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

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Visits of Global-Bio-Pact representatives to bioenergy projects (rice husk combustion and biogas production) of “Tio Pelon” in Costa Rica

Global-Bio-Pact Meeting, Workshop and Study Tour in Costa Rica

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At the beautiful campus of the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) in Turrialba, Costa Rica, the 1st Global-Bio-Pact Progress Meeting took place on 7-8 September 2010. The consortium presented first results of the project and discussed about next steps to be taken, especially on the elaboration of the Global-Bio-Pact case studies.

Furthermore, also at the CATIE campus, an “Intercultural workshop on public perception on the use of biomass for biofuels and bioproducts” was organised by CATIE on 9 September 2010. Currently, no biofuel is sold at the Costa Rican market, although some initiatives promote bioethanol from sugarcane and biodiesel from jatropha and palm oil. However, the major bottleneck of biofuel production and use in Costa Rica is the lack of suitable policies. The workshop participants also mentioned that there is little awareness about biofuels among many Costa Ricans.

The Global-Bio-Pact meeting and workshop was framed by several site visits. Besides the visit of CATIE’s botanical gardens and a biodiversity research project of CATIE, Global-Bio-Pact representatives visited two bioenergy projects of “Tio Pelon”, Costa Rica’s largest rice producer. Rice husks are used to generate heat and power for the rice mill. Manure of the company’s pig farm is fermented in a covered lagoon digester to produce biogas.

Palm oil production chain in Indonesia

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One of the Global-Bio-Pact case studies focuses on the socio-economic impacts of palm oil production for biofuels and bioproducts in Indonesia. The next Global-Bio-Pact Meeting, Workshop and Study Tour will be organised in Medan, Northern Part of Sumatra, Indonesia, on 14-17 March 2011. Due to these events, a short introduction into the palm oil production chain is presented.

Plantation processes

The first step in the supply chain occurs at the plantation level, where fresh fruit bunches (FFBs) are produced. For this production to take place, land is cleared and prepared, the plantation must be managed and maintained, and harvesting is carried out. At each of these stages, there is diversity in the specific practices employed. Oil palm is cultivated by a range of actors, from large estate companies to small scale independent smallholders; inevitably, the technical knowledge and capacity and financial situation of these actors varies significantly. Numerous regulations relating to plantation practices do exist in Indonesia, but unlike in neighbouring Malaysia they are poorly enforced. Interest in improving practices and willingness to follow standards even by the large scale growers also varies widely.

Land clearance

Oil palm plantations in Indonesia have typically replaced forests, and their expansion is a significant factor in lowland tropical deforestation. Most oil palm development has taken place on forest land designated as production or conversion forest (World Bank 2006). Although there is increasing pressure to use 'degraded land' for new oil palm development a commonly accepted definition for such areas has yet to be established (Gingold 2010). A significant amount of recent oil palm development has also occurred on peatland.

Land clearance therefore typically begins with logging of timber within the concession area. Although the practice is illegal, and more reputable companies have adopted zero-burning techniques to clear remaining vegetation, fire is still used for land clearance in Indonesia (Wong-Anan 2010). This is in spite of international concerns, and the implementation of an ASEAN Agreement on Transboundary Haze Pollution.

Plantation establishment

After land clearance, further field preparation is required, including the establishment of a field drainage system and the development of roads by estates. Soil conservation measures such as terracing, conservation bunds and silt pits and sowing of leguminous cover crops may also be employed at this stage, when the risk of soil erosion is highest (Teoh 2002). After field preparation the seedlings are planted. The establishment phase (prior to production of the first harvestable FFBs) is typically between 3 and 4 years.

Fresh fruit bunch

Plantation management and maintenance

Field maintenance includes water and soil management, pruning, weeding, pest and disease management and fertiliser application. Soil and water management practices vary; larger estates commonly employ independent consultants and follow recommendations, whereas most smallholders do not use such practices. Poor water management leads to concerns about drainage (especially on peat) and unsustainable irrigation (Proforest et al. 2004). Integrated pest management has been adopted by some estates. In some best practice examples there is very limited use of organic fertilisers, in most others nitrogen-based chemical fertilisers are used in large quantities on the plantations.

Harvesting

After planting, the young palms take 30-36 months to produce their first harvestable FFBs, and yield their peak harvest from years 8-15. Harvesting of FFBs in Indonesia is done manually, and is relatively labour intensive, with an average of one worker per 3 ha (Barlow et al. 2003). The oil palm's economically viable life span is typically 22-25 years, although it can be extended for as long as 30 years, after which the old stand requires replanting (USDA – FAS 2007).

Transportation to palm oil mill

Due to the necessity for FFBs to be processed soon after harvesting, palm oil mills are located on or in the vicinity of plantations. Processing must take place within 24 hours to prevent deterioration in the quality of the fruit and a rapid rise in free fatty acids (FFA), which could adversely affect the quality of the crude palm oil (CPO). Most palm oil mills are owned and run by estate companies. A lack of independent mills means that independent smallholders usually sell their FFBs to the mills of neighbouring estates.

Palm oil mill processes

The second main stage of the production chain takes place in the palm oil mill. The purpose of this initial processing is to physically extract the CPO (and palm kernel oil) from the FFBs. Milling also produces a number of waste/co-products.

The first process at the mill is the sterilising of FFBs, which takes place in pressurised vessels using steam at high temperatures. This process both arrests the formation of FFAs and softens the bunches in preparation for subsequent subprocesses. After sterilising, the bunches are stripped of their fruitlets in a thresher, leaving empty fruit bunches (EFB) as a waste product. The fruitlets are then transferred to a press digester where they are heated using steam, while being stirred; this loosens the oil bearing mesocarp from the nuts while breaking open the oil cells. The digested mash is then pressed to extract the oil. The press cake is sent to the kernal plant so that the kernals can be recovered, while the oil is diluted and clarified in vertical clarifier tanks. Clarified oil is subsequently transferred to purifiers, which remove dirt, moisture and other impurities and finally dried in a vacuum drier to prepare it for storage and dispatch. Meanwhile sludge from the clarifier is fed into a centrifuge to extract remaining oil.

The waste product from this process is palm oil mill effluent (POME). The press cake is subsequently processed using depericarper, which separates the nuts from the fibre. The nuts are then cracked using a winnower and hydro-cyclone; the kernels are extracted and can then be further processed to extract palm kernel oil, leaving the shells behind (Teoh 2002).

The side products from the milling processes are utilised to varying extents on Indonesian plantations. Shells and fibre are in demand as a fuel source, and are sold or used by the mills themselves. Empty fruit bunches are also burnt, both to avoid their accumulation, which is considered a fire hazard, and to produce ash for use on the plantation. Burning of EFBs, however, is often a source of air pollution due to the mills' inappropriate boiler capacity. Despite the potential for EFBs to be recycled as organic fertiliser, as noted above, this practice has seen very limited adoption in Indonesia. POME was, in the past, returned directly to water courses, affecting both aquatic ecosystems and local communities. Although problems persist, observations suggest that POME management is improving in Indonesian palm oil mills, and that regulations are being more strictly enforced. Indonesia does, however, still lag behind Malaysia in POME management (Sheil et al. 2009).

Refinery processes

After initial processing in the palm oil mill, CPO is further refined before being used in a range of food and non food products. A few large palm oil mills in Indonesia have integrated refining capacity, but the majority of refining takes place elsewhere, either in Indonesia or in the destination country after export.

The refining of CPO removes free fatty acids, phosphatides, odouriferous matter, water, and other impurities. This is necessary for CPO to be used in food products, and the objective is to produce an edible oil of consistent quality that meets industry standards.

The first stage of the refining process produces refined, bleached and deodorised palm oil (RBDPO), most commonly by physical refining. CPO is firstly degummed and it is treated with phosphoric or citric acid to remove natural gums. It is then bleached, which removes coloured matter and any metal ions in the oil, then subsequently heated for simultaneous deacidification and deodorisation.

The treated oil is then subjected to steam distillation, which strips free fatty acids while removing odours. The oil is then cooled to 55°C before polishing. The second refining stage is fractionation. The main fractions from the refined oil are (RBD) olein (liquid fraction) and (RBD) stearin (solid fraction). These fractions can be separated by dry fractionation, detergent fractionation and solvent fractionation. RBDPO and its fractions are used for different purposes. Most refined oil is used for food purposes; (RBD) olein is mainly used as cooking oil, while (RBD) stearin is used in the production of margarines and shortenings. RBDPO (unfractionated) is also used to produce margarine and shortening along with frying fats and ice cream (Teoh 2002).

CPO and RBDPO (and palm kernel oil) are also used to produce a wide range of non food products. These may result from direct processing of

CPO/RBDPO (such as biodiesel, drilling mud soaps, and epoxidised palm oil products (EPOPs)), or through the oleochemical route.

Biodiesel is only a relatively minor use of palm oil in Indonesia. Although a number of the large palm oil companies have invested in or expressed an interest in constructing biodiesel plants, production is currently low. Biodiesel is produced in reactors by the process of transesterification. RBDPO is mixed with an alcohol (usually methanol) in the presence of a catalyst. This process produces methyl esters (biodiesel) and glycerol, which may either be allowed to separate by gravity, or the methyl ester is separated from the glycerol and washed with water and acetic acid until the washing water is neutral. The methyl ester is then dried by heating. The co-product from the production of biodiesel is therefore glycerol, which may be used to produce soap or other products. Wastewater is also produced, which should be treated before being disposed of or released into the environment (Teoh 2002).

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Update on the Global-Bio-Pact Case Studies

In the framework of Global-Bio-Pact, case studies on socio-economic impacts of biofuel and bioproduct value chains are investigated in order to present data from different value chains. 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. In the following chapters a brief overview on the status of the case studies is presented.

Case Study: Soy in Argentina

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.

Without doubt the soy value chain is an important instrument for development since it creates infrastructure. Biodiesel is a very recent activity in Argentina and the main driver for soybean expansion is the soybean price.

In the Global-Bio-Pact project, the case of soybean is addressed in a specific way since soybeans are a food/feed crop and only a minor by-product of soy is currently used for energy purposes. The main product of soy is soy meal for fodder and food production. The objectives of the study are:

- Identify the principal drivers that promote the expansion of soybeans
- Identify the specific weight of feed/food products and oils
- Clarify consequences of tax policies
- Define the impact of the biodiesel industry
- Weigh the regional and national impact of soybean expansion on direct and indirect jobs

The soy industry in Argentina can be divided into three classes, each with different strengths and weaknesses:

- "Oil Crushers": representing the large multinational oilseed crushers with the largest plants and ample access to feedstock;
- "Large Independents": large plants but without access to their own feedstock
- "Small Independents": small and medium producers with none of the above, counting on government support at policy level.

Specific cases have been selected representing the following areas:

- Regional production chain in the North West part of Argentina.
- Main productive area of Argentina (Santa Fe province), including (1) large scale production and (2) medium independent scale production.

The candidates have already been selected and specific studies on energy and carbon footprint of the different products of the whole chain have started on regional level.

Medium biodiesel plant surrounded by crops in the main producing area of Rosario, Argentina

Case Study: Oil palm in Indonesia

The selection of case studies to illustrate palm oil production in Indonesia was designed to capture the diversity and variations in the sector. The Global-Bio-Pact partner GBI is currently looking at a wide range of sites providing the opportunity to explore differences between the three main ownership models found within the palm oil sector, as well as regional differences. As the data collection progresses the 3 ownership types are investigated:

- private plantations comprised of a nucleus estate and smallholder plasma areas
- state owned plantations
- and independent smallholders

Currently, examples of each of these production models in both North Sumatra and South Sumatra are investigated and data are collected. The selection of private and state owned companies has been largely determined by willingness to cooperate and share data.

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.

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.

Case Study: Jatropha in Tanzania

Tanzania is blessed with 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.

Sun-Biofuels jatropha Farm in Kisarawe District, Tanzania

TaTEDO through the Global-Bio-Pact project is undertaking a case study on socio-economic impacts of jatropha production, processing and marketing in Tanzania of company, regional and local community level. The sites considered appropriate for this study are Kisarawe District in the Coast Region, Arusha Region and Leguruki Village in Meru District. In Kisarawe District, the study will assess the socio-economic impacts of large scale jatropha farming (implemented by the company Sun-Biofuel). The regional case study will be undertaken for different jatropha stakeholders in the production, processing and marketing chain for Arusha Region. The local community selected for this case study is Leguruki Village. More than 90% of villagers in Leguruki are smallholder farmers who either grow jatropha as hedges or intercrop it with other agricultural crops such as maize, beans and banana.

These case studies are expected to assess the understanding of the possible socio-economic impacts of jatropha farming (by companies, regions and local communities) in Tanzania. The findings and lessons learnt will contribute to the current efforts of biofuels policy development in Tanzania.

Case Study: Sugarcane in Brazil

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 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 about 60% of the whole sugarcane production.

The two case studies were defined with the specific purpose of identifying advantages or disadvantages of the sugarcane sector in Brazil. Few producing units are run by cooperatives and one of them was chosen for the assessment in Alagoas, a traditional sugarcane area in Northeast Brazil. Besides the uncommon way of management, the Cooperative Pindorama also produces fruits and other industrialized products. The sugarcane mill run by the Cooperative is a medium size unit considering Brazilian standards (about 850 thousand tonnes of sugarcane crushed per year). The purpose of the case study is the assessment of the socio-economic impacts in this production unit and the comparison with the impacts of production in traditional units located in the same region. A field trip for gathering information is scheduled for mid-January 2011.

The second case study addresses the production of organic sugarcane in the state of São Paulo, by the São Francisco mill, located in the most important area of sugar and ethanol production in Brazil. The mill is a typical medium-size unit (about 1.3 million tonnes of sugarcane crushed in 2009) and is so far the most important experience in relation to the organic production of sugarcane which has started in 1987. The company reports good results regarding productivity and also benefits to the environment. The purpose is to indentify positive or negative socio-economic impacts of organic sugarcane production in comparison with the traditional practices predominant in Brazil. A visit to the mill was organised in October 2010, and a second visit will be made during the next harvest season, after April 2011.

Case Study: Sugarcane in Costa Rica

The smallest country of Global-Bio-Pact case studies, Costa Rica has a long standing tradition of sugarcane production and ethanol production which started in 1918. 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 longstanding incentives to invest securely in ethanol facilities.

The two investigated sites of interest for the Global-Bio-Pact project are:

- 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.

- The Juan Viñas plant is in the central cordillera where sugarcane is grown in mixture with coffee and pastures.

Ethanol distillery of CATSA, Costa Rica (www.catsa.net)

Case Study: Lignocellulosic biomass in Europe and North-America

The case study on lignocellulosic biomass in Europe and North-America focuses on large scale production of second generation bioethanol, biorefineries, and bio-plastics. In the selection process of the case study, various choices have to be made regarding biomass feedstock, technology, and country of origin, after which the involved companies have to be invited for further cooperation. Two general types of biorefinery technologies are of special interest:

- The lignocellulosic feedstock biorefinery (often including ethanol production from cellulose and lignocellulose)
- Thermochemical biorefinery (for example pyrolysis and upgrading of pyrolysis in existing refineries)

Canada, with its large forested areas and significant second generation biorefinery activities was selected as focus area. A list of eight potential Canadian case studies has been established, from which Tembec in Temiscaming (Quebec) and Lignol Innovations in Vancouver (BC) were selected.

Tembec produces up to 15 million litres/year of ethanol as one by-product of a sulphite pulping process that produces specialty cellulose. The ethanol is not used as fuel ethanol, but is supplied to industrial markets such as the vinegar production industry. Tembec is the only known pulp mill in North America that produces commercial ethanol.

Lignol is in the process of commercializing its integrated cellulose to ethanol process technology for biorefining ethanol, pure lignin and other co-products from forestry residues. Lignol's modified solvent based pre-treatment technology facilitates the rapid, high-yield conversion of cellulose to ethanol and the production of value-added bio-chemical co-products, including high purity lignins.

This new class of high purity lignin extractives (and their subsequent derivatives) can be engineered to meet the chemical properties and functional requirements of a range of industrial applications that until now has not been possible with traditional lignin by-products generated from other processes.

Both cases utilise woody biomass; the process of Lignol focuses more on utilisation of the lignin fraction, while the case of Tembec has considerable commercial scale. Both companies are formally requested to cooperate as Global-Bio-Pact case study partner.

Selected Events on Bioenergy and Bioproducts

Upcoming: 2nd Global-Bio-Pact Progress Meeting in Meda, Indonesia

The next internal Global-Bio-Pact meeting will be organised on 14-15 March 2011 in Medan, Indonesia. The meeting will be hosted by GBI - PT Greenlight Biofuels Indonesia. 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 Global Trade of Biofuels & Bioproducts"

An international workshop on "Sustainability of Global Trade of Biofuels & Bioproducts" will be organised by GBI - PT Greenlight Biofuels Indonesia and WIP Renewable Energies, Germany, on 16 March 2011.

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

Upcoming:
Global-Bio-Pact Study Tour to Oil Palm Plantations in Indonesia

An all day study tour to a fully integrated oil palm company will take place on 17 March 2011. The company operations will include core plantations, smallholder plantations, palm oil processing mills and possibly a biofuel refinery in operation. There will be an opportunity to ask questions to the management, observe social responsibility programs, as well as see the community infrastructure that plantation companies normally provide.

Further information: www.globalbiopact.eu

19th European Biomass Conference

The 19th European Biomass Conference and Exhibition will take place in Berlin, Germany (Conference 6-10 June 2011 - Exhibition 6-9 June 2011). The Technical Programme is coordinated by the European Commission, DG Joint Research Centre.

For over 30 years, the European Biomass Conference and Exhibition (EU BC&E) has combined a very renowned international Scientific Conference with an Industry Exhibition. Since 2007 the Conference and Exhibition takes place every year. The EU BC&E is held at different venues throughout Europe and ranks on top of the world's leading events in the biomass sector.

This event is supported by European and international organisations such as the European Commission, UNESCO - United Nations Educational, Scientific and Cultural Organization, Natural Sciences Sector, WCRE - World Council for Renewable Energy, EUBIA - European Biomass Industry Association.

The 19th European Biomass Conference and Exhibition is realized by WIP-Renewable Energies with the international support of ETA-Florence Renewable Energies and the scientific support of the European Commission, DG Joint Research Centre.

Further information: www.conference-biomass.com

Global-Bio-Pact Twinning Initiative with Australia, Canada, and New Zealand

On the occasion of the First Canada-Europe-Australia-New Zealand Workshop on Biotechnologies for Biorefineries and Biobased Materials in Saskatoon, Canada on 6-7 October 2010 an “AU-CA-EU-NZ Working Group on Socio-economic Impacts of Biomass and Bioproducts” was set-up in the framework of the Global-Bio-Pact project.

The aim of this working group is to promote knowledge and information exchange between stakeholders from Australia, Canada, Europe, and New Zealand in the field of socio-economic impacts of biomass and bioproducts and to establish a collaboration platform for the identification of future cooperation activities.

If you are interested in joining this Working Group, please contact Rainer Janssen or Dominik Rutz (rainer.janssen@wip-munich.de, dominik.rutz@wip-munich.de)

Selected Publications

Biofuels Assessment on Technical Opportunities and Research Needs for Latin America Final Report

This Publishable Summary Report of the EU FP7 project BioTop presents results of the project from 1 March 2008 to 31 August 2010. Various studies on the biofuel sector in Latin America (LA) were elaborated and provided a basis for the identification of research needs and cooperation opportunities.

The BioTop consortium, consisting of five European and five Latin American partner institutions, identified these needs and opportunities in dedicated work packages on improved conversion technologies, standardisation and trade, as well as on sustainability. Scenarios on biofuels research were elaborated contributing to the development of policy and research recommendations. Finally, the project partners disseminated the project by different means, including the organisation of three EU-LA cooperation workshops in Sao Paulo (Brazil), Buenos Aires (Argentina), and Valparaiso (Chile). Furthermore, four study tours were organised: to the Biomass-to-Liquid (BtL) plant of CHOREN Industries in Germany, to a biodiesel plant in Argentina's main soy production area Santa Fe Province, to two biogas plants in Santiago de Chile, as well as to the lignocellulose bioethanol plant of ABENGOA and to the research facilities of CIEMAT in Spain.

A final BioTop conference was organised in July 2010 in Brussels.

Further information: www.top-biofuel.org

Sustainable Production of Second -Generation Biofuels: Potential and perspectives in major economies and developing countries

Research-and-development activities on second-generation biofuels so far have been undertaken only in a number of developed countries and in some large emerging economies like Brazil, China and India. The aim of this study is, therefore, to identify opportunities and constraints related to the potential future production of second-generation biofuels and assess the framework for a successful implementation of a second-generation biofuel industry under different economic and geographic conditions. Therefore, eight countries have been analysed in detail: Mexico, four major non-OECD economies (Brazil, China, India and South Africa), and three developing countries in Africa and South-east Asia (Cameroon, Tanzania and Thailand). The study further assesses the potential of agricultural and forestry residues as potential feedstock for second-generation biofuels.

This study presents the contribution of second-generation biofuels from residues to the future biofuel demand projected in IEA scenarios and under which conditions major economies and developing countries could profit from second-generation biofuels production.

Report available at: www.iea.org

Reference: Eisentraut A (2010)

Socio-Economic Impacts of Biomass Feedstock Production

The aim of this report is to provide a first overview of the most relevant socio-economic impacts of feedstock production, based on available literature. The review focuses on the biomass resources that were selected for the five different Global-Bio-Pact case studies.

Report available at: www.globalbiopact.eu

Reference: Van Dam J et al. (2010)

Making Integrated Food-Energy Systems Work for People and Climate

A safe integration of food and energy production may be one of the best ways to improve national food and energy security and simultaneously reduce poverty in a climate smart way. Farming systems that combine food and energy crops present numerous benefits to poor rural communities. For example, poor farmers can use the residues from rice crop to produce bioenergy or in an agro-forestry system they can use the debris of trees used to grow crops like fruits, coconuts or coffee beans for cooking. Other types of food and energy systems use by-products from livestock for biogas and compost production. Yet others combine biofuel crops and livestock on the same land.

The report 'Making Integrated Food-Energy Systems Work for People and Climate' presents a comprehensive overview of different IFES options while addressing risks and constraints associated with current bioenergy productions schemes. The report was developed within the framework of the FAO project on Integrated Food Energy Systems (IFES) financed by the German Federal Ministry for Food, Agriculture and Consumer Protection.

Further information: please contact Ms. Anne Bogdanski, Associate Natural Resources Management Officer (Bioenergy), FAO, NRC (Anne.Bogdanski@fao.org). The report is available at: http://www.fao.org/bioenergy/67564/en/.

Sustainable Biofuel Development Policies, Programs and Practices in APEC Economies

This study was published in November 2010 by Winrock International for the Asia Pacific Economic Cooperation's (APEC) Biofuels Task Force. The report presents current policies, programs, and practices in APEC economies that aim to ensure that biofuels are sustainable. With respect to socio-economic sustainability, the report addresses the topics access to food and land, biofuel cooperatives, employment for women, support to smallholders, improving livelihoods, as well as community based initiatives.

The report concludes with the following three recommendations on future actions: (1) to collaborate on sustainable biofuels activities and share lessons learned, (2) to promote all areas of sustainability simultaneously, rather than look at a select few elements of sustainability, and (3) to incorporate more performance-based approaches to monitoring compliance with, and impacts of, sustainable biofuel policies, programs, and practices.

Further information: Mr. David Walden, Bioenergy Program Officer at Winrock International (dwalden@winrock.org)

Report available at: www.iadb.org

Status of 2nd Generation Biofuels Demonstration Facilities in June 2010

Driven by the need to partly replace fossil transport fuels and by food versus fuel and highest possible GHG mitigation considerations, large efforts are dedicated to the development of technologies for the production of biofuels from lignocellulosic raw materials. A high number of projects are being pursued, but only few facilities in the demonstration scale are actually operating. The technologies applied vary widely, as do the raw materials of choice.

This report gives an overview on 66 projects that are being pursued currently, and provides details on the facility size, feedstock in use and technology applied. About 50 companies have provided data on their projects directly to the authors.

The report shows that currently many facilities in the demonstration scale are under construction and will hopefully successfully demonstrate biofuels production from lignocellulosic raw materials in the near future. Plans exist to build larger commercial facilities and thus rapidly increase the production capacities. Despite the possibly fast development, the volumes of lignocellulosic biofuels to be produced in the next five years will be small as compared to the current production of conventional biofuels. High efforts still need to be made to pursue these and more demonstration activities and to quickly multiply facilities when technologies have proven their technical and economic feasibility.

While this report gives an overview on the status by mid 2010, all data on these projects is also available in the internet (http://biofuels.abc-energy.at/demoplants/) and will be updated and expanded to new projects throughout the years to come.

Report available at: www.task39.org

Reference: Bacovsky D, Dallos M, Wörgetter M (2010)

Other News

Formulation of a National Sustainability Scheme for Biofuels in Mali

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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 bioenergy sector. This development is embedded in several policy documents of the Government of Mali.

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. Biofuels are foreseen to play a major role to achieve the objectives of this strategy. In June 2009 the National Agency for the Development of Biofuels (ANADEB) was legally established as the implementing agency of the National Strategy on Biofuels in Mali.

The main motivations for the development of a biofuels sector in Mali, as in many other countries worldwide, are to contribute to the 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, as well as to contribute to an improved energy access and the creation of employment opportunities and significant revenues especially for the rural population.

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.

Within the project Mainstreaming Sustainability in the Biofuel Sector in Mali, coordinated by Mali Folkecenter and co-funded by the Global Sustainable Biomass Fund, national sustainability criteria are currently being developed. These activities are supported by international experts from FACT Foundation and WIP with the aim to establish a biofuel certification scheme suitable for the specific framework conditions in Mali.

An intensive stakeholder consultation has been launched with the establishment of several cross-sector multi-stakeholder working groups. On 22-23 July 2010 a stakeholder workshop was organised in Bamako in order to elaborate initial recommendations on suitable sustainability criteria for Mali. With the assistance of international experts an identification and prioritisation of potential negative impacts and a concise list of sustainability concerns for the Malian framework conditions is elaborated in a participatory process with the involvement of a large variety of biofuel stakeholders.

Biofuels for export into the European market will be subject to the sustainability criteria specified in the Renewable Energy Directive (RED). Several certification schemes are already available or will be available during 2011 (e.g. ISCC, REDCert, NTA 8080, RSB) in order to certify compliance with the RED. It is therefore recommended to use these existing certification systems for biofuels export into Europe rather than to develop a new Malian system. Furthermore, most certification systems offer the opportunity to facilitate the adaptation of the systems to national or regional conditions and crops. Biofuels for export will generally be produced by larger companies which should be able to certify biofuels according to international schemes.

On the other hand, biofuels for national consumption or for export into markets without sustainability requirements (i.e. Asian markets) may require the development of a national sustainability scheme with a clear focus on Malian sustainability concerns, namely the avoidance of food-fuel and land tenure conflicts, the increase of energy access for the rural population and the ensuring of sufficient local and national revenue generation. The Malian sustainability scheme may thereby involve less administrative requirements than international schemes in order to limit the associated costs to facilitate the engagement of small-scale farmers in the biofuels sector in Mali.

Further information: www.wip-munich.de

Braskem inaugurated a plant for green plastic made 100% from renewable resources

Launched in July 2007, Braskem's green polyethylene was the first in the world to be made 100% from renewable raw materials. In 2010, Braskem transformed the project into reality by inaugurating its first green ethylene plant, moving out in front as the world's leading biopolymer producer.

Braskem invested approximately R$ 500 million in the plant, which will produce each year 200 kt of polyethylene made from sugarcane ethanol. In terms of the sustainability balance, each ton of green polyethylene produced will capture and sequester 2.5 tons of CO_2. Located in Triunfo, Rio Grande do Sul, the plant will produce a wide range of HDPE and LLDPE grades to meet the growing demand for ever more sustainable products.

Braskem plant

Polyethylene is the most widely used plastic in the world, especially in the car, cosmetics, packaging, toy, personal hygiene and cleaning products industries, among others. Since Braskem's green polyethylene has the same characteristics and properties as polyethylene made from fossil resources, it enjoys the same versatility in terms of applications.

Further information: www.braskem.com

GBEP Task Force on Sustainability

In the July 2005 Gleneagles Plan of Action, the G8 +5 (Brazil, China, India, Mexico and South Africa) agreed to "... promote the continued development and commercialisation of renewable energy by: [...] d) launching a Global Bioenergy Partnership to support wider, cost effective, biomass and biofuels deployment, particularly in developing countries where biomass use is prevalent". The Global Bioenergy Partnership (GBEP) was launched during the Ministerial Segment of the 14th session of the Commission on Sustainable Development (CSD14) in New York on 11 May 2006.

The GBEP Task Force on Sustainability, established in June 2008 under the leadership of the United Kingdom, and currently led by Sweden, is working to develop a set of relevant, practical, science-based, voluntary criteria and indicators as well as examples of best practice regarding the sustainability of bioenergy. The criteria and indicators are intended to guide bioenergy analysis at domestic level with a view to informing decision making and facilitating the sustainable development of bioenergy.

The publication of the GBEP sustainability criteria and indicators for bioenergy is anticipated for summer 2011.

Further information: www.globalbioenergy.org

Global-Bio-Pact Coordination

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