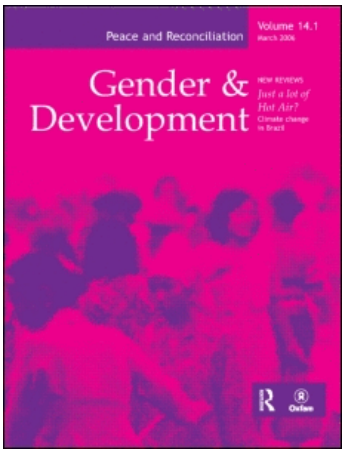

Gender & Development
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713422432

The bio-fuel frenzy: what options for rural women? A case of rural development schizophrenia

Nidhi Tandon

Online Publication Date: 01 March 2009

To cite this Article Tandon, Nidhi(2009)'The bio-fuel frenzy: what options for rural women? A case of rural development schizophrenia',Gender & Development,17:1,109 — 124
To link to this Article: DOI: 10.1080/13552070802696961
URL: http://dx.doi.org/10.1080/13552070802696961

The bio-fuel frenzy: what options for rural women? A case of rural development schizophrenia

Nidhi Tandon

Schizophrenia, from the Greek roots schizein ('to split') and phren ('mind'), is a psychiatric diagnosis that describes a mental illness characterised by impairments in the perception or expression of reality. The key message of this article is that mainstream agricultural policy is at odds with what needs to happen on the ground, and is being further entrenched by the bio-fuel industry. It presents a strong case for locally owned food and fuel sources. The movement demanding these is a critical movement that women need to lead, in the face of mega-trends that continue to remain outside their remit and influence. It may be that the only way for women to effect real changes to policy is to lead change in the fields, and at grassroots and communal levels. In other words, self-sufficient communities should promote their ways of life in all their diversity, to present a viable counter-movement to today's global and monolithic agricultural structures, standards, and markets. It is local people who feel most strongly about local livelihoods, and they can take responsibility for action around local issues.

Key words: bio-fuels; women; jatropha; organic farming; climate change; land; locally owned fuel and food

Bio-fuels: where we are today[1]

With financial support from the Asian Development Bank, the Philippines has set aside a million hectares for *jatropha* (palm oil) plantations. A native Latin American plant, *jatropha* is a wild shrub, easy to establish, quick-growing and hardy, and not browsed easily by cattle or goats. Its seeds contain up to 40 per cent oil, and the plant is now cultivated on a massive scale for bio-diesel, in several countries including India, Malawi, Swaziland, and Indonesia.

In Mindanao, an island in southern Philippines, where the plant's local name is *tuba-tuba*, whole tracts of arable land used for food crops, like rice, are gradually being turned into agro-industrial plantations for bio-fuels. For Erlinda Garcia, and other

ISSN 1355-2074 print/1364-9221 online/09/010109–16 © Oxfam GB 2009
DOI: 10.1080/13552070802696961

village women, the rush to plant *jatropha* has meant losing the patches of *cogon* grass that they harvested for roofing, and the freshwater snails which lived in ponds, now drained for plantations. The women used to sell the snails and *cogon* grass, and were employed as seasonal weeders, gleaners, and harvesters on the rice fields. Without these livelihood sources, Erlinda is learning about *odig* – organic, diversified gardening: 'I can plant squash, string beans and other vegetables using organic fertilisers and pesticides' (Reyes 2007).

In the village of Kugwe in north-west Cameroon, where palm oil is already the main cash crop, increased international demand for palm oil has put further pressure on women. Here, the palm-tree farms are the property of the head of the family. Food crops grown in these farms belong to women to feed the family and sell in local markets. Processing farm produce is also women's work, no matter what the crop. Using their legs and feet, women smash the oil-palm nuts to produce oil, which represents about 75 per cent of the community's earnings. When it comes to income-sharing, however, proceeds from the sale of harvested palm oil belong to the head of the family. If the head of the family hires a professional harvester, the latter would still draw on the labour of women and children from the household. For every 40 litres of first-grade oil, the women receive seven litres for household use. The remaining oil is shared equally between harvester and owner. Often women and children gather fibre and squeeze out low-grade oil to add to their remuneration. Apart from being the main labour force in oil production, the women are also the main conveyors of the finished product, taking it from farms to the main market, some eight kilometres away. This involves carrying 20 to 40 litres of the finished product (at times, with a baby as well) on the back, over rugged stony roads and steep hills. This weight and the arduous journey put further stress on women's physical health and well-being (Yitamben 2008).

On the other side of the continent in Swaziland, 200 kilometres south of Mbabane, a 400-hectare farm in Hluthi is a hive of activity for 250 workers planting and harvesting *jatropha* seeds. A five-metre tall plant can be expected to yield around five kilogrammes of seeds: enough to produce one litre of oil. But for all the hope invested in the plant, Thuli Makama, director of the Swaziland environmental group Yonge Nawe, thinks things could turn sour. 'How long will it be before rural people are being moved off their land to make way for these plantations? We agree that they have a potential to give a badly needed boost to agriculture, to earn foreign exchange and reduce dependency on oil … but the potential for environmental and social damage are just as great' (AFP 2007).

As with many things left unregulated and unmonitored, development initiatives can exacerbate existing inequities. The rapid expansion of the bio-fuel sector is no different, and rural women are once again suffering the consequences of development policies that are driven by national policies, government subsidies, profit opportunities

for agribusiness and energy companies, and the ever-growing fuel consumption in international markets.

Despite the fact that bio-fuels will only ever be one small element in a worldwide future energy mix,[2] the immediate impact on women's land-use options, on their income and livelihoods, on food affordability and related costs of living, and, ultimately, on the price of farmland, is enormous. In combination, these factors threaten the already narrow confines within which rural women operate.

The impacts of first-generation bio-fuel crops based on intensive monoculture cropping are already having systemic local and global effects. At the global level, the most visible and immediate impact is the huge increase in the prices of staple foods, including wheat, rice, and corn – the *tortilla* riots in Mexico and rice queues in Thailand are testament to this.[3]

What is the impact?

This section outlines local-level impacts of these trends (while noting that there are also, obviously, global implications).

The shifting of cash-crop production from food to fuel use has negative effects on local food access. Palm oil and soybean oil are two important calorie sources for peoples living in Asia, Melanesia, and parts of the Middle East. Demand for these oils is now competing with demand for palm oil to fuel cars in Europe. Shifting from growing food and fibres to bio-fuel requires new (and costly) inputs. Many bio-fuel initiatives follow a mono-cropping system which intensifies soil and land degradation and water pollution through intense use of fertiliser and pesticides, and introduces more new and potentially invasive crop species to natural ecosystems (such as eucalyptus, pine, and acacia).

This shift has not resulted in any improvement in the low rural employment levels associated with mechanised farming of cash food crops. In the tropics, 100 hectares dedicated to family farming generates 35 jobs. Oil palm and sugarcane provide just ten jobs per 100 hectares, and eucalyptus just two. Soybean plantations provide just half a job for the same area of land (Holt-Gimenez 2007).

There is increased competition for farmland. Land for bio-fuels is often in direct competition with all other land use, including food and fibre crops. If one looks at rural development through a land-use lens, the trends point towards farmland converting to bio-fuel, and grazing land edging ever closer into forests and nature reserves, or onto marginal lands. According to Sawit Watch,[4] the number of land conflicts in Indonesia has risen sharply, as demand for palm oil has increased. Over 400 villages have already suffered as a result (Rettet den Regenwald e.V. 2007). Women are increasingly facing fewer choices about land use, and in many cases, are forced onto marginal lands.

The trend towards bio-fuels is also resulting in previously uncultivated land being stripped for cultivation – leading to deforestation and habitat fragmentation. In Malaysia and Indonesia, the development of new land to meet the demand for palm oil is contributing to a 1.5 per cent annual rate of deforestation of tropical rainforests.[5] Many women source forest bio-diversity products for their livelihoods.

If land-tenure systems are weak, there is risk of appropriation of land by large private entities interested in lucrative bio-fuels markets. The sale value of farmland is increasing. It is only a matter of time before prices for farmland will increase across the board in developing and developed countries alike.[6] Yet poor people, who often farm under difficult conditions and who generally have little negotiating power, may have no option but to sell their land at low prices. Where land is legally owned by the state, which is typical in most African countries, small farmers may find that their land has been allocated to large, outside investors (Raswan *et al.* 2008).

The ripple effect of price hikes for farmland in developing countries may have further negative implications for women. Lone women farmers are usually leasees, rather than owners, of the land they farm, while married women are dependent on male relatives for access to land in patriarchal systems. Only a few women may have some means to invest in land. Women are not involved in the decisions around land use. They only become involved in decisions around land use (and by extension, natural resource use) as a last resort, when things have already got out of hand.

By extension, women are typically not participants in the discussions and decisions around monetary aspects of land use and value. What keeps them from being persuasive and forceful advocates on behalf of securing communal revenues from carbon sequestration of their forest lands is their lack of information, insights, and engagement in the evolving carbon market and the emerging economic value proposition of ecosystems and bio-diversity.

Cultivation of bio-fuels is leading to higher prices for food. Jacques Diouf, Director General of the Food and Agriculture Organization (FAO), singled out bio-fuel programmes as one of the major contributing factors to the global price rise of food linked to the diversion of farmland from food to fuel crops.[7] According to IFPRI (the International Food Policy Research Institute), for every percentage increase in food prices, an additional 16 million people are threatened with hunger, with rural and urban poor people worst hit. Food-price increases accelerated in 2008, on top of a 181 per cent increase in global wheat prices over the 36 months leading up to February 2008, and an 83 per cent increase in overall global food prices over that period (World Bank 2008). Progress in reducing poverty and hunger has been limited in recent years. Excluding data for China, the absolute number of hungry people has increased from 823 to 830 million between 1992 and 2004 (FAO 2006).

In the face of seemingly overwhelming negative impacts of commercial bio-fuel farming, what can women farmers and peasants realistically do to ensure that their

livelihoods, food sources, and land uses are protected? A women's entrepreneurial support organisation in Cameroon, ASAFE, is promoting the domestication of indigenous forest crops around Kugwe which can be sustainably harvested by women and children to supplement their livelihoods. Will they be able to retain control over this additional income, and for how long, before its profitability is claimed by the men of the village? In Erlinda's case, an arguably positive outcome may be emerging from her search for new sources of livelihood. But this begs another question, why is it that women are primarily only *reacting* to these changing circumstances, and are not able to *proactively* take steps to influence policy or adapt to change before 'things turn sour'?

Bio-politics of trade-offs between food and fuel

Decisions about land use and crop choice are heavily influenced (if not imposed) by business and global trade and aid decisions that are taken outside the realm of the farm, on the international trading floors of agri-commodities, and in the board rooms of development banks and aid institutions. The 2008 food-price crisis was evidence of a series of trade policies and domestic subsidies that fed into even more market speculation, which in turn drove world prices on agri-commodities ever higher (this was before the financial crisis towards the end of 2008).

In the developing world, especially those countries where there is not much collateral with which to negotiate, farmers and landowners are being influenced, or have little alternative choice other than, to take short-term risky decisions involving cash-crop farming and a reliance on external inputs. These decisions have long-term implications for farmers' livelihoods and global food supply, at a time of uncertainty and lack of understanding of the opportunities and risks of bio-fuels for ecosystems and livelihoods.

High stakes and profit motives

Early ventures into the bio-fuel markets were assured of high returns on investments. A 2006 report (Goldman Sachs 2006) on bio-diesel estimated that the first shipments of palm bio-diesel to Europe were priced at about $700 per ton.[8] It went on to advise that 'palm bio-diesel manufacturers can realise profit margins of US$170/ton (about 25 per cent of sales). Taking into account capacity costs of about US$11 million for a facility of 60,000 tons per year implies a gross return on investment of 90 per cent, or a payback period of 1.1 years' (*ibid.*, 4).

Investors in the commodity-market capitals of the world forecast that the bio-fuel industry could help to ease world hunger. The commonly held perception is that more fertiliser, more mechanisation, and more pesticide use would increase agricultural productivity in developing countries. With this perception, governments

are encouraged to adopt bio-fuel production policies to attract further investment that would support agricultural improvements, which would 'benefit food production, accelerate rural economic development, and alleviate poverty and migration to the cities. Higher world crop prices will support farm income' (*ibid.*, 4).

Big business, however, is buffered from irregular harvests, because ultimately the consumers pay a higher price. Small farmers are *not* buffered in this way. The US-based National Oceanic and Atmospheric Administration recently declared the return of El Niño, a global weather phenomenon that investors recognise as being adverse for agricultural production, but positive for prices (and profits). Plantation companies are usually net beneficiaries from El Niño; any production shortfall is more than made up for by higher selling prices. What does this imply in terms of agro-industrial responses to climate change and plantation systems? Is there really an incentive to change farming methods to cope better with climate change, when the market and price speculation make up for any shortfall in quantity?

The 'wealth creation' driving investment motivation is clear, and is in stark contrast to the driving forces behind the acquisition of knowledge, which brings value to agricultural systems as a whole. Lester Brown, president of the Earth Policy Institute, describes this as the beginning of a great tragedy: 'The United States, in a misguided effort to reduce its oil insecurity by converting grain into fuel for cars, is generating global food insecurity on a scale never seen before'.[9]

A rural backbone with no support

One might expect that rural-based subsistence farmers would be spared the vagaries of international markets by growing what they need to eat and heat with. But most of the time, this is not the case. More commonly, when crisis strikes, rural households are faced with narrower options, have fewer reserves to draw on, must do more with less, and are left to their own devices to manage risk – often with adverse consequences. In some rural locations, migration to cities means some households are initially protected in times of economic crisis. Eventually however, family members may lose urban jobs and return to rural areas, remittances from family members may decline or stop altogether, and changes in the relative prices of basic household necessities put further stress on the rural household. While this may be the year in which urban populations exceed rural populations globally, the rural sector is, *de facto*, the social security net for most people and should be treated thus by policy makers.[10]

History shows that when small-scale farming systems are intact, rural areas are better able to absorb shocks than urban areas. One of the reasons why rural people were able to survive the long civil war in Uganda (1971–1986) was the resilience of subsistence agriculture – a sector very much run and led by women. The sector that contracted most severely during that period was construction and manufacturing (the asset-producing sector, employing mostly men). However, relative to gross domestic

product (GDP), subsistence agriculture grew during the war, and only contracted to its pre-war status after peace was restored.

It is precisely for this reason that much more needs to be done to enable land owners, farmers, and rural populations to support their communities in times of the shifting priorities brought about by climate change. While it may be premature for countries to have a clear road map, more research and analysis is needed to enable us to better manage the trade-offs between energy and food security, and the implications for the economy and society of the bio-fuel and climate-change investments in rural areas. This research and analysis must take account of the perceptions, interests, and needs of women farmers and rural workers.

In 1980, 30 per cent of annual World Bank lending went to agricultural projects. This declined to 12 per cent in 2007, while the current overall proportion of all official development assistance to agriculture is only 4 per cent.[11] Of equal concern is that now the World Bank is seeking to double its lending for agriculture in Africa, and there is a real possibility that most of this increase will go to the bio-fuel and bio-technology arenas, and not to small-scale self-sufficient farming.

This is echoed in a recent report prepared for the Canadian Food Security Policy Group:

> *Like other donor countries, prior to 1990, Canada recognised the importance of agriculture in developing countries by directing approximately 20 per cent of its aid towards agricultural development. But, also like other donors, it cut its aid for agricultural development dramatically during the 1990s, falling by 34 per cent between 1990 and 2000. The 57 per cent drop in aid for agriculture to sub-Saharan Africa was particularly steep and difficult to understand.*
> (Canadian Food Security Policy Group 2007, 2).

Schizophrenic rural development

The current agricultural industrial complex, the trade and subsidy regime, and its transport and processing systems, are clearly unwilling and unable to address the poverty and food issues that were the focus of attention at the Club of Rome 30 years ago.[12] Monsanto's Chief Executive, Robert Shapiro, told a Greenpeace Business Conference recently: 'the commercial industrial technologies that are used in agriculture today to feed the world ... are not inherently sustainable. They have not worked well to promote either self-sufficiency or food security in developing countries' (Vasilikiotis 2000, 2).

Quite to the contrary, import and export policies have further deepened the crisis, and have set the world up for an international food system that is inherently at odds with itself, and on the verge of triggering the worst global food crisis in two generations.

What we are witnessing now is the coupling of two complex systems, one for food and the other for energy, into which new global linkages are being introduced,

in the form of 'renewable fuels', new financing systems,[13] and greater uncertainties in the weather due to climate change. The convergence of these factors is increasing pressures on land use in a multitude of ways, and policy makers are unable to make clear decisions based on available information. In the agricultural arena, the traditional tensions around using land for food, feed (pasture), fibre, and forest now have a fifth factor to contend with: land for bio-energy.[14] Experiments with bio-fuels and bio-technology are compounding the problem, as farmers shift from monoculture cash-crop plantations to monoculture forest and bio-fuel plantations, whose long-term effects on soil and water are still unquantifiable and unknown. It is as though no lessons have been learned from the exacting toll taken on farmers by so-called high-yield crops, which increased farmers' dependence on external inputs for irrigation, fertilisers, and pesticides, in order to achieve those high yields.

At the same time, we are witnessing increased urgency and understanding of the importance of bio-diversity, and of small-scale subsistence farming, as the critical solutions on which to pin our hopes for successful adaptation to climate change. It is generally recognised that the agri-food sector plays a critical role in preserving rural landscapes, and contributing to sustainable rural development. The European Union (EU), for instance, has introduced regulations which require farmers to 'apply usual good farming practice' in order to qualify for certain EU funds. Good farming practice involves nutrient management planning, protection of water, good grassland management, compliance with animal welfare and hygiene standards, proper use, handling, and storage of pesticides and chemicals, and the protection of wildlife habitats. The Inter-governmental Panel on Climate Change (IPCC) affirms that 'sustainable development can reduce vulnerability to climate change by enhancing adaptive capacity and increasing resilience. At present, however, few plans for promoting sustainability have explicitly included either adapting to climate change impacts or promoting adaptive capacity' (IPCC 2007, 18).

We are witnessing two farming systems that are at odds with each other. In most developing countries, there are two conflicting models. One is large monoculture plantations (eucalyptus, soybeans, rice, sugar cane), on lands held by a few large companies which promise to make agriculture a predictable process – when in fact nature is *not* predictable, and even less so with climate change. At the other end of the spectrum, there are small-scale farmers – and especially organic farmers – who work very carefully alongside nature. They comprise peasant, indigenous, and landless communities, coming together to form collectives, producing together and demanding agrarian reform, emphasising the role that small-scale family farms play in revitalising rural areas and their economies.

Women mobilise in protest

As highlighted above, women subsistence farmers are excluded from decisions on resource management and crop choices. Furthermore, they have no insurance against the direct consequences of these same decisions, including high costs of food in an era of high-cost fuel, and disaster and risk management in the face of climate changes and climate disasters. More often than not, women do not have access to comprehensive information about the implications or impacts of their choices or actions, but are, perversely, at the front line of activities which inform the decisions which affect them. For decades now, women have been bearing the brunt of experiments with farming livelihoods, including the fall-out from experiments into genetically modified organisms and toxic pesticide use, and coping with the loss of male earners due to high suicide rates in India, due to indebtedness associated with input-intensive agriculture.[15]

Typically, the only changes that women have orchestrated involved protracted – and sometimes violent – protests, through mobilising collective action locally and internationally. In some instances, women's groups have been successful in preventing further damage to their local eco-systems and livelihoods. Niger Delta Women for Justice, for instance, brought together international activists, in solidarity with Nigerian peasant women, and numerous grassroots organisations, to stop the gas-flaring activities of five oil companies in the country – AGIP, Chevron, Mobil, Shell, and Texaco. In January 2006, Nigerian courts ordered Shell to stop the flaring of natural gas. Since the late 1990s, there have been repeated efforts to stop gas flaring, oil spillages, and blowouts in the oil-rich Niger Delta.[16]

More recently, on 8 March 2008, peasant women mobilised against agri-business, and in favour of the Brazilian people's food sovereignty. Nine hundred women, members of Via Campesina in Rio Grande do Sul, occupied 2,100 hectares of monoculture eucalyptus plantations belonging to the Swedish–Finnish transnational company, Stora Enso. The occupation of this ranch by the women of Via Campesina had various objectives:

- to demand that these lands illegally acquired by Stora Enso be expropriated in favour of the Agrarian Reform;
- to demand that projects proposing a reduction of the frontier strip be withdrawn from the Senate and the Federal Chamber, as they will only lead to greater land concentration in benefit of foreign companies, while involving a threat to the ecosystems and to Brazil's sovereignty, causing greater environmental destruction and more poverty for the people;
- to denounce the impacts of monoculture eucalyptus plantations – depletion of water sources, elimination of flora and fauna due to agrochemicals applied in the plantations – that end up affecting peasant farming, as can be testified by the rural population of the

Municipality of Encruzilhada do Sul, where Aracruz Celulose has an enormous green desert (*World Rainforest Movement Bulletin*, April 2008).

In an era of industrial agriculture, the decisions about what is grown, where, by whom, and for what price, are no longer made by those who are doing the growing. The only public recourse that women have is to resort to protracted protest.

Urgent issues for women to address

In today's increasingly complex and interdependent rural settings, we need to ask some critical questions that will enable women to be more proactive.

- What are the ways in which women's needs, priorities, and decision-making can be supported in favour of positive decisions for their livelihoods as well as for the long-term stability of the planet's health?
- How can women reclaim autonomy over their farming and land-use choices, and make both food and fuel considerations central to their farming?
- Is there an argument in favour of women farmers focusing on growing for local subsistence, local community, and local bio-diversity, rather than export markets?
- How should women participate in the discussions and decisions around the new bio-fuel agro-economies that could divert their livelihoods (or even physically displace them) away from food production and/or farming land?
- If women continue to be left out of investment and international aid targets, how can they combine forces to secure income and funds independently for their fuel and food objectives?
- At the same time, as climate patterns shift, farming knowledge (which is never static) needs to evolve with interaction with natural resources, production systems, intelligent technologies, and livelihoods to ensure that women who are in the front line of dealing with climate disasters, can manage and plan for climate change. How can this be done?

Women for food and fuel self-sufficiency, diversity and conservation[17]

Few internationally agreed plans for promoting sustainability have explicitly examined the strengths, versatility, and resilience of subsistence organic farming, and even fewer have considered the critical roles that women are playing in managing communal food and fuel sources. For all the lip service that institutions like the World Bank[18] pay to gender and women's empowerment, the fact remains that mere crumbs of support are offered to rural women, and then only when there is some return on investment, or some novel pilot initiative to be promoted.

In order to support women in leading change at the grassroots level, there needs to be focused attention, organisational capacity, and resources systematically dedicated and packaged to support rural women's needs. Women who both secure household

energy and produce crops could benefit from 'food-fuel' intercropping to meet their community's food and energy needs. Using and renewing biomass resources in a way that complements organic farming practices could make fuel as central a component to the farm plan as food and fodder. At the crux of all this, naturally, is women's access to farmland.

Resources, information, and know-how need to be designed with groups of women to enable them to take a decisive and concerted stand for more knowledge-intensive, bio-diversity-rich, conservationist, and health-conscious farming methods. Women need information on the newest developments in the bio-fuel and other bio-technology sectors. They need to understand that bio-fuels are not a green solution, but are rather a trade-off in terms of land and water use and ultimately ecosystems and livelihoods. Women need to consider efficient ways of using traditional biomass fuels, which offer a clean and sustainable energy source. They need to develop collective negotiating power to ensure that small-scale biomass cultivation and processing production is established for local use. They need to learn about policies and incentive models such as those within Brazil's Social Fuel Seal programme that help smallholders to receive fair prices when they sell biomass to large processors.

Organic agriculture provides a concrete and promising alternative to vulnerable societies to manage production in today's risky climates.[19] By its very nature, organic farming comprises highly diverse farming systems, and by extension increases the diversity of a household's income sources, and hence its capacity to absorb adverse effects of climate change. Organic farming is also a low-risk farming strategy with low input costs and a much lower likelihood of crop failure and loss due to pest or disease attack.[20]

In an interview for *Mother Earth News*, an organic farmer in the USA said:

> *First, organic pioneers were ridiculed. Then, as evidence of the benefits of organic farming became more obvious . . . mainstream chemical agriculture actively condemned organic ideas as not feasible. Now that the . . . public has become enthusiastic about organically grown foods, the food industry wants to take over. Toward that end, the US Department of Agriculture-controlled national definition of 'organic' is tailored to meet the marketing needs of organisations that have no connection to the agricultural integrity 'organic' once represented.* (Coleman 2001, 1)

He went on to emphasise, 'The decision to farm organically was a statement of faith in the wisdom of the natural world, to the quality of the crops and livestock, and to the nutritional benefits of properly cultivated food. [Organic] farmers' goals were to grow the most nutritious food possible, while protecting the soil for future generations. Responsible growers need to identify not only that our food is grown to higher more considered standards, but also that it is much fresher because it is *grown right where it is sold*' (*ibid.*).

The organic and eco-agriculture movements are gathering pace in farming communities across the world. Women's groups combined forces in Andhra Pradesh, India to turn away from pesticide use, and are managing diversified agro-ecological farms (Kavitha 2004).

A network of small-scale farmers in the Caribbean island states, the Knowing and Growing network, has been working with women farmers and producers since 2004, providing training workshops on organic farming and information and communication technologies. During one workshop women farmers visited an organic chocolate farm in Grenada and saw for themselves how cocoa trees grown under the shade of mango trees were protected from the devastation of the hurricanes that hit the island in 2005 (NID/JOAM 2006).

In Bangladesh, ten 'rules' of ecological agriculture provide the basis for development of the Nayakrishi Andolon (New Agriculture Movement), a community-based farmer movement now numbering more than 170,000 farm families in 15 different districts. Several local governments have declared their territories pesticide-free zones, joining forces with Nayakrishi farmers to stop the sale and use of pesticide within their boundaries (Mazar *et al.* 2007).

These examples highlight the critical importance of local knowledge, local systems, and local decision-making.

Concluding note

Climate change will bring with it a disaster divide, where once again those with the means and the power will continue to profit from bio-fuel production in developing countries, and promote technological innovations over lifestyle changes. Experience so far from the management of other public goods and common resources is that it is powerful and rich people who tend to benefit during periods of resource mismanagement and who are least affected by subsequent regulation, while poor and disenfranchised people regularly lose out on both counts.

Protest is an action only of last resort. Where women have control over resources and land-use choices, they are liable to be proactive about making food and fuel decisions that benefit their immediate communities.

Nidhi Tandon is a social activist working with women's groups in developing countries, director of Networked Intelligence for Development, and an independent gender and development consultant. She is from East Africa and is currently based in Toronto. Postal address: 461 Roncesvalles Avenue, Suite D, Toronto, ON M6R 2N4, Canada. Email: Nidhi@networkedintelligence.com

Notes

1 Bio-fuels are liquid fuels derived from biomass (plant and animal matter). First-generation bio-fuels are produced from the edible parts of crops. Second-generation bio-fuels can be produced from cellulose biomass such as straw, agricultural waste, woods, and grasses. Next-generation bio-fuels will be developed from algae and genetically modified plants that are the subject of much research and investment.

2 According to the International Energy Agency, bio-fuels will represent only 4 to 7 per cent of the world's road-fuel use by 2030, compared with 1 per cent in 2005.

3 In 2008, US wheat export prices rose from $375 per ton in January to $440 per ton in March, and Thai rice exports increased from $365 per ton to $562 per ton.

4 Sawit Watch is an Indonesian network campaigning against industrial oil-palm plantations, founded in 1998 by Indonesian NGOs.

5 Fargione *et al.* 2008, p.1. In November 2007 a team from RAINS (Regional Advisory and Information Network Systems) discovered massive destruction of vegetation cover over a large stretch of land near a village called Alipe within the White Volta River Basin in the northern region of Ghana. Heavy agricultural machinery were systematically pulling down trees and decimating the area. Enquiry revealed that the site was to be the beginning of a large *jatropha* plantation developed by a Norwegian bio-fuel company called BioFuel Africa – a subsidiary of BioFuel Norway (*World Rainforest Movement Bulletin* 129, April 2008).

6 Prices had already risen right across Europe and more than doubled in the UK in the 18 months from January 2007(Commodities boom drives up land values, *Financial Times*, 24 April 2008).

7 Jacques Diouf, speaking at a conference in India, 9 April 2008.

8 While bio-diesel is made from edible oil feed-stocks, bio-ethanol is made from sugar-based feed-stocks like sugar cane or corn starch. Both are bio-fuels and have lower emissions, but the key difference is that bio-ethanol is a substitute for gasoline, while bio-diesel is a substitute for petroleum diesel. Diesel engines are common in Europe, which is one reason for the success of bio-diesel.

9 See www.casavaria.com/cafesentido/2008/02/06/282/why-ethanol-production-will-drive-world-food-prices-even-higher-in-2008/ (last accessed November 2008).

10 The latest United Nations population figures suggest that in 2008, humans shifted from being a rural species to being an urban species, with more than half the world's population living in urban areas.

11 Official development assistance (ODA) is defined as those flows to countries on Part I of the DAC (Development Assistance Committee) List of Aid Recipients (developing countries) and to multilateral institutions for flows to Part I aid recipients which are: i. provided by official agencies, including state and local governments, or by their executing agencies; and ii. each transaction of which: a) is administered with the promotion of the economic development and welfare of developing countries as its main objective; and b) is concessional in character and conveys a grant element of at

least 25% (calculated at a discount rate of 10 per cent), www.oecd.org/dataoecd/26/14/26415658.pdf (last accessed November 2008).

12 The Club of Rome is a not-for-profit organisation, independent of any political, ideological, or religious interests. Its essential mission is 'to act as a global catalyst for change through the identification and analysis of the crucial problems facing humanity and the communication of such problems to the most important public and private decision makers as well as to the general public.' Its activities should: 'adopt a global perspective with awareness of the increasing interdependence of nations. They should, through holistic thinking, achieve a deeper understanding of the complexity of contemporary problems and adopt a trans-disciplinary and long-term perspective focusing on the choices and policies determining the destiny of future generations', www.clubofrome.org/ (last accessed November 2008).

13 There are new financial instruments in place in the form of taxes, levies, bonds, and concessional loans and grants, loans and grants from the International Bank for Reconstruction and Development and the International Development Association, as well as various carbon schemes, to mention a few.

14 Bio-energy includes fuel sources that have been used for millennia, such as fuelwood, cow dung, and charcoal. Today bio-fuel production is on a steep curve upwards. Global ethanol fuel production, which accounts for over 90 per cent of total bio-fuel production, more than doubled between 2000 and 2005. Global bio-diesel production nearly quadrupled between 2000 and 2005 (Worldwatch Institute 2006).

15 The agrarian crisis in India has resulted in large scale suicides of farmers estimated to be over 100,000 in the last decade. The system has not addressed the needs of small farmers, the rising costs of farm inputs and the inequalities and increasing burdens placed on rural communities.

16 See www.ndwj.kabissa.org/ (last accessed November 2008).

17 The Organic Agriculture community is aware of the potential of OA for climate-change adaptation. See IFOAM 2007 or the International Trade Centre's report 'Organic Farming and Climate Change'. This publication concludes that organic agriculture has much to offer in mitigation of climate change through its emphasis on closed nutrient cycles, and is a particularly resilient and productive system for adaptation strategies. It also raises the issue of whether organic agriculture should be eligible for carbon credits under voluntary carbon offsetting markets and the Clean Development Mechanism.

18 The World Bank Group president announced increased support to improve the economic conditions of women in developing countries, including rural areas where they face rising food prices and discrimination: '....gender equality is also smart economics' said Zoellick, World Bank Spring Meetings, 11 April 2008, Washington DC.

19 In contrast to the industrial/monoculture approach advocated by the biotech industry, organic agriculture is described by the FAO as 'a holistic production management system which promotes and enhances agro-ecosystem health, including bio-diversity, biological cycles and soil biological activity'.

20 Evidence from farming practice, monitoring and research – Networked Intelligence for Development and Rowan's Royale organic coffee farm, Blue Mountain, Jamaica.

References

AFP (2007) 'Swaziland Spots Seeds of Recovery in Bio-fuel Plant', www.rawstory.com/news/afp/Swaziland_spots_seeds_of_recovery_i_07292007.html (last accessed November 2008)

Brown, L.R. (2008) 'Why Ethanol Production Will Drive World Food Prices Even Higher in 2008', Earth Policy Institute, 24 January, www.earth-policy.org/Updates/2008/Update69.htm (last accessed November 2008)

Canadian Food Security Policy Group (2007) 'Effective Aid for Small Farmers in Sub-Saharan Africa: Southern Civil Society Perspectives Case Studies in Ethiopia, Ghana and Mozambique', Ottawa: Canadian Food Security Policy Group

Coleman, E. (2001) 'Beyond Organic', *Mother Earth News*, the Original Guide to Living Wisely, December/January

Dar, W. (2007) 'Research Needed to Cut Risks to Bio-fuel Farmers', Science and Development Network, www.scidev.net/en/opinions/research-needed-to-cut-risks-to-bio-fuel-farmers.html (last accessed November 2008)

FAO (Food and Agriculture Organization) (2006) 'The State of Food and Agriculture: Food Aid for Food Security?', Rome: FAO, ftp://ftp.fao.org/docrep/fao/009/a0800e/a0800e.pdf, (last accessed November 2008)

Fargione, J., J. Hill, D. Tilman, S. Polasky and P. Hawthorne (2008) 'Land Clearing and the Bio-fuel Carbon Debt', *Science* 319(5867): 1235–8

Goldman Sachs (2006) Global Investment Research, ASEAN: Agriculture: Plantations: Bullish on Bio-Diesel

Holt-Gimenez, E. (2007) 'The Bio-fuel Myth', *International Herald Tribune*, 10 July

IFOAM (2007) 'OA's role in countering CC', www.ifoam.organic_facts/benefits/pdfs/climate_change_english.pdf (last accessed November 2008**)**

IPCC (Inter-governmental panel on climate change) (2007) 'WMO/UNEP Climate Change 2007: Impacts, Adaptation and Vulnerability', Summary for Policy Makers, 18

Kavitha Kuruganti (2004) 'Success Story: An Indian village says ''no'' to pesticides', www.peopleandplanet.net/doc.php?id=2342 (last accessed November 2008)

Mazhar, F., D. Buckles, P.V. Satheesh, and F. Akhter (2007) 'Food Sovereignty and Uncultivated Bio-diversity in South Asia: Essays on the Poverty of Food Policy and the Wealth of the Social Landscape', Ottawa: IDRC

NID/JOAM (Networked Intelligence for Development and Jamaica Organic Agriculture Movement) (2006) 'Information Technologies in Support of Organic Agriculture, Knowing & Growing: Regional Training Workshop for Women Entrepreneurs', 24–29 May 2006, Grenada Workshop Report, www.networkedintelligence.com (last accessed November 2008)

Raswant, V., N. Hart, and M. Romano (2008) 'Bio-fuel Expansion: Challenges, Risks and Opportunities for Rural Poor People. How the poor can benefit from this emerging opportunity', paper prepared for the round-table organised during the thirty-first session of IFAD's Governing Council

Rettet den Regenwald, e.V. (2007) 'Orang-Utans sterben für nachwachsende Rohstoffe', www.regenwald.org/ (last accessed November 2008)

Reyes, L. S. (2007) 'Bio-fuels Gain, but Food Farms, Forests Lose', Mindanao Bureau

Vasilikiotis, C. (2000) 'Can Organic Farming ''Feed the World''?', University of California, Berkeley, CA

World Bank (2008) 'Rising Food Prices: Policy Options and World Bank Response', internal briefing note for Development Committee meeting, http://siteresources.worldbank.org/NEWS/Resources/risingfoodprices_backgroundnote_apr08.pdf (last accessed November 2008)

World Rainforest Movement Bulletin (2008) 'Communities and Tree Monocultures – The Brazil of Stora Enso: Violence against Women and Made-to-measure Legislation'

Worldwatch Institute (2006) 'Biofuels for Transportation: Global Potential and Implications for Sustainable Agriculture and Energy in the 21st Century', Washington, DC: Worldwatch Institute

Yitamben, G. (2008) Extract from interview with President of ASAFE, Mme. Gisele Yitamben, 28 April, www.asafe.org (last accessed November 2008)