships: From Battleground to Common Ground?* pp. 27–31 [pdf] <www.forestpeoples.org/sites/fpp/files/publication/2012/03/finalversion-reportbiofuelsworskhopcordaid.pdf> [accessed 5 May 2013].

Watanabe, K. and Zylbersztajn, D. (2010) *Building Supply-systems from Scratch: The Case of Biodiesel Chain in Brazil* [pdf] <www.foodorfuel.org/sites/foodorfuel.org/files/docs/Watanabe_and_Zylbersztajn_WICANEM2010.pdf> [accessed 16 June 2013].

Watanabe, K. and Zylbersztajn, D. (2012) 'Building supply systems from scratch: the case of the castor bean for biodiesel chain in Minas Gerais, Brazil', *International Journal on Food System Dynamics* 3(2): 185–98 [online] <<http://ageconsearch.umn.edu/bitstream/144856/2/Watanabe-Zylbersztajn.pdf>> [accessed 16 June 2013].

Will, M. (2013) *Contract Farming Handbook* [pdf], GIZ <www.giz.de/Themen/de/dokumente/giz2013-en-handbook-contract-farming-manual-low-resolution.pdf> [accessed 5 August 2013].