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## PROMEMORIA

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### ***The Global Challenges University Alliance***

#### **Summary**

By 2050 the world's population will exceed nine billion, requiring agricultural, forest and fisheries systems to produce food, animal feed, fibres, energy and materials for another two billion people. The crucial issue is how to achieve this with very little new land to use, without causing unsustainable ecological consequences and during an on-going climate change. Meeting these Global Challenges can only be done through obtaining greater scientific knowledge about the fundamental conditions for life – translating knowledge into relevant action – and through dedicated international co-operation.

SLU has recently initiated a project that aims to form a Global Challenges University Alliance, and is planning to involve 25 of the world's top "bio-economy" universities at all continents. The partner universities should be strong in agricultural sciences (incl food, veterinary, landscape architecture and forest sciences), environmental sciences and/or the life sciences.

The Alliance build-up will take place through thematic Global Challenges University Workshops (Bioenergy, Food security, Green cities etc.), with 4-8 participating universities, and by organising corresponding thematic Global Challenges Summer Schools for MSc/PhD students. Both research and education components will train the young "bio-economy" leaders of the future and provide an active global network very early in their careers.

## ***Introduction***

By 2050 the world's population is expected to exceed nine billion. This makes for very challenging demands on both natural and cultivated ecosystems and their ability to convert soil minerals, sunlight, air and water into food, animal feed, fibres, energy and materials for at least another two billion people. The crucial issue of our time is how to achieve this without having any new land to use, without causing unsustainable ecological consequences, at the same time as we restore and recreate lost natural values – all during on-going climate change. The political awareness of the importance of sustainability issues is well illustrated by a recent quotation from EU commissioner for the Environment Janez Potocnik, “Resource efficiency will be a dominant theme for the rest of our life” (Forum for Agriculture, Brussels, March 2012).

## ***University responses to the global challenges***

Meeting these grand challenges can only be achieved with the help of greater scientific knowledge about soils, waters, microbes, plants, animals and ecosystems – about the fundamental conditions for life – and by translating that knowledge into relevant action, including the use of knowledge from social, economic and design sciences. Science is in itself truly international and the grand challenges are indeed global. Hence SLU proposes the formation of the Global Challenges University Alliance, eventually involving 25 of the world top "bio-economy" universities from all continents. Important topics for joint research and education activities of members of the planned University Alliance includes:

- Food supply for a growing global population
- Long-term productivity development in forestry and agriculture
- Competition for land (food, fibres, fuel, animal feed, habitations, social values)
- Impoverishment of genetic resources
- Water shortages and water quality
- Pandemics and zoonoses
- Adaptation to climate change
- Greenhouse gas emissions
- Eutrophication and impoverishment of aquatic resources
- Finite reserves of fossil raw materials
- Increased urbanisation and changing conditions in rural areas
- Lifestyle changes and changes in patterns of consumption

The alliance build-up will be gradual and take place through thematic Global Challenges University Workshops (e.g. *Bioenergy, Food security, Green cities, Environmental resource monitoring*, etc), each with 4-8 participating universities. Corresponding thematic Global Challenges Summer Schools for advanced MSc and for PhD students will be organised as two-week intense courses with strong student participation. A specific goal is that the summer schools – modelled on previous successful Nordic courses (Nordic Ministerial Council funding) – would have student participants from universities located at least on three continents. Apart from the specific subject knowledge gained, the students – the future leaders of the global bio-economy – will gain an important global network for their future professional life.

It is critical for the success of the suggested project that other highly ranked agricultural/life sciences/environment-oriented universities are willing to participate. The top ranked Cornell University and University of Tokyo have now both committed to the project through their contact persons professor Larry Walker and professor Masahiro Samejima. For Agricultural Universities/Faculties (including forestry and veterinary sciences) a recent global bibliometrics based ranking study placed Cornell at place 3, SLU at place 15 and University of Tokyo at place 17 among the 300 institutions ranked for the subject Agriculture. (<http://taiwanranking.lis.ntu.edu.tw/DataPage/TOP300.aspx?query=Agriculture>).

SLU has thus secured the active project participation from a leading North-American and a leading Asian university. Contribution from highly ranked universities from three continents already from the start of the project should facilitate positive responses when inviting other internationally leading universities to be part of building the alliance.

### ***Program development***

The gradual build-up of the Global Challenges University Network will take place through a series of workshops to develop a final Global Challenges University Alliance with 25 members (see map on page 5). Please note that the arrows on the map are indicative only and do not necessarily indicate a specific university, rather an interesting region, climate and culture wise). The workshops will normally involve 4-8 universities (maximum 100 people participating). It is likely that some universities will participate at most workshops, while others will be more selective and contribute to only one or two workshops within their strategic focus areas.

Time plan, preliminary titles and tentative participants for the first Global Challenges University Workshops are indicated below:

*Biofuels/Biorefineries*, September 2012 (SLU, Cornell, University of Tokyo, .....)

*Food Security, Quality and Safety*, March 2013 (SLU, Cornell.....)

*Environmental monitoring and assessment*, May 2013 (SLU,.....)

*Urbanisation/Peri-urbanisation*, September 2013 (SLU,.....)

*Forestry for the Future*, March 2014 (SLU, University of Tokyo,.....)

In addition to scientific presentations from participants from the universities involved, three other specific activities are planned for the workshops, exemplified with those for the first workshop:

- Initiate the writing of a mini-review on the present state and future of biofuel/biorefinery research.
- Planning for a "Global Challenges Summer School" on the workshop topics, intended for PhD/advanced MSc students and run as an intense two-week/10-days activity, with very substantial student activity, seminars etc.
- Explore the possibilities for joint research projects and initiate the writing of common grant applications for international funding

Selected African Universities will be specially invited to the workshops. Together with Cornell, SLU share a very strong interest in furthering links with the African research and education systems. For this first workshop, it would also be highly advantageous to complement the northern/temperate zone of the Cornell – SLU – University of Tokyo axis with a more southern/tropical zone axis by involving Brazil – Central/Eastern Africa – Singapore. For Brazil, the partner university will be selected together with Cornell and Tokyo, with the Sao Paulo region particularly in mind. One or two African universities, most likely including the University of Makerere, Uganda, will be invited through the special "African development organisation" at SLU. Finally, leading scientists and representatives of the University management level at the National University of Singapore will also be invited to participate.

## *The Global Challenges University Alliance*



Please note:

With the exception of Cornell University, SLU and University of Tokyo, the arrows only indicate a region of interest, not a specific university