

**Expert Meeting**  
on  
**Bioenergy Policy, Markets and Trade and Food Security**  
and  
**Global Perspectives on Fuel and Food Security**  
FAO Headquarters, Rome, 18-20 February 2008

**Options for Decision Makers**

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**Introduction**

The combined expert group meeting covering *Bioenergy policy, markets, trade and food security* and *Global perspectives on fuel and food security* focused on the current situation and future prospects for biofuels. Participants identified priority action areas that address the impacts of climate change and biofuel production on food security and identified the potential opportunities that biofuel production presents for agricultural and rural development, which they summarized in a set of twelve key messages\*.

Dramatic growth in world population during the last half-century coupled with rising lifestyle expectations are two of the main drivers increasing demand for food and other agricultural commodities. These demands signify long-term trends that will continue to be important until at least 2050. They are expected to put increasing pressure on natural resources such as land, water, natural forests and biodiversity. At the same time, industrialization, commercialization and globalization of economic activity have increased pressure on natural resources, since natural resources and ecosystem services traditionally have been undervalued or underpriced by the market and, hence, overused. Climate change and the expansion of biofuel production as a possible source of clean energy will place the earth's natural resource base under additional, possibly significant, pressure.

Reliance on fossil-based energy is not sustainable, according to the International Energy Agency (IEA), either in terms of security of supply or environmental impact. Bioenergy, in its various forms, has potential to help meet, at least in part, growing energy demands. Under foreseeable technological scenarios, it is recognized that the amount of biomass required to produce biofuel will be able to supply only a fraction of what is currently obtained from fossil fuels. Nevertheless, bioenergy production significantly affects commodity markets and trade, and developments in technology may alter the extent and nature of these impacts.

**Trends**

The following trends reflect the current understanding of the context that links biofuel, climate change and food security:

- Accelerating investments in biofuels are set against changes in rural sectors of developing countries that are driven by trade integration and rapid food price increases projected to continue at levels 30 to 50 percent above previous equilibrium levels.

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\* Although this document is built around those messages, these can be accessed through the website <http://www.fao.org/foodclimate>

- Expanding biofuel production is currently driven mainly by policy measures adopted to promote farm incomes, energy security, climate change mitigation and rural development, mainly in OECD countries.
- Rising costs of both food and oil (now more than US\$100 per barrel) are causing financial stress to poor households. Notably, most of the FAO designated food insecure countries are also net food and oil importers.
- Growing attention to climate change, greenhouse gas (GHG) emissions, land-use changes and linked environmental issues such as nitrogen loadings have focused attention on whether biofuels are a solution to these problems or are contributing to them.
- Rising costs of oil contribute to rising costs of commodities, especially food. In addition, as oil prices go higher, it becomes cost effective for biofuel producers to expand production and pay more for agricultural feedstocks. Competition for feedstocks raises their prices and, indirectly, the prices of other commodities, including food, and ultimately increases their costs to consumers.

### **Policy issues**

The following policy issues reflect the current understanding of the context that links biofuel, climate change and food security:

- Cellulosic feedstocks based on non-food crops have received attention as potential alternatives for biofuel production, especially in relation to GHG emissions. However, cellulosic biofuels are not currently commercially viable and may not be for many years to come. Building policy on technological assumptions that have not yet been fulfilled is risky.
- Subsidy “stacking”, such as combining production subsidies, tax exemptions and border tariffs for biofuels, has led to unintended side-effects and contradictions, including implicit subsidies to gasoline consumption, exactly the opposite of what was intended.
- Environmental impacts of biofuels, according to modelling results, will alter land use in substantial ways, including land and forest clearing. This may lead to increased GHG emissions. Life-cycle analysis of these impacts is urgently needed.
- In view of climate change impacts, such as increased frequencies of extreme weather events, increased biofuel production may aggravate negative impacts on the environment and on food security, especially in sub-Saharan Africa and parts of South Asia. Even in environments with good water supply, such as the Mississippi basin and the Gulf of Mexico, nitrogen loadings from expanded row-crop production will harm water quality.
- Biofuels pose potential challenges to trade policy, not only because of the tariff protection afforded them, but in terms of their classification under various WTO modalities, including treating them as agricultural, industrial goods or environmental goods. Trade treatment of biofuels is often overshadowed by domestic concerns with energy self-reliance.

### **Policy challenges**

Notwithstanding significant concerns about the impact of biofuels, biofuel development, potentially based on both first and second generation biofuel technologies, could present new opportunities for agricultural and rural development in a number of developing countries, particularly those where physical and institutional infrastructures are reasonably well developed. The challenge will be to develop national and global policies that will provide incentives for investments that take advantage of these opportunities while also taking into account the need to minimize risks to food security for the poor, address environmental concerns, protect the rights of indigenous peoples and achieve a net reduction in emissions.

The current framing of the policy issue as one of potential tradeoffs between food and fuel security pits proponents of biofuel production against those most concerned about food security. There is a need to link food and fuel policies, so as not to compromise food security or to deprive poor farmers of potential gains from biofuel development.

## **Response options**

### *Improving the knowledge base*

The biofuel industry was a minor consumer of grains and oilseeds from the 1970s until the end of the century. Data and research into biofuels and their effects on markets, trade and food security reflect the relatively recent emergence of the industry. The fact that neither the impacts of this growth nor of current biofuel policies are fully understood indicates an urgent need for further analysis of land use changes, investment patterns, GHG emissions, trade flows, environmental impacts and food security. Additionally, there is a need for a common methodology for life-cycle analysis of GHG emissions that recognizes the importance of emissions from direct and indirect land-use change. Rather than being analyzed in isolation, biofuels need to be put in the context of the total energy mix, including other renewable energy sources and energy efficiencies.

In order to make this happen, high priority needs to be given to research on the following issues:

- determine the impact of policies for biofuel development on: food and energy security at national and global levels; agricultural and rural development for different country situations; and the wellbeing of vulnerable and food insecure people;
- calculate agricultural investment options at different scales based on cost-benefit analyses;
- develop methods for life-cycle analyses of biofuels that include direct and indirect land-use effects in the calculus of net greenhouse gas emissions;
- undertake trade-off assessments of alternative policy options that can be used as a basis for developing an integrated policy approach.

Considerable relevant data have been assembled, spatial analyses have been conducted and models built that pertain to these issues. However, this work has been done using a variety of methods at different levels of aggregation in ways that do not permit easy communication and application of the results for decision-making at national and local levels. Therefore, the group stressed the importance of ensuring that large models and remote-sensed data are compatible with results from existing local studies, to the extent feasible. Many existing data sets could be better linked and integrated across countries, agencies and sub-agencies. There is a need for expansion of the knowledge base, which requires making analysis of data sets more widely available, linking and integrating aggregated and disaggregated models so that a coherent set of policy-relevant messages can be produced.

At the international level, FAO and governments should undertake technical reviews in terms of food insecurity, subsidy stacking and the environmental impacts of biofuel expansion. Especially where assessments are global or transboundary in nature, multilateral review by FAO, OECD, WTO and other groups such as UNEP may be appropriate. It would be useful for FAO and OECD to develop some type of globally-based information and data clearinghouse on biofuels and the issues and challenges they pose.

### *Building capacity*

The technical and organizational challenges many developing countries face on questions of biofuels are daunting. Developing countries lack the ability to pay large biofuel subsidies yet many, such as Angola, Malaysia and Thailand, are encouraging ethanol and biodiesel production from sugar cane, oil palm, sugar and cassava. Many others are considering how they can be part of the biofuel boom and whether the employment and rural development opportunities are worthwhile to convert land to grow feedstocks and produce biofuels. In Malaysia and Indonesia, for example, substantial land clearing is underway to plant oil palm for biodiesel, which can be used in-country or exported as a feedstock to the EU.

With respect to food security, there are serious reservations about the current effect of biofuels. Fuel and food prices have moved higher together and the rapid growth of biofuel feedstock demand is the principal *new* factor in the rise of world food commodity prices to record levels, as higher feedstock prices have had knock-on effects on other commodities. Food price inflation has risen in almost all countries, and is particularly problematic in those countries where high shares of income are devoted to food expenditures. The food import bill of developing countries increased 10 percent from 2005 to 2006 and by an estimated 33 percent from 2006 to 2007.

Decisions need to be made on the basis of the best available knowledge. Tools such as scenario and risk analysis can guide decisions. Strategies can be formulated that strengthen resilience against a range of possible future events or developments. Uncertainty should not be used as an excuse for delaying the assessment of options and making decisions about policies or investments that could promote future food and energy security.

Sharing knowledge: need to make existing knowledge available to developing countries. This issue is not just about compiling knowledge. It is about transforming knowledge into a form that offers meaningful guidance at the application level. Institutional structures should be identified that allow information to be shared widely and used by those in a position to take appropriate action.

Offering guidance: need for guidelines for developing and developed countries on the estimation and reporting of GHGs, compliance with WTO rules, and avoidance of trade barriers related to biofuels. In addition, development of certification and compliance regulations and the cost of their application needs to recognize national differences in priorities and levels of development, especially for developing countries.

Agreeing on terminology: need for more precise terminology for the emerging bioenergy and biofuel sectors. Even among experts, terms are not always used in the same way, which can lead to public misunderstanding of the issues and increase uncertainty about the implications of alternative development pathways.

### *Investing in innovation*

Technological innovation, crucial to achieving long-term food and fuel security, requires significant new investment in research and development (R&D) programmes. R&D can improve technical efficiencies and identify strategies and opportunities for coping with scarcities and adapting to climate change (see guiding principle C in final section of this paper).

Objectives should be to:

- improve physical and economic efficiencies of feedstock production and biofuel conversion processes;
- conduct careful economic analyses of second generation biofuel technology in different socio-cultural contexts;
- clarify the meaning of the term “marginal lands” and assess their potential for production of second generation biofuels;
- breed a new generation of high-yielding crops, including those providing feedstock for biofuel, and animals adapted to anticipated changes in climatic conditions;
- identify new technologies and practices for adaptation to climate change in the agriculture, energy and transport sectors.

#### *Getting national and international policies right*

Most countries’ biofuel policies have multiple objectives, in particular energy security, climate change mitigation, and agricultural and rural development. These goals are not always compatible with other objectives, and there is increasing recognition of trade offs with food security and the sustainable use of natural resources. Policies are required that help achieve goals efficiently, while recognizing also their impact on international markets.

At the national and subnational levels, the policy instruments underlying the biofuel industry include: mandates, tax rebates, direct production subsidies, tariffs, distribution and transport subsidies, and research and development. All have encouraged rapid expansion in biofuel production, sometimes leading to imbalances of supply and demand due to engineering and availability constraints. This, together with rising input costs, may put the entire industry at risk. There is a need to develop policies that will guide coherent investments in food or biofuel within the context of overall agriculture and food security policies, considering differences in national needs and contexts, and international spill-over consequences.

Policy priorities need to be identified that will guide public sector investment in infrastructure and encourage private sector investment in productive activities in the food or biofuel subsectors, avoiding inefficient policies that help neither food nor energy security.

Both developed and developing countries will need to ensure environmental sustainability of biofuel development by adopting policies through which biofuels impart a positive impact on the CO<sub>2</sub> balance, protect land and water resources from depletion and environmental damage and prevent excessive new loadings of pollutants. To support such policies, there is an urgent need for internationally agreed standards that can address the global environmental implications of bioenergy production.

In general, there is a need for national policies, institutions and investments to:

- ensure that food security is not compromised, particularly for the most vulnerable;
- contribute to continued improvement of productivity in the agriculture sector and the equitable and sustainable development of the rural economy;
- support options for natural resource conservation and agricultural and rural development with low carbon pathways;
- minimize negative environmental externalities and provide environmental services to society in general;
- assist those who are adversely affected by climate change and the impact of biofuel production expansion.

In addition there is a need for:

- policy-makers to provide for the integration of local, regional or international policies that affect the agricultural sector and the rural economy; and
- integration and coherence of policies between national and global levels and between public and private sectors, in order to avoid policy instruments that have the potential to create undesirable and conflicting outcomes.

At the international level, policies are needed to integrate biofuel production and food security, taking account of:

- types of energy: fossil, non-bio-renewable, bio-renewable, food;
- levels: global, regional, national, local;
- sectors: agriculture, energy, environment, industry, transport, trade, finance, infrastructure investment, service provision;
- national demographics: more vulnerable and less vulnerable countries and population groups under different long-term trend scenarios;
- capacity-building: across sectors and levels, to enable developing countries to make the most benefit from opportunities for biofuel production.

International policies need to promote biofuels within sustainable development pathways, through, where appropriate, international cooperation and policy frameworks.

Policy priorities should be guided by the following four interdependent principles.

- A. Outward looking and market oriented: there is a need for policies to be more market-oriented and outward-looking to reduce existing distortions in biofuels and agricultural markets and avoid introducing new ones.
- B. Environmentally sustainable: there is a need for policies to strive to make biofuels sufficiently 'net CO<sub>2</sub> positive', protect land and water resource from depletion and environmental damages, and prevent excessive new loadings of pollutants.
- C. Growth-enabling: there is a need for policies to promote R&D with the objectives of improving economic and physical efficiencies of the feedstock production and biofuel conversion processes and adaptation to climate change.
- D. Protective of the poor and the food insecure: there is a need for priority to be given to the problems created by food deficits and dependence on oil imports for the poor and hungry. Potential opportunities to improve food security and the rural economy from current developments should not be overlooked.