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Bioenergy: Balancing energy needs with food production and environmental sustainability

Background

Biofuels such as bio-diesel and bio-ethanol are separated into two categories: first generation and second generation. First generation biofuels are produced from feedstock like vegetable oils, sugar, and starch ethanol. In recent years, concerns about climate change and dependence on fossil fuels has cultivated several governmental initiatives towards bioenergy. As a result, manufacturing and commerce of bioenergy are expanding. Scientists have in turn begun to investigate the negative and positive effects connected to bioenergy. While the primary focal point of biofuels is on transportation, the advantages and uses of bioenergy span several functions. The goal is to reduce greenhouse gas emissions.

According to the Food and Agricultural Organization, “world population growth and increased economic development will require a substantial increase in food in the coming years.” This can be met by an increase in productivity. However, the supplementary use of food grade feedstock for biofuels is now competing with food production. This could weaken the world food supply and increase local food shortages and prices. This technology has adverse effects economically, ecologically, and socio-politically by converting biomass into energy.

The systemic character of bioenergy is demonstrated by the many impacts of bioenergy production and on rural development, biodiversity, climate change, the environment, food security and independence. It appears that in at least some parts of the

world, policies are being decided before sound scientific knowledge about the risks, which has considered, or even generated.

Recent Developments

In 2006, bioenergy (primarily for cooking and heating) accounted for 14% of total global primary energy consumption. Modern bioenergy made up less than 2% of this total and only 0.3% derived from biofuels. Under the appropriate conditions, increasing bioenergy's share of the energy mix can contribute to meeting important global needs such as reducing GHG emission, enhancing energy security and, particularly in developing countries, promoting sustainable rural development. However, bioenergy is just one way to meet these needs- there are various other available technologies such as solar and wind- and bioenergy will bring value to society only if the benefits it provides exceed its externalities and the opportunity cost of its development. Most win-win opportunities for niche applications of bioenergy, such as farm-scale biogas plants or biomass for combined heat and power (CHP), appear to be optimal at a small, local scale, primarily due to the low energy of density of biomass resources.

More recently, in 2008 at the FAO Headquarters in Rome, the FAO Bioenergy group held a technical consultation on "How to design, implement and replicate sustainable livelihood oriented small-scale bio energy initiatives." The state of Orissa in India occupies around 5% of the total geographical area of India. The biodiesel-based water-pumping project is being implemented in the remote and tribal districts in Eastern Orissa. This is one of the largest NGOs in the state of Orissa, India that involves biodiesel-based water pumping. In Brazil, the testing of the "CleanCook" ethanol stoves in households has taken place in three different areas of the Minas Gerais state of Brazil.

Stove users have reported benefits ranging from a reduction in smoke and safety improvements, to time and cost savings. In Vietnam, the country embarked on an integrated land management scheme, supported by the Vietnamese Gardener's Association (VACVINA). It involves gardening, fish rearing and animal husbandry to make optimal use of the land. Traditional fuels such as wood and coal for cooking, are becoming increasingly scarce and expensive, and can contribute to deforestation. Increasing livestock production in rural communities with high population density leads to health and environmental issues from the quantity of animal dung being produced.

Questions to Consider

What innovative or established ways is your country Balancing energy needs with food production and environmental sustainability?

Feeding 9 billion. Sustainable solutions to increase food security for our growing population

Background

Predictions now put the world's population at 9 billion people by 2050. Changing consumption patterns, the impacts of climate change and growing scarcity of water and land make the challenge of increasing agricultural yields worldwide even greater. The global hunger population however has exceeded a billion, while the number of hungry people has been declining in thirty-one countries during the fifteen-year period from 1991 to 2005¹. Crop production methods will need to sustain the environment, preserve natural resources and support the livelihoods of farmers and rural populations around the world.

¹ Pathways to Success: Success stories in agricultural production and food security. United Nations Food and Agricultural Organization. Rome, Italy 2009

In 1996 the Food and Agricultural Organization of the United Nations caucused in Rome at the World Food Summit in an attempt to solve the crisis by 2015. Since then, only a few nations have made significant progress. While this is an economic issue, terrorism, corruption, and environmental degradation also contribute to world hunger. The course of action should involve sustainable management of natural resources, elimination of unsustainable patterns of consumption and production, particularly in industrialized countries, and early stabilization of the world population.² Revitalization of rural areas must also be a priority to enhance social stability and help redress the excessive rate of rural-urban migration confronting many countries.

Recent Developments

Both Algeria and Turkey have succeeded in increasing their agricultural exports and Algeria has also boosted cereals production significantly.³ Both countries have remained committed to promoting its agricultural sector and governmental policies that promote international trade. New approaches to crop management including modified irrigation regimes, seed treatments to protect against pests and diseases and agroecological approaches which manage the interactions between plants, animals, microorganisms and the physical environment within agricultural systems. For example, the push-pull' system for pest management in maize crops. A border of Napier grass surrounds the maize field, which is more attractive to moths than the maize for laying

² Rome Declaration on World Food Security. Food and Agricultural Organization of the United Nations. Rome, Italy. 1996

³ Pathways to Success: Success stories in agricultural production and food security. United Nations Food and Agricultural Organization. Rome, Italy 2009

their eggs. In addition, rows of maize are intercropped with rows of the forage legume silverleaf, which repels stemborer moths away from maize. Breeding and GM of new varieties of crops that are resistant to disease, drought, salinity, heat and toxic heavy metals.

Recently in Rome, in the hard fought negotiations over a draft declaration from the three-day talks, wealthier nations succeeded in removing a goal to end world hunger by 2025 and declined to commit to increasing agricultural aid to nearly 20 percent of all international development aid, where it peaked in 1980 before gradually falling.⁴ While the FAO hoped to set an agricultural aid target of \$44 billion toward helping farmers in poorer countries, the committee instead committed to \$22 billion over the next three years although there has not been a decision of how the aid is to be distributed.

Questions to Consider

What can your country's government do to contribute to solving the world's hunger problem?

Preventing the transboundary spread of invasive plant and animal species

Background

The National Invasive Species Information Center defines invasive species as any 'non-indigenous species that adversely affects the habitats they invade economically,

⁴ MacFarquhar, Neil. Disagreement Over Goals at U.N. Meeting on Hunger. New York Times. November 16, 2009

environmentally or ecologically.”⁵Invasive plant species pose both a threat to the economy and ecology of space they inhabit. Invasive species often out compete native’s species due to their ability to reproduce at a faster rate. It is reported that more than 80 percent of endangered species could suffer losses worldwide. This could lead to the spread of viruses because of the increase in transportation into remote ecosystems. As yellow fever and malaria have been connected to the invasion of species, today introduced rodents, insects, and birds could spread Cholera and a human host AIDS virus. Globalization and tourism is a direct source to this biotic invasion.

Recent Developments

In Senegal, there is an invasive species called *Typha Australis* that is found throughout the delta region of the Senegal River. Estimates suggest that there is the potential of 519,000 tonnes of dry biomass from *Typha* in the delta area. There are two main actors directly involved in the market chain; the company of four people who harvest, dry and process the *Typha* into briquettes, and a women’s group which markets and sells the final product. The harvesting process is very demanding and as such investigation is ongoing into the options for mechanisation of collection of the *Typha*.⁶ In North America, the *Bromus tectorum*, originally from Eurasia, is highly fire-adapted. It increases the frequency and intensity of by providing large amounts of dry detritus during the dry fire season in Western North America. In areas where it is widespread, it has

⁵ National Invasive Species Information Center. What Is An Invasive Species?. United States Department of Agriculture Library. February 3, 1999.

⁶ Small Scale Bioenergy Initiatives: Brief Description and preliminary lessons on livelihood impacts from case studies in Asia, Latin America and Africa. PISCES and FAO. January 2009.

altered the local fire regime so much that native plants cannot survive the frequent fires, allowing *B. tectorum* to further extend and maintain dominance in its introduced range.⁷

Questions to Consider

What are ways that your country could prevent the transboundary spread of invasive plant and animal species without compromising the ecosystem?

⁷ Richardson, D.M. Effects of Invasive Alien Species on Fire. 2004.