

# Fuel for thought

Concerns about energy supply are a key driver behind the worldwide demand for biofuels. Africa has the potential to be a major producer of alternative and eco-friendly diesel, but is it ready? KERRY DIMMER looks at the options

A farmer harvesting almonds for biofuel

**With one eye on the civil conflicts that** have erupted in the oil-rich North African and Middle Eastern countries and another on the radiation leaks at the Fukushima nuclear plant in Japan, fears of another worldwide economic

downturn loom. Our dependency on oil is frightening, and nuclear production can have devastating consequences.

Oil and nuclear power are both sources of energy that are extremely vital to driving our

technical world forward. When either or both become problematic, markets crash, operations cease and people die. Disrupting already unstable energy sources can have devastating effects worldwide.

For some years now – and given scores of technological breakthroughs, case studies and research – we have been aware of the potential of biofuels. Experts in the field believe wholeheartedly that the very survival of the world

depends on finding alternative sources of power because at some point, given supply and demand levels, fossil fuels are just not going to be available. If you think the current wars and conflicts affecting the price of oil are

serious, try get your mind around the consequences once oil becomes a precious and scarce commodity. We have to change our thinking and minimise our dependency on oil and other industrialised power sources.





The croton plant

That is why the biofuel industry is crucial, particularly to Africa, as it works towards becoming an independent and viable economic continent.

What makes Africa an attractive source for biofuels is its vast tracts of land that lie dormant and undeveloped. The debate that rages around using this land for the production of biofuels is, however, controversial. On the one hand, this land could be used to provide food for famine-stricken areas. On the other, crops for the production of biofuel are a commodity and are economically very lucrative.

Christine Adamow from Africa Biofuel and Emission Reduction Limited (Aber) provides insight: 'Biofuel, especially biodiesel, has a place in the world given that fossil fuels are expendable. But the 20-million-dollar question has to be: What is the cost of taking a natural resource of energy and converting it to fuel? What is the cost to the food chain, the environment, the consumer? And what is the cost to future usage and expendability by using up a natural resource?'

Adamow doesn't believe anyone has that answer because the biofuel industry in Africa is still in a formative stage. She points out

that ethanol exploration has been an international focus for some 30 years while Africa is still a toddler of only five years in biofuel exploration, production and research. 'Africa doesn't have a large biodiesel producer at this time so there has been no significant volumes of biodiesel brought to the market yet.'

A case in point is that Aber has been active in Africa for almost 12 years and is only now ready to launch its first business unit. 'Come back in five years,' Adamow urges, 'and we'll open our entire model to scrutiny because we are confident that after all our research we have a good basis for a forward-moving strategy, one that will be a win for the company, the government and the local shareholders, which include the farmers.'

There are a number of biodiesel agriplants that can provide oil for fuel – castor, palm, sunflower, almonds and coconut are among the most popular. However, these are food stocks. Therefore, to minimise the impact on the food chain, biodiesel should ideally be sourced from plants that have no nutritional value, such as the jatropha tree and the croton plant, which have similar characteristics.

Aber prefers croton because it's indigenous to Africa and has been a source for light and cooking heat for centuries, particularly in rural areas. Jatropha was brought to Africa from the Amazon and, given its toxic nature, is used primarily as a hedge to keep animals from invading farmlands.

But Bernie Pavitt from the Jatropha Organisation of South Africa puts no weight to the problem that jatropha trees are not indigenous. 'There are many alien plants in Africa that serve as a source of food so why not jatropha? It can put Africa on the map in terms of biodiesel production.'

'It works very well in symbiosis with other crops so it does not take away from viable food farming. It also develops very well on land that is unsuitable for food farming and it sustains for up to 50 years.'

Jatropha trees can be harvested from the second year and are self-seeding with canopies that need to be pruned only once a year. Jatropha forests also counteract the effects of climate change, bearing in mind that one tree can generally produce enough oxygen in one season for inhalation by 10 people a year. It is also drought resistant

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Biofuel companies are moving to phase out the use of food crops, like the palm oil trees pictured here, for fuel

and has by-product viability in glycerin, and, confirms Pavitt, produces the best quality of oil for biodiesel production.

South Africa currently has some 41 000 ha of land available for jatropha oil investment but it is in Congo Brazzaville, where 250 000 ha is being developed by The Bayo Foundation, that Pavitt (as the programme's project manager), can really prove the potential of jatropha as more than a biodiesel poster child.

'We have determined that from 50 000 ha of jatropha over eight years, 7 271 jobs will be created. That's an average of 909 jobs annually. This will go a long way in satisfying government mandates, particularly in South Africa, to create job opportunities.'

Job creation aside, the real challenge as far as Pavitt is concerned, is that the fuel versus food debate is so overwhelming that international companies are not funding or assisting Africa with biodiesel development as much as they could.

'While this is ongoing, nothing is being done in either case, thereby increasing frustrations given that the vast majority of agricultural land

## *'What is the cost of taking a natural resource of energy and converting it to fuel? What is the cost to the food chain, the environment, the consumer?'*

being considered for jatropha is not suitable for food crops. Anyway, jatropha planting debunks that argument because it can be planted in between viable food harvests.'

Whether using jatropha, croton or any other oil-producing plant for that matter, orchestrating and building a biodiesel industrial sector in Africa needs extremely careful planning, not least of which is the impact of manufacture on the environment.

As Adamow points out: 'Manufacturing can be a polluter unto itself so I think that if governments are going to support biofuels as a new industrial sector there also has to be attention given to the standards for setting up new manufacturing facilities so those do not become emitters of additional new types of pollution.'

African governments should be very interested in developing a new industrial sector, and can't ignore the economic benefits of such a viable market once all the issues are sorted and studies concluded. Governments will have to provide acceptable and stringent policies and will naturally become involved in distribution and purchasing decisions.

However, it will be the public-private sector relationships that will drive biodiesel production into Africa's future. 'The private sector knows how to make money, it owns the technology and skills, and more importantly, it has the motivation to make profit,' says Adamow. 'But in order for any enterprise to be successful it requires the co-operation and commitment of its government.'

'The problem is that Africa and African governments have a long history of failure in public-private partnerships so there's a lot of work yet to be done. Already, and only in the past five years, I understand that some US\$150–200 million has been lost to biofuel project failure in East Africa alone.'

It's been pointed out that failure is often a good thing, in that learning what does not work gives a higher probability of success along the path towards the creation of a winning formula. As it is, it's taken Brazil and India 20 to 30 years to establish their countries in the biofuel market.

'I don't think you can eclipse this curve,' says Adamow. 'It's a process and if you skip the steps between one and ten, you run the risk of failure.'

Africa needs to be methodical and merge the key leadership and stakeholder opinions that will firstly need to encompass how biofuels can address the continent's own needs for energy before it can take advantage of potential international trade opportunities.

Biofuel production on the continent remains contentious and there are legitimate concerns, but ultimately if this market can encompass best practices and minimise our dependency on fossil fuels, it will be supported by the billions of people who want and need to compensate for the harm we have already caused our world. **AD**