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Global Assessment of Biomass and Bioproduct Impacts on Socio-economics and Sustainability

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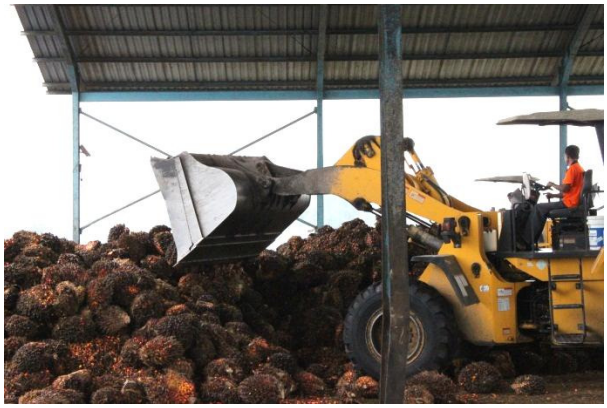

Visit of Global-Bio-Pact representatives to the T Karya Pertama Niaga Jaya CPO Mill in Indonesia

Global-Bio-Pact Meeting, Workshop and Study Tour in Indonesia

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During one week in March 2011, the Global-Bio-Pact consortium organised a workshop, a study tour and an internal project meeting in Medan (Sumatra), Indonesia.

The Global-Bio-Pact International Workshop "Sustainability of Global Trade of Biofuels & Bioproducts", organised by Greenlight Biofuels Indonesia and supported by WIP Renewable Energies, Germany, took place at the University of North Sumatra, Medan, Indonesia on Wednesday 16 March 2011. The workshop was intended to engage various stakeholders working on sustainability issues related to the biofuel and bioproduct value chains and trade, and to encourage discussion and exchange of ideas between international members of the Global-Bio-Pact consortium and Indonesian stakeholders. As the workshop was held in Indonesia, much of the discussion, and all the presentations from Indonesian participants focused on issues in the palm oil sector, as palm oil is the country's primary potential feedstock for biofuel production.

Over 40 participants attended the workshop, including both local stakeholders and international consortium members. Participants represented academia, national research institutes and NGOs. Recurring themes throughout the workshop included the challenges faced by smallholders in obtaining certification, the role of sustainability certification schemes in improving sustainability standards and

the conflicts between social and environmental sustainability and economic development. A summary and the presentations of the workshop are available at the Global-Bio-Pact website.

The workshop was followed on 17 March by a study tour for Global-Bio-Pact consortium members. The objectives of the study tour were to enable the Global-Bio-Pact participants to see the actual palm oil production chain and discuss production practices with mill operators. In addition, study tour participants were able to observe first hand and gain an understanding of the production process of palm oil by smallholders which represent 45% of total palm oil producers in Indonesia.

The tour included visits to an independent palm oil mill (T Karya Pertama Niaga Jaya CPO Mill, KPNJ) in Batubara District, and to a group of independent oil palm smallholders in Perbaungan District, both in North Sumatra Province, south of Medan. A detailed description of the study tour is available at the Global-Bio-Pact website.

The Global-Bio-Pact consortium would like to thank the University of North Sumatra for their support in hosting the workshop, the owners and managers of PT Karya Pertama Niaga Jaya (KPNJ) CPO Mill for their hospitality, and Bapak Sabirin from PANSU and the farmers with whom he works for allowing us to visit their village.

Study tour participants in the KPNJ conference room

Update on the Global-Bio-Pact Case Studies

By the Global-Bio-Pact consortium

In the framework of Global-Bio-Pact, Case Studies on socio-economic impacts of biofuel and bioproduct value chains are investigated. The objective is to use the input of the Case Studies for the elaboration of recommendations on how to address socio-economic impacts in sustainability schemes. The current status is presented below.

Methodology

The following methodology for the elaboration of the Case Studies was agreed by the Global-Bio-Pact partners. The following Case Studies for socio-economic impacts are investigated in the framework of Global-Bio-Pact:

- Biodiesel from soy in Argentina
- Palm oil and biodiesel in Indonesia
- Bioethanol from sugarcane in Brazil
- Bioethanol from sugarcane in Costa Rica
- Jatropha oil and biodiesel in Tanzania
- Jatropha oil and biodiesel in Mali
- Lignocellulosic ethanol refinery in North-America
- Pyrolysis refinery in Europe

In each Case Study country of the Global-Bio-Pact project assessments at national, regional level, as well as at the local, company or project level are currently implemented.

The Case Studies at the national level were selected in order to balance the geographical distribution (Africa, Latin America, Asia, Europe, N-America), feedstock sources (soy, palm oil, jatropha, sugarcane, lignocellulosic feedstock), conversion technologies (e.g. fermentation, pressing, transesterification, hydrolysis, gasification) and products (biodiesel, pure plant oil, ethanol, bioproducts, 2nd generation technologies). Thereby, the assessment focuses on existing conversion technologies since these are the current hotspots of socio-economic concern, but also include impacts of future technologies which are not yet commercially available.

In the Global-Bio-Pact project, the regional level was defined as a homogenous region in climate, soil, and socio-economic parameters. The size of the region depends on the country and can be a province or district.

At the local level the system boundary is an area of a farmer, company, association or project. The local area refers to the area where the biomass feedstock (including by-products) is produced and converted into the final or intermediate product. In each Global-Bio-Pact Case Study country different local Case Studies (projects, companies) were selected and investigated. Thereby, the local Case Studies can be within or outside the regional boundary. The investigated topics at the local level are:

- Economics
- Employment generation
- Working conditions
- Health issues
- Food issues
- Land use competition and conflicts
- Gender issues

Thereby a main outcome of the Case Studies at the local level will address the following issues:

- Relevance of impacts
- Link of socio-economic/ environmental impacts
- Determination of thresholds
- Impact mitigation options
- Impact of biomass certification

The Case Studies are currently elaborated by national partners of the Global-Bio-Pact project. The following chapters present a state-of-the-art on these Case Studies. The final reports on the Case Studies will be published by end of 2011 and will be available at the Global-Bio-Pact website.

Case Study: Soy in Argentina

National level: The Case Study in Argentina is on biodiesel from soy and its related products, since Argentina is a main player in biodiesel production with a capacity of 1.6 million tons/year (2009) and investments that forecast a total production of 3 million t/a in 2011. A main focus of the Case Study in Argentina is an analysis of the soybean complex at national level due to its magnitude and importance for the whole country. The Argentinean soy complex and economy is one of the more dynamic sectors of the country, generating almost 30% of the external currencies income due to exports and representing almost 30% of the agro-industrial sector GDP. Argentina is the world's leading exporter in soybean oil, soy meal and soy biodiesel and the third exporter in soybeans.

Regional level: The main productive area of Argentina (Santa Fe, Cordoba, Entre Rios) as well as the regional production chain in the North Western part of Argentina has been selected as regional Case Studies. The first one is placed in the main region of soy production were more than 80% of Argentinean soy is produced and about 90% of the crushing capacity is installed. The second area belongs to a regional production facility placed between the provinces of Santiago del Estero and Catamarca.

Case Study: Oil palm in Indonesia

National level: Palm oil has the largest share (57%) of the world's vegetable oil exports. The production continues to increase, particularly in Indonesia. Malaysia and Indonesia are the world's largest producers of palm oil, producing 86% of total global palm oil output in 2006. As palm oil is one of the major natural resources for bioproducts and biofuel production in Indonesia and as large impacts are expected, it was selected as Global-Bio-Pact Case Study.

Palm oil, which is extracted from the fruits of the oil palm, has many uses, for example in food products, cosmetics, animal feed, biofuels, and chemicals. Partly because the oil palm has the highest per-hectare yield of all edible oils and due to the steady increase of Indonesia's palm oil export, palm oil is foreseen to become one of the most important vegetable oils in the world. Thus, growers in Indonesia are increasing the production of palm oil to meet the global demand. The Indonesian Government promotes palm oil production to become the world's top producer of palm oil and at the same time it is regarded as a major tool of rural socio-economic development.

Although palm oil generates a considerable amount of foreign currency for Indonesia, its production may have significant negative environmental and socio-economic impacts resulting from large scale palm oil production. Examples are expropriation of community forest land, which deprives local communities of their livelihood resources. Large scale oil palm cultivation may also undermine local employment. Three main ownership models are investigated in the Global-Bio-Pact project:

- Private plantations
- State owned plantations
- Independent smallholders

Regional level: The main regional focus is North Sumatra. The region is a major producer of palm oil, contributing 18% of Indonesia's national production. The sector is a key contributor to the region's economy and is well established within the region, having originated here. North Sumatra is considered to have the most favourable soil and climatic conditions for plantation development and has well developed infrastructure. Although the full range of ownership models are represented in North Sumatra, the region is particularly notable for having the country's longest standing plantations and those exhibiting industry best practices. North Sumatra also allows for the study of the entire conversion chain, being home to refineries and downstream processing facilities.

Global-Bio-Pact study tour participants
in discussion with oil palm smallholder farmers

An important feature of the palm oil industry in Indonesia is its regional diversity. Therefore, it was decided to investigate a second region, Jambi, in South Sumatra as a comparison to those in North Sumatra. Like North Sumatra, palm oil production is important to Jambi's regional economy. However, it represents a contrast in terms of average size of plantations, having smaller, independently owned plantations, and less established infrastructure. Drawing local Case Studies from two regions also allows understanding the impacts of the differing approaches of provincial governments on socio-economic and environmental impacts.

Local level: The first local Case Study of palm oil production in Indonesia is the independent smallholder system in Harapan Makmur Village, Jambi. The village is located in a relatively isolated part of Jambi province. Oil palm smallholders in this village have been cultivating the crop for a maximum of 6 years. They have adopted oil palm independently, purchasing planting materials from traders. The crop has been widely adopted amongst villages, with 70% of village land now used to cultivate oil palm. The socio-economic impacts of palm oil production in this village are mixed: farmers are earning a higher income than with previous crops, selling their fresh fruit bunches to traders, who subsequently sell them on to the nearest palm oil mill. However, the full income potential of palm oil is currently not yet being realized for farmers in this village. Remote from the nearest mill, lacking in extension services and market information, their yields are low and their bargaining position is weak: the price they receive for their crop is significantly lower than factory gate prices. Moreover, in converting large areas of land to oil palm from rice paddy, the village produces far less food than it previously did.

The other Case Studies are drawn from North Sumatra, with studies of a large private plantation associated mill, a contrasting group of independent smallholders, and a palm oil refinery with plans to begin biodiesel production about to be undertaken.

These Case Studies have been selected to represent both the entire production and conversion chain of biodiesel from palm oil, but also to capture some of the diversity, particularly in the production stage, present in Indonesia.

Case Study: Jatropha in Tanzania

National level: Tanzania has considerable land resources for liquid biofuels production which could be used for export earnings as well as to reduce fossil oil imports, to increase employment, and to stimulate rural economic growth. In recent years, there has been a growing interest in liquid biofuels. Local and multinational investors are acquiring increasingly large farms, some in the range of up to 400,000 hectares in some parts of Tanzania. But also some smallholder farmers have developed interest in taking advantage of this opportunity through improving rural energy services, soap production and selling seeds and oil to large companies. Jatropha is being considered as one of the main crops for producing biofuels (biodiesel or straight vegetable oil - SVO) in Tanzania.

The growing interest in liquid biofuels production has also increased government commitment to the promotion of the biofuel sector. However, while the biofuels sector is growing, the country is facing several socio-economic challenges without a clear bioenergy policy. There are only statements within energy, agriculture, forest, land and environment policies aimed at enhancing production and use of solid biofuels. Liquid biofuel guidelines have recently been approved by the parliament. However, recent development in biofuel production in the country has led to calls on government to develop a comprehensive policy and strategies for biofuels development.

Regional level: The first Case Study in Tanzania assesses the Sun-Biofuels company located in Kisarawe District, Coastal Region. The company is representing a stand-alone large scale plantation model. Sun-Biofuels (Tanzania) Ltd has invested in an 8,200 ha plant with a strategy to cover the whole biofuel value chain, from feedstock cultivation to processing and marketing of the end product. The company has directly and indirectly affected over 10,000 inhabitants in 12 villages from which the land was allocated for jatropha plantations.

The second Case Study is the company Diligent in the Arusha region. It is representing a contractor business model for jatropha in which smallholder farmers are producing jatropha seeds on contractual arrangements with Diligent. The company has entered into contracts with local smallholder farmers, who grow jatropha and contractually supply seeds to the company. The company has no own plantation-based production, but it sources seeds solely from contracted local farmers and out-

growers. The company is producing oil for domestic use and export. The by–products are used locally.

Local level: At local level the independent small-scale farmer model plays an important role of producing, processing and marketing jatropha. Some small-scale farmers are organised in associations/cooperatives in order to locally produce, process and use jatropha oil and its by-products for meeting their different own needs.

The Case Study of independent smallholder communities for local level focuses on Leguruki and Selela Village Communities in Arusha Region. Jatropha is produced from small farms by intercropping with other crops or planting on their farm hedges. Jatropha oil and other by products are either used locally or sold to local processing centres (Energy Services Platform - ESPs) for rural electrification and motive power for milling, dehusking and oil pressing. Villagers bring their seeds for pressing to the ESPs in order to produce jatropha oil. Electricity is distributed to the villagers from ESPs through mini-grids constructed in the two villages. Villagers have been using electricity as an alternative energy source for the provision of light, powering various electrical appliances such as radio, TV sets, charging mobile phones and other services. The installed ESPs create income for village government through collection of taxes from entrepreneurs who own ESPs and individuals through selling jatropha oil and other by-products. Moreover, jatropha oil is used for soap making, insect repellents and seedcakes for biogas plants.

The model of independent small-scale farmers in cooperatives has been observed to be a potential promising business model for developing jatropha farming in Tanzania. This model has high positive socio-economic and environmental impacts since it enables people to produce, to process and to use jatropha oil locally for income and energy generation and has potential to sell extra oil or seeds to local biodiesel producing companies.

Case Study: Jatropha in Mali

National level: The potential for jatropha is of particular interest for Mali as the country is not an oil producing country and hard-earned resources are devoted for the importation of increasingly expensive fossil fuel products. Several initiatives, using jatropha oil as fuel are being implemented by various actors in Mali for rural electrification and by the transport sector. But this is at its infancy and the contribution to the national energy supply is very low.

In 2007, the government of Mali has adopted the national strategy for the development of biofuel which is based on the energy policy and the renewable energy strategy. The objective of the national biofuel strategy is to replace 20% of diesel oil consumption with biofuel by 2022. Jatropha oil and ethanol have been identified as the most promising sources for biofuel production in Mali. The objective of the national biofuel target for jatropha oil production is to produce 39.2 Ml by 2012 and 84 Ml by 2022. This will require the production of 224,000 tons of seeds in 2012, 336,000 tons in 2017 and 448,000 tons in 2022. The total plantation surface necessary to produce these quantities are 71,680 hectares in 2012, 53,760 hectares in 2017 and 47,787 hectares in 2022.

In order to facilitate the implementation of this strategy and the elaboration of legislative rules, the National Agency for Biofuel Development (ANADEB) was established in 2009.

Regional & local level: The two selected Case Studies in Mali are MaliBiocarburant, a Dutch-Mali joint venture company, and the Garalo Bagani Yelen pilot project of the Mali-Folkecenter Nyetaa.

MaliBiocarburant is a Dutch-Mali joint venture company that works with rural populations to produce biodiesel from jatropha oil. It is currently the most centralised jatropha activity in Mali, as the biodiesel-processing technology is more high-tech and thus requires a more centralised approach. Mobile pressing units have been deployed to villages in an attempt to reduce transport costs by transporting oil instead of seed. Oil is processed in Koulikoro at the processing station with a capacity of 2,000 litres per day. MaliBiocarburant has been successful in obtaining carbon credits for its work. MaliBiocarburant seeks to supply jatropha biodiesel for the national market.

Biodiesel could thus create a sizable market for itself due to the fact that it can be used in most diesel engines with just some very minor engine changes. This means the potential market is very large. But there may also be an increased risk that the biodiesel is exported instead of being used for the local needs and the local development in Mali.

Mali-Folkecenter Nyetaa (MFC) has a more low-tech grassroots approach based on the use of pure jatropha oil in converted diesel gensets to produce power for rural electrification. MFC is currently working in eleven villages to set up these systems. Garalo Bagani Yelen was the pilot project in which the organisational model was developed. This model has been expanded into the 10-villages project called “Bagani Courant 10”. The key to the approach is that in typical rural diesel electrification projects, 50-75% of operating costs are for fuel. This cash leaves the village and the country to pay for diesel imports. In MFC’s work the fuel costs are re-injected into the local community to pay for jatropha oil and jatropha seeds and thus the electrification increases people’s revenues. Combined with the support for new income generating activi-

ties it becomes an engine to kick-start local economic development.

Case Study: Sugarcane in Costa Rica

National level: The smallest country of the Global-Bio-Pact Case Studies, Costa Rica has a long standing tradition of sugarcane production and ethanol production which started in 1918. The activity covers 9.3% of agricultural employment and 1.3% of total employment. Since 2004, Costa Rica dehydrates Brazilian ethanol to be further exported to the United States. Nowadays, the sugarcane area is 53,000 hectares, producing 400,000 tons. From these volumes ethanol production is still very limited, given favourable conditions for sugar supply and the lack of incentives to invest securely in ethanol facilities.

Local level: The local Case Study in Costa Rica is CATSA in Guanacaste representing a large modern plant in a flat area which is suitable for sugarcane monocultures. The plant produces ethanol for exportation (including to Germany) and has just passed successfully the auditing procedure of the International Sustainability & Carbon Certification (ISCC) Standard. In the 2008/09 harvesting season 13% of the national ethanol production (195,901 tons) was produced by CATSA. 800 farmers supply the plant with sugarcane (27% of cane processed in the mill).

Case Study: Sugarcane in Brazil

National level: Brazil is worldwide the largest sugarcane producer and the second largest ethanol producer (the largest producer from sugarcane). The most traditional area of sugarcane production in Brazil is in the Northeast, which currently contributes less than 10% of the total output. The Brazilian Northeast is one of the poorest areas in the country and has the worst socio-economic indicators (e.g. health, education, income, wealth distribution). On the other hand, the state of São Paulo is the richest region in Brazil, and concentrates a large amount of the sugarcane production.

Regional level: The two regional Case Studies in Brazil are the states of Alagoas and São Paulo. São Paulo is the largest producer in Brazil with around 40% of all sugarcane employments of the country, and 60% of sugarcane production, representing one of the most important sugarcane production regions in the world.

In São Paulo, the sugarcane sector indicators of income and schooling are higher than the Brazilian average for the sector, as reported in the 2006 National Survey by Household Sampling (PNAD). These averages are also among the highest averages in the agricultural sector, behind only two traditional crops (soy and citrus). In the near future, the labour requirements will decrease due to higher mechanization levels, and the schooling requirements will increase, since trucks and harvest machines require higher educational levels than sugarcane cutting.

Alagoas is a traditional sugarcane producer with 54% of Northeast's total sugarcane production, most of it used for sugar production (68%). In Alagoas, the analysis of the socio-economic indicators showed that the state itself has worse conditions than other sugarcane producing states. But, within Alagoas, the municipalities with sugarcane and ethanol are still better off than the municipalities without sugarcane and ethanol production. Although the state represents only 5% of all national sugarcane production, it has 14% of all employments in the sector.

Local level: The two local Case Studies were selected because of their uniqueness. The São Francisco mill, situated north of São Paulo state is the largest organic sugarcane producer in the world, and the Pindorama mill is a cooperative in the Alagoas state. Social and technical issues of these two production systems differ from usual plants.

The São Francisco mill harvests 1,400,000 tons of sugarcane per harvest season, and employs over 400 people in the field. Because organic sugar is mainly exported, it demands a wide variety of certifications granting trustfulness to an organic product. The São Francisco mill was the first in Brazil to receive international certification in 1997 as an organic sugar producer. Today it is certified with eight seals that guarantee their organic origin as well as environmental and social standards. The seals are recognized in Europe, USA and Japan.

The Pindorama mill is a small mill that harvested 610 thousand tonnes of sugarcane, and produced 35 million litres of ethanol in 2009/2010. Being a cooperative, it has better economic returns for small associated producers. However, in comparison with other mills in the region, it cannot be said that the benefits are transmitted to workers. The comparison done with two other mills in Alagoas, showed that Pindorama did not performs any better or improved social, economic or environmental, indicators. On the other hand, there are several social projects done by Pindorama, including technical teaching such as reading and computer classes and new professions (like welders).

Case Study: Woody biomass in Canada

National level: Canada has the largest forest estates in the world with 397.3 million hectares of forest and is one of the leading exporters of forest products globally. In rural areas the forestry sector is dominant with entire towns depending on it. Biomass is currently not utilized in large quantities for

energy production. With large parts of the country not suitable for agriculture, liquid biofuels will have to be produced from wood products. The Case Study in Canada focuses on British Columbia situated on the western coast of Canada bordering the United States. British Columbia is the most important forestry province in Canada in terms of resource base and forestry industry. The Global-Bio-Pact Case Study includes one study on a lignocellulosic ethanol refinery and one on a pyrolysis refinery.

Lignocellulosic ethanol refinery: Lignol is a company based in Vancouver, British Columbia, Canada. The company is currently developing a pilot plant with a daily dry biomass input of 200 t. The plant is based on the Accell technology combining pre-treatment and lignin / hemicellulose removal in one process. Lignin and ethanol are the main products and extraction of other products is currently under research. Feedstock used for lignocellulosic biofuel production may come from different sources and have usually been co-products from various wood processing activities, like mill residues and logging residues. Lignol's pilot plant in Burnaby has been using pulping chips – with a moisture content of 50% - obtained from debarked whole log chippings and chips from lumber mill residues such as slabs and trim ends of logs. The costs of the chips range between 50 and 70 $/t. Generally, chips from sawmills tend to be lowest cost while chips from logs harvested from hillsides invariably tend to have the highest costs. A hypothetical commercial plant located in British Columbia would most likely have its own cutting rights or source feedstock from contractors on Crown lands provided under provincial cutting rights. Native Indian tribes might provide cutting rights on their territory or supply the chips directly to the company. The investment cost of the plant is unknown yet, but for the business case to be valid the lignin utilization is essential. The employment generation of the plant can be compared to a normal paper mill. The installation can employ around 45 workers in total. On management level 3 direct jobs are created and for every shift (4 shifts a day) 5 people can be employed. The remaining jobs are created in the harvesting and supply sector.

Pyrolysis refinery: The Global-Bio-Pact Case Study for pyrolysis in Canada is fictitious and based on the long experience of BTG Biomass Technology Group in developing the flash pyrolysis technology. In BTG's pyrolysis process woody biomass is transformed by a rotating cone reactor to pyrolysis oil, coal and gas. Pyrolysis oil – which has a larger energy density than raw biomass – can, for example, be used in a boiler, furnace, gas turbine or diesel engine (under development) to replace domestic fuel oil. Current research focuses on the extraction/fractionation of chemicals and the use as automotive fuel. The plant is assumed to have an input of 120 t of dry biomass per day. The investment cost – including biomass pre-treatment, biomass & pyrolysis oil storage and utilization of the heat – lies between 10 and 15 million Euro. In Canada there are a lot of abandoned pulp and paper mills, which are perfect locations for pyrolysis plants. Such pyrolysis plants can give a boost to the local and regional economy. Instead of exporting raw biomass, high-end biofuels are produced which have a higher added value for the region. The plant will also create around 45 jobs of which 17 jobs are direct. The other jobs are created in wood harvesting, transportation of pyrolysis oil and plant maintenance.

Excerpt of: Rutz D. et al. (2011) Sustainability of Biofuels and Bioproducts: Socio-Economic Impact Assessment. - in: Proceedings of the 19th EBCE, 6-10 June 2011, Berlin, Germany

Methodology to analyse public perception on biofuels

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Public perception of biofuels is the spontaneous appreciation that people make on biofuels. There is a growing consciousness about the importance of considering public's opinions when deciding on biofuel development, and about the necessity to properly inform the public on the expected benefits and drawbacks of biofuel projects, as well as on remaining uncertainties. However, although public perception is recognized as an important determinant of the success of renewable energy programs, there are few studies analyzing its impact and how perceptions are formed. Biofuel experts might well recommend more incentives, information, and research on biofuels; such recommendations are usually lacking insights on what can really influence public perception. In the Global Bio-Pact project a dedicated task is on assessing the public perception of biofuels, considering its subjectivity and tendency to discriminate amongst different aspects of biofuel development: putting emphasis on some, not retaining information on other aspects, valuing risks in own non-expert ways. Since perception is the result of experiences and information over time, we reckon it is relatively superficial and more easily influenced than beliefs. Therefore we devoted efforts to understanding the process of public percep-

tion, before analyzing the current situation in six countries of Africa, Asia and Latin America. Our literature review on how public perception is formed, led us to a conceptual framework on which to anchor fieldwork. The basic idea is to identify the variables and the parameters of public perception, without judging whether people are right or wrong.

Schematically variables influencing public perception relate either to public policy objectives (e.g. GHG emission mitigation, rural development), or to specific cases of biofuel production or consumption (successful cases or failures). In each country the main stakeholders of biofuel development are identified and it is assessed to what extent they either influence public objectives, or participate to biofuel success stories (or failures). Additionally to such internal and structural influences, we account for crises or abrupt changes and external references or success/failure stories coming from abroad. Food and energy crises are typically susceptible to impact the public perception of biofuels, either positively or negatively. In the same way, the Brazilian Ethanol Program can represent a model for other countries, while the lower-efficiency and costlier use of maize in the USA would appear unaffordable to them.

Mentioned variables will only influence public perception if corresponding information reach the public and is kept in collective memory. Processes of getting informed, of giving importance or not to received information and resultantly, of appraising biofuels, are explored through the analysis of media and of cultural parameters that may influence the treatment of information on biofuel issues.

Socio-economic impacts of current and future biomass conversion chains

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Contrary to other renewable energy sources like wind, solar and hydro-energy, biomass can be used for multiple applications like food, feed, biofuels and bio-products in addition to heat and power generation. Many first generation feedstock like palm oil, soy, sunflower and rapeseed for diesel generation and sugar cane and beet for ethanol production require considerable quantities of agricultural land. The last decade much attention has been paid to the environmental impacts of these crops, which has among others resulted in European sustainability criteria as described in the EU Renewable Energy Directive (RED). Within the Global-Bio-Pact project focus is placed on the future outlook of our increasingly bio-based economy. Will future bioenergy conversion chains, like 'biorefineries' or 'second generation biofuel production' imply more sustainable practises? How is the sustainability of these biofuels guaranteed, especially socio-economic sustainability issues that are not covered by the RED. Furthermore it is observed that while current sustainability schemes pay much attention to biofuel production, its conversion seems to attract less attention. The Global-Bio-Pact project has produced 2 reports that can be used as building blocks to address the above mentioned issues:

- Identification of current and future industrial and small scale conversion chains
- Introduction to socio-economic impact analysis.

Both reports can be found on the Global-Bio-Pact website.

Identification of current and future industrial and small scale conversion chains

The first report provides an excellent overview of current and future biomass conversion technologies, with special focus on the different types of biorefineries. Figure 1 shows a dazzling number of possible options. For lignocellulosic biomass several pathways are described, using a systematic approach distinguishing between biochemical, thermochemical and hybrid pathways. Also the status of the different pathways is discussed. Figure 2 shows that a large part of the small plants are operational, while most of the medium and large scale plants are planned but not yet operational. This clearly shows that most lignocellulosic biorefineries are still in the pilot and demonstration phase.

Introduction to socio-economic impact analysis

Several methods have been developed to assess impacts of planned interventions (policies, programs, plans, projects), such as:

- Socio-economic impact assessment (SEIA)
- Environmental impact assessment (EIA)
- Strategic environmental assessment (SEA)
- Social impact assessment (SIA)
- Development impact assessment / sustainable development
- Fiscal impact analysis
- Traffic impact analysis

These impact assessments are described in further detail in the recently published “Introduction to socio-economic impact analysis”, available from the Global-Bio-Pact website.

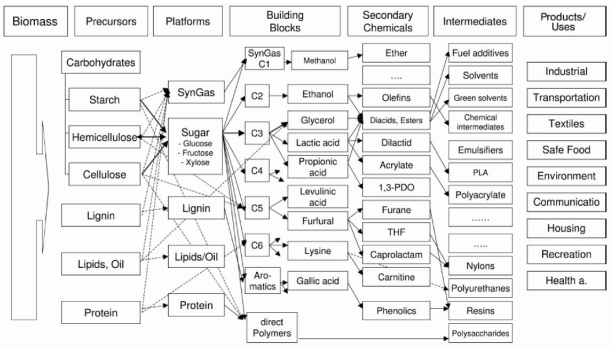

Figure 1: Schematic overview flow chart: biomass to products (Kamm et al. 2006)

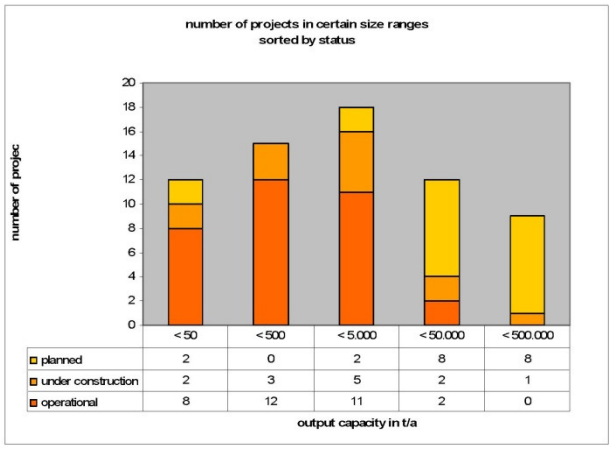

Figure 2: Planned, under construction and operational lignocellulosic biorefinery projects. Source: (Bacovsky et al. 2010)

An interesting issue is the relation between biomass sustainability certification schemes and the several impact assessment methods. Biomass certification schemes measure whether the normative sustainability criteria are met by the use of indicators for compliance. The selection of the accurate and precise indicators is very relevant. Project operators are responsible for data collection on indicators of compliance, which should therefore not be a too complicated or time consuming process. Impact assessments are systematic processes to identify, predict and evaluate the effects of proposed actions and projects. These assessments are applied prior to major decisions and commitments being made, while biomass certification generally takes place after project implementation. Impact assessments contain in depth analyses and are performed by specialists. The expected impacts should be described in a transparent and understandable way to the project developer. The project developer - and possibly government bodies and other involved stakeholders - subsequently decide whether mitigation measures are needed or, in the worst case, whether the project can proceed at all.

The described difference between the two instruments might be a bit exaggerated. Impact assessments will be implicitly normative and certification systems might contain indicators that are descriptive rather than normative. Certification schemes and impact assessments can also complement each other. An interesting example is the certification scheme of the Roundtable on Sustainable Biofuels (see www.rsb.org). It requests participating operators to perform a screening exercise to determine whether assessments like an Environmental and Social Impact Assessment are required. A special RSB Screening Tool (RSB 2011) is developed for this purpose. In case biofuel operations will have significant impacts, as measured during the screening exercise, a social impact assessment process shall be carried out. RSB provides further guidance on how to carry out these impact assessments. This could be an interesting way to address the relevant socio-economic issues in more depth while using a biomass certification scheme.

Table 1: Differences: certification systems - impact assessments

	Certification systems	**Impact assessments**
Timing	Carried out after project implementation	Carried out before project implementation
Depth	Project operators must provide proof that criteria are met.	Qualified experts perform in depth assessments
Appreciation	Project must meet predefined criteria that are determined in advance and integrated in the certification system.	The assessments results in an overview of possible impacts. The project developer and stakeholders must decide whether these impacts are acceptable.

Next steps

The question how socio-economic sustainability can be guaranteed for both biomass production and conversion, using current and future technologies will be worked out in more detail in several Case Studies that are current under development. It will be very interesting to analyse what similarities and differences in socio-economic impacts occur between the different biomass technology combinations, and to determine in how far a standardised approach can be addressed to assess these impacts.

References:

2009/28/EC (2009). Directive 2009/28/EC

Bacovsky, D. et al. (2010). Status of 2nd generation biofuels demonstration Facilities in June 2010. http://www.ascension-publishing.com/BIZ/IEATask39-0610.pdf.

Kamm, B. et al. (2006). Biorefineries - industrial processes and products. Wiley-VCH. Weinheim, Germany.

RSB (2011). RSB Screening Tool, http://rsb.epfl.ch/page-24929-en.html., RSB.

Rainforest Alliance: Sustainability of palm oil in Sumatra

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Sumatra island is the only place in the world where all of the three: rhino, elephant and orang-utan live naturally. But the natural habitat of these species is shrinking as the rainforests on Sumatra are disappearing. The strong demand for palm oil is one of many reasons for the habitat loss. Palm oil would not have to be in a bad light if the demand is met by increased productivity on existing areas instead of continuous deforestation. There is a market demand for palm oil which originates from plantation areas which are not associated with forest destruction. The Rainforest Alliance (RA), known by its green frog seal is providing a credible market driven to reward palm oil companies which meet the critical criteria of zero deforestation.

Peter Sprang, based in Indonesia at the Rainforest Alliance's Asia Pacific regional office, was given the opportunity to share experience at the Medan Global-Bio-Pact fuel conference in March 2011. The Rainforest Alliance works in forestry, agriculture, tourism and climate change. In the field of agriculture, it operates in more than 30 countries, with Indonesia ranked in the top 5 in terms of hectares covered. RA's agriculture program works with a number of crops, with coffee, cocoa and tea being the main ones. Oil palm is one of the crops which can obtain Rainforest Alliance Certification™ if audited against the Sustainable Agriculture Network (SAN) standards and critical criteria like deforestation are complied with. The standards encompass a range of aspects of sustainability in agriculture and are based on 10 principles and 99 criteria. There are benefits related to following better standards: one such example is documented in the certification process of banana plantations, which are similar to oil palm plantations. While cost are reduced (due to more efficient agrochemical application), productivity went up (less waste, improved logistics).

So, how can this lesson be applicable for biofuels/palm oil? Better management starts with training and improved inputs, such as plant material as well as a strict selection of soils which are most suitable for growing oil palm. The Rainforest Alliance has developed training tools which help farmers and plantation managers to implement what the complex standard is asking for. In Indonesia this includes learning from the palm oil sector on how to increase productivity on existing plantation areas and prevent plantation on sites which are not suitable for oil palm.

Furthermore, there is at least one encouraging example of a palm oil plantation in Indonesia, which has a well-established conservation department. If conservation is done as a serious, research based exercise, it can provide a real return of investment for any company. Conflicts between wildlife and humans can be avoided and the site selection for plantation versus conservation can be based on an assessment which includes all ecological risks (for example flooding) and benefits (for example endangered species or carbon credits). Pest management and complimenting bio-fertilizer projects can derive from applied research in conservation areas.

While there are short term profits to be made on the expense of converting more and more forest land on Sumatra, this might not be the most economical solution on a landscape level. Soil erosion, landslides, droughts, flooding, climate change are placing a real financial risk to the people and plantations on Sumatra. Unfortunately the loss of endangered species cannot be measured in equal terms with the loss of short term profit today. But if productivity and profit on existing farm land is increased, the growing public awareness in Indonesia for the value of its world heritage status forests and its animals can turn into support for strict conservation as a benefit for present and future generations.

Stakeholders investing in biofuels could therefore strengthen initiatives, which help the Indonesian palm oil sector to apply better farming practices, provide better plant materials and enforce conservation initiatives. Giving market preferences to products which are credibly certified according to strict standards is another option among many ways to make a difference.

Oil Palm, Land Conversion, Food Security and Market Power

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Palm Oil in Indonesia

Since 2008 Indonesia has been recorded as the greatest crude palm oil producer in the world. Since 1985, the oil palm plantation has shown a tremendous increase from 0.14 million ha in 1985 to 1.08 million ha in 1996 and to 7.50 million ha in 2009 (Directorate General of Plantation, 2010). This benefits Indonesia with an increase of export value from CPO export, from US$ 238,403,000 in 1985 to US$ 11,605,431,000 in 2009 (Directorate General of Plantation, 2011). Instead of the bright story of its growth and contribution to GNP and jobs created, growth of oil plantation also brings some other consequences. First is the land conversion issue, in particular the paddy fields that might lead to food insecurity problems and second is the market power possibility.

Land Conversion and Food Security

North Sumatra is known as one of the centres of oil palm plantation in Indonesia. Plantations are divided into 3 groups, namely state, private and smallholder plantations. While the state and private plantation areas and production have been recorded since 1967, those of the smallholders were just recorded in 1979. However, with the scheme from the government, smallholders' area increased significantly from only 3,125 ha in 1985 to over 3 million ha in 2009. Unfortunately, the increase was not only using vacant lands, but some of the oil palm trees were cultivated on paddy fields. Farmers even plant oil palm trees at the edge of the irrigation channels because they appear to thrive there.

In fact, previous studies show that on average the water requirement for oil palm trees are 0.9 lt/sec/ha (Harahap and Darmosarkoro, 1999 in Wignyosukarto 2010) or 12-25 lt/trunk/day (Amri, 2004 in Lestari, 2010; Medan Bisnis, 2006). Oil palms will grow by 15-25 cm/month if water supply is sufficient. Without enough water supplies they only grow 7-13 cm/month (Balai Penelitian Agroklimat dan Hidrologi, 2007). This is likely to decrease water supply to paddy fields which require average water supply of 0.74 – 1.2 lt/sec/ha, or 6.39 – 10.37 mm/day/ha (Juliardi and Ruskandar, 2006). Furthermore, in 2011, 197,128.8 ha of the irrigated paddy fields are highly damaged, 39% irrigation channels in North Sumatra are in poor condition (statements of Head of Bappeda Sumut in Batavi-ase, 2010 and Head of North Sumatra Agriculture Agent in Waspada, 2010). Wignysukarto (2010) estimated that there will be a lack of water supply soon. On average the annual water supply in North Sumatra is about 96.2 billion m^3/year, whereas if oil palm plantations increase to 4.3 million ha, the plantations themselves already need 103 billion m^3/year.

Paddy fields

In North Sumatra, paddy field centres are mostly located in the east coast of the Sumatera Island, which are Kabupaten Labuhan Batu, Langkat, Deli Serdang, Simalungun and Serdang Bedagai with 48,092 ha, 46,613 ha, 43,736 ha, 41,165 ha and 40,022 ha of paddy field area, respectively. In Kabupaten Labuhan Batu, the Head of Agriculture Agency announced that until 2010 around 3,000 ha paddy fields have been converted into oil palm, the remaining paddy fields are only around 26,000 ha (Medan Bisnis, 17 Jan 2011). Similar conditions likely appear in other paddy production centres such as Deli Serdang, Simalungun and Langkat. This leads to a decrease in the rice supply, which is the food staple in North Sumatra. At the same time, the demand of rice tends to increase with the increase of population. If such a condition persists, is it predicted that North Sumatra would soon face a lack of rice supply.

Oligopsony Market and Market Power

The lack of water in paddy fields made farmers convert their land. However, this is not the only reason, because previously, when the water supply decreased, farmers cultivated other seasonal crops such as corn or vegetables. But lately, with the increased demand in palm oil, they converted the

fields to oil palm plantations. In addition, the increase in fertilizer price and labour wage also pushed farmers to convert their paddy fields into oil palm plantation. On average, farmers only need to fertilize oil palm trees twice a year. Labour is needed for fertilisation and harvesting, which is done twice a month. With such patterns, farmers consider that running oil palm plantation will give higher benefit than paddy.

Transport of FFBs to the mill

However, farmers do not include their investment costs in the first three years of oil palm growth. If they do so, the average income from selling Fresh Fruit Bunches (FFB) is about 350,000 Rp/ha/month, while that from paddy grain is about 400,000 Rp/ha/month (Chalil, 2011: study case in Deli Serdang, Sumatera Utara). Moreover, with a lack of capital, farmers need to take loans from village agents and pay it when they sell their FFB to the same agents. Thus, farmers cannot sell FFB to other agents even if they offer better buying price. It is also hard for farmers to directly sell their FFB to mills because with the average land area of less than 1 ha, each farmer could only produce less than 2 ton per month, while direct sales require at least 100 ton/day (Chalil, 2009: study case in Labuhan Batu and Serdang Bedagai, Sumatera Utara).

The FFB market tends to be an oligopsony market with few village buyers and many smallholders. These give buyers opportunities to exert market power, while farmers have no bargain power in determining the FFB selling price.

In conclusion, oil palm plantations appear to benefit Indonesian economy especially with respect to export revenues. However, oil palms should be developed with caution, in order not to harm food security nor raise market power problems especially for smallholders.

References:

Balai Penelitian Agroklimat dan Hidlogi, 2007, "Pengelolaan Air untuk Peningkatan Ketersediaan Air Tanaman Kelapa Sawit di PTPTN VIII Cimulang, http://balitklimat.litbang.deptan.go.id

Bataviase, 2010, "Irigasi Sawah Sumut Rusak Parah", http://bataviase.co.id/node/172364

Chalil, 2011, Analisis Perbandingan Pendapatan Usahatani Padi Sawah Dan Perkebunan Sawit Pada Kasus Alih Fungsi Lahan, Seminar "Kontribusi Dunia Pendidikan Ekonomi, Manajemen dan Akuntansi dalam Penguatan Perekonomian Bangsa", Yogyakarta, 28 Juni 2011

Chalil, 2009, Analisis Dampak Market Power pada Industri Kelapa Sawit, Jurnal Keuangan dan Bisnis, vol2, No.3, 11/2010

Directorate General of Plantation database, 2010, http://ditjenbun.deptan.go.id

Juliardi and Ruskandar, 2006, "Teknik Mengairi Padi, Kalau macak-macak cukup, mengapa harus digenang?", Tabloid Sinar Tani, 13 September 2006

Lestari, M., 2010, "Kabut Asap dan Penegakan Hukum Lingkungan", http://riaupos.co.id/new

Medan Bisnis, 2006, "Irigasi Tidak Berfungsi, Petani Tapsel Alihkan Tanaman Pangan ke Kelapa Sawit", 20 Maret 2006

Siregar,A.N., 2010, "Alih Fungsi Lahan Pertanian Terus Meningkat", http://www.waspada.co.id

Wignyosukarto, 2010, "Perkebunan Kelapa Sawit dan Alokasi Air" , http://budiws.wordpress.com

Formulation of a National Sustainability Scheme for Biofuels in Mali

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Sustainability aspects of biofuels and the implementation of certification schemes in Mali is a core focus of the next Global-Bio-Pact Meeting and Workshop in Bamako Mali (see event announcements). Therefore, this chapter presents current activities in Mali. It is based on a paper of the proceedings from the 19th European Biomass Conference [1] and the report "Development of Sustainability Criteria for Biofuels – International Initiatives and Expertise" [2] which are available at the Global-Bio-Pact website.

During recent years the Government of Mali as well as the civil society in Mali has shown considerable interest in the development of a strong and sustainable biofuels sector. This development is embed-

ded in several policy documents of the Government of Mali such as the Poverty Reduction Strategy with the following three main objectives for the period 2007-2011:

- Development of infrastructures and the productive sector
- Pursuance and consolidation of structural reforms
- Strengthening of the social sector (education, health, water access)

The achievement of these objectives addresses several priority areas of which three are closely interlinked with the development of a sustainable biofuels sector:

- Food security and rural development
- Development of small-medium size enterprises
- Protection and sustainable management of natural resources

In 2006 the National Strategy on Renewable Energy was published by the Ministry of Energy and Water (MEE) stating the targets of 10% reduction in fossil fuel imports by 2014, 15% by 2019, and 20% by 2024. This strategy includes the following main objectives:

- Improve access to energy especially from renewable sources
- Rationalise the use of existing energy sources
- Increase efficiency of the use of existing natural resources to produce energy
- Promote the sustainable use of biomass resources through the conservation and protection of forests
- Strengthen government capacity and streamline administrative procedures in the energy sector

Biofuels are foreseen to play a major role to achieve the objectives of the National Strategy on Renewable Energy. The National Agency for the Development of Biofuels (ANADEB), legally established on 5th June 2009, is the implementing agency of the National Strategy on Biofuels. The main responsibilities of ANADEB include:

- Establishment of a centralized and harmonized framework for biofuel promotion
- Increase of the number of professionals working in the biofuels field
- Enacting of production licensing requirements and technical quality standards for biofuels
- Creation of a dialogue between main public and private actors in the field
- Promotion of trade between international partners in biofuels

Thereby, the National Strategy on Biofuels states the importance of ensuring the environmental, economic and social sustainability of the development of the biofuels sector in Mali, and ANADEB is currently involved in the elaboration of national sustainability criteria and a biofuel certification scheme suitable for the specific framework conditions in Mali. This activity is strongly supported by the project Mainstreaming Sustainability in the Biofuel Sector in Mali, which also serves to build capacity and expertise within ANADEB in the field of sustainable biofuels production. This project is coordinated by Mali-Folkecenter and co-funded by the Dutch Global Sustainable Biomass Fund (administered by NL Agency, the Ministry of Economic Affairs, Agriculture and Innovation, the Netherlands).

Biofuel sustainability concerns in Mali

The main motivations for the development of a biofuels sector in Mali, as in many other countries worldwide, are to contribute to national energy security and to address the important problem of high and increasing crude oil prices which place pressure on the country's trade balance. Further objectives are the contribution to improved energy access and the creation of employment opportunities and significant revenues especially for the rural population.

The following paragraphs underline framework conditions important for considerations on ensuring sustainability of the biofuels sector in Mali [1].

(a) Food security

An important sustainability criterion for Mali is to avoid the conflict of agricultural production for food and biofuels. Thereby, it needs to be ensured that the development of the biofuels sector in Mali does not have any negative impact on food production. On the contrary, investments in the agricultural sector triggered by biofuels production should lead to an increase of food production.

Food production in Mali has historically been highly variable due to fluctuating rainfall, which also influences river levels and hence irrigated as well as rain-fed agriculture. This variability, combined with a low percentage of total agricultural production entering the market, causes volatile available food quantities as well as fluctuating prices for food products. It is estimated that a fourth of the households in Mali are in a chronic situation of food insecurity with cereal consumption representing around 50% of household expenses.

(b) Access to electricity

In Mali only about 23% of households have access to electricity (58% in urban areas and 11% in rural

areas). Biofuels may therefore significantly contribute to rural electrification through the use of straight plant oil (e.g. Jatropha oil) in modified diesel engines for the decentralised production of electricity. Several villages in Mali have already been equipped with Multifunctional Platforms based on Jatropha oil to power agricultural machinery and to provide electricity for household consumption and for the operation of productive units.

(c) Employment and revenue generation

The development of a sustainable biofuels sector in Mali needs to ensure that sufficient revenues and jobs are created for local and national stakeholders including rural communities. This criterion will generally favour the local and national use of biofuels as transport fuels (e.g. as pure biofuels or through blending of biofuels with fossil fuels) or for decentralised small-scale electricity generation. If biofuels or raw materials for biofuels production are exported, mechanisms need to be put in place to guarantee appropriate revenue creation within Mali.

(d) Land tenure

Biofuel production in Mali should not have negative consequences on land tenure. The Malian land tenure is complex and characterised by the co-existence of customary and modern land tenure laws. Customary laws are usually oral, vague, variable, unpublished, and their co-existence with modern law is often still conflictual. Land conflicts which occur on a permanent basis are exacerbated by demographic growth, high urbanisation rate, recurrent drought and poor land management practices.

(e) Water availability

Biofuel production in Mali should not have negative impact on water quality, availability and use. More than 60% of the surface area of Mali is desert or semi-desert (74.8 million ha) and the 43.7 million hectares of land suitable for agriculture and livestock production face a deficit in rainfall, droughts, and irregular water levels. Water access was identified as one of the main barriers for the production of biofuels in Mali.

(f) Soil protection

Soil erosion and degradation can result from the cultivation of energy plants as well as from the extraction of agricultural residues. Therefore, biofuel production in Mali should not lead to a degradation of soils caused for instance by inappropriate agricultural practices and fertiliser use.

The specific sustainability concerns for biofuel development in Mali highlighted above are meant to provide an initial overview and are by no means exhaustive. The development of a concise set of sustainability criteria should be based on extensive stakeholder involvement as foreseen in the framework of the project Mainstreaming Sustainability in the Biofuel Sector in Mali.

Development of national sustainability criteria

The following chapter provides recommendations for the development of national sustainability criteria and certification systems to promote sustainability in the future biofuel sector in Mali. Thereby, the development of a Malian biofuel sustainability system should proceed along the following 4 main steps:

(1) Identification of potential negative impacts – Stakeholder consultation

(2) Selection of suitable principles and criteria – Stakeholder consultation

(3) Formulation of indicators for proof of compliance

(4) Policy measures – Elaboration of certification scheme

Conclusion

The development of national sustainability schemes in African countries is regarded as an appropriate means to ensure environmental, social and economic sustainability of biofuels and bioenergy production and use. Thereby, potential negative impacts can be identified and mitigated such as increasing competition over land and water resources, rising food prices, land ownership conflicts and displacement of rural communities.

The current initiative in Mali implemented under the guidance of the National Agency for the Development of Biofuels (ANADEB) and supported by the project Mainstreaming Sustainability in the Biofuel Sector in Mali will provide the grounds for the development of a sustainable biofuels sector in Mali based on intensive consultation of a large number of national stakeholders.

References:

[1] Janssen R., Rutz D., Togola I., Ouattara O., Burrell T. (2011): Formulation of a National Sustainability Scheme for Biofuels in Mali. - in: Proceedings of the 19th EBCE, 6-10 June 2011, Berlin, Germany

[2] Janssen R. and Rutz D. (2010): "Development of Sustainability Criteria for Biofuels – International Initiatives and Expertise", report elaborated in the framework of the project Mainstreaming Sustainability in the Biofuel Sector in Mali , October 2010

[3] FARA (2010): "Mapping Food and Agriculture in Africa", report prepared for FARA, Ed. Dr. Rocio A. Diaz-Chavez, Imperial College London, May 2010

Socio economic aspects of the cultivation of *Acrocomia* spp. as a bioenergy/biofuel source

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Acrocomia is a still not very well known Latin American energy plant, which grows naturally in the tropics and subtropics from Mexico to the North of Argentina. This palm can tolerate cold temperatures up to -5° C. Furthermore, it only needs average soil qualities, at least 800 mm of precipitation, little maintenance efforts and has a high yield of fruits per hectare. The first fruits can be expected in the 5th year after seeding. Planting of new Acrocomia palms is associated with many general advantages of afforestation and contributes to carbon storage in the leaves, trunks, and roots for more than 70 years.

Another advantage of this palm with non-toxic fruits is the many options for gaining several products. This allows simultaneous production of food, feed, fuel and raw materials for the cosmetic and chemical industry.

The following table describes the compounds and uses of the different parts of the fruits.

Outer hull 18%	Biological fertilizer, process heat, biogas, furfural production
Mesocarp oil 11%	Biodiesel, glycerin, chem. industry, soap
Mesocarp press cake 25%	Animal fodder, biogas
Kernel shell 37%	Heating material, raw material for active coal, briquette, furfural production, etc.
Kernel oil 5%	Foodstuff, cosmetics, chem. Industry
Kernel press cake 4%	Animal fodder

Up to today this fruit is processed only in Paraguay in 9 factories. The fruits for these factories are exclusively from wild growing palms. A group of universities and private companies (University of Hohenheim in Germany, Catholic University of Paraguay, National University of Formosa, Argentina, Agroenergías SRL) made joint research efforts on this palm to increase the know-how of selection, propagation, planting, harvesting and post harvesting. This know-how is needed to set up commercial plantations. A focus is devoted to support small scale farmers. In fact, planting of Acrocomia is perfect for small scale farmers. They can plant this palm at any scale. Even few palms per hectare would be suitable and would allow at the same time intercropping with other crops. Acrocomia furthermore has the potential to create a fixed income for smallholders at low risks. Finally, it avoids soil erosion through an intensive root system.

In Paraguay – where this experience exists – an Acrocomia plantation of one hectare permits to harvest about 20 t of fruits per ha. The current price for one ton of fruits is 60 US$, so that in the harvesting time the small scale farmer can calculate with gross earnings of about 1,200 US$ per hectare.

The mentioned group of universities put much effort in the investigation and promotion of Acrocomia to small scale farmers in the tropics and subtropics so that they get a chance to participate in the advantages of this superior energy plant.

Acrocomia cultivation has to be planned carefully, but once established, it offers opportunities for small-scale farmers. These results should be used not only in Paraguay or Latin America, but also on a worldwide basis in the tropics and subtropics.

Acrocomia palm

For more information see: www.acrocomiasolutions.com

The Global Bioenergy Partnership (GBEP) sustainability indicators for bioenergy

The Global Bioenergy Partnership (GBEP) is an international initiative established in 2005 as a forum where voluntary cooperation works towards consensus amongst governments, intergovernmental organizations and other partners in the areas of the sustainability of bioenergy and its contribution to climate change mitigation. GBEP is currently co-chaired by Italy and Brazil, and its Secretariat is based in FAO since its establishment in 2006.

In May 2011, the GBEP Steering Committee endorsed a set of 24 relevant, practical, science-based, voluntary sustainability indicators for bioenergy defined by the GBEP Task Force on Sustainability. This agreement involves 45 Countries and 22 International Organizations.

These indicators are intended to guide any analysis undertaken of bioenergy at the domestic level with a view to informing decision making and facilitating the sustainable development of bioenergy and, accordingly, shall not be applied so as to limit trade in bioenergy in a manner inconsistent with multilateral trade obligations.

GBEP's work on sustainability indicators was developed under the following three pillars, namely the environmental, social and economic pillar.

The themes and indicator topics are shown in the table below. The details of the indicators and how to measure them are available at the GBEB website.

Information on the GBEP sustainability indicators for bioenergy is available at www.globalbioenergy.org. A report, including supporting information for the indicators is expected by autumn 2011 for submission to the G20 Summit.

PILLARS GBEP's work on sustainability indicators was developed under the following three pillars, noting interlinkages between them:		
Environmental	**Social**	**Economic**
THEMES GBEP considers the following themes relevant, and these guided the development of indicators under this pillar:		
Greenhouse gas emissions, Productive capacity of the land and ecosystems, Air quality, Water availability, use efficiency and quality, Biological diversity, Land-use change, including indirect effects.	Price and supply of a national food basket, Access to land, water and other natural resources, Labour conditions, Rural and social development, Access to energy, Human health and safety.	Resource availability and use efficiencies in bioenergy production, conversion, distribution and end-use, Economic development, Economic viability and competitiveness of bioenergy, Access to technology and technological capabilities, Energy security/Diversification of sources and supply, Energy security/Infrastructure and logistics for distribution and use.
INDICATORS		
1. Life-cycle GHG emissions	9. Allocation and tenure of land for new bioenergy production	17. Productivity
2. Soil quality	10. Price and supply of a national food basket	18. Net energy balance
3. Harvest levels of wood resources	11. Change in income	19. Gross value added
4. Emissions of non-GHG air pollutants, including air toxics	12. Jobs in the bioenergy sector	20. Change in consumption of fossil fuels and traditional use of biomass
5. Water use and efficiency	13. Change in unpaid time spent by women and children collecting biomass	21. Training and re-qualification of the workforce
6. Water quality	14. Bioenergy used to expand access to modern energy services	22. Energy diversity
7. Biological diversity in the landscape	15. Change in mortality and burden of disease attributable to indoor smoke	23. Infrastructure and logistics for distribution of bioenergy
8. Land use and land-use change related to bioenergy feedstock production	16. Incidence of occupational injury, illness and fatalities	24. Capacity and flexibility of use of bioenergy

Selected Events on Bioenergy and Bioproducts

Upcoming: 3rd Global-Bio-Pact Progress Meeting in Bamako, Mali

The next internal Global-Bio-Pact meeting will be organised on **26-27 September 2011** in Bamako, Mali. The meeting will be hosted by Mali-Folkecenter. This meeting is an internal meeting for the Global-Bio-Pact consortium in order to present the progress of the project.

Upcoming: Global-Bio-Pact Workshop on "Sustainability of Biofuels in West Africa"

An international workshop on "Sustainability of Biofuels in West Africa" will be organised by Mali-Folkecenter, the Ministry of Energy and Mining of Mali, and WIP Renewable Energies, Germany, in Bamako, Mali, on **28 September 2011**. The workshop will include a site visit to jatropha plantations on **29 September 2011** in the vicinity of Bamako.

The programme and registration form is available at www.globalbiopact.eu.

Upcoming: Fourth Stakeholder Plenary Meeting of EBTP

The Fourth Stakeholder Plenary Meeting of the European Biofuels Technology Platform (EBTP) is a two-day conference for all biofuels stakeholders on **14-15 September 2011** in Brussels. Participation is free for European biofuels stakeholders from industry, academia, research organisations, common interest groups or other associations with an interest in biofuels production and use. Speakers include experts from leading organisations involved in developing sustainable advanced biofuels in Europe. Speakers have also been invited from the US and Brazil to give a global perspective on sustainability and financing.

More information available at: http://www.biofuelstp.eu/spm4/spm4_prog.html

Other News

Germany phases out Nuclear Power until 2020

July 2011: Germany will abandon nuclear energy in favour of renewable sources. In the Parliament decision on 30 June 2011, most German parties agreed on a broad consensus to phase out stepwise all 17 German nuclear power stations by 2022. Eight nuclear power plants were already closed in 2011. This was a consequence of the Fukushima Daichi nuclear plant meltdown in Japan in March along with domestic political and public pressures increasing continuously since several decades. The German government intends to replace nuclear power with renewable energies and energy efficiency measures. While some European countries fear negative economic consequences, the German government hopes that this is a sign for other countries to follow and that this will be a historical paradigm change in the global energy supply. Stakeholders of the renewable energy sector hope that this will have a positive impact also on the development of biofuels and bioproducts.

A Compilation of Bioenergy Sustainability Initiatives

The complex interrelationships between bioenergy, poverty and food security are currently being analyzed in the context of the FAO's Bioenergy and Food Security Criteria and Indicators (BEFSCI) project, which is in the process of field-testing and refining a methodology to assess the impacts of bioenergy production on food security.

BEFSCI aims to develop a set of principles, criteria, indicators, good practices and policy options on

sustainable bioenergy production that safeguards and, if possible, fosters food security.

Over the past few years, numerous initiatives have been developed to address the environmental and socio-economic impacts associated with the production of biofuels or of specific biofuel feedstocks. These initiatives include regulatory frameworks, voluntary standards/certification schemes, and scorecards. Some of them cover the entire supply chain, while others deal only with parts of it.

The BEFSCI project reviewed 23 of these initiatives. A portion of them are still under development or are being tested, while others are already in operation or implementation. A few of these initiatives were completed but never adopted.

The following initiatives were reviewed by the BEFSCI project:

Regulatory frameworks

- Biofuels Life Cycle Assessment Ordinance (BLCAO) - Swiss Confederation
- Biomass Sustainability Order (BioNachV) - Germany
- EU Renewable Energy Directive (RED)
- Low Carbon Fuel Standard (LCFS) - State of California, USA
- Regulation of Fuels and Fuel Additives (RFS2) - USA
- Renewable Transport Fuel Obligation (RTFO) - UK
- Social Fuel Seal - Brazil
- Testing Framework for Sustainable Biomass ("Cramer Criteria") - The Netherlands

Voluntary standards / certification schemes

- Basel Criteria for Responsible Soy Production
- Bonsucro (BSI)
- Council on Sustainable Biomass Production (CSBP)
- Global Bioenergy Partnership (GBEP)
- Green Gold Label 2: Agriculture Source Criteria (GGLS2)
- International Sustainability & Carbon Certification (ISCC)
- Forest Stewardship Council (FSC)
- Nordic Ecolabelling of Fuels
- Roundtable on Responsible Soy (RTRS)
- Roundtable on Sustainable Biofuels (RSB)
- Roundtable on Sustainable Palm Oil (RSPO)
- SEKAB Verified Sustainable Ethanol Initiative
- Sustainable Biodiesel Alliance (SBA)

Scorecards

- Inter-American Development Bank (IDB) Biofuels Sustainability Scorecard
- WB/WWF Biofuels Environmental Sustainability Scorecard

Press release from 21.7.2011; More information about the BEFSCI project:
http://www.fao.org/bioenergy/foodsecurity/befsci/62379/en/

RSB recognized by the European Union as proof of compliance with the Renewable Energy Directive!

Lausanne, 19 July 2011 – The European Union recognized the standard and certification system of the Roundtable on Sustainable Biofuels (RSB) as a way to demonstrate and document compliance with the EU biofuels mandate. Biofuels entering the EU market must demonstrate environmental benefits compared to fossil fuels in order to count toward the mandate established under the Renewable Energy Directive (2009/28/EC). Qualifying biofuels feedstocks must avoid harm to land with high biodiversity value or high carbon stock. In addition, biofuels must demonstrate a 35% saving in GHG emissions compared to fossil fuels.

The implementing rules of the Renewable Energy Directive (RED) include certification under voluntary standards which are recognised by the European Commission (EC), as proof of compliance, in order to facilitate access into the EU market.

"The standard developed and promulgated by the Roundtable on Sustainable Biofuels (RSB) is implemented by way of our global certification scheme, which ensures that biofuels are produced in an environmentally and socially responsible manner," said RSB Chair Barbara Bramble, Senior Advisor for the International Climate and Energy Program at the National Wildlife Federation. "The RSB certification system also provides for biofuel and biomass traceability."

As a result, the RSB applied for and successfully obtained the recognition of the EC, as announced today by Commissioner for Energy Günther Oettinger. As of today, RSB certified biofuels have open access to the EU market without further verification of sustainability aspects.

The Roundtable on Sustainable Biofuels is a multi-stakeholder initiative hosted by the Energy Center of Ecole Polytechnique Fédérale de Lausanne

(EPFL), that has developed a global sustainability standard and certification system for biofuel production. The RSB sustainability standard, which defines the requirements to receive certification, represents a global consensus of over 120 organizations including farmers and refiners, regulators and NGOs, and was intentionally designed to ensure the sustainability of biofuels production while streamlining compliance for industry.

Press release from 19.7.2011; More information:
http://rsb.epfl.ch/

First EU sustainability schemes for biofuels get the go-ahead

The EU has set itself an objective to achieve a minimum share of 10% renewable energy in transport by 2020. In order to receive government support or count towards mandatory national renewable energy targets, biofuels used in the EU, whether locally produced or imported, have to comply with sustainability criteria. These criteria aim at preventing the conversion of areas of high biodiversity and high carbon stock for the production of raw materials for biofuels. Companies can choose whether to demonstrate compliance with these sustainability requirements through national systems or by joining a voluntary scheme which is recognised by the EC.

When the EC has thoroughly checked a scheme against the sustainability requirements and is satisfied that it adequately covers the sustainability requirements of the Renewable Energy Directive, it will give its recognition for five years. Such a scheme verifies how the biofuels are produced. If the rules of the voluntary scheme have been met, the scheme can issue a certificate for that product. The following schemes were recognised:

- ISCC (German (government financed) scheme covering all types of biofuels)
- Bonsucro EU (Roundtable initiative for sugarcane biofuels, focus on Brazil)
- RTRS EU RED (RT initiative for soy based biofuels, focus Argentina and Brazil)
- RSB EU RED (Roundtable initiative covering all types of biofuels)
- 2BSvs (French industry scheme covering all types of biofuels)
- RSBA (Industry scheme for Abengoa covering their supply chain)
- Greenergy, Industry scheme for Greenergy covering Brazil sugar cane ethanol

The Commission is currently discussing with other voluntary schemes how these can also improve their standard in order to meet the sustainability requirements for biofuels.

Press release from 19.7.2011;
More information:
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/901

German biofuel company Choren declares insolvency

One of Germanys most recognised companies in developing second generation biofuels, Choren Industries GmbH has declared insolvency. Choren is one of the worldwide few gasification technology companies for solid biomass and oil based residue feedstock. The centre-piece of the technology is the patented Carbo-V® process on the production of tar-free synthetic combustion gas. The process can be used to generate heat, power or transport fuels. The plant is being built in Freiberg in south Germany to produce about 15,000 tonnes a year of biomass-to-liquid (BTL) fuels largely using wood products and wood-based waste.

CHOREN
C = Carbon
H = Hydrogen
O = Oxygen
REN = Renewable

The reason for the insolvency was financial difficulties with the start-up of the company's test plant, said a statement from interim insolvency administrator Kanzlei Kuebler. However, Kuebler mentions that the company will continue operations and it is foreseen to start negotiations with new investors. Furthermore, according to Kuebler, the company's subsidiaries in China and the U.S. are not covered by the insolvency declaration.

Study Tour to CHOREN in Freiberg on the occasion of the BioTop Kick-off-Meeting in Munich, 9 April 2008
The Global-Bio-Pact members WIP and BTG participated in this visit.

More information: http://www.choren.com/

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