Chapter 6

Policy Recommendations

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CHAPTER 6
POLICY RECOMMENDATIONS

This report investigates various issues of 'Sustainable Biomass Utilisation Vision in East Asia.' The overriding benefits of biomass utilisation, as a source of renewable energy, are that it reduces the rate of depletion of fossil fuels and as shown in the preceding chapters, there are economic, environment and social benefits. At the same time, there are potential negative impacts and pitfalls associated with the development of biomass energy industry. To ensure that biomass utilisation remains a sustainable source of energy supply, the following recommendations are proposed.

6.1. Addressing Macro and Micro Levels Needs to Reap Maximum Economic Benefits

For a complete picture of the economic impacts of biomass utilisation, policy makers should consider not only the economic benefits at the national level, such as reduction of fuel import, increase in employment opportunities and revenue generation, but also the financial sustainability of the biomass energy industry within the local economy.

The business environment must be made favourable for the growth of the biomass utilisation industry. Regulations that mandate use of biofuels as fossil fuel blend, and various forms of direct or indirect subsidies may be needed to spur the growth of the biomass energy industry. However, such approaches are viable only for short-term gains and will not sustain the biomass energy business in the long run.

For long term sustainability of biomass energy programs, such policies should be implemented that will enhance the distribution of economic benefits to each stakeholder within the value-added chain; enhance profitability of the biomass energy business through maximising the biomass energy resources, use appropriate technologies; and adopt the most suitable form of material flow for conversion of feedstock to biofuel.

The economic benefit of the biomass energy industry should also be expanded to the development of other industries that are able to utilise their by-products as raw material. The investment environment for industry sectors such as the machinery sector for mechanisation and automation, the chemical sector, in particular, the agrochemicals sector, and the information technology sector for enhanced distribution network should also be conducive to support the growth of the biomass energy industry.

Maximum economic benefits from the biomass energy industry can be sustained through addressing both the micro and macro levels needs such as ensuring reliability of supply and stable pricing, in particular, for developing economies, where production of feedstock materials involves small-scale farmers.

In view of the diverse industry sectors and sub-sectors that are associated with the growth of the biomass industry, there are ample opportunities for the East Asian countries to work together for a sustainable demand and supply equilibrium of biomass energy within the region.

6.2. Enhancing Positive and Mitigating Negative Environmental Impacts

Most of the potential problems highlighted in the environmental aspects of biomass utilisation are related to agriculture activities and practices. The major environmental impacts associated with biomass cultivation include greenhouse gas emission and pollutants discharge from the production, distribution and application of different streams of materials, products and services required to produce the biomass feedstock; and loss of biodiversity through conversion of forest land to farm land.

There are also many positive impacts on the environment linked to the use of biomass energy, particularly when evaluated throughout its life cycle, i.e. from ‘field to fuel’. Any biomass feedstock’s value as a carbon neutral material is based on its ability to accumulate carbon during its growth and release the same amount during combustion, thus not adding any additional GHGs to the atmosphere. The positive environmental benefits of GHG reductions in biomass growth and utilisation can be realized as long as no large forest areas are cleared for agriculture production, and no over-harvesting of biomass is carried out. Proper planning and the sustainable management of agricultural land, along with control harvesting, will promote the sequestration of carbon dioxide via photosynthesis. The planted biomass, in particular for crops with long life span such as oil palms (25 years) acts as good carbon sink that sequester carbon dioxide for growth. Otherwise, changes in land use or large clearance of tropical forest to grow more biomass resources may end up emitting more GHGs than is intended to reduce.

Policies and strategies in support of biomass utilisation sustainability should be framed to enhance the positive impacts while mitigating the negatives. Adoption of proper water conservation and planning is encouraged, especially in rain starved areas. Supplemental irrigation and water harvesting methods have been among the methods proposed. Another policy should aim at GAP (Good Agricultural Practices), staring from a top-down approach, involving governmental support to the certification authorities, and finally, the training and education of farmers. Organic farming is one of the excellent agricultural methods as exemplified by certain palm oil plantations in Malaysia.

The impacts over the entire life cycle of the particular biomass energy should be considered and a technique such as Life Cycle Assessment (LCA) is adopted to rank the activities according to their contribution to the impacts. An activity or the stage of the life cycle that generates the most extensive damage for a particular impact category is referred to as a hotspot. The mitigation action plans, whether in the form of regulations, technological solutions, good practices or infrastructure development should be prioritised according to the ranking of the hotspots or the extent of damage of the impact to the environment.

6.3. Realising Direct and Indirect Societal Benefits or Returns

Societal impacts are not necessarily measured by direct monetary or tangible benefits. Well-developed biomass energy supply in the rural areas will lead to improved living conditions due to both increased income from employment opportunities and the availability of energy for better infrastructure, and public service facilities. These factors may contribute to increase in the level of literacy, in particular, among the rural female population, and promote gender equality.

There are, however, potential negative societal impacts that must be addressed to ensure sustainability of biomass utilisation. The foremost issue is of balancing food versus energy security. Care should be taken that the use of agricultural land for energy crops, the use of food crops as bioenergy feedstock, and consumption of agro-residues as fodder do not affect the food security. Policies should be designed in such a way that they benefit all strata of the society including land-less labourers, small-scale farmers, women and weaker sections. Large-scale mechanisation in biofuel plantation and other labour oriented activities should be avoided for better job prospects of rural population.

Policies that will demarcate arable landuse, promote cultivation of energy crops in waste land, wherever feasible, or apportion food crops that can be used for bioenergy production at the national level will ensure food security. However, in this context, studies should be conducted to establish the actual needs of each of the stakeholders to enable policy makers set realistic targets and controls.

6.4. Developing Sustainability Indicators to Enhance the Decision Making Process

Key performance indicators are already used by most Governments and businesses to assess the progress or success rate of policies and strategies, and communicate their performance to stakeholders. Sustainability indicators can be viewed as a sub-set of the generic key performance indicators, and are focused on characterising and reporting on the outcome of sustainable solutions.

Sustainable development indicators should address ecological, economic and social sustainability. At this juncture, there is no single indicator that is able to integrate all three aspects although there are indicators that do integrate at least two aspects. Eco-efficiency and Life Cycle Costing (LCC), for example, integrate environmental and economic aspects, while societal costs consider environment and society impacts.

A number of indicators of variable complexity can be applied to monitor the sustainability of biomass utilisation. Some can be as simple as employment generation, reduction in import, total value added, return on investment, increase in energy efficiency, and reduction in pollution load associated with a particular bioenergy industry with base comparison factors such as per unit of investment or land area.

In the absence of a singular indicator capable of integrating all three aspects, a suite of indicators is recommended. However, not every indicator need to be applied in the decision making process. Choice of indicator should depend on the relevance, type of background information available, and how the indicator value will be used in the decision making process.

In view of the wide choices of indicators that could be developed, there should be harmonisation on the use of specific indicators, at least at the regional level to enable Governments compare the effectiveness of national, regional or even international policies and strategies, and more importantly, to work towards some common goals under the 'Sustainable Biomass Utilisation Vision'.

Meanwhile, given the importance of the use of indicators in decision-making process, the integration of all three aspects into a single representative indicator should still be actively pursued. Emphasis should be given to develop new indicators that will address current and complex issues such as energy security.

6.5. Using Appropriate Tools to Generate Quantifiable and Verifiable Life Cycle Information

Appropriate evaluation tools or techniques will enable the generation of quantifiable information and data for incorporation into the sustainability indicators, benchmarking or other reporting applications. Among the evaluation tools that are able to systematically capture the impacts over the life cycle of a product or service is life cycle assessment (LCA). It is an established tool that can provide life cycle footprints for critical environmental impact categories such as green house gas emission, acidification, biodiversity and eutrophication. The use of LCA will also ensure that negative impacts are not passed from one environmental compartment to another, from one time frame to another, or from one region to another.

In the area of biomass utilisation, LCA can also provide quantifiable information to evaluate landuse in the context of optimised land size, the choice of crops, and comparison among various crops as bioenergy feedstock.

6.6. Considering Country-Specific Needs and Available Biomass Resources

Depending on the country's experience and needs, the driving force for the development of biomass energy production and utilisation in East Asia can be economic, environmental or social factor, or a combination of these factors. The ranking of importance of these factors is country specific. Examples of variations in country conditions include distribution of the biomass resources, large or small land holdings management, demand for the final product, availability of local technical expertise, labour skills, and seasonal supplies. These conditions will affect the extent of benefits gained from the biomass energy industry. Careful assessment is needed to ensure that appropriate decisions are made in line with the driving forces for sustainable biomass utilisation at national or country level.

6.7. Promoting Regional and International cooperation

At the regional and international levels, each country should respect the policies and approach that may be adopted by the other countries. Collaboration between bioenergy producing and bioenergy consuming countries in East Asia, to create mutual beneficial relationships covering technology exchange, capacity building and pricing controls, should be high on the agenda to sustain biomass utilisation from the economic, environment and social aspects.

At the regional and international levels, each country should pay due attention to the policies and approaches that are adopted by other Countries. Collaboration between bioenergy producing and bioenergy consuming countries in East Asia, including technology exchange, capacity building and appropriate pricing should be given priority for sustainable biomass utilisation.

For example, agriculture has been identified as one of the major contributing factors to negative environmental impacts through agrochemicals' application, water and land management. The environmental impact from use of the agrochemicals in agriculture can be reduced by improving the application practices at the farms or plantations, and also by improving the process of formulation and production of agrochemicals, most of which are produced outside the developing countries.

The recommendations presented above by the WG are not exhaustive and represent only the initial findings established from the ERIA Joint Research Project on ‘Sustainable Biomass Utilisation Vision in East Asia’ that officially commenced in October 2007. Many of the issues pertaining to sustainability of the biomass energy industry have been identified in the project. However, further in-depth investigation is required in order to find concrete solutions at the regional level.