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Re: Comments on Draft Regulations regarding the mandatory blending of biofuels with petrol and diesel.

The African Centre for Biosafety (ACB) is a non-profit organisation, based in Johannesburg, South Africa. It was established to protect Africa's biodiversity, traditional knowledge, food production systems, culture and diversity, from the threats posed by genetic engineering in food and agriculture. It has in addition to its work in the field of genetic engineering, also opposed biopiracy, agrofuels, and the Green Revolution Push in Africa, as it strongly supports social justice equity and ecological sustainability.

The ACB has been monitoring developments around South Africa's nascent biofuels industry for some time. Previous publications on the topic include:

- Agrofuels in South Africa: Projects, players and poverty (2008)
- South Africa's Biofuels strategy: Greenwashing agribusiness interests (2008)
- South Africa's agrofuels industry: A non-starter? (2011)

The first two were in direct response to the publication of the Department of Minerals and Energy's (DME) 'Biofuels Industrial Strategy', published in December 2007. Detailed repetition of their contents here is unnecessary; suffice to say that the prospect of further incursion of industrial mono-cropping into the former homeland areas; the potential impact this would have on food production and prices, and who the real beneficiaries would be, were amongst the primary concerns expressed by us.

In 2010, South Africa produced its largest maize surplus in nearly 30 years. This caused tremendous downward pressure on the margins of commercial maize producers in the country, and seemed to resuscitate powerful industry lobby groups into advocating for the reintroduction of maize as a biofuel feedstock. In response to this, the ACB conducted further research into the biofuels landscape at the beginning of this year (2011). The subsequent report that was produced

indicated that the implementation of the Biofeuls Strategy was still very much in its infancy, with only one major project (the Cradock Bioethanol plant in the Eastern Cape) being anywhere near to completion. Further, continuing deliberations over fiscal incentives appeared to be holding back further investment from the private sector (the Cradock project being funded with public finance).

In light of the above, it was with extreme disquiet that the ACB learned of the publication for comment of the draft regulations regarding the mandatory blending of biofuels with petrol and diesel by the Minister of Energy Ms. Dipuo Peters. Having regard to our previous submissions, the focus of these comments will be focused on the practical issues of implementation, and some implications that mandatory blending will have upon agricultural production in South Africa. The Department of Economic Development has in particular made repeated claims around the employment potential of a biofuels industry in South Africa. In the light that respected civil society organisations specialising in labour issues already conducting research into these issues, we do not deal with issues of job creation.

Liquid fuels and transportation in South Africa

Transportation in South Africa accounts for approximately 12% of total Greenhouse Gas (GHG) emissions.[1] Even assuming the highly contested assumption that biofuels are 'neutral' in terms of GHG emissions, how much impact will a replacing less 5% of South Africa's liquid fuels have on overall emissions reductions targets? In the last decade, the total domestic fuel consumption has increased somewhere in the region of 4 billion litres.[2] Over the same period, the number of vehicles on South Africa's roads has increased by over 2.5 million.[3] Continual massive investments in the country's road network (for example R 20 billion on phase one of the Gauteng Freeway Improvement Project[4]) will do little to reverse these trends, quickly negating any incremental emission reductions from the incorporation of biofuels into the national liquid fuel supply.

Bioethanol mandatory blending

Sugarcane and Sugar beet have been put forward as the major biofuels feedstocks. In 2009, the latest figures available show that 11.1 billion litres of petrol were consumed in the country.[5] A minimum blending ratio of 2% of this would require an annual production of 220 million litres of bioethanol. Tongaat Hullet estimates that an E2 (2%) blending ratio could be achieved with 400,000 tons of sugar, with an E5 blend requiring 1 million tons.[6] Though the sugar industry recognizes the potential for growth presented by mandatory up-liftment,

it has been grappling with one of the worst recorded droughts in its history. As such, production has dipped below 2 million tons for the first time since 1996.[7]

Figures from the South African Sugar Association indicate there are 29,130 registered cane growers in country, with nearly 85% of the nation's crop being produced by just 1,550 large scale growers. A further 6.7% is produced by milling companies who own their own sugar estates, with the remainder being produced by just under 14,000 small scale growers who delivered cane to millers last year.[8] Sugar cane production accounts for approximately 18% of South Africa's annual fertilizer use.[9]

The viability of ethanol production from sugar cane will be dependent upon the potential revenue that the industry can earn from exporting sugar. The BFAP predicts that, with rising world sugar prices over the period 2012 – 2020, SA's biofuels policy will 'have to offer significant value if it is to attract investors'.[10] During 2009/10 alone, South Africa exported R2.3 billion worth of sugar.[11]

Though not a traditionally cultivated crop in South Africa, sugarbeet appears to have been earmarked as one that can make a significant contribution to the establishment of a biofuels industry. It is unclear in the long term how sustainable this cultivation will be for small scale farmers, without state support. The proposed 18,000 ha to be used at the Cradock bio-ethanol plant will likely require up to 90 tons of nitrogen per day (assuming sugarbeet is the crop grown) from when the plants have 4 to 5 leaves per plant, until the canopy is complete. Additionally, the Cradock plant needs to obtain a permit for 1.25 million cubic metres of water, as the plant is for industrial, rather than food use.[12]

Though maize has been prohibited from use as a feedstock, owing to fears over food security, a huge glut harvested in 2010 brought the issue to the forefront of the agricultural discourse yet again, with many industry players, and even the Minister of Agriculture, advocating for its re-inclusion in the strategy. Arguments against the inclusion of maize on the grounds of food security have been well made previously by the ACB, and need not be repeated in any great detail here.[13] The dependence of maize production in South Africa on fossil fuel and chemical inputs needs to be highlighted, however, to dispel the myth that maize based ethanol is a truly 'green' alternative. For example, maize production consumes fully 36% of South Africa's fertiliser use.[14] In addition to this, during 2009/10 over 50% of the yellow maize planted in the Republic was genetically engineered to be resistant to glyphosate based herbicides (known as Roundup Ready); this was over 340,000 ha.[15] As a general rule, Monsanto (who own all GM Roundup Ready crop varieties sold in the country) recommends two applications of 2.5 litres per hectare of its Roundup herbicide for its Roundup Ready maize. This has to be mixed with a minimum of 100 litres of water per ha.[16] Even diverting 10% of this land to ethanol production would require 85,000 litres of glyphosate, and a further 850,000 litres of water.

Biodiesel mandatory blending

In 2009 South Africa's diesel consumption was 9.1 billion litres. In order to achieve a minimum 5% blending ratio with biodiesel, as mandated by the regulations, will require approximately 455 million liters of biodiesel production a year. The major feedstocks advocated to do this are canola, soya and sunflower. Canola barely seems credible as a feedstock given that virtually all production in South Africa is confined to the Southern Cape, far from the former homeland areas that have been earmarked as the major sites of feedstock production. Additionally, even if South Africa's entire Canola crop from 2010 were to be used to produce biodiesel, this would still amount to less than 10% of the amount required by a 5% mandatory blending ratio.[17]

Assuming that the majority of demand will be supplied by soya and sunflower, what are the practical and environmental implications of this? To begin with soya, the proposed Rainbow National Renewable Fuels (RNRF) biodiesel plant at the Coega Industrial Development Zone (IDZ) in the Eastern Cape had a planned production capacity of 288 million litres (just under two thirds of total demand). This was to be processed from over 1.3 million tons of soya.[18] During the last crop year, the total soy harvest in South Africa was about 700,00 tons, which itself represented a 23% increase over the previous year. The Bureau for Food and Agricultural policy (BFAP) predicts that by 2020 production in South Africa will have reached 1.7 million tons, which would seem to provide significant quantities for biodiesel production, though the total demand for liquid fuels in South Africa is likely to be significantly higher by this time (as mentioned above).

Probing beneath the veneer of sustainability of soy derived biodiesel seriously calls into question these claims. Presently, close to 85% of the soybean crop in South Africa is genetically modified to withstand the glyphosate based herbicide 'Roundup'. Using RNRFs calculations gives an approximate figure of 210 litres of biodiesel produced for every one ton of soybeans processed. In its latest projection for current summer field crops, the Crop Estimates Committee puts the average[19] soybean yield in South Africa at 1.7 tons per ha,[20] which roughly translates into 357 litres of biodiesel per ha. However, this soya requires other chemical inputs in order to achieve this growth. According to Monsanto's Roundup Ready soybean user manual for South Africa, a minimum Roundup dosage of 2 litres / ha should be used. Additionally, the Roundup must be mixed with between 100 to 125 litres of water per ha.[21] In other words, the production of 227 million litres of biodiesel (half of the amount required under a mandatory blending ratio of 5%) would require 635,000 ha of land, at least 1.2 million litres of glyphosate, and at a conservative estimate, a further 63.5 million litres of water.

Looking at Sunflower as a potential feedstock, studies have given it a moderate fuel yield of around 360 litres per hectare.[22] This would require over 630,000 ha of land to produce. During 2010/2011 sunflower producers planted 642,700 ha.[23] Though Sunflower performs reasonably well under drought conditions, it is still considered an inefficient user of water. It is a relatively efficient user of soil nutrients, particularly compared to soybeans; to achieve yields of above 2 tons per ha between 40 and 70 Kg of nitrogen is recommended (depending on the soil type).[24]

Implications and potential future scenarios

The figures given above are in no way definitive, merely meant to give indications of some of the unseen environmental costs of biofuels production. It should be worth noting that these figures are all based on current land and input usage, and a static level of biofuels demand. These of course are highly unlikely to remain static, even in the short term. Future increases in the mandatory blending levels (for example the EU has a 10% rate) will put even greater strain on the country's resource base. Even if mandatory blending levels are held constant, general increases in fuel consumption will still ensure that biofuels production requirements will continue to increase. Petrol consumption from 2000 – 2009 was a relatively modest 6.9%, which, if the same rate of increase was maintained, would result in an extra demand of around 15 million litres per year. However, consumption of diesel over the same period increased by an astonishing 53%.[25] If these trends continued by the end of the decade, diesel consumption will have overtaken that of petrol, to an annual consumption of nearly 15 billion litres. At a 5% blending ration this would require South Africa to produce approximately 734 million litres of biodiesel. Even allowing for advances in fuel and engine efficiency, it is clear that levels of future demand are likely to put extreme pressure on the country's fragile resource base, particularly when considering that agriculture across Southern Africa is expected to take the brunt of the impact of climate change.

The National Biofuels Strategy has been championed as a driver of rural employment and development as, in theory, feedstocks for biofuels plants are to be grown by and purchased from emerging farmers, particularly in the former homelands. However, the criteria for licenses to manufacture biofuels contain a number of caveats that need further elaboration. For example, the criteria state, perhaps in implicit acknowledgement to severe constraints under which emerging farmers operate, that 'the use of feedstock from commercial farmers will also require a detailed phase in plan and a period for increased use or evening out of feedstocks be emerging farmers in under utilised areas'.

The conclusion one must draw is that for the time being it will be the commercial farming sector, not emerging farmers, who will be the suppliers, and hence beneficiaries, of biofuels production. An official from the Department of Energy

seemed to confirm this when questioned how mandatory blending would be supplied by an as yet un-established supply chain of emerging farmers, stating that too much emphasis was being placed on the position of emerging farmers in current scenarios.[26] The Central Energy Fund (CEF), one of the key state agencies behind the biofuels strategy, having investigated 11 potential projects from 2006 – 2009, currently has no future project investigations penciled in up until mid 2013. [27]

Similarly, provisions are made which will allow for the importation of feedstocks, albeit under certain conditions. Bearing in mind the tremendous extra demand mandatory blending is likely to entail, it is highly likely that some of these feedstocks may have to be sourced from abroad initially. Given the slow progress domestically, and with maize being excluded as a feedstock for the time being and in any vent, supplies in particular being tight due to huge exports over the last 12 months[28], where will these feedstocks come from? In the case of sugar, Brazil is currently the major origin centre for South Africa's sugar imports. The Bureau for Food and Agricultural Policy (BFAP) expects sugar imports to amount to around 120,000 tons per year up until 2010.[29] Brazil is the world's largest producer of ethanol. It is interesting to note that the multinational grain trade Bunge, who recently entered the South African agricultural scene through a joint venture with Senwes, has significant interests in the Brazilian sugar and biofuels industries.

Maize and soya would be the two obvious choices for imports, as these are the two primary crops traded in an international market for GM commodities estimated to be worth $150 billion a year.[30] Yet currently imports of GM commodities from the US are forbidden (as they have approved GM varieties for environmental release that have not been approved in South Africa). Similarly, South Africa's two largest foreign suppliers for GM commodities, Brazil and Argentina, now find themselves in the same position. However, the South African Animal Feed Manufactures Association (AFMA), together with other role players in the grain trade industry have been busy lobbying for the removal of these restrictions and were part of the South African Bureau of Standards (SABS) Committee who drafted requirements of the importation of GM commodities not approved for general release. South Africa is currently negotiating the formulation of a free trade agreement (FTA) with the Mercosur countries (of whom Brazil and Argentina are both members). In light of this information, it appears that extremely powerful interests are at play to stimulate the further trade in GM commodities between Latin America and South Africa. It is not unreasonable to assume that some of this trade could be diverted towards the biofuels industry if not closely monitored.[31]

The environmental benefits of biofuels are highly contested. The United Nations Environment Programme estimates that to power all of the world's vehicles on biofuels would require more land than exists on Earth.[32] Research from the United States has found that maize based ethanol requires 29% more fossil energy than the fuel produced. The figures for biodiesel from soybean and

sunflower were 27% and 118% respectively.[33] The scale of production required by the mandatory blending of bioethanol and biodiesel, as indicated above, will require prodigious quantities of agro-chemicals and fertilizers. The spread of Roundup Ready (RR) crops associated with GM maize and soybean is of particular concern. In the United States, RR crops have been directly responsible for the additional application of nearly 150,000 tons of glyphosate.[34] In Latin America, where small scale farmers eke out a precarious existence in the midst of industrial RR crop plantations, the human health impacts of glyphosate exposure have been horrific.[35]

It should also be noted that South Africa imports over 60% of its current fertiliser demand. These fertilizers, which producers will be relying on to produce sufficient quantities of biofuel feedstock, are heavily dependent upon the fossil fuel industry for both their production and transportation. From early 2007 to early 2008, the international price of key fertiliser ingredients ammonia, urea, DAP and potassium chloride increased by 229%, 213%, 380% and 598% respectively. This translated into local price increases for LAN, urea, MAP and potassium chloride of 171%, 172%, 313% and 271% respectively. Once inside South Africa, the majority of fertilizers are transported by road, due to the capacity constraints inherent in the country's road network. [36] It is highly ironic that projected higher fuel prices in the future are likely to make biofuels more attractive; yet it was the rocketing price of oil that was a major cause of the huge fertilizer price increases mentioned above. One of the primary arguments, not just in South Africa, for the development of domestic liquid fuels sources is anchored on the theories of energy security and foreign exchange savings. Yet for a country so dependent upon imports of key inputs, a far more nuanced reading of the situation is required. The domestic fertilizer industry is heavily concentrated between four companies: SASOL, Omnia, Yara (now Kynoch – taken over by Farmsecure), and Foksor.[37] These are likely to benefit handsomely in the event the domestic biofuels industry takes off.

In the Department of Energy's National Biofuel Strategy mandatory blending ratios were not favoured during the initial phases. As, according to the strategy, we are still a year away from the end of the first phase, we would like to know if the current levels of 2% for ethanol and 5% for biodiesel will be kept? Will the first phase be extended, given the slow progress that has been made so far on the ground? Government agencies (including Transnet, Eskom and the Department of Defense) were cited as being large consumers of fuel in the strategy. With the intention to introduce mandatory blending, are these public institutions still regarded as potential guaranteed markets for biofuels?

Finally, all of the above scenarios have to be considered in the much wider theme of anthropogenic climate change, the impacts of which are already being felt in South Africa and the wider African continent. Do we really want to put ourselves in the position where dwindling food availability will be in direct competition with demand for transport fuels?

The ACB has been tracking the development (or lack thereof) of the biofuels industry in South Africa for some time, and has previously published widely on the subject. Together with many progressive members of civil society, we strive for an economic system that puts the needs of people above the wants of private wealth accumulation, and that ensures an equitable and sustainable use of the Earth's resources towards these ends. We fear that industrial agro-fuels merely perpetuate an economic and political system that is taking us ever further from these goals. A frank and thorough national debate on the issue is sorely needed, and one in which everybody's voice carries equal worth.

We thank you again for the opportunity to make submission on this issue.

Regards,

Mariam Mayet, Director, African Centre for Biosafety.

[1] http://www.pmg.org.za/files/docs/090812greenhouseinventory.pdf
[2] http://www.treasury.gov.za/divisions/tfsie/tax/CarbonTaxWorkshop/National%20Treasury%20Carbon%20Tax%20Discussion%20Paper%20Presentation.pdf
[3] http://www.transport.gov.za/library/docs/stats/2001/table2.3a.pdf
[4] http://www.polity.org.za/article/sa-statement-by-the-deaprtment-of-transport-on-the-gauteng-freeway-improvement-project-e-tolling-01112011-2011-11-01
[5] http://www.treasury.gov.za/divisions/tfsie/tax/CarbonTaxWorkshop/National%20Treasury%20Carbon%20Tax%20Discussion%20Paper%20Presentation.pdf
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[12] http://www.biosafetyafrica.org.za/images/stories/dmdocuments/Agrofuels.pdf
[13] http://www.biosafetyafrica.org.za/images/stories/dmdocuments/Agrofuels.pdf
[14] GRAIN SA (2011). **Fertiliser report.**
[15] http://www.biosafetyafrica.org.za/images/stories/dmdocuments/GMO-Monsantos-May2011.pdf
[16] http://www.monsanto.co.za/en/content/biotech/prod_guides/yieldgard_eng.pdf
[17] South Africa's total Canola crop for 2009/10 was 36,999 tons. In the ACB publication 'Agrofuels in South Africa: Projects, players and poverty', we highlighted a proposed Canola - biodiesel plant in the Eastern Cape that had a planned capacity to produce 200,000 tons of biodiesel (approximately 566 million litres), which would require 500,000 tons of Canola.
[18] ACB (2008). **Agrofuels in South Africa: Projects, players and poverty.**
[19] We appreciate that using an average yield figures, in addition to average recommend application rates presents its own methodolical shortcomings, we do so however as the figure are indicative of issues in the production of biofuels we believe merit further and more thorough investigation.
[20] http://www.daff.gov.za/doaDev/cropestimates/Media_Sep_2011.pdf
[21] http://www.monsanto.co.za/en/content/biotech/prod_guides/soya_eng.pdf (accessed 14/11/2011)

[22] http://www.esastap.org.za/esastap/pdfs/present_bioe02_sep2007.pdf
[23] http://www.biosafetyafrica.org.za/images/stories/dmdocuments/Senwes-Bunge_casestudy.pdf
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[26] Department of Energy, renewable fuels. Personal correspondence. 16/11/2011
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[37] GRAIN SA (2011). **Fertiliser report.**