FACT Position Paper Food Fuels

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Executive summary

FACT Foundation organized an expert workshop on "food & fuels" on May 18, 2009. 26 Participants of a mixed background discussed 9 propositions. Major findings were that:
- The effects biofuels have on food security are highly context specific. It was generally excepted that small scale biofuel production for local development poses less of a threat to food security than large scale production for exports. Consequently, many of the sustainability criteria will have to be different for each situation.
- From a technical point of view there is the potential to produce sufficient food and fuels for the world population, considering 10% bio-energy in the world primary energy mix. However political and socio-economical issues are more determinant. When farmers are given the right incentives, they will invest and their production of both food and fuels will increase.
- Multipurpose crops, that can be used both as food and fuel, increase farmers income - and food security since they can be consumed in case of food shortages. Besides, better market prices ensure farmer investments in yield increasing technologies.

Introduction

The FACT Foundation organized an expert workshop around the debate on "food & fuels" on May 18, 2009. Biofuels receive a lot of criticism lately which mostly focuses on large scale biofuel production for export. The positive role biofuels can play for developing countries and the conditions under which biofuels can be best deployed receive much less attention. The validity of the arguments against biofuels and the conditions under which biofuels play a positive role for development were discussed on basis of 9 propositions.

This position paper is the main result of the seminar and reflects the issues that were discussed during the workshop.

The content of this position paper is:

- A discussion on the **criticism on biofuels** related to food production. In the food-fuel debate criticism mostly extends to biofuel production as a whole.
- An overview of the many **distinctions in biofuel production** which strongly determine the effect on the issue of food – fuels.
- A list of the **different issues** that are crucial in the debate on food – fuels.
- Notes of the **propositions** that were discussed.
- **Conclusions and recommendations**. These always refer to a specific context but general trends mentioned.

Criticism on biofuels

Many nations consider biofuels as a means to increase energy security, an economic stimulus and as a means to combat climate change. This led the EU and several other countries to implement mandatory blending targets for biofuels, which created a large artificial market. In most countries the energy that can be extracted from organic residues and the amount of biofuels that can be produced from energy crops at a national scale are not sufficient to meet the targets. Bio-energy therefore

needs to be imported from outside the EU, including many developing countries where it could be produced at a large scale.
There are many points of critique on this type of large scale biofuel production for exports. It could lead to:

- new forms of colonialism in which developed countries claim land in developing countries for their energy security;
- food crises in a number of countries where food prices have risen due to various external factors and where this increase is mainly attributed to biofuels.

Besides, many studies take the global biofuels production potential as a starting point and conclude that biofuels cannot meet the total global energy needs or only when almost all agricultural land is used for bio-energy production. This is correct but it is not a valid argument against biofuels as such since just like many other renewable energy sources, biofuels will only be part of the future energy mix. Another issue is that GHG emission reductions of biofuels are questionable.

Distinctions in biofuel production systems

Many distinctions can be made in biofuel systems (from production to utilization); they can differ in many aspects, or include both sides of the distinction. The context of each biofuel system is defined by a combination of these aspects. The effect biofuels have on food production therefore may differ for each context. Various distinctions are shown in the table below.

table 1. Several distinctions in biofuel production systems.

1	Use of crop production	vs.	Organic residues
2	Exclusive energy crops	vs.	Multipurpose crops
3	Annual crops	vs.	Permanent crops
4	Use of plant organ only	vs.	Use of whole crop
5	Calorific value as only use	vs.	All plant components are used at their highest value (cascade use and biorefinery)
6	Mono-cropping	vs.	Intercropping
7	Export oriented	vs.	Local production and use
8	First generation biofuel	vs.	Second generation
9	Large scale	vs.	Small scale
10	Land based biofuels	vs.	Aquatic biofuels
11	Use of agricultural land	vs.	Use of wasteland
12	Rural production	vs.	Urban production
13	Closed nutrient cycle	vs.	Permanent nutrient removal

Issues related to Food – Fuels

Different issues relate to biofuels and food security and are mentioned here. For each given context (biofuel production system) these issues are different. Sustainability criteria for these issues should also refer to these contexts. Some issues extend beyond food and biofuel production systems. An example is dumping of excess agricultural products from developed countries in developing countries which puts market prices under heavy pressure.

Technical issues

The agricultural production potential is based on local natural factors, such as crop characteristics, geography, soil and climate. Actual production is always lower and depends on human management,

e.g. use of fertilization, irrigation, weeding and pest and disease management. It is important to assess the local potential (considering technical limitations) and compare these with local energy and food requirements to see if enough food and fuels can be produced.
Consider the case of local production of Jatropha on wastelands and the extraction of oil and the use of residues (fruit hulls, presscake) for biogas production. There is a cascade of multiple energy extraction steps. Nutrients remain in the residue from biogas production and can be returned to the fields. Jatropha seeds can be left on the trees and be harvested when labour is available. In such context there is great potential to produce bio-energy without influencing food production. The situation is different with large scale production of biomass for exports using agricultural land. Food production decreases when large amounts of agricultural land are dedicated to energy crops, unless per hectare production levels are boosted.

Socio-economical issues

Food production strongly depends on food and energy prices. Food prices may be highly volatile and when food producers have access to the energy market and vice versa competition can help to stabilize and increase prices for agricultural commodities. Better prices make it profitable to implement technical yield improving measures.
Policy issues will strongly determine whether biofuel and food production systems provide enough income and security. Policies that promote land ownership will give farmers security of land which makes them more willing to invest in it. Production of food and fuels both put claims on locally available labour. This needs consideration. E.g. an agricultural calendar should determine when labour is needed for plantation management, harvest and processing of food and biofuels to determine whether there are any conflicting claims on labour. Land grab is also influencing food security and biofuels. Capital rich buy or lease land in developing countries to produce food and biofuels for their own markets. Whereas in some cases these developing countries receive food aid from the U.N.
Consumption patterns strongly determine the amount of land needed to provide sufficient food and energy. Eating meat, driving and flying for example put very high claims on land (a large ecological footprint).

Environmental issues

Important to include in the discussion as well are the competing claims food and biofuel production have on nature, soil nutrients, water use and erosion. Water should be available for both and enough water should be reserved for other local purposes (soil buffer, other vegetation, drinking, local industry, etc.). Biodiversity relates to diverse healthy diets. Greenhouse gas emission reductions are different for each type of biofuel production. It is important to consider the amount of fossil fuels that are replaced by biofuels and the carbon storage in aboveground and underground biomass.

4. Propositions

1. “Biofuels can be produced at current agricultural lands and no extra land is needed, since in most developing countries agriculture is not well developed, production per ha could be doubled or tripled using better inputs (better varieties, nutrients, good weeding, etc) and surplus yield can be an energy source”

There is a general agreement that it is technically possible to double or triple yields. There is also the potential for optimizing the use of crops by separation of the different plant components and use of them at their highest (functional) value. In order of importance, political, economical and than technical issues determine agricultural production levels.

Economical limitations are low food prices and price volatility. A major political limitation that policy in developing countries is more focused on the urban than on the rural population. The issue of land rights also plays an important role. Landless farmers do not or minimally invest in land to make it more productive. There is a lack of information and awareness on prices for agricultural commodities among poor farmers. If this information is available it would create awareness, which would help the farmers get better prices.

Credit provision is a very important issue that will help yields to increase, in this respect more social investments would help. Structural adjustment plans should be allowed to subsidize inputs for farmers. Investment in farmer training is also very important.

Moving into biofuel production can be risky – particular when its unknown crops like Jatropha. It is not fair that farmers should carry the risk – particularly not because many do not understand the risk involved. Crop insurance can minimize the risk and make farmers more willing to try new ventures. Crop insurance programs are of course common throughout the developed world but also has a long history in developing countries. However, it appears to have been neglected over the last decades when structural adjustment and market led interventions dominated. FAO published a "Compendium of Crop Insurance Programmes" back in 1991. Crop insurances have been tested in Mozambique over the last two seasons with promising results.

2. "When biofuels produced in LDC's are meant for export to Western countries at least two conditions should apply: (1) strict sustainability criteria for the complete chain and (2) only surplus shall be exported (biofuels shall first be used to satisfy local demand)"

Most participants are sceptic about the applicability of sustainability criteria; it might not be easily enforced. Criteria can also be an obstacle to small farmers, since these criteria may be impossible to meet. The importance of these criteria must be seen more in the light of their role in initiating processes and change than in enforced laws. Criteria put companies under pressure; Essent for example stopped importing palm oil for co-firing because of sustainability claims that could not be substantiated. Certification in one country can also lead to relocation of unsustainable practice to another country.

The majority of the discussion group is sceptical when it concerns export and therefore the discussion focused mainly on local production and use. Dutch Minister Mr Bert Koenders made the following statement: "No African shall be left in the dark because we import biofuels". When bio energy exports are controlled by supply and demand and price driven incentives there would be no export/import of biofuels. It is an artificial market created by mandatory blending targets and subsidies.

A difference should be made between biomass and bio energy. Energy carriers like bio oil or bio gas do not contain nutrients. Export does not lead to nutrient depletion.

3. "When resources (available land, water, nutrients) are scarce and food production is just sufficient, food production should be given priority, next biofuels"

The majority of the discussion group does not agree with the proposition as such. Knowledge, capital and people should be added to the mentioned resources. It is mentioned that farmers could sell bio energy and buy food from income that is generated. One cannot force farmers to cultivate food crops when energy crops provide them with better income. However this only is possible when there is a good market infrastructure.

The choice between food and fuel crops is highly dependant on price volatility. Food prices are suggested to be more stable than energy prices, which are connected to the world oil price. It is questionable if the income of subsistence farmers should be linked to something as volatile as the oil price. The more because small farmers are unable to react to price changes. They generally cannot store their product when prices are low to sell later. Improvement of the welfare level of small farmers is not so much a matter of stimulating energy crops, but one of stable price increases of primary agricultural products. Also one should realize that not all crops can be stored and that the further processing of these crops to storable products can further enhance price stability.

Fragmentation of large families and shifting to less storable crops over the last decades has contributed to the reduction in storage capacities. Farmers are forced to sell whatever they have due to the subsistence level they are at. The advantage of food crops over energy crops is the lower risk. At least some of the food crops will have a reasonable price by the time they are harvested. The same holds for a combination of food and energy crops.

4. "A policy for price stability is required for the food crop and biofuel crop market"

The majority is in favour of this proposition. The main problem for the small farmers is their poor connection to markets. Even if they produce extra yields, there is no place to sell them. Food aid and dumping of cheap food in LDC's also causes problems which led to the tortilla crisis for example.

Policy opportunities for price stability:

- guarantee a minimal price and production quota for food crops;
- import duties on all agricultural crops that can be produced in the country itself; only at the time a domestic oversupply is reached.
- change margins in the vertical production chain. The aim should be to have higher prices at the farm and lower prices at the markets in cities. This means the cash flow to middlemen should be reduced.
- insurance systems which are accessible for small farmers.

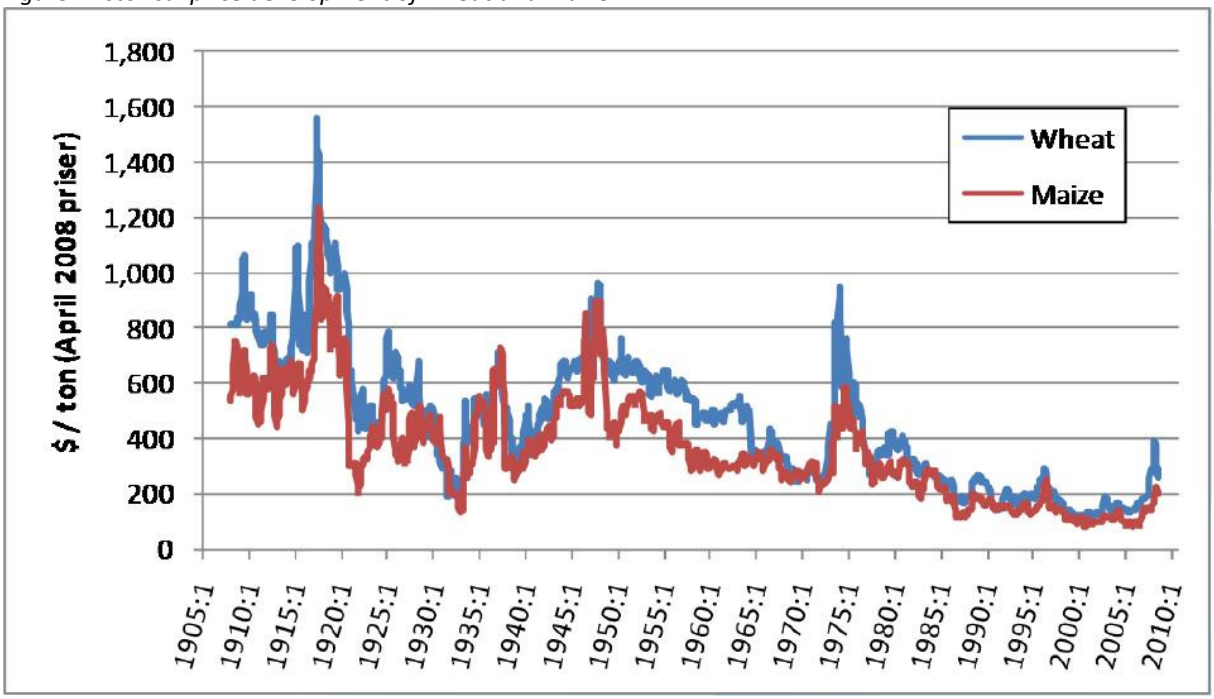
However, higher food prices do not always benefit the farmer. In Ethiopia for instance the price of some food crops rose in 2000. Main beneficiaries were the government and a group of wealthy people. This shows that existing power structures and corruption may prevent that farmers benefit from higher food prices.

In the food-fuel discussion higher food prices resulting in competitive claims on land, are one of the arguments against energy crops. In this parallel session most people advocate higher prices for food crops. How should this be interpreted? The main problem when food prices are affected by oil prices is again the volatility. Big firms in EU + US can react to this flexibility. Small farmers cannot react to flexible prices as they are unable to store when prices are low or increase their yield when prices are high. They also lack access to information. The argument of opponents of biofuels is that higher food prices shift poverty from farmers to the lower income group in urban areas. This argument is valid and should be tackled by improvement in the production to market chain. In this chain serious efficiency improvements are possible; also subsidized basic stable food prices for the poor can be provided or direct monetary income support of the poor can be considered.

5. "Change in consumption patterns (shift from vegetable based to animal based diets) plays a much larger role in food security issues than biofuels. In other words: rather a vegetarian in a Hummer than a meat-eater in a Smart"

There is an academic debate on the role of a) consumption patterns, b) speculation, c) production shortfalls (low stocks), d) biofuels and c)increased prices of agricultural inputs (linked to oil prices) on recent increases in food prices. Various think tanks such as the FAO, World Bank and OECD indicated the following relative weight to the underlying causes of the rise in food prices: 40-45% for meat consumption, 30 % biofuels, 25% speculation. Other studies show different percentages. The following graph shows that the price volatility also occurred long before the introduction of biofuels.

Figure: Historical price development of wheat and maize



source: Kenneth Baltzer, ELOBIO workshop, Bruxelles, October 2008

A suggestion is to use the concept of ecological footprint in the discussion. E.g. pork is more efficient in converting feed into meat and fat than beef. Eating beef has a worse effect than pork.
The numbers are clear; consumption pattern has great impact. Global awareness programmes on the importance of various lifestyle decisions on climate could be important. However fiscal measures are needed to complement awareness. When people have to pay for their ecological footprint, they are more likely to change their behaviour. Behavioural patterns do not change easily. Therefore it should be on political agenda, combined with a positive and optimistic message.

6. "The economic feasibility of biofuels should be compared to energy alternatives like hydro-power, wind, solar and or conventional alternatives"

The proposition should focus on economic feasibility for rural villagers. It might be more useful to compare biofuel crops to other agricultural crops when considering the effects for local farmers. Renewable energy is the focus of the western countries, while farmers focus on survival and basic needs. Farmers generally do not look beyond the first harvest. Immediate economic returns are necessary (annual crops). Farmers need to be able to make informed decisions.

Comparison of biofuels with other renewable energy sources is difficult because of a) different project sizes, b) different local needs, c) social acceptance and d) effects on employment.
Local acceptance and suitability are connected to technological simplicity and investment costs. The preference for high investment, low variable costs or low investments, high variable costs depends

on the situation. For poor farmers low investment costs and high variable costs are an opportunity for local economic activity. The more isolated the area is from access to energy the more attractive local bio energy becomes.

7. "Land can be used for the production of food and fuel either using crops that can have both options (e.g. sugar cane, corn, sunflower) or intercropping single food or fuel e.g. Jatropha or Pongamia combined with intercrops. The first system is more flexible, and might be preferred to ensure a food safety net"

The focus on climate change may prevent project developers from intercropping biofuels with food because food crops do not apply for carbon credits. Using residues for bio energy is promoted in a similar way to reduce GHG emissions and might thus be economically attractive. Ecologically it might be better to use it as cattle feed when possible. Burning biomass is not a good idea because some nutrients are lost, and the organic compound structure turned into ashes. In case of bio gas energy can be extracted first, and then nutrients can be returned.

No one in the session agrees with the statement that non-edible crops have an advantage over edible crops when it comes to biofuels. Crops that are edible and have energy uses a) increase food security, since in times of scarcity the crop can be consumed b) increase farmers income security because they can sell to energy and food market, c) can generate fuels in general at a much lower capital requirement than non-edible crops.
Projects that promote small-scale local production and consumption of biofuels can show positive results for certain forms of bio energy. These results in many cases do not apply to large scale business oriented biofuels projects. Therefore it is important that these positive results are not misused by large scale investors for totally different biofuel projects without positive impact locally.

8. "In many cases the GHG emission reductions from biofuels do not compensate for the initial GHG released because of land use conversion (e.g. conversion of rainforest on tropical peat soils to palm oil plantations)"

It is generally agreed upon that GHG emission of land conversion is frequently not compensated by CO2 reductions of biofuel by replacing fossil fuel emissions. There should be a more common agreed standard GHG tool to be able to judge the GHG balance of a biofuels project.

GHG balances might lead to negative judgement whereas other with perspectives the development is positive. For example when crops that have poor yields or poor market prices are replaced by better yielding ones. Or when one replaces poor crops, on a piece of land where bio diversity is already lost, with a higher yielding crop. Savannah like areas could, with the right effort, be transformed into agricultural land. This might be negative from a GHG reduction perspective but it might decrease the amount of rainforests (an even higher carbon rich vegetation) to be cleared.

9. "Land rich in biodiversity should not be converted into agricultural land for biofuels"

Everyone in the group agrees on this point. Though it is argued that western countries also had their learning curves in industrial development and destroyed nearly all biodiversity around them. Who are we to determine how people in Africa or Asia should be living their lives and use their natural resources? Local farmers want to cook their food and do not care that it comes from a rainforest. Even if they did care, what alternatives do they have? If Western people want to preserve biodiversity in rainforests they should be providing the solutions. At the moment these solutions are lacking. The Western countries should focus combining solutions to local needs with solutions to

global issues like climate change and be prepared to pay the price for it. Humans have already killed most of the wildlife and biodiversity on this planet. If we want to preserve what is left it should be our money and effort, not that of e.g. subsistence farmers in sub-Saharan Africa. There are hardly unused lands; most lands have some kind of use.

5. Conclusions & Recommendations

Main conclusion is that one can only discuss "food – fuels" for a specific given context (biofuel production type) and that one can hardly generalize.

Technically speaking, enough food and fuels could be easily produced when we consider the contribution of biofuels in the total global primary energy supply to be 10%. The main problem is that the technical potential is in many cases not reached because of political and economic barriers. There are areas with a high potential for biofuel production and areas where biofuels can hardly be produced (e.g. deserts). Borders, trade barriers, isolated regions with poor infrastructure, etc. make it impossible to consider this 10% average for all parts in the world. The contribution of biofuels in the energy mix and the impact on food security should therefore be considered at national and local levels.

Logically speaking a developing country with an energy shortage would not export biofuels before meeting domestic energy demands. However export of biofuels can help developing countries earn foreign exchange. They receive good prices because of the large demand because of mandatory blending targets in developed countries and can earn extra money from carbon credits. It might then be profitable to purchase cheaper fossil energy from abroad. Without these mandatory blending targets and carbon credits this would likely not occur.

Prices for agricultural commodities, price volatility, land security and access to capital, knowledge and inputs strongly determine to what extent farmers adopt technical measures to increase yields. These thus also determine to what extent farmers approach food and fuel production potential. Policy strongly influences these factors and thus plays a crucial role. Opportunities to reduce price volatility for agricultural products (both food and energy) can be the following:

- Consider the crop type: perennial versus seasonal. The latter gives farmers more flexibility.
- Good governance that stimulates subsidies or guaranteed prices.
- Development of local markets as primary markets.
- Create energy need in the local market as a stabilising factor for prices of energy crops. Micro finance and social investors are possible catalysts. Local economy is a pillar for long term stability.
- Combine different crop types to spread risks.
- Long term price agreements and safety prices both for food and energy crops.
- Farmers should become more involved in the distribution chain in order to reduce their dependence on middlemen and have better access to the market.

There is scepticism on the applicability on the sustainability criteria. Criteria should differ for the many contexts or biofuel production types. In many situations (e.g. remote, poorly developed areas) they will be very hard to enforce.

The distinction between food crops for energy and non-food crops for energy and the preference for non food crops makes no sense. Multipurpose crops (that can be used for food and energy or other uses) increase the market value and income security for farmers. Moreover they can be consumed in times of food shortage.