

## **GBEP Working Group on Capacity Building for Sustainable Bioenergy (WGCB)**

### **2<sup>nd</sup> Bioenergy Week Summary** *Maputo, Mozambique, 5-9 May 2014*

The 2<sup>nd</sup> GBEP Bioenergy Week was successfully held from 5 to 9 May 2014 in Maputo, Mozambique, as part of efforts of the GBEP Working Group on Capacity Building for Sustainable Bioenergy to facilitate cooperation and capacity building on the potential benefits of sustainable modern bioenergy.

The event was hosted by the Government of Mozambique and organized by the GBEP Secretariat with the support of the Governments of Brazil and Italy, as well as of APLA Brazil and Vale S.A. The event gathered around 120 participants from the Americas, Africa, Southeast Asia and Europe among scientists and government officials, including also representatives of the private sector, in particular from Africa, to discuss on specific sustainability themes that are of key interest for Africa like regulatory and policy frameworks for bioenergy, food security and bioenergy, family farmers integration in the bioenergy value chain, and sustainable modern biomass energy development.

As a follow up to the 1<sup>st</sup> GBEP Bioenergy Week held in 2013 in Brazil, the Maputo event allowed having the opportunity to learn from positive experiences in the sustainable production and use of bioenergy that could guide the design and implementation of bioenergy policies in the interested countries. Furthermore it provided the opportunity to continue a dialogue with the African private sector and stakeholders on ways to improve mutual cooperation towards a more sustainable production and use of bioenergy.

#### **Opening session**

In her opening statement *Amb. Ligia Maria Scherer*, Ambassador of Brazil to Mozambique, remarked the importance of the bilateral agreement between Brazil and Italy to bring the second Bioenergy Week to Maputo.

*Francesca Blasone*, First Secretary of the Italian Embassy in Mozambique, highlighted the continued Italian support to the Global Bioenergy Partnership also through the valuable chairmanship of Corrado Clini, Director General of the Ministry of Environment in Italy, and the importance of the bioenergy development sector in Mozambique.

*Amb. Mariangela Rebuá*, Director General of the Ministry of External Relations of Brazil and co-Chair of GBEP, noted that in order to transition away from traditional biomass to modern biomass, national policies that ensure the sustainability of bioenergy are key. The comprehensive and balanced set of social, environmental and economic sustainability

indicators of GBEP gives an important and significant contribution to assist countries in the formulation of public policies and regulatory frameworks for bioenergy. She stressed that bioenergy is neither good nor bad per se; it depends on how it is produced. In light of this it is necessary to build local capacity to facilitate the adaptation process of sustainability challenges to every context and reality, being flexible enough to take into account different production systems. There is no one-size fits all solution.

*Miguel Almada*, Director of the Ministry of Agriculture in Argentina and co-chair of the GBEP Working Group on Capacity Building for Sustainable Bioenergy (WGCB), applauded the organization of the 2<sup>nd</sup> Bioenergy Week as part of the efforts of the GBEP Working Group that has the main aim to facilitate cooperation and capacity building through sharing information, stimulating discussion, and identifying opportunities for cooperation on sustainable bioenergy development and deployment.

*Maria Michela Morese*, GBEP Executive Secretary, highlighted the importance of access to adequate and affordable energy as one of the basic requirements for guaranteeing the wellbeing and development of rural populations on a sustainable basis. In light of this the Bioenergy Week was considered as an excellent example of concrete willingness to work together in partnership to further the global goal of sustainable energy development for all.

The opening session was concluded by the *Honourable Jaime Himede*, Mozambique's Vice-Minister of Energy, who remarked that the 2<sup>nd</sup> GBEP Bioenergy Week held Mozambique was an opportunity to have an important debate between different actors from public and private sectors on best policies, technologies and practices for sustainable bioenergy production.

### **Regional overviews**

Speakers in this session, moderated by *Antonio Saide*, National Director of New and Renewable Energy in Mozambique, gave an overview regarding the role of bioenergy in various regions of the world.

*Frederico Dimas Paiva* presented feasibility studies for biofuels and food production developed in Mozambique by the Getulio Vargas Foundation (FGV). These studies included analysis of 14 different crops. In light of these studies FGV developed project proposals on the basis of the Mozambican government priorities with the objective to raise funds for their execution.

*Carlos Eduardo Martin Mandarino* (Ministry of Development, Industry and Foreign Trade of Brazil) shared some figures on the sugar cane sector in Brazil counting 389 mills (in December 2013); 70,000 of sugarcane growers; 1.1 million of jobs created; US\$ 35 billion in sector revenues (2013/2014); US\$14 billion in foreign revenues (exports) in 2013. These numbers bring Brazil as the first sugar producer and the second ethanol producer of the world. Furthermore, bio-packaging from sugar cane ethanol is increasing, replacing traditional fossil fuel inputs in the petrochemical industry, as well as the selling of flex-fuel cars (3,2 million just in 2013).

*Kristen Johnson* (US Department of Energy) gave an overview of the role of bioenergy in the United States as a long-term commitment towards various benefits including reducing dependence on foreign oil while establishing bio-industry, promoting sustainable diversification of energy mix as well as positive environmental impacts. The U.S. production under RFS 2013 is as follows: 13.1 billion gallons of corn ethanol; 2.18 billion gallons of biodiesel; 122 million gallons of other advanced biofuels and under 1 million gallons ethanol equivalent of cellulosic biofuels. She also presented the recent initiatives in the Americas, including the Memorandum of Understanding signed in 2007 between U.S.A. and Brazil to advance cooperation on biofuels. On this bilateral agreement also *Frederico Dimas Paiva* of Getulio Vargas Foundation (FGV) intervened.

*Rosemarie Gumera* (Philippine National Biofuel Board) gave an overview on biofuels mandates in Asia: China - E10 in nine provinces; India - E5 with up to 20% for biodiesel and bioethanol planned by 2017; Vietnam - E5 by 2015; South Korea - B2.5; Indonesia E3 and B2.5; Malaysia - B5, planned up to B7; Taiwan - B1, with planned E3; Thailand - B5 reduced to B4 in 2014 due to reduced palm production oil; and the Philippines - B2 mandate planned to reach B5 though postponed due to recent typhoon, and E10 mandate.

### **Regulatory and policy frameworks for bioenergy**

This session, moderated by *Kees Kwant* of the Netherlands Enterprise Agency, was divided into two parts: one with speakers sharing information on national regulatory frameworks as key factor for the sustainable development of bioenergy; and the other with a roundtable discussion to identify lessons learned from the bioenergy policy developments in various countries.

*Marcelina Mataveia* (National Directorate of New and Renewable Energy of Mozambique) elaborated on the main drivers for biofuels in Mozambique highlighting climate change as one of the main drivers as well as the need to stabilize energy prices through a diversification of the energy mix in light of the national dependency on imports of fossil fuels.

In 2009 the National Strategy on Biofuels was approved by the government of Mozambique introducing blending mandates in a phased approach starting with E10 and B3. In addition, technical requirements for biofuels were approved in 2010 to set the regulations for norms, quality and standards for fuels and storage. Furthermore, an inter-ministerial committee on biofuels was created under the chairmanship of the Minister of Energy assisted by the Minister of Agriculture along with other relevant Ministries. In addition to this, other instruments have been developed in setting up legal framework for biofuels. In particular, Mozambique has separate regulations for wood-based fuels and in fact a national strategy for sustainable biomass energy was approved last year. The country is also trying to reduce dependency on coal and charcoal through LPG and electricity, but also biogas, briquettes and other fuels for domestic and industrial use. This related regulation was approved in 2013. Finally a licensing regulation has been discussed at the inter-ministerial committee level and is expected to be approved in 2014.

*Kwabena Otu-Danquah* (Energy Commission of Ghana) offered a glance of the National Bioenergy Strategy in Ghana starting with some national figures: the country has 24.6 million people with 72% electricity access; 49% of the energy consumption is petroleum based, while 39% is wood based.

Regarding the wood based energy he described the supply side - mentioning land and tree tenure issues as well as the need to create local infrastructure to facilitate the transportation and supply – and the demand side – mentioning the low dissemination of improved wood fuel stoves, implying health hazards and absence of standards for technologies. On this issue the country is looking at strategies to stimulate the use of efficient cookstoves up to 20% by 2020. This would also involve local artisans in the production of high quality cookstoves, therefore creating job opportunities.

With reference to biofuels, he listed key challenges on the supply and on the demand side like land tenure systems that do not promote the easy acquisition of land for cultivation of bioenergy crops; the absence of storage and distribution facilities throughout the country; the non-existence of biofuel pricing mechanisms as well as of fiscal incentives for biofuel production, distribution and consumption; the high costs of biofuel refinery equipments; and the high dependence on fossil fuels. He continued mentioning the national strategies to address these challenges like through specific proportion of land earmarked for biofuel feedstock cultivation for food production; supporting measures for local enterprises in the production and supply of biofuel feedstock; increasing biofuel supply in the national petroleum product mix to 10% by 2020; banning biofuel imports and biofuel feedstock's exports in order to encourage local production and use; introducing fiscal incentives on biofuel production and supply; enforcing quality standards; and establishing pricing mechanisms.

*Ricardo Dornelles* (Ministry of Mines and Energy of Brazil) gave an overview of the evolution of the bioenergy regulatory frameworks in Brazil since 1937. The most recent national policies foresee national mandatory mix for ethanol equivalent to E18 up to E25, and for biodiesel as of B5. There is also a tax differentiation regime at federal level, as well as a line of credit to implement or renew sugarcane plantations. Furthermore, intense agro-ecological zoning activities are aimed to orient and guarantee that raw-material production take place only in suitable areas. Still on the Brazilian strategies for the future, *Carlos Eduardo Martin Mandarino* of the Ministry of Development, Industry and Foreign Trade of Brazil, mentioned a joint plan with BNDES (Brazilian Development Bank) and FINEP (Brazilian Innovation Agency) to select and finance business plans that focus on commercialization of new technologies for sugarcane processing. The budget allocated to this end is equivalent to approximately US\$ 500 million in loans. Second generation ethanol, new cane products and diversification are the main aims of this joint plan.

The second part of the session was structured into parallel round table discussions. Participants were invited to prioritize problems related to policy developments in their own countries/experience and propose appropriate solutions to overcome them. In *Annex I* the main results of these roundtable discussions.

Furthermore, before closing the session participants were invited to write action points as take home commitments.

### **Food Security and Bioenergy**

This session, moderated by *Olivier Dubois* (FAO), was aimed at sharing best practices as well as discuss and identify capacity development needs related to food security and bioenergy.

*Simeao Cambaco*, representing the Ministry of Agriculture in Mozambique, offered a glance of the agro-ecologic zoning work developed in various provinces of the country from 2010 to 2013. The main goal of this work was to inform policy makers regarding land management, as well as geospatial distribution of national agricultural potentials.

*Abdelmoneim Taha Ahmed* (Sudan) gave an overview of the bioenergy potentials in the country. He stressed that the potential development of the biofuel industry in the country, both from a technical and social point of view, are supported by the following elements: i. availability of national resources, including land and water (rain fed and irrigation, taking advantage also of the Water Treaty signed in 1959 with Egypt for which around 6 milliards cubic meters of water are still available for use in Sudan); ii. variety of energy crops available (soybean and sunflower as the preferred ones, but also maize, sesame, cotton, and groundnut); iii. support to food security related dimensions; iv. practical experience of the first bioethanol plant established in Sudan in 2009 by the Kenana Sugar Company, with a production capacity of 200,000Lt/day - 65 ml Lt/year, 90% of which is exported to the European Union.

Sudan has good potential to produce biodiesel but quantitative and qualitative analysis is needed.

*Olivier Dubois* introduced the FAO Bioenergy and Food Security Rapid Appraisal (BEFS RA) as a tool that allows countries to get a preliminary indication of their sustainability bioenergy production with respect to food security. BEFS RA has been piloted in the Philippines and *Rosemarie Gumera Gumera* (Philippine National Biofuel Board) gave an overview of its preliminary results. In particular she highlighted the followings:

1. regarding biodiesel there is large room for intensification in feedstock production and supply - especially for coconut but also oil palm – which would bring to a decrease on their production costs. This would not compete with food security;
2. regarding bioethanol there is room for intensification in feedstock production and supply - especially for cassava and sugarcane – which would bring to a decrease on their production costs. For large plant with intensified yields sugarcane ethanol appears to be more competitive when compared to the international price of ethanol. Cassava based ethanol production appears to be more labor intensive than sugarcane based ethanol;
3. subsidies are needed for the intensification programmes, however they could be eventually reduced as the sector becomes more competitive.

*André Machado* (Ministry of Agriculture of Brazil) shared the country experience on social seal for biodiesel, involving family farming, industries and cooperatives.

12.3 million people in Brazil is employed or self-employed by family farming, that take of most of the national food production (83% of the national production of cassava; 70% beans; 46% corn; 38% coffee; 33% rice; 21% wheat; 58% dairy; 51% poultry; 59% swine; and 30% cattle). The major oilseed produced in Brazil for biodeisel is soybean, and approximately 15-20% of the soybeans in the country are produced by family farmers.

For every USD 2.20 invested in the purchase of oilseeds and oils from other suppliers, approximately USD 1.00 is invested in the purchase of oilseeds and oils from family farming. As a result there is a positive impact on income and access to technology for thousands of families that also receive trainings. In addition to this, there is also a good participation of industries.

The second part of the session was structured into a round table discussion. *Olivier Dubois* (FAO), as an introduction, elaborated on the links between bioenergy and food security, focusing on risks and opportunities that can affect the four dimensions of food security (availability; access; utilization and stability). On the basis of this introduction, participants were invited to identify capacity development needs that experts consider important to strengthen opportunities and reduce risks. In *Annex II* the main results of this roundtable discussion.

It was decided to submit the results of this roundtable discussion to the next meeting of the GBEP Working Group on Capacity Building (Rome, November 2014) in order to discuss and agree on the role of GBEP with respect to the capacity building needs identified. Participants were also invited to make best use of this list of identified needs to stimulate bilateral cooperation.

### **Family Farmers Integration in the Bioenergy Value Chain**

This session, moderated by *Amb. Mariangela Rebuá* (Brazil), encompassed seven presentations aimed at sharing best practices related to family farmers integration in the bioenergy value chain.

*Nadew Tadele* (Ethiopia) gave an overview of the experience in Ethiopia. About 95% of the total energy consumption in Ethiopia is from traditional biomass fuels, with only 5% coming from modern energy sources. Most biomass is obtained from firewood, charcoal, dung and crop residues that mainly depend on the surrounding forest resources and agricultural residues. Ethiopia imports its entire petroleum fuel requirement by spending over 80% of the foreign earning annually. As a consequence looking at alternative energy sources is very critical in order to impact positively to the economic, environmental and social conditions of the country.

The national biofuel strategy was introduced in September 2007 with the objective to produce adequate bio-fuel energy from domestic resource, substituting imported petroleum products and exporting surplus of products. This strategy is based on some principles among which the guarantee to support food security by avoiding negative effects on the economic development.

In Ethiopia 313.4 million liters/year of kerosene are used at household level. More than 6,000 stoves have been distributed by different organizations. In order to produce affordable ethanol for cookstoves, this is produced by the Government in an alternative energy laboratory center. Extensive research has been developed on jatropha supporting family farmers' production in several areas throughout the country.

*Marcelo de Sousa* shared the experience of the International Center on Renewable Energy-Biogás (CIBiogás-ER) on agro-energy cooperative for family farming in Brazil. In terms of background data this agro-energy cooperative counts 33 rural properties with 25 km of biogas pipeline length including: 1072 cattle, 12,64 m<sup>3</sup>/day of production of cattle waste, with an equivalent biogas production of 122,00 m<sup>3</sup>/day, as well as 3082 swine, 35,79 m<sup>3</sup>/day of production of swine waste, with an equivalent biogas production of 699,79 m<sup>3</sup>/day. As a result the cooperative is able to produce 48.43 m<sup>3</sup>/day of total waste (manure) and 820 m<sup>3</sup>/day of biogas.

He stressed that biogas helps to support the rural economy, has positive environmental impacts, reduces negative impacts from livestock, and reduces animal and livestock diseases.

*Gaston Kremer* shared the experience of the Green Social Bioethanol in the sustainable energy autonomy of rural communities. This Brazilian company, in cooperation with other partners like DuPont, PANGEA, Project Gaia and GACC, has developed projects of green micro-distilleries to produce bioethanol at the local level, in a community contexts. The experiences related to pilot projects in Guyana and Nigeria was shared. He stressed that in light of these experiences it has been proved that their equipment is adequate for the African reality, but has to be adapted to different situations.

*Olivier Dubois* (FAO) gave an overview on the integrated food and energy system project in Malawi. In this country a large part of the population is food insecure, 97% of rural dwellers still rely on fuel wood for cooking, and deforestation progresses rapidly with almost 1% per year. FAO, Concern Universal and ICRISAT carried out a project in Malawi to increase food security and energy access while ensuring the conservation and sustainable use of forests by growing fuel wood on farm. Integrated Food-Energy Systems such as intercropping maize and pigeon peas have shown that it is possible for households to burn woody biomass for fuel without leading to forest degradation or deforestation. On the contrary, if properly produced and managed, the intercropping with woody species can enhance food security and improve household income, as well as reduce pressure on forests for the provision of wood.

*Ella Lammers* (Netherlands Enterprise Agency) gave an overview of the Netherlands' Programme for Sustainable Biomass (40 projects in 20 countries, covering 10 different types of biomass) and presented the study conducted on smallholders certification in biomass supply chains, which draws on the experiences with smallholder certification in sectors other than the biomass production. The objective of this study is to provide an insight into: i. the benefits for companies and other stakeholders to include smallholders in biomass certification processes; ii. the benefits for smallholders to be certified in biomass supply chains; iii. the risks and challenges regarding certification of smallholders in biomass supply chains; iv. the lessons learned from existing certification schemes applied in smallholder settings in and outside the biomass sector; and v. to provide recommendations including practical information on steps and strategies that enable successful certification of smallholders in biomass supply chains. Among the various conclusions of this study it was highlighted that there are benefits in smallholders certifications, already in the process of the certification, as well as challenges like difficulties in their development and implementation, and high costs.

*Bachir Afonso* (ADDP, Grupo de saneamento) shared the experience of smallholders jatropha production in Mozambique. Currently this activity involves 6000 farmers in the Northern area of the country where there are community shops that collect the jatropha seeds from the farmers, to be then sent to processing centers (filtration) and finally brought to shops. One of the main conclusions was the recognition that jatropha could be the ideal solution in terms of energy access for local communities, with positive impacts on their environmental, social and economic aspects. Political and fiscal incentives were highlighted as needed in order to facilitate jatropha cultivation in the country.

*Rolf Hogan* presented the RSB standard which is based on 12 principles, further developed into criteria. Compliance with these criteria is assessed through a set of dedicated indicators.

In order to guide operators through the RSB Standard, several guidelines are associated with specific elements such as the calculation of GHG emissions on a life-cycle basis or the assessment of the situation with regards to food security in the region of operations. He concluded that certification can help providing market access, enhancing sustainable production and efficiencies, as well as promoting cooperation. However, at the same time, it also presents barriers in terms of cost, lack of capacity, unsustainable practices and lack of organization.

The second part of the session was structured into parallel discussions to identify challenges and opportunities of integrated family farming systems in the bioenergy value chain. In *Annex III* the main results of this discussion.

### **Sustainable Modern Biomass Energy Development**

This session, moderated by *Martina Otto* (UNEP) encompassed various presentations aimed at sharing best practices related to sustainable modern biomass energy development.

*Ahmed Abdelati* (Egypt) presented the main socioeconomic aspects, including water scarcity and energy dependency on hydrocarbon imports, which brought Egypt to foresee reforms to make investment in Egypt's energy sector more attractive, in particular into renewable energy. Among the various best practice project examples available in the country he gave an overview of two thermal gas plants. Each plant capacity reaches 350 m<sup>3</sup> per working shift to face the consumption of 300 household units. The working routine in the plants is as follows: 1. collection and filter of post-combustion gases; 2. testing of gas by the color of flame; 3. transferring gas into the reservoir; 4. reservoir working as a gas storage above the water; 5. while the gas is consuming, the system is re-operated to pump new gas. Below the chemical properties of the gas produced: nitrogen 41%; carbon dioxide 27%; methane 13%; hydro carbonate 4%; and other gases 15%.

The Natural Gas Company establishes the gas network and feeds for free the 300 households that contributed to produce thermal gas.

*Simone Favaro* elaborated on the experience of ICRAF related to wood fuels. She stressed that charcoal is and will continue to be an important source of energy in Africa. Its use has increased considerably in the last 60 years and it is appropriate to consider alternative wood sources for its increasing future use. She mentioned various good examples like the coconut agroforestry for electricity generation in Sri Lanka, the use of biomass briquettes in Kenya and the coconut shell, as well as the pongamia for biodiesel in India. She concluded that at the global level, the potential of wood-based energy must be taken into account in policy debates such as Sustainable Development Goals, while at the national level, wood-based fuels must be considered positively so that wood as a renewable form of energy can play its proper role among other sources of energy in available energy mixes. Furthermore she highlighted the need for official recognition of charcoal production and marketing by national energy policies in Africa.

*Ranyee Chiang and Seema Patel* shared the experience of the Global Alliance for Clean Cookstoves (GACC) starting from some global numbers: 3 billion people dependent on

traditional stoves, 2 billion tons of biomass is burned each year, up to 40% of household income is spent on fuel and 4 million people die annually due to the exposure to indoor air pollution. The mission of GACC is to create a thriving market for clean cookstoves and fuels, with the objective to get 100 million households adopting clean and efficient cookstoves and fuels by 2020. This is planned to be reached, *inter alia*, supporting enterprises through finance and capacity building, as well as improving production of existing fuels and facilitating transition to cleaner fuels. GACC is currently working on a report to collect examples of initiatives related to sustainable fuel production, distribution and use.

*Suani Coelho* (CENBIO) gave an overview of the modern biomass options in Brazil. She mentioned the national production of firewood, charcoal and liquor which is 30,4 Mtoe, while the production of sugar cane biomass is 43.6 Mtoe (2012). She referred to the use of solid biomass for power production (biomass contributing with 7% of the electricity generated by national power plants, bagasse from sugarcane with 80%, forest-based biomass with 15.8% and other types of biomass with 1.8%), and forest plantations activities (eucalyptus and pinus). The estimation of forest wood residues in Brazil in terms of capacity is 237.375 ton/year while the real production is only 59.980 ton/year. As such there is a high unused capacity that could open positive perspectives in terms of biomass trade. She highlighted that in Brazil various types of forest certification are applied; in particular Brazil is the fifth largest area of FSC-certified forests in the world, and 40% of the certified areas in Brazil is mostly located in forest plantations in the South and South-East of the country, in the Atlantic Forest area. She stressed the importance of certifications and the need for them to be voluntary and flexible in order to reflect the local conditions. She concluded announcing that in 2014 CENBIO/USP, with the financial support of Italy and in cooperation with different partners and researchers, will test the GBEP sustainability indicators in several sugar cane mills in the São Paulo State.

*Marcelo de Sousa* (International Center on Renewable Energy-Biogás, CIBiogás-ER) presented the case of Paraná for sustainable modern biomass from forests, on small rural properties. He mentioned a specific project on eucalyptus, involving 5 rural properties of the agro-energy cooperative for family farming. The project has shown positive impacts on economic, environmental and social sides. In particular, it is worth mentioning new revenue generation, energy diversification and efficiency for the economic aspects; use of biofertilizers and better treatment of effluents for the environmental aspects; and better efficiency of the rural property resources for the social aspects. On the basis of this good example in Paraná *Toni Vieira* (Federal University of Paraná, Brazil) elaborated on the importance of media communication starting from the general public at the education level (schools). He invited participants to act towards a better use of the communication tools.

*Linus Mofor*, after an overview on the structure and programme of IRENA, elaborated on the drivers and potential of the bioethanol production from sugarcane in Africa. He stressed that it can be produced with high yield per unit of land; contribute substantially to the energy agenda and to climate change mitigation; it is a mature and well-proven technology as well as widely adopted on a commercial basis in Africa; some African countries are amongst the lowest-cost sugar producers in the world (i.e. Malawi, Swaziland and Zimbabwe); and it presents good level of improvement in terms of optimization of existing sugarcane mills. Despite this enormous potential, policies and regulatory frameworks in Africa represent enormous barriers due to total lack of related policies or, where existing, non-uniformity and

often inconsistency. As take away messages he highlighted the need of coherent policies for market certainty and incentives for private sector investments, as well as effective south-south and triangular cooperation.

He concluded highlighting the need to take advantage of the robust experience of GBEP on bioenergy and confirmed the willingness of IRENA to strengthen the cooperation with GBEP on capacity building activities for sustainable bioenergy.

*Micas Cumbana* (GIZ AMES) gave an overview on the Energizing Development Partnership (Env Dev) which is co-funded by the EU and the Irish-Aid, and implemented by GIZ in cooperation with the NL Agency. The main objective of the partnership is to provide at least 14 million people with access to energy in a sustainable manner by 2015. The main Env Dev commitments are the followings: for every 20 Euro spent, at least 1 person will have sustainable access to modern energy technologies and services (currently 14 million people); indoor air pollution for at least 4 million women and children will be reduced; pro-poor markets for off-grid energy technologies and services will be developed and strengthened; greenhouse gas emissions will be reduced by at least 50% in relation to offered/used service. With its activities and projects Env Dev provides energy for households, social institutions and enterprises.

With reference to the activities in Mozambique he showed industrial, semi industrial and artisanal stoves that were identified, tested and promoted by the partnership, also mentioning their energy saving comparative advantages.

*Miguel Verhein* (Algasol Renewables, Spain) elaborated on the potential in microalgae biomass as source of biofuels in developing countries. Algae yields are 20-50 times higher than other plants, can be harvested almost everywhere, and can grow under difficult conditions. He analysed challenges and benefits of the different systems available: open ponds (with high contamination risks, low biomass concentration and high energy consumption); tube and flat panels (with high centrifugate capacity, impacts concentration and temperature control needed); and fermentation (with very high centrifugate capacity, not industrially scalable; and additional sugar based feedstock required with consequent food versus fuel debate involved). He stressed the added value of the Algasol's system that with its modular floating bag technology differs from the conventional ones and can grow algae in the ocean as well as on the land. He also mentioned the various algae market opportunities: animal feed (fishmeal), biofuels, nutraceuticals (DHA/EPA omega-3s), and pharmaceuticals.

*Femi Oye* (SME Funds, Nigeria) presented his organization experience on small-scale cellulosic ethanol from sawdust in Nigeria. He gave an overview of the country as a background, highlighting that 98% of households in Nigeria lack access to clean cooking and lighting fuels, which causes on one side the expenditures of 60% of their daily earnings, and on the other side over 95.000 deaths per year. This strong use of wood energy in a traditional manner also creates a strong pressure on forests in term of high deforestation rate which is one of the highest in the world with 3.3% of the country forests lost each year. Diversification of energy sources is key in order to reduce ethanol imports (98% of annual ethanol consumption is imported) and expenditures on kerosene (around USD 9 million are spent daily).

The presented technology to produce cellulosic ethanol in gel is economically feasible using a combination of thermal, chemical and biochemical techniques. The lignin in the plant fiber is used to drive the process by generating steam and electricity, thus eliminating the need for

fossil CO<sub>2</sub> sources, such as coal or natural gas. This kind of production has also positive impacts on gender aspects, not only because mainly women use energy at home for cooking and lighting, but also in terms of women entrepreneurship. More than 200.000 cookstoves have been sold in Nigeria by this project - 2/3 of which in the last 5 years - and 2 million liters of biofuel gel have been produced and sold. Advantages are considerable also in terms of costs: the price of the gel fuel is just below the cost of kerosene in Nigeria (less than \$1 per volume litre) and 0.75 litre of gel fuel will provide a full day of cooking for a family of five. Around 60-70% of the gel fuel cost is related to feedstock cost (water hyacinth).

In conclusion, this technology presents benefits in terms of environmental, economic and social considerations.

*Betty Ikalany* shared the experience of TEWDI (Teso Women Development Initiative) on a for-profit social business enterprise to produce and sell charcoal briquettes and improved cookstoves in Uganda. Currently products are sold to households, institutions (i.e. schools, hotels and restaurants) and poultry farms, which count around 70.000 people in the Municipality of Soroti, with the objective to reach up to 5 million people in the entire Teso region. The feedstock used is carbonized agricultural waste including maize cobs, groundnuts and charcoal dust, using cassava flour as binder. This feedstock is pressed and briquettes are produced using diesel-powered extruder which was modified from a meat grinder.

Despite the simple production system and the positive impacts on social and economic level, the TEWDI project still presents some barriers in terms of insufficient funds to acquire better machinery, limited space to dry the briquettes due to high volumes handled, and limited awareness by end users and microfinance institutions.

Moderators of the various sessions – 1. Regulatory and policy frameworks for bioenergy; 2. Food security and bioenergy; 3. Family Farmers Integration in the bioenergy value chain; and 4. Sustainable Modern Biomass Energy Development - were invited to recap on main messages and lessons learned from the previous discussions.

### **Round table discussion among policy makers, business sector and international banks/funds – Lessons Learned – Part I**

This round table represented an interactive session with the aim to analyze and discuss the necessary steps to best develop and finance bioenergy projects in Africa.

The moderator, *Pjotr Schade* (Everest Energy Group), introduced the session by sharing lessons learned from the 41 bioenergy projects developed all over the world (11 in Africa) by the Netherlands Enterprise Agency; many of which with the support of the Everest Energy Group. As a starting point the moderator shared the “7 building blocks” that guided the Everest Energy Group to develop sustainable bioenergy projects, and to identify key risks and opportunities: 1. Financing; 2. Sales and trading; 3. Logistics; 4. Permits, licence and subsidies; 5. EPCM (engineering, procurement, construction and management) and OM (output management); 6. site selection; and 7. sourcing.

### ***How to develop a project***

Three steps were presented as key in order to well structure projects that would increase their bankability:

1. *strategic analysis - qualitative analysis* (SWOT analysis: Strengths; Weaknesses; Opportunities; and Threats);
2. *business case evaluation - quantitative analysis* using discounted cash flow method; and
3. *structured investment documentation - project data to management data.*

Lessons learned from the above mentioned bioenergy projects in Africa were summarized under four key categories:

- i. *Securing inputs*
  - engaging with smallholder organizations and local stakeholders greatly increases stability of the input;
  - engaging with local and national policy makers for land-use planning and management, permits and licenses.
- ii. *Securing outputs*
  - a stable output market is of vital importance for a project to generate cash flow and to be able to attract finance for a project;
  - the regulatory framework and an enabling environment are key for the bioenergy market.
- iii. *Local stakeholders*
  - Involving local stakeholders increases the chances of successfully gaining access to financial resources;
  - Involving policy makers, civil society and stakeholder groups facilitates support to the project highlighting the benefits that will be generated in terms of sustainable economic growth and improvements in social welfare.
- iv. *Do's and don'ts*
  - On the “Do's” side, it was highlighted the need to well structure projects; be clear on strengths and weaknesses; calculate conservative cases; and keep core project team small and with short lines.
  - On the “Don'ts” side it was highlighted the need to use common/standard denominators in order to use a universal language; avoid many variables which increase the risk perception; develop scalable projects; and focus on interests of partners.

### ***How to finance a project***

Two fund development phases were presented:

1. clustering of projects based on key financial parameters, project funding requirements and preconditions of an investment portfolio.
2. match projects with investors in light of analysis of criteria for investor selection.

The following lessons learned were shared:

- i. structuring a project before approaching funders is key;

- ii. the most eligible sort of investors prove to be Development Banks, Development Bank Funds, Private Equity and Credit Enhancement agencies, while commercial (High Street Banks) have difficulty servicing the demand of bio-energy projects;
- iii. recommending to use an existing infrastructure for a new facility and working together with partners who have similar interests and goals;
- iv. financiers prefer projects with larger size, for small projects bundling should be considered.

Participants actively interacted throughout the session with the objective to better understand from the lessons shared. Participants highlighted a big gap between project owner and project financier in terms of capacities, language and tools. Participants also mentioned the need for economic structuring capacities in between the project owner and the project financier to facilitate a transaction. A project facilitator, which could be supported by governments, semi-governments and/or development banks, was considered important but need to be a third party (external to the project).

It was mentioned the “Project Navigator”, under development by IRENA, to help project developers measure their progress, identify required adjustments and recognize key factors to consider in planning. It is a total support package, ensuring clear development, bankability and more effective implementation of renewable energy projects. It was also mentioned the Private Financing Advisory Network (PFAN) which is a multilateral, public-private partnership initiated by the Climate Technology Initiative (CTI) of the World Bank. CTI PFAN operates to bridge the gap between investments and clean energy businesses. It identifies promising clean energy projects at an early stage and provides mentoring for development of a business plan, investment pitch, and growth strategy, significantly enhancing the possibility of financial closure (additional information available at: [www.cti-pfan.net](http://www.cti-pfan.net)).

As a concluding part of the round table participants were invited to identify and prioritize difficulties in the development of a project (see Annex IV). Participants discussed and agreed the structuring a project represents the biggest difficulty, but also recognized that there are tools available to overcome this.

### **Round table discussion among policy makers, business sector and international banks/funds – Lessons Learned – Part II**

This round table, moderated by *Flávio Castelar* (APLA/APEX) encompassed various presentations aimed at sharing best practices related to the development and financing of bioenergy projects in Africa.

*Daniel Vivas* offered a glance on the role of BNDES (Brazilian Development Bank) in the biofuel sector. The presentation emphasized that BNDES offers special lines of credit to clean energy operations such as hydro, wind, solar, bioenergy, cogeneration, transmission and distribution projects. It also provides support for feasibility studies for the energy sector projects. It has supported more than 120 projects that will provide a nameplate capacity of: i. cane crushing: 125 million tons; ii. ethanol production: 8 billion liters; iii. sugar production: 4.2 billion kg; iv. electric energy surplus: 2,500 MW.

*Raquel Capistrano* presented the experience of Petrobras Biocombustível - an integral subsidiary of Petrobras - in the production of bioethanol and biodiesel. Its ethanol production facility has an annual capacity of 1.5 billion liters. It produces ethanol and sugar from sugarcane and sells power to the grid from bagasse cogeneration.

Its biodiesel production facility has an annual capacity of 821 million liters. The main feedstocks used are from oilseeds (soya, palm oil), animal fats and residual cooking oils.

She also mentioned the R&D of the company on cellulosic ethanol since 2004.

Petrobras has introduced family farming systems in its production chain. In the 2013-2014 harvest it worked with 15,700 family farmers in six states of the Brazilian semi-arid region.

Under its business plan for 2014-2018 the company estimates to make total investments of US\$2.3 billion and to have a market share of 24% for biodiesel and 15% for bioethanol in 2030. It has also signed a MoU with the Government of Mozambique to conduct feasibility studies into: mandate to add ethanol to gasoline in Mozambique; ethanol mills in Mozambique; mechanisms to export surplus ethanol production; and the building of a distillery in Cia de Sena.

*Guilherme Nastari* (Datagro) gave an overview on the history of sugar production in Brazil, where an increasing demand of sugarcane brought to increased production over the years. This was reflected into a huge increase in mechanization. He also showed graphs on production costs versus price of the sugar and bioethanol sector in Brazil. He highlighted the opportunity to transfer Brazil's experience to Mozambique for which stability of prices and a long term revenue strategy would be needed.

*Celso Procknor* (PROCKNOR) elaborated on the company and its main activities that consist in the development and implementation of industrial projects, as well as the development of equipment and systems for the agro-industry to enhance production of sugar, ethanol, sugar cane by-products and renewable energy from biomass.

He shared one main lesson learned from their project implementations: the most important challenge for their projects has been lack of skilled workforce. Related to this large female workforce has emerged in the plant control rooms and has proven to be very careful in its running of the plant.

This roundtable was followed by an **Update on the sustainable bioenergy component of the SE4All initiative** presented by *Gerard Ostheimer* (SE4All Bioenergy Lead, Novozymes). He highlighted the main drivers behind the initiative: energy poverty widespread and preventing economic development. The international development community has begun to act and has recognized that universal energy access cannot be achieved solely with donations and government programs.

The Sustainable Bioenergy High-Impact Opportunity – co chaired by FAO and IUCN with the support of Novozymes acting as Secretariat - has been introduced with the aim to catalyze deployment of sustainable bioenergy, including clean cooking solutions; increased agricultural productivity; energy from municipal solid waste; sustainable aviation biofuels and cellulosic ethanol.

Sustainable Bioenergy High-Impact Regional Initiatives will align with the SE4All regional hubs and seek to reduce transaction costs to sustainable bioenergy development and deployment in the area of policy support, finance support, knowledge support and project development.

Finally he mentioned the Sustainable Bioenergy Projects and High-Impact Initiatives:

- Bioenergy and Food Security (UN FAO)
- Bioports for Sustainable Aviation (KLM and SKYNRG)
- Policy Tools Promoting Sustainable Bioenergy (International Energy Agency and UN FAO)
- Smallholder Sustainability Certification (RSB and Boeing)
- Sustainable Aviation Biofuels (UN ICAO, Carbon War Room & Boeing)
- Sustainable Bioenergy in Africa (PANGEA and NEPAD)
- Sustainable Bioenergy in Latin America (IDB and Novozymes)
- Sustainable Biofuels for Maritime and Heavy Trucking (Carbon War Room)

### **Break out groups with policy makers, business sector and international banks/funds**

Participants were divided into two break out groups for parallel discussions on the main themes discussed during the previous round tables, including on how to combine sustainability requirements in bioenergy policy development, business interests and funding opportunities. The discussion was developed on the basis of case study presentations.

#### ***Break out group 1 - How to best develop and finance a project in Africa***

*Moderators: Flávio Castelar APLA/APEX and Pjotr Schade, Everest Energy Group*

*Kante Gaoussou* (Saphir, Côte d'Ivoire) shared the experience of his company in the ethanol production for clean cooking in Côte d'Ivoire. Cassava is one of the most important root crops in tropical countries. In Côte d'Ivoire, it is the major food crop after yam with an annual production of 2,200,000 tonnes.

COTRAME and SAPHIR HM have signed an agreement with international partners (SE4All, PANGEA, Project Gaia and Green Social) to collaborate in the development and deployment of sustainable ethanol production for clean cooking. They are currently collaborating partners for the Sustainable Bioenergy High-Impact Opportunity (HIO).

The identified opportunity is an investment in a cassava based Integrated Food Energy System under which cassava will be processed into cassava food product and resulting waste water will be utilised for clean cooking ethanol for household cooking.

*Jorge Manjate* (Agriculture Promotion Center, Ministry of Agriculture, Mozambique) gave an overview of the bioethanol production as an output to optimize sugar industry in Mozambique. The presentation revealed that the sugar industry has a potential for the development of the rural economy in Mozambique, with immediate impact on local communities and job creation in poor areas. Investments in rehabilitation and expansion of the 4 sugar mills currently in operation, resulted in increased sugar production from 13,000 tonnes in 1992 to 296,000 tones 2011. The production of outgrowers, increased from 80 hectares in 2000 to 9,000 hectares in 2013. Molasses production is estimated at 120,000 tonnes of which about 10,000 tonnes are consumed locally and the remaining exported to South Africa and the EU.

The presentation concluded that there are opportunities to use the molasses produced in Mozambique to generate 35 million tonnes of ethanol enough to meet the national needs of 20 million liters for E10 blends if the approval of a legal framework and other challenges in the sector are resolved.

*Tom Maate Wa' Bukombi* (Green Investments) highlighted the multiple uses of sweet sorghum in light of a case study of the Kayunga Sorghum Energy Plant in Uganda. These multiple uses include using its stalk juice for ethanol production, grain as food, feed, and fuel; stripped leaves and bagasse/stillage for animal feed; and bio-compost/power for co-generation.

The pre-feasibility study for the sorghum energy plant revealed the following:

- a land size of 4,000 hectares will be required to cultivate sufficient sorghum to produce 20 million liter of ethanol and 10 MW of power from sweet sorghum stalks;
- the Ethanol & Power Plants will employ 500 people in 2 shifts;
- bio-green sweet sorghum concept which has been replicated in Kenya and Tanzania could be replicated in other areas in Uganda;
- there is need for having own funds for the start-up; and
- ethanol produced can be used in Uganda and in the East Africa region, while the excess exported to China, EU and USA.

The Break-out group 1 continued with an open discussion on issues raised during the previous presentations and also developed a case scenario/simulation on how to best develop and structure a project in order to facilitate its funding opportunities.

### ***Break out group 2 - The importance of national/regional stakeholder engagement for projects in Africa***

*Moderators: Gerard Ostheimer, Novozymes, and Cedric Lemarie, VALE*

*Dwight Rosslee* (Selectra, South Africa) presented the experience of his company on production and deployment of bioenergy crops cultivated on mine impacted land in South Africa. Soil characteristics of this kind of land is similar to that of surrounding farms with varying levels of contamination by heavy metals and other pollutants. An agriculture strategy has been implemented in order to obtain a soil amelioration (correct PH and nutrient loading); a biological activation of the soil; and a plant selection. The final energy source is biogas and ethanol for fuel vehicle use; biogas and combined heat and power for heat application; and steam for electricity application.

*Anthony King* (Scania, South Africa) shared the Scania experience on Sustainable Biofuel powered buses and trucks for Sub-Saharan Africa.

The presentation stated with the assumption that there are only three commercially viable biofuel solutions: bioethanol, biodiesel and biogas. In light of this Scania recognizes in these biofuels the key for decarbonizing transports, and therefore has produced buses and trucks that run on these three major fuels. This is a unique product portfolio and it supplies a complete package of heavy duty city transport, fuelling stations and arranges contacts necessary for setting up local supply of bioethanol. Bioethanol is by far the biggest of these fuels and also usually the most cost efficient and sustainable.

A good example of this is an ethanol bus in Johannesburg which runs on ethanol from locally grown sugar beets on waste land.

The presentation concluded that the transportation sector in South Africa is 96% dependent on fossil fuel and there is no single solution for achieving sustainable transportation. It therefore requires many parallel developments to address the issue. New energy-efficient vehicle

technologies and biofuels are all important elements to ensure a sustainable transportation system.

*Cedric Lemarie* (VALE) presented the Nacala Corridor Project in Mozambique. Vale in partnership with CFM (the Mozambican port and rail company) has invested a total of USD 4.5 billion in the Nacala Corridor Project. The project entails the construction of the Nacala-a-velha Port and over 900 km rail line from the coal mines to the port. This rail line could be used for transportation of biofuels in future.

### **Conclusions - Main results and messages of the Bioenergy Week**

During the concluding session, chaired by Maria Michela Morese (GBEP Executive Secretary), moderators of the various sessions that have taken place during the 2<sup>nd</sup> Bioenergy Week were invited to recap on results and main messages.

#### ***Food security and bioenergy - Olivier Dubois, FAO***

Bioenergy development is complex and multi-faceted and therefore assessment of its sustainability must be evidence-based, contextualized and integrated. Country level assessments should define what types of bioenergy is viable, and how, where and for which purpose they should be produced.

Bioenergy and in particular biofuels are here to stay. Therefore, while one can argue for or against biofuels, it is absolutely key to develop the policies, programmes and capacities to make sure that biofuels – whatever their nature – are developed in a sustainable way.

This is doable because, conversely to a few years ago, enough knowledge and tools are now available to help governments and operators manage risks and harness opportunities for biofuel development, while safeguarding vulnerable groups.

Several capacity needs regarding the links between bioenergy development and the main dimensions food security have been identified, through information/awareness raising, training, institutional/good governance and the policy environment. In many cases these needs are similar to those needed for sustainable agriculture intensification and responsible agricultural investments. Examples include adequate and smart incentives to stimulate demand matched by sustainable supply, participatory land use planning and financial support to small-scale producers. Some are specific to bioenergy, such as the opportunities of bioenergy development, improving access to modern energy to enable local development.

Next steps regarding capacity development include sharing the identified needs with GBEP Partners and Observers and wherever else it is deemed appropriate, and exploring cost effective implementation modalities such as e-learning and training of trainers.

#### ***Family farmers integration - Maria Michela Morese, GBEP Executive Secretary***

Challenges and opportunities for family farmers integration were identified under three main areas also identified under many other sessions: policy, finance, and awareness raising. The biggest opportunity or advantage of participation of small holders in bioenergy is the possibility to reduce their vulnerability by boosting food security, income generation and capacity building.

Among the challenges, need to increase income generation, vulnerability of the communities, land tenure to improve security to land and access to bioenergy products.

***Modern biomass energy development - Martina Otto, UNEP***

Modern bioenergy has its place in the energy mix and should be embedded in overall energy policy. Too many are depending on traditional biomass that is cumbersome as well as risky for health and environment. Bioenergy makes up to 77% of renewable energy worldwide already mostly through traditional biomass, but modern renewable energy needs to increase dramatically. This latter will offer important opportunities for trade and not just local use, as well as provide potential for developing countries. Feedstocks vary across local conditions, so there is opportunity for everywhere.

A multitude of activities is already happening across the globe. Multiple benefits have been mentioned as key, not only climate mitigation and access to energy, but also environmental and health benefits, as well as income generation. As a result there is the need to look at all of them. There is also the need to look at sustainability and at the whole value chain, not just the end use with more efficient cookstoves including the fuels.

Three main barriers and solutions were identified, same as in the other sessions: i. policy - in terms of political will to be engaged and laws to be put in place; ii. finance – in terms of access to finance and grant mechanisms; and iii. Awareness raising – in terms of common tools available and information sharing.

There is a need to think about quality and sustainability which would include a role for the GBEP indicators on a national level and certification.

***Round table discussion on the development and financing of projects in Africa. Lessons Learned – Part I - Meghan Sapp, PANGEA***

The discussion highlighted a big gap between project owner and project financier in terms of capacities, language and tools. The need for economic structuring capacities in between the project owner and the project financier to facilitate a transaction was highlighted. A project facilitator, which could be supported by governments, semi-governments and/or development banks, was considered important but need to be a third party (external to the project).

Difficulties in the development of a project were identified and prioritized. The structuring of a project was agreed to represent the biggest difficulty in the development process of a project, but it was also recognized that there are tools available to overcome this.

***Round table discussion on the development and financing of projects in Africa. Lessons Learned - Part II, and Break out group 1 “How to best develop and finance a project in Africa” - Flávio Castelar, APLA/APEX***

Clear and common understanding that clear policies are needed in order to facilitate market creation. Africa has huge bioenergy production potential on small or large scale without jeopardizing production of food. More action on this matter is needed.

***Break out group 2 “The importance of national/regional stakeholder engagement for projects in Africa”, and Regulatory and policy frameworks for bioenergy - Gerard Ostheimer, Novozymes***

Also under these sessions three main areas were identified as key for further actions: policy, finance and awareness raising. There are a lot of practical examples on the ground of setting up projects but many calls for policies were heard. Economic aspects including insufficient access to funding and issues around price competitiveness with fossil fuels were also raised. Finally lack of awareness that translates into lack of opportunities for farmers was stressed. To address those challenges more engagement is required at all level to establish legitimate frameworks, reach out to the financing community, extend relevant information to the communities, and valorize the biomass.

***Closing remarks***

The Bioenergy Week concluded with closing remarks by *Antonio Saide*, National Director of New and Renewable Energy of Mozambique and *Maria Michela Morese*, GBEP Executive Secretary.

It was highlighted that during the Bioenergy Week special emphasis was given to the means to combine sustainability requirements in bioenergy policy development, business interests and funding opportunities. To this end the workshop saw interactive sessions involving policy makers, business and international banks/funds representatives, which gave the opportunity to have parallel discussion on how to best develop and finance projects in Africa, taking into account the importance of national and regional stakeholder engagement.

During the week it was possible to exchange experiences and foster capacity building with very productive results for implementing sustainable bioenergy solutions.

As a general conclusion the 2<sup>nd</sup> Bioenergy Week contributed to develop capacity of participating governmental officials and stakeholders on the sustainable production and use of bioenergy that could guide towards the implementation of sustainable bioenergy policies.

## ANNEX I

### **Round table discussion on policy developments Lessons learned and capacity development (5 May 2014)** *Moderator: Kees Kwant, Netherlands Enterprise Agency*

Participants were invited to prioritize problems related to policy developments in their own countries/experience and propose appropriate solutions to overcome them.

#### **Problem Review**

##### ***1. Lack of awareness***

- Opportunities to valorize biomass & residues
- At different levels: producers/end users/to get finance resources
- More proactive role of private sector
- Lack of dissemination of information

##### ***2. Economic aspects***

- Insufficient access to funding resources
- Lack of price competitiveness of bioenergy

##### ***3. Policy***

- Inadequate smallholder inclusion
- Inadequate policy for land tenure security
- How to realize existing policies

#### **Solutions Review**

##### ***1. Lack of awareness***

- Engage local communities, stakeholders, certify strategies
- Information should be transparent/objective and clear regarding pros & cons
- Tools to carry out objective analysis to facilitate decision making
- Start from what is known at the local, regional and national level (ie baseline)
- Finance resources
- Feasibility studies
- Training/education of diverse producers and end uses of bioenergy potential
- Valorize biomass & residues
- Ensure the implementation of the project
- More communication btw government and private sector
- Agroecological zoning
- Public – private partnerships
- Engagement of the private sector in the regulatory framework
- Monetary valorization of biomass
- Engagement of research institutions and conducting pilot studies

## 2. *Economic aspects*

- Introduction of mandates
- Promotion of incentives for local markets vs exports
- “Friendly funding”
- Competitive financing
- Conducive investment environment
- Create a compelling case for bioenergy
- Incubators to assist entrepreneurs

### *Financing*

- Establish a legal framework: corporate and smallholder
- Show the potential for bioenergy for sustainable development
- Basket of funds for joint ventures

### *Price competitiveness*

- Technologies should be enhanced
- Economies of scale such as IFES
- Improvement of bioenergy crop productivity to reduce the cost of production

## 3. *Policy*

### *Smallholder Inclusion*

- Public/Private sector investment in extension
- Policies promoting certification
- South-South tech cooperation
- Making the business case for smallholder integration

### *Land Tenure*

- Start with proper mapping for a land registry and land titles
- Law to own land
- Streamline acquisition of land titles
- Need for equity to ensure sustained benefits to residents
- Business models inclusive of the communities

**ANNEX II**

**Round table discussion on Food Security and Bioenergy (6 May 2014)**

*Moderator: Olivier Dubois, FAO*

Participants were invited to elaborate on risks and opportunities that can affect the four dimensions of food security (availability; access; utilization and stability), as well as to identify capacity development needs that are considered important to strengthen opportunities and reduce risks.

Food Security Dimension - Bioenergy Link	Risks	Opportunities	Needs ( capacity dev & others)
Food Availability: Feedstock production and use	<ul style="list-style-type: none"> <li>• Competition for feedstock</li> <li>• Competition for natural resources and inputs</li> <li>• Loss or deterioration of natural resources and ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>• Improved natural resource management</li> <li>• Increased agriculture production/productivity</li> </ul>	<ul style="list-style-type: none"> <li>• Resource and local assessment needs</li> <li>• R&amp;D for sustainable intensification</li> <li>• Private sector dialogue with and support to family farmers</li> <li>• Collaboration with academia and national universities</li> <li>• Policy incentives for private sector support to farmers</li> <li>• Training farmers on sustainable agricultural intensification</li> <li>• Land use planning in a participatory setting with farmers, private sector and stakeholders</li> <li>• Raising awareness and sharing of information on bioenergy development benefits</li> <li>• Capacity development of policy makers</li> <li>• Policy development to incentivize bioenergy demand</li> <li>• Bioenergy for food</li> </ul>

			processing
<p>Food Access: Income, prices and tenure security</p>	<ul style="list-style-type: none"> <li>• Physical and economic displacement</li> <li>• Increased food prices?</li> </ul>	<ul style="list-style-type: none"> <li>• Employment opportunities (skilled and unskilled)</li> <li>• Increased income from increased food prices?</li> <li>• More secure land rights</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitate linkages between local markets/farmers and international markets</li> <li>• Capacity building in the adoption of voluntary guidelines on land tenure</li> <li>• Capacity building for income generation</li> <li>• Train people on different phases of agricultural processing</li> <li>• Support to farm organizations/associations</li> <li>• Microcredit support small scale farmers access to inputs</li> <li>• Access to modern energy services</li> <li>• Income/livelihood diversification</li> </ul>
<p>Food Utilization: Improved access to energy for cooking</p>	<ul style="list-style-type: none"> <li>• Supply: Unsustainable management of natural resources ( e.g. deforestation), safety issues related to traditional fuel collection</li> <li>• Consumption: Health risks related to bad cookstoves</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable sourcing of bioenergy</li> <li>• Improved cooking stoves</li> <li>• Improved nutrition resulting from better cooking</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity development for quality control and standards</li> <li>• Facilitate understanding of situation analysis /use mode</li> <li>• Capacity for national production of good quality cook stoves</li> <li>• Promote alternative feedstock for cooking</li> </ul>

**ANNEX III**

**Discussion on Integration of Family Farmers in the Bioenergy Value Chain (6 May 2014)**

*Moderator: Amb. Mariangela Rebuá, Brazil*

Participants were invited to identify challenges and opportunities of integrated family farming systems in the bioenergy value chain.

<b>Challenges</b>	<b>Opportunities</b>
<ul style="list-style-type: none"> <li>• Lack of knowledge (including of the benefits of bioenergy) and skills</li> <li>• Access to funding (i.e. microfinance), technology, information and markets (infrastructure and lack of buyers)</li> <li>• Bureaucracy</li> <li>• Cultural barriers</li> <li>• Need to increase income</li> <li>• Need to increase capacity building respecting local culture</li> <li>• Need to increase access to energy</li> <li>• Vulnerability of population that would reflect on control of prices</li> <li>• Inadequate land tenure</li> <li>• Traditional division of labor (between men and women)</li> <li>• Inadequate share of information for planning purposes</li> <li>• NGOs could slow down progresses</li> <li>• Low price of bioenergy products</li> </ul>	<ul style="list-style-type: none"> <li>• Funding for improving knowledge (government incentives and development agencies)</li> <li>• Development of cooperatives and associations</li> <li>• SME in rural communities</li> <li>• Voluntary and flexible certification for market expansion</li> <li>• Partnerships with larger enterprises</li> <li>• Increase energy access</li> <li>• Use of local biomass to generate electric power (i.e. jatropha, biogas)</li> <li>• Implementation of bio-digester of wastes</li> <li>• Use of bio fertilizers in agriculture</li> <li>• Involvement in the value chain with strengthened ownership</li> <li>• More shared forum like GBEP focused on country issues</li> <li>• Access to more modern technologies</li> <li>• Sustainable production of bioenergy in the rural areas</li> <li>• Development of community based bioenergy markets</li> <li>• Stimulation of policies towards sustainable development of bioenergy</li> </ul>

**ANNEX IV**

**Round table discussion among policy makers, business sector  
and international banks/funds – Lessons Learned – Part I (7 May 2014)**  
*Moderator: Pjotr Schade, Everest Energy Group*

Participants were invited to identify and prioritize difficulties in the development of a project.

<b>Difficulties</b>
<ol style="list-style-type: none"> <li>1. <b>Structuring projects to be attractive for finance</b></li> <li>2. Finding accessible and affordable project facilitation services</li> <li>3. Uncertainty of policies</li> <li>4. Making bankable business plan</li> <li>5. Co-funding needed for eligibility</li> <li>6. Difficulty to get developer and recipient speaking the same language</li> <li>7. Compensation – cost of development</li> <li>8. Skill manpower</li> <li>9. High transaction costs</li> <li>10. Environmental licenses</li> <li>11. Clarity on targets both for developer and finance</li> <li>12. Identify interested company/partners</li> <li>13. Unfavorable exchange rate</li> <li>14. Cost of facilitation services</li> </ol>