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Assessing biofuels: Aiming for sustainable development or complying with the market?

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ABSTRACT

The growing interest in biofuels has led to increasing concern about their wider implications, particularly if grown for transport use in large scale. Such concerns include environmental, social and economic issues. To counterbalance the possible negative effects, a series of measures are being put in place to help their sustainability. Nevertheless, considering the different meanings of sustainability in different parts of the world and the need to expand productive rural activities, the differences between trying to assure a commodity and the benefits or impacts at local level raise the questions between the aims of sustainability and the need to comply with a market. The ideal situation would be to reconcile both aspects, which in practise represent a major challenge for governments and industry. This paper provides an overview on the sustainability assessment of biofuels to consider a possible way forward.

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1. Introduction

Since the 1970s the use of biofuels (defined as liquid or gaseous fuel for transport produced from biomass; EC, 2003) has attracted attention for a number of reasons, including concerns about oil dependency, production of “renewable” non-fossil fuels, increasing demand for local rural activities. Additionally, environmental concerns have been raised along with concerns with adherence to international agreements to reduce green house gases (GHG) and dependency on oil fuels (Feehan and Petersen, 2004). The relatively small share of transport fuels currently being provided by biofuels has prompted EU-member states to undertake a raft of initiatives aimed at significantly increasing the proportion in biofuel use in transport. This expansion of biofuel use has, in turn, raised awareness of their potential environmental and social impacts of across all stages in the supply and use chains.

There are also other arguments in favour of the use of biomass in this way, such as security of energy supply, diversification of energy sources, low-carbon emission, an alternative market for agricultural products and rehabilitation of degraded lands. Over the last years several activities have emerged for reviewing the environmental and social impacts of cultivation and production of biofuels, as well as activities regarding certification and sustainability standards (see for instance JEC, 2010; RSB, 2010). However, the current debate focuses on the possible negative social and environmental implications, especially as regards land competition, the questionable reduction of

emissions and “the fuel versus food” debate (Diaz-Chavez and Woods, 2008; Lynd et al., 2011).

This paper examines the differences between assessing sustainability in biofuels production in terms of achieving or moving towards sustainable development goals in production areas and providing certification that focuses on market compliance.

2. Sustainability assessment

Since the original definition of sustainable development in the Brundtland report (WCED, 1987), where the idea was to reconcile environmental protection and economic development (Dresner, 2002), the concept has undergone changes. Although this concept is widely accepted, worldwide differences in meaning and views still exist. Sustainable development and sustainability are sometimes used interchangeably to refer to maintenance of the resources or a system over time.

Traditionally, the concept of sustainable development has focused on three pillars (social, environmental and economic) but in recent years, it has evolved to include other components, such as policy and institutions (Diaz-Chavez, 2003) along with linkages and overlaps between them (Moldan and Dahl, 2009).

Additional concepts consider sustainable development as a global goal but with limits in terms of the availability of resources and the long term needed to maintain them (Udo and Jansson, 2009).

Despite the diversity of conceptualisations of sustainable development, some main considerations are commonly accepted. For instance, Strange and Bayley (2008) refer to the idea that it is a conceptual framework. It can also be seen as a process with

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principles of integration of all decisions, across space and time and an end goal with specific sub-goals such as providing better conditions (e.g. health, livelihoods and employment) and avoiding resource depletion, social exclusion, poverty and unemployment.

Therefore, approaches to sustainable development have been varied, reflecting the diversity of challenges faced by individual countries and their diverse populations and cultures. Thus, while sustainable development is a universal challenge, many practical responses can only be defined nationally and locally (Dalal-Clayton and Bass, 2002). Furthermore, the general concept of sustainable development points to aspirations towards achieving a quality of life that can be maintained for many generations. This tendency comes from the idea that sustainability is: socially desirable, economically viable and ecologically sustainable. Sustainable development is then the complex of activities that can be expected to improve the human condition in such a manner that the improvement can be maintained (Munro, 1995).

According to Dalal-Clayton and Bass (2002), achieving sustainable development requires deep structural changes and new ways of working in all areas of economic, social and political life. This includes various strategies such as different economic growth patterns that actively favour the poor; removing fiscal policies that negatively affect the poor or promote environmental damage; urgently requiring new market prices, mechanisms and strategies (Diaz-Chavez, 2003). However, the main achievement within sustainable development is the encouragement of stakeholders participation

3. How to assess sustainability in practise and whose sustainability? A framework proposal

Since there are different definitions of sustainability, there are different methods to assess sustainability. According to Dalal-Clayton and Bass (2002), the purpose of measuring and analysing sustainability is to answer essential questions related to how healthy is the ecosystem; how are human activities affecting that particular ecosystem; how is life quality for the population (considering their future generations); is there an equity well-being and the interlinks between these question This information is essential for determining the progress of a society towards greater sustainability, its main strengths and weaknesses, helps decision-makers to focus on the priorities of sustainable development (Diaz-Chavez, 2003).

There is no single best methodology for conducting a sustainability appraisal or assessment. Rather, this requires the use of a wide range of analytical tools, which derive from Environmental Impact Assessment (EIA), policy analysis and plan evaluation practise, among others. As suggested by the United Nations Economic Commission for Europe (UNECE, 2006), the type of analytical tools to be used depends on the type of sustainability assessment required. For instance, EIA methods can be adapted where a cause-effect chain can be identified (i.e. checklists, Geographic Information Systems (GIS), predictive modelling, Life Cycle Assessment (LCA), impact networks and Multi-criteria assessment). Strategic Environmental Assessment (SEA) can also be applicable for assessing plans, programmes and policies but also for regional development (e.g. considering scale issues). Where the environmental effects of plans and programmes or particular components are indirect and generalised, it will be more suitable to use policy appraisal or plan evaluation (i.e. scenario building, simulation modelling, policy and legal reviews; Diaz-Chavez, 2010a, 2010b).

For instance, in the EU, Sustainability Appraisal or Assessment (SA) is now a mandatory element of the new Local Development Framework (LDF) process under the Planning and Compulsory

Purchase Act 2004. It must be carried out on all Development Plan Documents and Supplementary Planning Documents. The SA must also meet the requirements of the Strategic Environmental Assessment (SEA) Directive EC (2001).

Other environmental management tools and other methodologies are already in use, which also contribute to sustainability assessment including environmental and social impact assessment (ESIA), health impact assessment (HIA), sustainable livelihoods assessment. Along with these, the application of other tools are the responsibility of large international and national companies through Corporate Social Responsibility (CSR) and the participation of different stakeholders to demand real accountability from government decisions and actions. Government enforcement and decision-making process also contribute to clearly state the way forward to sustainability.

Probably the major asset of sustainable development is the linking of the economic, social and environmental issues as well as considering stakeholders participation. The understanding of sustainable development as a general concept in order to use resources responsibly and considering the well-being of future generations faces a policy and management challenge. The measurement of sustainability has been suggested through different tools, which include assets, reports and indicators. For instance, the term of “weak sustainability” used by Pearce (1993, 2006) where the “capital” should be passed from one generation to another regardless the type of capital (human made, natural, social and economic).

On the other hand, the use of indicators provides a means of producing and analysing information. They are useful to share and compare information, to facilitate decision-making and to provide information to different stakeholders including the general public. The appropriate selection of indicators within a framework should provide an adequate basis for the measurement of sustainability (Diaz-Chavez, 2003). There are different types of initiatives in the development and application of Sustainability Indicators (SIs), one where institutions deliver the development (institutional sustainability) and other where the community participation is the bedrock (Bell and Morse, 1999). In this last case, sustainable community indicators link the long term economic, social and environmental health of a community.

The three main themes can be extended to consider policy and institutions not as drivers for decision-making but as an integral part of sustainable development (see Fig. 1).

This suggested approach (Fig. 1) considers the integration of four themes but not treated independently and emphasises the causality links. The additional possibilities of considering cumulative impacts and enforcement helps to better understand the decision-making process and other related aspects (Diaz-Chavez, 2006b).

This thematic framework (Fig. 1) considers:

Social: the characteristics that belong to society (individuals, populations and communities) it should also consider essential requirements to promote a better life quality (including poverty alleviation)

Environment: the total global environment system and the conditions (human activities or natural causes) affecting its components (physical and biological).

Economic: the economic measures linked to the other themes and the productivity of the ecosystem.

Policy and Institutions: all the components derived from it (political organisations and political activities) and the “institutionality” or the decision-making capacity of society (Diaz-Chavez, 2006b).

The themes need to be considered as integrated, rather than separately, e.g. embedded. Considering the themes embedded adds value to the system. Gibson (2006) suggests that this is to be able to better integrate the goals of sustainability and maximise its benefits.

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