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STAKES AND PERSPECTIVES OF BIOFUELS FOR AFRICA

Synthesis and conclusions



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With the purpose of analyzing the issue of biofuels development in Africa, the conference has strived to be a privileged place for exchanges between economical and political policy-makers, technical experts and civil society groups in African countries. More than 300 experts, policy makers and NGO representatives from over 35 countries met for 3 days in Ouagadougou. They worked under the aegis of the Government of Burkina Faso and regional organizations, namely the Economic Community of West African States (ECOWAS) and the West African Economic and Monetary Union (or UEMOA). Biofuels development in Africa was considered in its technological, agricultural and environmental dimensions, as well as in its institutional and political aspects.

The theme of the international conference was **“Stakes and Perspectives of Biofuels for Africa”**. The main objective was to provide governments and policy makers of ECOWAS countries an objective assessment of the potential of biofuels in Africa. Indeed, it is necessary, more than ever, to assess the true potential of biofuels in Africa. This should be done on rational bases by illustrating their opportunities and benefits while bearing in mind their limitations and risks to the environment, economy and society. In most countries in Africa, economic growth leads to significant increase of energy needs. A difficult access to energy unquestionably represents a major handicap to development. The current escalation of the price of crude oil and other raw materials weakens most countries’ economies and household incomes, particularly for low income households. Biofuels certainly are an option that should not be neglected, but national energy, agriculture and tariff strategies, to mention only a few, must be based on a thorough evaluation of the various possible scenarios. These include biodiesel or ethanol production for export versus the implementation of short term production of vegetable oils for rural electrification. These are real political choices resulting in economic, social and environmental consequences that are radically different. Indeed, it could be thought that biofuels for export will concern rather a type of industrial agriculture that can create jobs, while the solutions in the second case will satisfy the agro-sylvo-pastoral systems with potentially less risk to the environment.

At the **first plenary session**, the organizing committee and the different speakers of the conference focused on presenting the state of the technologies for biofuel production and on the agricultural potential for the concerned traditional crops by first generation biofuels. It becomes evident from the presentations that the first generation technologies (biodiesel from vegetal oils, ethanol from sugar or starch) are mature and already the subject of major publicity on the African continent, with many ongoing projects being studied. It has been shown that the availability of raw materials could be the main limiting factor, especially for biodiesel produced from oilseed products. Over the last 5 years, the increase of the total production of ECOWAS seeds (groundnut, cotton, sesame seeds, palm and coconut) has been above 100% while the consumption per capita has remained almost constant, yet the region remains predominantly in deficit. The prices of oils (palm, soybean, coconut and peanut) have sharply increased following the palm oil’s price which has virtually the same curve as the price for crude oil. In the future, biofuels could be based on crops dedicated to the production of energy and on agricultural by-products, potentially reducing tensions on the prices of agricultural products.

Second-generation technologies enable the transformation of lignocelluloses in sugars to produce ethanol or synthesis gas and diesel. The presentations and discussions have also shown that commercially they are not viable yet and will not be for several more years (10 to 15 years). Competition between biofuels and food crops over land, water and other factors of production (input, labour) may particularly persist because the evolution of consumption

practices in many developing countries cannot keep up with the overall demand for agricultural products, which increases due to population growth. The principal experiences with biofuels (in Europe, India, Pacific zone, Brazil, etc.) have been the subjects of presentations and discussions to promote mutual learning. The importance of acknowledging national socio-economic specificities was highlighted.

At the **second plenary session**, the challenges and risks for socio-economic and environmental sustainability were discussed. Presenters tried to highlight the potential benefits as well as the sometimes very controversial environmental impacts of biofuels. Faced with the risks of promoting production pathways which are poorly adapted to the particular constraints of a country, the discussions have confirmed the importance of considering local specificities of biomass resources and accepting that the demand for liquid biofuels could become apparent according to other schemes than those found in industrialized countries. Otherwise, most of the necessary means for the implantation of a biofuels industry would rely on foreign investments, on which the determinants could differ from national priorities. Globally, the lack of accurate information on implementation conditions of some production activities or the production of alternative crops such as *Pourghere* (*Jatropha*) has been identified. The need to address the issue of biofuels is recognized. The rise in prices of agricultural products directly imputable to the demand for biofuels has also been at the heart of the debate over a potential conflict between food and fuel. While it was recognized that higher prices of basic agricultural products can seriously compromise the situation of poor populations, it was also recalled that many producers could benefit from this increase, particularly if biofuels allow them to modernize their agriculture and to increase agricultural productivity.

These first two sessions and roundtable discussions had aimed to provide elements for making decisions on the various technological options needed for setting up coherent and innovative policies in the field of biofuels in Africa (the sector will require, in fact, an inter-ministerial coordination). These aspects have also been discussed at the third plenary session on the last day. The result is that in the present state of technology, biofuels can only marginally improve the energy security of countries because currently the agricultural production of ECOWAS meets only a small portion of the demand for fuel. It is assumed that the production of dedicated energy crops, such as the *Jatropha*, could make a greater contribution to energy security, but there are still no successful realizations that can be considered as examples. So far, the production of biofuels in industrialized countries or in Brazil has developed through high customs duties often associated with heavy subsidies. For ECOWAS countries which could effectively produce biofuels for their own consumption or for new export markets, such policies could prove too costly. The challenge for the African governments will be to avoid supporting the production of biofuels through incentive measures (which can cause distortions likely to remove other more profitable activities) and to put in place regulations suitable to preserve the poorest fraction of their populations. They must carefully evaluate the economic, environmental, social and energy security benefits so that they can expect different possible options: ethanol or biodiesel, export or national market, transport or rural electrification, and so on.

Eight (8) roundtables were held.

The roundtable **“Biofuels for transport versus production of electricity”** was about different uses of biofuels. The transport sector is the main target of the use of biofuels in industrialized countries and a major cause of the growing consumption of crude oil in Africa. The use of biofuels for local transport could promote a certain independence of African countries vis-à-vis crude oil or be a source of revenue in case of exports. At the same time, most of the rural areas in Africa are poorly electrified and have little access to energy. This roundtable has attempted to analyze the pros and cons of using biomass fuels for transportation, electricity production or for other uses. The roundtable also looked at the extent to which biomass could help improve the living conditions of rural populations as well as the economical development of the entire country. The outcome of the discussions was that the direct benefits of local populations in terms of incomes, jobs and improvement of living conditions should be a priority. It has been recommended in the short term to promote the satisfaction of the rural demand by the use of vegetable oils for electricity production. In the medium term, it appears important to set essential laws and regulations for the development of biofuels in a broad sense, including transportation if opportunities exist in the country. A large-scale production, which is already foreseen in some countries, must take into account land ownership issues which are still not resolved in many countries. The countries also need to draw up plans for biofuel development by analyzing the best use of the biofuels while taking care not to directly imitate patterns and solutions implemented in other areas which have very different socio-economic conditions.

The roundtable **"Jatropha: a plant for future fuel or a delusion?"** has raised more questions than it has provided answers. Is it a plant for the future of large agro-industrial enterprises or family farms? What are its water requirements? Will there be competition with other plants? What variability will there be in the production? What are varieties in use? What success rate will plantations have? How will the plantations be monitored? What is the resistance to insects (termites)? What kind of management should be used in industrial plantations? The roundtable has recommended conducting upstream agricultural research programs as the current knowledge is insufficient for a large-scale exploitation. Field experimentations and pourghere oil fuel utilization tests are indispensable, especially for family farms and rural electrification. An African network under the aegis of regional organizations UEMOA/ECOWAS should be put in place.

The roundtable **“Use of vegetable oils in engines”** was very technical and confirms the technological maturity of this particular application for all stationary uses. The discussions, however, also highlighted the lack of reliable information on adaptations or modifications of engines or how to use them with regard to the quality of concerned oils. The necessity to professionalize the role-players in the industry by offering initial or professional training sessions on the subject, in order to develop service and maintenance capability, has been highly recommended. Similarly, the need for standards and norms on oil quality in order to avoid below-average performances, especially on a long run basis, has been reported. Again, a common approach for a unified UEMOA / ECOWAS level is recommended.

The roundtable **"Competition between non-food and food uses: stakes and risks"** has recalled that bioenergies represent both a threat to food security and a challenge of increasing agricultural productivity and improving the food security. Only a fraction of agricultural production can be diverted to increase the productivity (irrigation) or conservation of products

(drying, processing) through the access to energy. Initially from much differentiated viewpoints, some expressed concerns about the rise in prices and the fact that land could be massively mobilized for biofuels. The discussions quickly progressed, however, to a finer characterization of different possible situations. An analysis of relations between food security and bioenergies appears necessary and urgent for each country and culture, case by case, prior to the implementation of large programs. Policies and regulatory measures must come from these two issues. It may be useful to draw lessons from acquired experiences for food crops and cash crops, given the similarities between the latter and energy crops. The evolution of discussions also helped to raise awareness about biofuel opportunities, including food security. The discussions focused attention on the important need to modernize and strengthen agriculture.

The roundtable **“Biofuels, energy policy and legislations”** was comprised of several representatives of ECOWAS Member States. During exchanges on the topic of public policies, it was pointed out that even as private investments for biofuels are already multiplying on the field, in the majority of ECOWAS Member States there is a current lack of texts relating to legislation as well as general frameworks. The main recommendation urged present States, ECOWAS and UEMOA to establish regulatory and legislative texts and to adopt policies on biofuels as soon as possible.

The roundtable **“Biofuels, and energy equity”** replaced the notion of energy equity on biofuel issues by insisting on the central role of the farmer/producer in local solutions as well as in the industry. As in other roundtables, the opportunities offered by biofuels to enhance access to energy in rural areas were highlighted and encouraged. The absence of representatives of farmers at the conference was also highlighted.

The role of the private sector was discussed in the roundtable **“What partnerships between the public and private sectors?”**. After finding that many initiatives already exist in some countries, it was recalled that the public-private partnership must be able to contribute to the creation of a favourable environment as a result of the real interest of the private sector for the development of biofuels. This requires the public sector to establish a legal, fiscal and institutional framework that can play the complementarity of public and private stakeholders on the short, medium and long term in order to promote the achievement of the necessary investment. This partnership should help ensure the optimal development of agricultural production chains (which passes through intensification), processing and distribution, in order to promote income generation and employment creation. It recalled the vital role that the private sector must play in capacity building and technology transfer.

The roundtable **“How to ensure the sustainability of biofuels?”** has addressed the issue of sustainability of the production and use of biofuels. This included the difficult issue of standardization and certification of projects vis-à-vis their eligibility to the CDM or their innocuousness. However, insofar as the recommendations of the roundtable participants favoured small, local applications, the certification project was not considered applicable in the immediate future to validate the sustainability of biofuels. The certification has to be a central concern of project leaders whose production is destined for export. Instead, it was recommended to African states to apply and adapt their currently existing laws and regulations. The exploitation of other types of biomass, such as algae or second generation fuel, has also been discussed. This particularly related to issues of land access to and the settlement of disputes over land title between local communities and industrial projects. Certification systems for measuring and indicating the environmental performances of

biofuels could help reduce the environmental risks associated with the production of biofuels on a large scale. At this level, initially differentiated positions were observed. Those for mandatory certification felt that certification is necessary in order to avoid disasters. Those against certification put forth the notion of extra cost for an unbearable certification service for import to the North. Discussions also underscored the lack of clear objectives about biofuels which results in the lack of sustainability criteria for African countries. These certifications are indeed expensive and, in order to be effective, they require the participation of all producers, buyers and importers, as well as the setting up of solid references and a control system. The methodological needs on both assessments of the potential and the follow-up impacts are important. The fact that progress on both fronts is interdependent and provides lessons learned from ongoing experiences revives the interest of apprehending these issues at the regional level.

Conclusions and recommendations of the conference

The conference was held in Ouagadougou under the aegis of the Minister of Mines, Quarries and Energy of Burkina Faso with the financial assistance of the French Ministry of Foreign Affairs, the French Agency for Environment and Energy Management (ADEME), the French Agency for Development (AFD), French Fund for World Environment (FFEM), Intelligent Energy for Europe program of the European Union through COMPETE & BEPITA project, DANIDA and Total group. It has been an opportunity to address all issues relating to the implementation of production activities and the use of biofuels in different African contexts: from agronomic to market aspects, through technical, regulatory, environmental and ethical aspects, bearing in mind that the private sector can and must play an indispensable role.

The conference has prominently highlighted that biofuels are now a reality and an opportunity that Africa should not miss. Biofuels would contribute to economic and social developments of African countries, in particular by reducing the gap between urban and rural populations.

During discussions at the meeting, recommendations arose at three levels: the short term (today), the medium-term (5-10 years) and the long term (10-20 years).

In the short term, it is recommended to support grassroots actions designed to rapidly reduce the negative impact on food security and the high prices or non-availability of fossil fuels.

It is necessary to promote the development of local uses of biofuels at a small scale, particularly for rural family farms. For example, vegetable oils can be used for rural electrification, mechanization, irrigation pump, drying, decortication and food production equipment. Discussions have particularly pointed out the ambiguity of the subject of bioenergies. They certainly represent a risk to food security if institutional guard rails and national priorities are not quickly elaborated. They constitute a challenge of increasing agricultural productivity and improving the food security, particularly when only a fraction of agricultural production can be diverted to increase the productivity (irrigation) or conservation of products (drying, processing) through access to energy. Biofuels can also contribute to agricultural intensification which is indispensable for sparing land and guaranteeing economic development for rural communities and southern country economies. The role of public authorities in directing market role-players in ways that are most in line with the national development objectives is fundamental.

Medium-term recommendations:

It is necessary right now to engage in studies and research programs for agro-industrial energy crops on a large scale, for the production of Biodiesel and Bioethanol. This would primarily rely on existing agricultural sectors, such as cotton, favouring "polygeneration". For example, this can be done by selecting varieties that can maintain the quality and fibre yields while maximizing seeds' oil yield. The collection of stems and the use of agricultural by-products could allow simultaneous production of fibres, fuel and electricity while providing energy independence to industrial complexes. Such models already exist in other sectors. An example is the sugar cane (sugar, alcohol and electricity). Biofuels offer the advantage of spreading market risks and intensifying agricultural production without the need of professional reconversions that are often observed as painful tasks. Agricultural intensification appears inevitable to allow yield increases and to cope with the different needs of agricultural

products, with respect for the environment. This intensification requires a strong agricultural research in order to propose new, more efficient and better integrated technical directions.

Of course, the research must also concern new crops, such as *Jatropha* or lignocelluloses. The aim of the research should be to minimize the use of inputs, to focus on species that are less demanding of water and, most importantly, to increase the income of local populations by considering the issue of land availability.

Long term recommendations:

On the horizon of the end of accessible and cheap crude oil, 2030-2040, it is necessary for Africa to develop alternative energy sources from its biomass. Therefore, Africa must engage itself right now in developing biofuels/biomass energies, especially through its involvement in international research programs. This would provide access to future technologies and to the development of training tools for its future key-players.

All the participants were unanimous in recognizing that this logic will not be achieved without the introduction of:

- **a specific institutional and regulatory framework** in line with the regional and international context. This should be for the benefit of sub-region countries, particularly in order to create the necessary conditions for private sector involvement in the long-term which is indispensable for its development. This framework should set the stakes and the national priorities: food security, energy security, local revenue, etc. in order to guarantee equity to the rural populations but also a sustainable access to markets if the need arises; and
- **a regional approach** under the aegis of ECOWAS and UEMOA in order to share experiences and to work on standardization and certification of African projects according to specific criteria, taking into account their socio-economic constraints and the nature of their environment.

Considering the actions which have already been undertaken and technical information needs which are based on possible performance indicators (agronomy, fuel, engines), the need to mark the development of biofuels through meetings such as today's meeting has become apparent. This is in order to:

- assess achievements and
- create a reflection and exchange community between various key-players involved in biofuels.

That is why the CIRAD and the 2iE, in partnership with national authorities and sub-regional organizations, commit to mobilize the means to hold a second **"Stakes and Perspectives of Biofuels for Africa"** International Conference in 2009.