

# International Conference

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## Session3:Biofuel as a Global Force of Change

Session 3, organized by G-COE Initiative 3, consisted of two oral presentations given by invited Professors and 15 poster presentations by the Initiative 3 members.

First of all, Prof. Dr. Faaij (Faculty of Science, Utrecht University, The Netherlands) gave us a comprehensive review (including most of the recent insights) concerning the sustainable use of bio-energy on a global scale. He was followed by Prof. Dr. Sakanishi (Biomass Technology Research Center, National Institute of Advance Industrial Science and Technology: AIST, Japan) whose presentation focused on the urgent necessity and the current situation of bio-fuels production in Japan, which is characterized by an extremely-low level of self-sufficiency in energy supply.

The comprehensive presentation given by Prof. Dr. Faaij can be summarized as follows. Nowadays, the rapid population growth and the search for high living standards create huge energy demands, of which up to 88% is covered by fossil fuels. However, most of the oil and gas reserves are concentrated in politically unstable regions (conversely, it can be said that fossil fuel resources invite political instability). Consequently, many nations are now strongly searching for diversifying energy supplies. This implies the shift to alternative energies instead of oil, in order to secure reliable and constant supplies. Biomass is especially a versatile energy source: it can be useful not only to produce power, heat and gaseous fuels, but also in providing carbon feedstock for materials and chemicals, in mitigating CO<sub>2</sub> emissions impacts on the global warming, and in providing rich and stable soils. Therefore, even though there are still many issues to be solved, it can be said that biomass and its use for energy and materials can indeed play a major role in the future world's energy and material supply. The potential biomass availability, however, does in fact encroach not only on global food demand but also on environmental problems related to sustainable management of natural resources and ecological services involving biodiversity, forests, water, atmosphere and soils. Dr. Faaij also emphasized land-use, rural income, development and modernization of agriculture as new elements one has to take into consideration when securing bio-fuel production.

As shown in Figure 1, nowadays demands on bio-fuels and food, the main focus of this session, are engaged in fierce competition against one another, when humans attempt to obtain both energy and food by utilizing biosphere resources. However, there can be important positive synergies between developing sustainable biomass and biofuel production and thereby becoming a key driver

for the investment and development of the agricultural sector in many (especially developing) countries. Moreover, both the environmental aspects (bio-diversity, forest, soil, atmosphere and water) and the socio-economical aspects (rural income, development, social economy, modernization and competitive land-use) have to be taken into account and only when those are considered as a whole, can the whole concept be understood.

In the Initiative 3, we aim at grappling with the issues related to the sustainable use of the biosphere as shown in Figure 1, based on a multidisciplinary approach. The poster presentations in this session were set so as to help deepen a comprehensive and mutual understanding of the research area, by covering many topics in the humanities and natural sciences. As a result, fruitful discussion on the creation of sustainable forest biosphere was done and the meaning of research conducted on an interdisciplinary base by Initiative 3 members could be reconfirmed.

Finally, it can be said that this Session 3 did provide a great opportunity for thinking about the biosphere from the viewpoint of bio-fuels. At the same time, it made it possible for us to deepen our understanding about the important connectivity among the elements composing biosphere, and to put forth the concept of sustainable forest biosphere through interdisciplinary studies.