

CeBiTec

Distinguished Lecture



date Monday, May 27th 2013, 17 c.t.

location Plenary Hall, ZiF building

speaker **Prof. Steve Long, Ph.D.**

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title **Food, Feed and Fuel from Crops
under Global Atmospheric Change.
Could we have it all in 2030?**

Global demand for our four major food and feed crops is beginning to out-strip supply, at a time when year-on-year yield per unit area increases are stagnating and while emerging global climate change further threatens supply. Not only is the rapidly developing economy of China drawing in more imports of these crops, but the EU 27 is now a net importer of 10% of these primary food stuffs, putting yet greater pressure on world supply. Global atmospheric and climate change is likely to place further pressure on supply. It will be shown that the methods used in the Green Revolution to increase genetic yield potential are almost at their biological limits, and radically new methods particularly in improving photosynthetic efficiency are critical if we are to see further increases in yield potential. The new opportunities here will be explained, and the necessity of basing these on synthetic and systems approaches explained. Recent progress in both a theoretical engineering framework and proof of concept improvement in crop productivity will be presented. The developing risk of demand outstripping supply comes at a time when we are also looking to the land to provide more sustainable sources of energy, including biofuels from crops. This is exemplified by Germany and the USA which are the world's largest producers of biodiesel and bio-ethanol respectively, but at the cost of land that could be used for food and feed production. In the context of possible shortages the continued use of land suited to food and feed production into 2030 for bioenergy will be neither socially acceptable nor economically viable. It will be argued that the use of food crops, which have been developed to meet nutritional needs, for bioenergy is environmentally flawed, sub-optimal with respect to net greenhouse gas (GHG) and other ecosystem services. It will be shown that, using Miscanthus, canes, agave and poplars as examples, there are many opportunities, some partially realized, to achieve very substantial quantities of bioenergy on non-agricultural land, globally. Systems based on such crops have positive greenhouse gas benefits and are without unsustainable impacts on food production. There is sufficient environmental resource and biotechnological understanding to achieve the goals of sustainable and adequate food and fuel production. But realization will depend on new policies based on a holistic view of these demands on land and other resources and a greater acceptance of biotechnology. A shift from the disaggregated and inconsistent policy development based on single issues and interests, which have characterised this arena on both sides of the Atlantic in recent years, to a holistic framework will be critical.