Risk Governance Guidelines for Bioenergy Policies

EXECUTIVE SUMMARY

IRGC is concerned that current policies may, in the longer-term, be detrimental to other fundamental challenges

Biomass has been a source of energy for millennia. Since the 1970s, in many countries – particularly Brazil – targeted government policies and programmes have led to the increased use of a broad range of biological resources as feedstocks for bioenergy (including sugar cane, maize, soya, rapeseed, jatropha and wood).

This trend has accelerated recently. Oil price increases are now recognised as a source of worldwide economic, social and political distress, and bioenergy – in the form of biofuels – is a part of how at least some governments are dealing with oil supply constraints. Policymakers have also recognised the role bioenergy can play in mitigating climate change through reducing greenhouse gas (GHG) emissions, and many governments are providing financial support to producers (through subsidies) and mandating the use of biofuels. As a result, the production of bioenergy is increasing rapidly.

This rapid increase has implications for business, civil society and the environment. It has also led to greater attention being paid both to the potential opportunities offered by bioenergy as well as to the negative direct and indirect effects of bioenergy production, particularly when using current technologies.

This attention is currently focused mostly on biofuels for transportation, which is the primary reason why the International Risk Governance Council (IRGC) has chosen to develop risk governance guidelines for bioenergy policies, focusing on bioenergy in its broadest sense. From this broad perspective the advantages of bioenergy can be significant, including energy security (a source of electricity, heat and gas as well as liquid fuels), GHG emission reductions and sustainable rural development. IRGC believes that these advantages are far from assured, as bioenergy development also involves substantial risks that are receiving inadequate attention. It appears to IRGC that, in at least some parts of the world, policies are being decided before sound scientific knowledge about the risks has been considered, or even generated. IRGC intends that its risk governance recommendations help decision-makers to develop and implement policies and promote investments that take account of longer-term considerations, and so ensure that the full potential of bioenergy is realised without causing some or all of the associated risks to occur.

Opportunities related to bioenergy development

There is no doubt that, under the appropriate conditions, bioenergy can contribute to important global needs such as enhancing energy security, reducing GHG emissions, and, particularly in developing countries, promoting sustainable rural development. In particular, biofuels can help compensate for the oil price increase, avoiding many economic and social problems that unaffordable oil prices would generate. However, bioenergy is just one way to meet these needs and it has value to society only if the benefits it provides exceed its costs, including the opportunity cost of its development, in the long term. IRGC believes that, in the short term, most win-win opportunities appear to be optimal at a small, local scale, primarily due to the low energy density of biomass resources. These include niche applications such as farm-scale biogas plants or biomass for combined heat and power (CHP). As biomass also tends to be bulky, making it more suited for processing close to where it is produced, it is better suited to multiple, small bioenergy facilities rather than large, centralised ones.

Bioenergy alone cannot achieve the objectives of energy security, GHG emission reductions and sustainable development. It needs to be seen as a part of a comprehensive, sustainable energy policy in which all the various options are employed optimally, including energy efficiency, conservation, and appropriate technologies. But, by taking full account of the associated risks, bioenergy can make a significant contribution to a number of the world's most pressing problems.

This executive summary is taken from the IRGC policy brief "Risk Governance Guidelines for Bioenergy Policies"

RISK ASSESSMENT

Economic and structural risks

Risks associated with current levels and techniques of production (particularly of liquid biofuels) are largely the result of economic incentives and market mechanisms such as subsidies, mandates and protective trade barriers, many of them counter-productive in the long term. These seek to promote investment by providing a degree of certainty to investors, but they can also distort markets and are subject to political decisions that may make them unsustainable.

Industry also faces regulatory and economic risks related to capital investment, due to the lack of clarity and focus of public policies. Although the resulting uncertainty is partly due to industry itself lobbying for policy changes, IRGC believes that the lack of a clear regulatory framework is an issue that needs to be addressed.

Additional risks associated with bioenergy stem from underlying institutional and structural problems, especially in countries with insecure land tenure and access to resources.

Environmental and social risks

Risks such as soil degradation, biodiversity loss, stress on water resources, the trade-off with food supply, and the direct and indirect impacts of land-use change on GHG emissions, demand attention. IRGC considers that research is urgently needed to develop scientific knowledge of the full environmental impacts throughout the life-cycle of the various forms of bioenergy.

Land-use change

Recent studies have highlighted land-use change as a potential environmental risk that may be exacerbated by bioenergy development. Where forested land is cleared or food crops are displaced to make way for bioenergy feedstock crops, bioenergy production may directly or indirectly increase GHG emissions and loss of biodiversity. Studies of these indirect impacts question the environmental rationale for bioenergy if large areas of land are required, regardless of location and production methods employed. The uncertainties associated with the effects of land-use and land-use change suggest the need for a conventional risk-based approach to decision-making. IRGC recommends the use of full life-cycle assessments (LCAs) to help assess the net direct and indirect impacts of land-use change, but other more strategic measures that consider land-use more broadly are also needed.

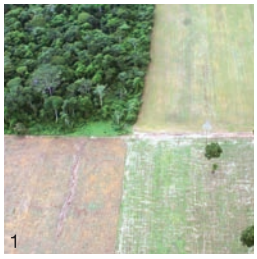
Given the considerable uncertainty about both the risks involved and the scientific data that underpin current understanding of bioenergy and its risks, IRGC believes governments first need to "take their foot off the accelerator" to provide time to consider carefully the risks involved in developing bioenergy. Given the necessity of mitigating climate change and improving energy security, investment in research and development is an urgent priority in order to minimise the time needed to assess the various options.

POLICY ASSESSMENT

Bioenergy policies are currently designed to pursue specific objectives such as agricultural support, rural development, reduced dependence on foreign sources of energy, environmental rehabilitation, and climate change mitigation. However, pursuing diverse multiple objectives with a single policy is rarely efficient. Moreover, bioenergy policy typically is shared among several parts of government, such as ministries dealing with energy, environment, climate change, economic development, trade and agriculture. This suggests to IRGC that, while an integrated approach to developing policy is needed, achieving it may be institutionally challenging.

Dealing with the trade-offs

Several indicators lead IRGC to conclude that the local, regional and global competition between food and fuel is not being adequately addressed, with severe negative side-effects in some developing countries, particularly for the poor. In many cases the food-fuel conflict is being exacerbated by policies that favour the diversion of food crops into biofuel production (in order to compensate for the oil price increase and its impact on food prices), at a time when other demands on finite land resources – for food production, housing, recreation, nature conservation, and so forth – are also increasing. Bioenergy technologies are developing quickly, and innovations that will reduce the competition between food and fuel are likely to make bioenergy more attractive in the future.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Climate change further complicates the demands on bioenergy. IRGC considers that insufficient attention is being given to the energy-climate change trade-off throughout the bioenergy value chain, particularly with regard to the overall GHG emission balance and the indirect impacts of land-use change.

Differentiated objectives with clear priority and focus

For the above reasons IRGC believes that, in addition to improving energy efficiency and managing energy demand:

- Industrialised countries and major exporters of bioenergy among the developing countries should encourage the development of bioenergy only where it can be demonstrated that doing so will significantly reduce GHG emissions over the whole life-cycle. Having met this basic criterion, governments can then encourage new investments to develop sustainable and economically-viable forms of bioenergy that contribute to energy security.

- Other developing countries and countries with economies in transition should develop bioenergy primarily to benefit local livelihoods through providing heat and electricity as well as affordable, safe and more efficient fuels, and so support wider sustainable development goals without, in doing so, jeopardising food security. In such countries, communities may need help to find appropriate ways to harness and exploit waste biomass and bioenergy crops at suitable scales.

IRGC also believes that, in all countries, policies should be developed in such a way as to not deplete biodiversity and other natural resources. Policies should use the principles of adaptive management, being revised as new scientific knowledge emerges that can help reduce uncertainty (for example, from full LCAs which take full account of bioenergy's many secondary impacts and which reflect different geographic, climatic, feedstock and production factors). Policies should also adapt to future technologies that may shift bioenergy production to new feedstocks, such as algae or municipal waste, which may be produced with a more favourable cost-benefit ratio.


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RISK MANAGEMENT STRATEGIES

From its research and the discussions held at the two workshops IRGC has concluded that risk management strategies should strike a balance between the case-specific opportunities offered by bioenergy and the risks it poses. IRGC has identified the following as practical actions and instruments that could help policymakers and industry develop sustainable bioenergy production and policies in the long term:

- Assess domestic energy needs and demand.
- Assess realistic capacities to produce domestic feedstock for bioenergy, avoiding over-optimistic projections about the potential contribution of bioenergy to the energy mix.
- Implement land-use policies which will reduce the risk of land with recognised high biodiversity value or high carbon stocks being converted to grow biomass feedstock, and encourage the use of marginal land, but only when environmentally, economically and socially appropriate.
- Foster research and development that enables a faster move toward new forms of bioenergy (including so-called second-generation, but also transitional technologies), which may require less land and may enable the more efficient use of wastes and non-food feedstock.
- Minimise any negative impact of bioenergy production (and in general of all agricultural practices) on water resources; and promote more sustainable agricultural practices, both for food and fuel production.
- Maximise the use of waste, particularly sewage, in bioenergy generation but only deliberately use food crop residues when doing so does not lead to soil erosion or humus depletion.
- Further develop and use risk assessment methodologies such as LCAs and Environmental Impact Assessments (EIAs), and apply them locally; ensure that their scope includes the full "cradle-to-grave" bioenergy life-cycle and that current limitations in methodology are overcome.
- Adopt internationally agreed definitions, sustainability standards and criteria for certification that would be recognised under international trade rules.
- Develop adaptive regulatory frameworks that set the conditions for transparent and balanced markets for producing and exporting countries to meet, first, their domestic needs, and, second, the needs of international trade.
- Employ only technology-neutral economic instruments to assure technological diversity in how environmental, economic and social performance standards are met.
- Engage consumers with transparent communication and thereby help them to make well-informed choices so that they, too, can contribute to promoting sustainable bioenergy and managing the associated risks.

Reducing GHG emissions, fostering development and reducing poverty


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IRGC hopes that its proposed risk governance guidelines will help in the practical avoidance of major risk governance deficits in bioenergy policies and practices. It also hopes that future public policies will emphasise:

- The long-term opportunities and risks, as well as the appropriate policy objectives and incentives that can either encourage or mitigate them;
- Market-oriented approaches, to reduce existing distortions in liquid biofuel and agricultural markets;
- Environmental sustainability, protecting land and water resources from depletion and environmental damage;
- Adaptive regulation, production and behaviour, to allow rapid improvements in the economic and physical efficiencies in the production and conversion processes such as those implied in second-generation technologies; and
- Priority given to economic concerns for developing countries, with a focus on food, employment and energy needs.

The International Risk Governance Council (IRGC) is an independent foundation based in Switzerland whose purpose is to identify and propose recommendations for the governance of emerging global risks.

Because many emerging risks are associated with new technologies and usually accompany significant economic and public benefits, different governance approaches and policy instruments must often be developed to maximise those benefits while minimising the identified risks. Important opportunities for social and economic development can be foregone where the public perceives inadequate risk governance measures.

To ensure the objectivity of its governance recommendations, the IRGC draws upon international scientific knowledge and expertise from both the public and private sectors in order to develop fact-based risk governance recommendations for policymakers, untainted by vested interests or political considerations.

The IRGC policy brief on Risk Governance Guidelines for Bioenergy Policies (available on www.irgc.org) is an example of such fact-based objective analysis. It is the result of an IRGC project, which involved a multidisciplinary team of experts, led by Jeff McNeely, Chief Scientist at the International Union for Conservation of Nature (IUCN).

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