

10. Blueprint for Bioenergy, Agriculture, and Rural Development in the UEMOA — 2009 to 2011

Building upon the inputs of the report, this chapter sets forth a Blueprint for Action in the field of bioenergy for the period 2009 to 2011. This Blueprint was established by the UEMOA, under the framework of its Biomass Energy Regional Program (BERP), in conjunction with the Rural Hub for West Africa. Key activities are organized into five pillars: capacity building, policy, finance, market development, and technology transfer and research and development (R&D).

10.1 KEY ACTIVITIES

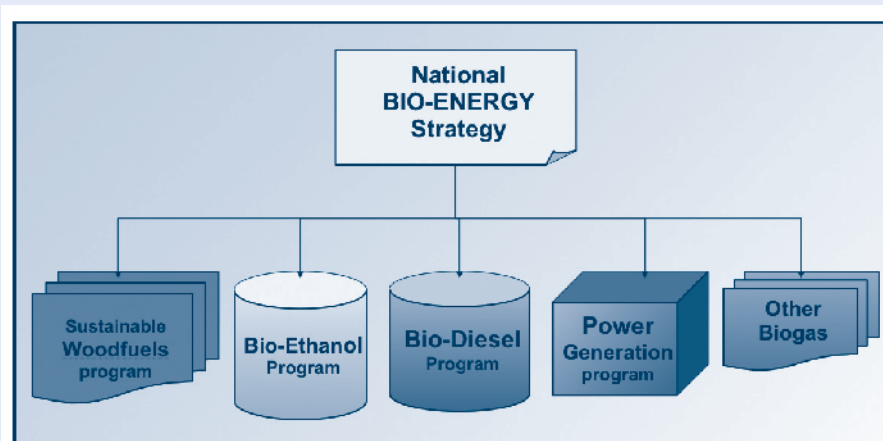
The primary activities of the three-year Blueprint are organized into five pillars:

- Capacity Building
- Policy Support
- Finance
- Market Development
- Technology Transfer and Research and Development (R&D)

Box 10-1: UEMOA Biomass Energy Agenda

The UEMOA BERP has set forth an ambitious strategy to pursue bioenergy in five areas: sustainable wood fuels, bioethanol, biodiesel, power generation, and biogas. This report provides input to the program, with the Blueprint laying out an action plan for delivering results.

UEMOA/AFRICA: Moving
Toward an Integrated
"Biomass Energy" Agenda



PILLAR 1: CAPACITY BUILDING

For bioenergy markets to develop and deepen, capacity building is required in all areas of project and program design, development, implementation, and operation. This entails a long-term commitment, with activities focusing on individuals, institutions, and systems, and aimed at public, private, and non-government organizations. Capacity-building activities include:

- Train policymakers on policies and programs for accelerating adoption of bioenergy by small landholders.
- Integrate bioenergy into national development strategies in agriculture, forest conservation and sustainable use, poverty alleviation, energy, and rural electrification.
- Strengthen enterprises to source, integrate, install, operate, maintain, and service bioenergy systems; provide business training and incubation support.
- Train the finance and banking sectors (senior management/loan officers) on the risks/rewards of financing bioenergy projects, through pilot projects and programs that minimize initial investment risks.
- Provide training and technical assistance on standards for bioenergy development, drawing on international efforts in this area (e.g., the European Union, the Global Bioenergy Partnership, and the Roundtable on Sustainable Biofuels, among others).
- Provide training to governments and the private sector on the CDM and official and voluntary carbon markets.
- Conduct communications and outreach on bioenergy benefits/challenges, including consumer awareness campaigns.

PILLAR 2: POLICY SUPPORT

Government support, in the form of policy, regulations, and/or incentives, has been instrumental in driving bioenergy markets worldwide. Key policy areas to address in the UEMOA are provided below; these should give due consideration to food security issues (see Box 10-2):

- Identify and develop pragmatic policy instruments, building upon lessons learned and experience from the UEMOA and other countries/regions. These should emphasize policies that promote local value-added, rural development, gender equity, community forestry, sustainable agriculture, etc.
- Consider establishment of national/regional targets and timetables for bioenergy development, to include issues of small farmers.
- Help establish regulatory frameworks at the national level to accelerate bioenergy development.
- Work with policymakers to link energy and agricultural priorities.

- Establish a lead organization in each national government to coordinate bioenergy activities across the interested ministries (e.g., agriculture, energy, rural development, finance, commerce/trade, and environment).
- Increase coordination and cooperation across Africa (e.g., the New Partnership for Africa's Development (NEPAD), ECOWAS).
- Establish guiding principles for land use development.
- Foster a regional market for sustainable bioenergy, to include cross-border trade.
- Engage the private sector in policy/regulatory development, including producer organizations, SMEs, cooperatives, etc.
- Address water rights.
- Monitor and evaluate the impact and performance of bioenergy activities at the national and regional levels.
- Apply the Bioenergy Evaluation Tool in assessing various bioenergy policies at the national and regional level (see Box 10-3).

Box 10-2: Local and Regional Bioenergy Markets

UEMOA member states can speed this process by adopting new, common standards for modern biomass and bioenergy products—and promoting more efficient technologies. Charcoal, the most common form of biomass apart from firewood, is energy inefficient, creates toxic particulates, and is a potent contributor to GHGs. Developing new, cleaner cooking fuels using sustainable biomass offers the opportunity to create employment in rural communities, raise incomes, and improve health. Combining this initiative with clean-burning, locally produced stoves offers even more benefits. Several pilot projects have focused on using combinations of agro-forest residues and/or animal wastes and have proven the viability of this approach. These programs should be scaled up.

Incorporating some portion of existing bio-oil production into diesel fuel through establishing a blending requirement (e.g., 2 to 10%) is a standard approach to reducing fossil fuel consumption and creating an additional market for local production. Lower-quality groundnut, palm, and cottonseed oils might be options for this practice. Pilot programs that use jatropha oil—a common hedging shrub with non-edible oilseeds—offer the most promise for village energy use, as the high-quality oil can run generators and small engines with minimal processing. Improving yields per hectare of this perennial plant holds promise for increasing oil production. Senegal is experimenting with mandating that a certain portion of cropland in each village be dedicated to jatropha production for local use.

Box 10-2 (continued): Local and Regional Bioenergy Markets

Ethanol is already produced in the region, primarily from sugarcane. As diesel is the most common fossil fuel in the region, substituting ethanol for other oxygenates—including lead—could create a cleaner fuel and reduce petroleum demand. As Côte d'Ivoire produces and sells much of the refined product in the region and produces bio-oils and ethanol, it could work with its UEMOA partners to 1) establish blending mandates for diesel and gasoline that would incorporate biofuels into the new formulations; 2) identify the best blending levels for the present—and work to increase them over time; and 3) jointly undertake market studies to determine how additional biofuel supplies could be produced in the region and used in the refining and blending processes.

Currently, all UEMOA countries subsidize petroleum products and electricity. The long-term objective would be to phase out such subsidies and reduce petroleum imports. This objective is achievable, but it demands a strategy and a commitment to use efficiency and conservation in combination with alternative fuels to achieve economic sustainability.

Box 10-3: Example of BEET Application

Ethanol Potential in Four West African Countries (Benin, Côte d'Ivoire, Senegal, and Togo)

The BioEnergy Evaluation Tool (BEET) Project, sponsored by the UNF, is a user-friendly decision support tool to evaluate country- and regional-level energy security, economic, agricultural, and environmental impacts of bioenergy policies and strategies on a quick-turnaround basis. An alpha version of BEET was recently developed and demonstrated for analysis of E10 policy in El Salvador as a case study—a beta version of BEET is currently underway. The BEET analytic capability provides insights into how bioenergy policies and investments can play an important role in contributing to sustainable economic development. BEET was also used to assess the potential for ethanol, produced from domestically grown crops, in four West African countries (Benin, Côte d'Ivoire, Senegal, and Togo) collectively as a single region. In the future, a more rigorous analysis of biofuels potential and implications in West Africa using BEET could be conducted as needed.

The table below illustrates the amount of land required to domestically produce ethanol for the four countries. The left column indicates the type of crop grown, and the data columns show the available arable requirement by crop type necessary to meet demand for ethanol under an E-10, E-25, or E-85 policy. Ethanol demand is based upon gasoline consumption in the transport sector for the four countries (IEA, 2005). For all of the scenarios, ethanol can be produced using currently available arable land and would not displace food produced from permanent crop land.

Total Land (in hectares) Required for Ethanol Crops (Benin, Côte d'Ivoire, Senegal, and Togo)

	E-10	E-25	E-85
Sugarcane	18,813	47,032	159,910
Maize	180,094	450,235	1,530,800

Box 10-3 (continued): Example of BEET Application

Potential Impacts of Ethanol Policy Options (Benin, Côte d'Ivoire, Senegal, and Togo)

	E-10	E-25	E-85
Reduction in Oil Imports (gallons/year)	25,208,040	63,020,100	214,268,340
Balance of Trade Impact (million US\$)	\$84.7	\$211.7	\$719.9
Investment in New Ethanol Production Facilities (million US\$)	\$62.6	\$164.8	\$573.1

The table above shows some of the key impacts of the alternative ethanol options using BEET. As can be seen in the first two rows, producing ethanol from domestically grown crops contributes significantly to reducing oil imports and improving the balance of trade collectively for the four countries. The upfront capital costs to achieve these impacts are shown in the third row. Comparing the balance of trade impacts with the investment costs for ethanol production facilities suggests that the payback times of these two ethanol options are relatively short for all of the ethanol production options. This example focuses on a domestic ethanol policy. Another option may be to export some or all of the ethanol produced within the UEMOA region. A more rigorous application of BEET would include evaluating the trade-offs between and impacts of exporting ethanol versus domestic consumption.

PILLAR 3: FINANCE

Finance and investment are key to the growth and development of bioenergy in UEMOA countries. As the industry expands and develops, the scope and breadth of financing sources and instruments, both locally and internationally, must be increased. More creative leveraging of public and private sector resources will be needed to meet the financing requirements of the bioenergy industry, including from a variety of public and private sector sources. Activities to be conducted include:

- Engage local financial institutions and micro-credit agencies on bioenergy; conduct banker training workshops to increase awareness of bioenergy risks/rewards by investment officers and managers.
- Establish risk mitigation facilities to spur local financing for bioenergy projects, particularly at the small-scale level.
- Foster development of “bankable” project portfolios in bioenergy; offer assistance to entrepreneurs in areas such as R&D, seed capital funding, pre-feasibility and feasibility assistance, reimbursable grants, etc.
- Develop a Bioenergy Regional Fund to provide investment support, in conjunction with the ECOWAS Bank of Investment.
- Conduct donor coordination roundtables to brief current and prospective donors on UEMOA bioenergy activities and secure their participation.
- Explore opportunities for carbon finance at the national/regional levels.
- Engage the private sector in project identification and development and understand its issues/requirements with respect to financing projects in the UEMOA member countries.

PILLAR 4: MARKET DEVELOPMENT

A number of near-term project and program opportunities exist for bioenergy development in UEMOA member countries and should be explored in more detail. Examples are provided below. Pursuit of these efforts however, will require assessment of technical, institutional, financial, environmental, social, and economic considerations, as well as a review of related experience in other countries. The Regional Bioenergy Center proposed in Pillar 5 below is envisioned to serve as a source of information on these topics.

- **Wood, Waste, and Residues.** Forests comprise a major natural resource in UEMOA, covering 44.5 million ha. Due to deforestation and degradation, this resource is under severe pressure. Traditional biomass in West Africa includes fuelwood, wastes from timber processing, agricultural and other forest residues, and animal waste. These products comprise the largest source of primary energy consumption (73%) in the UEMOA area. Modern stoves and low-tech processing systems are key to make this resource sustainable and more efficient.
- **Combined Heat and Power.** CHP, or cogeneration, plants have considerable potential for application throughout UEMOA member countries. As CHP plants are relatively large-scale operations, they require a significant and reliable source of crop residues and sustainable woody biomass. This can be met through plantations, but could also be sourced from rural areas where the CHP facility could serve as a hub for rural electrification schemes.
- **Small-scale Biomass Gasification** is already being demonstrated successfully in several countries and could have applications in the UEMOA.
- **Sugarcane.** Bioethanol production from sugarcane is highly developed worldwide, making bioethanol the main biofuel used today. UEMOA has potential for expansion of production and use of bioethanol in sugarcane-producing countries. Programs can be designed to advance economic and social development, and increase jobs and raise income. Much can be learned from the experiences of other countries such as Brazil; research is needed to determine the best crop varieties given the unique needs, conditions, and resources in the UEMOA.
- **Biomass for Clean Cooking Fuels.** Improved cookstoves and feedstock programs (e.g., biogas, ethanol gel) can potentially free valuable time of women and children in collection of traditional biomass, while reducing health impacts and slowing deforestation. Widespread dissemination of improved cookstoves should be a priority.
- **Sweet Sorghum.** Sweet sorghum is a promising crop offering several benefits. Most notably it provides fuel (ethanol), power, food (grains), and fodder (leaves) and has a variety of rural, industrial, and commercial applications. Sweet sorghum is widely grown in the region.
- **Biomass for Rural Electrification,** to include agricultural processing and electricity generation. Liquid biofuels such as vegetable oils and biodiesel provide opportunities for power production at a relatively small scale and, in particular, for small and medium-size

electricity grids at the village and community levels. There are large numbers of oilseed-bearing trees and shrubs available that do not compete with food production or land use and generate fewer environmental impacts. Solid biomass — from sustainable forest programs — can also be used. Effort is needed to organize grassroots organizations for collection, grading, and oil processing.

- **Diesel Displacement.** Adaptation of existing diesel engines to use biofuels has significant potential. Biodiesel lends itself to small-scale agriculture because it can displace diesel in both transport and electricity generation. Examples exist where women's groups, cooperatives, communities, and others have collaborated on biodiesel development for local applications.

PILLAR 5: TECHNOLOGY TRANSFER AND R&D

Support is required for all aspects of technology research, development, demonstration, deployment, marketing, financing, operation, and maintenance. Further, continued emphasis on accelerating renewable energy R&D is critical to reduce costs, improve performance, and enhance competitiveness with fossil energy sources. Proposed activities include:

- Strengthen local data availability. Access to reliable timely data for bioenergy decision making—including policies, projects, and programs—is a major issue in UEMOA member countries and regionally. An inventory of data services and needs should be conducted and a “prioritized” listing of requirements compiled. The UEMOA member countries should coordinate on this effort with groups like FAO, IFAD, OECD, and others that are also looking at strengthening agricultural data systems in Africa and elsewhere.
- Establish/implement a Regional Bioenergy Center with information on policies, markets, technologies, costs, business models, applications, finance sources, standards and certification, etc. The Center should study traditional biofuels, new crops, including trees, and establish priorities for expanding sustainable use, where and when appropriate.
- Develop tools and toolkits to assist the public and private sector in bioenergy decision making.
- Conduct joint research efforts between local research institutions and industry, aimed at renewable energy applications and collaborative efforts to carry out renewable energy resource assessments.
- Combine efforts with industrialized countries to promote knowledge transfer and the development of appropriate bioenergy technologies for the UEMOA.
- Facilitate South-South collaboration and cooperation on sustainable bioenergy development and forest management.
- Conduct research on current/potential biomass supply and value chains, including forests, in the UEMOA member countries.
- Continue research on local issues related to bioenergy development such as land use, land tenure, soil conditions, socio-economic issues, etc.

10.2 SCHEDULE

The proposed schedule of activities over the three-year program time frame is provided in Figure 10-1.

Figure 10-1: UEMOA Bioenergy, Agriculture, and Rural Development Strategy Proposed Schedule of Activities—CY 2009–2011

	2009	2010	2011
Capacity Building			
Train policymakers			
Develop/implement standards/quality assurance			
Integrate bioenergy into national/regional strategies			
Conduct communications and outreach on bioenergy benefits/risks			
Perform enterprise development training			
Provide banker training			
Conduct carbon training (CDM, voluntary)			
Policy Support			
Establish regional targets/timetables for bioenergy development			
Identify appropriate policy instruments			
Work with policymakers to link energy/agricultural priorities			
Identify national organization to coordinate bioenergy across ministries			
Create national regulatory frameworks			
Establish guiding principles for land use development & water rights			
Foster regional market for bioenergy			
Engage private sector in policy/regulatory development			
Monitor and evaluate performance on bioenergy activities			
Finance			
Develop project preparation facilities			
Conduct donor coordination			
Engage local financial institutions & micro-credit agencies on bioenergy			
Establish risk mitigation facility(ies) to spur local financing			
Develop a Bioenergy Regional Fund (with ECOWAS Bank of Investment)			
Explore opportunities for carbon finance at the national/regional level			
Market Development			
Assess near-term project/ program opportunities in UEMOA countries/ region			
Implement viable projects			
Technology Transfer and R&D			
Establish/operate Regional Bioenergy Center			
Develop tools/toolkits			
Conduct joint efforts with industrialized countries and South-South collaboration			

10.3 MANAGEMENT AND IMPLEMENTATION

The UEMOA BERP would have lead responsibility for Blueprint coordination, working in close cooperation with member countries on design, development, and implementation. This effort will include a consultation process conducted at the national and regional levels, engaging policymakers, agricultural producers, the private sector, and civil society. The need for these consultations on bioenergy has been strongly voiced by the UEMOA member countries. Also engaging in the consultation process would be a number of external organizations, to include the international financial community, private companies, research organizations, bilateral/multilateral organizations, etc. The technical and financial support of these organizations will be key to success.

As part of the Blueprint management effort, a Bioenergy Advisory Task Force will be formulated. The Task Force will be comprised of experts representing key stakeholder groups across the region and internationally, to advise on sustainable bioenergy development in the UEMOA region.