

## Session 3

# **Biofuel as a Global Force of Change**

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Our project on the forestry model of sustainable humanosphere was originally a comprehensive interdisciplinary study of local societies dependent on forestry products, to examine the impact of frontier technologies of molecular biology, wood engineering and forest science on land use, commercial forestry, commercialization of forest waste, employment generation, changes in customary law, local administration and local politics.

Environment and energy are challenges facing sustainable humanosphere today. According to the International Energy Agency, global demand for energy is expected to increase by more than 20% by 2020, based on marked demand for energy in Asia and Africa. Fossil fuel will be required for more than 30% of this increase. Increased consumption of the fuels will steadily enhance emissions of carbon dioxide, increasing greenhouse gases in the atmosphere. Reducing dependence on fossil fuels is a challenging priority in restoring the environment and the economy to a sustainable humanosphere and biosphere.

Reducing dependence on fossil fuel consumption requires breakthroughs in science, based on the forestry model of sustainable humanosphere in Southeast Asia. Biomass-based biofuels, such as cellulosic ethanol, are a potential source of renewable energy which can be generated without affecting food production. They could also offer a solution to both pollution and greenhouse gases because plants that are grown as biofuel feedstocks reabsorb the carbon dioxide emitted when the biofuels are burned.

Bioenergy crops include trees such as falcate and grasses such as sugarcane and others grown specifically for energy production. The challenges facing bioenergy include the agroforestry settlement of sustainable humanosphere, development of next generation bioenergy crops and design of enzymes and microbes with novel biomass-degrading capabilities. There are many potential energy crops among trees and grasses that have not markedly benefited from the years of agricultural research devoted to breeding traditional crops such as corn, wheat and rice.

Our group will offer students, postdoctoral staff and young scientists interdisciplinary research discussions covering a broad range of biofuel-related fields. We seek to develop new forms of frontier science and technology that sustainably integrate the humanosphere and biosphere.