GBEP AG6 Workshop
Examples of Positive Bioenergy and Water Relationships

Royal Swedish Academy of Agriculture and Science, August 25-26, 2015
Governance often aims at hedging against risks associated with the bioenergy expansion that we see (and debate) today.

- **Stop pumping scarce groundwater for energy crops!!!**
- **Million liter of water for each liter of ethanol?**
- **Water for food not for fuel!!!!**
- **Growing water scarcity?**

**Food today**

**Biofuels today**

Sources: FAO & IPCC SREN
Governance of bioenergy expansion should also recognize this prospective future

Sources: FAO & IPCC SREN
Important to ensure that governance systems guide development towards a future situation where much larger bioenergy demand is met in ways that are acceptable from environmental and socioeconomic points of view.
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- Spotlight on Bioenergy and Water
- Paris, July 2010
- UNEP, IEA Bioenergy Task 43, OEKO
- Flag issues as critical to development of sustainable bioenergy
Recent five years: workshops, conferences, seminars, publications.......

UNEP Paris 2010
Bio Austr Conf Sunshine Coast 2011
WWF Marseille 2012
WWW Stklm 2013
WBM Rotterdam 2014
UNEP Paris 2015

GBEP AG6
Vision

Good management of resources - benefiting from complementarity of different land use systems - can deliver food, materials and bioenergy AND improve the state of water
Vision

Good management of resources - benefiting from complementarity of different land use systems - can deliver food, materials and bioenergy AND improve the state of water

GBEP AG6 – Bioenergy and Water

• Identify and disseminate ways of integrating bioenergy systems into agriculture and forestry landscapes to promote sustainable management of water resources

• Share knowledge and experiences on best management practices, policies and instruments supporting bioenergy systems that contribute positively to the state of water

• Support awareness raising on GBEP sustainability indicators for water
# Call for Examples of Positive Bioenergy and Water Relationships

The Global Bioenergy Partnership (GBEP) has launched an initiative to identify cases of positive outcomes for bioenergy and water interactions. We’re writing to seek your participation in this initiative to catalogue and highlight worldwide examples of bioenergy systems, throughout all stages of production, which can produce positive impacts on the status of water. We welcome information on crops and other feedstocks with bioenergy potential, even if not yet used for bioenergy purposes, as well as information about policy initiatives that encourage technical solutions leading to positive outcomes for bioenergy and water.

The goal of this initiative is to showcase innovative examples of how bioenergy systems (in both the feedstock production and conversion phases) can produce positive impacts on the status of water and to serve as a way to inspire and build on this knowledge and experience with other bioenergy producers. Not only technical solutions should be considered, but also policies and other initiatives that encourage technical solutions leading to positive outcomes for bioenergy and water.

The GBEP Activity Group on Bioenergy and Water has launched an initiative to identify cases of positive outcomes for bioenergy and water interactions. We’re writing to seek your participation in this initiative to catalogue and highlight worldwide examples of bioenergy systems, throughout all stages of production, which can produce positive impacts on the status of water. We welcome information on crops and other feedstocks with bioenergy potential, even if not yet used for bioenergy purposes, as well as information about policy initiatives that encourage technical solutions leading to positive outcomes for bioenergy and water.

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### Template for Submissions

<table>
<thead>
<tr>
<th>General</th>
</tr>
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<tbody>
<tr>
<td>Contact name</td>
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<tr>
<td>Affiliation/Organization</td>
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<tr>
<td>Other details</td>
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<tr>
<td>Positive impacts for water availability</td>
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<tr>
<td>Positive impacts for water quality</td>
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<tr>
<td>Knowledge sharing/technologies implementing the project/practice/policy</td>
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<tr>
<td>Achieved outcomes</td>
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<td>Main challenges encountered</td>
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<tr>
<td>Potential for scaling up and/or replicability</td>
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</tbody>
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### GBEP Activity Group on Bioenergy and Water

The GBEP Activity Group on Bioenergy and Water aims to identify and disseminate exemplars of integrating bioenergy systems into agricultural and forested landscapes for improving sustainable management of raw resources, including waste water. This includes sharing knowledge and experiences on landscape identification and design, best management practices as well as on policies and instruments supporting bioenergy implementation that contributes positively to the status of water. With the support of the US as a GBEP partner, IEA Bioenergy Task 43, assisted by Task 40, is co-organizing the Activity Group and contributing to the work defined in the workshop.

Bioenergy and water are intrinsically linked. Water quantity and quality (sometimes their temporal distributions) have been identified as emerging issues of concern in the bioenergy field. Yet, there is evidence that bioenergy systems can be designed and integrated to improve adaptation to water constraints and to optimize overall resource management. For example, effective planting including intercropping for bioenergy feedstocks can support water quality improvements by trapping nutrients and sediment, filtering runoff and enhancing infiltration. Also, irrigation of technical solutions and best management practices in both feedstock cultivation/collection and refining phases can improve both the condition of water resources from both quantity and quality perspectives. Policies and other instruments can prove useful in encouraging the application of these practices among industry actors.
Call for examples

Call for Examples of Positive Bioenergy and Water Relationships

<table>
<thead>
<tr>
<th>Author/Country</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdelati_EGYPT</td>
<td>Bioremediation of industrial drainage water with Sesbania aegyptiaca</td>
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<tr>
<td>Almada/Murmis_ARGENTINA</td>
<td>Waste-to-energy in Argentina</td>
</tr>
<tr>
<td>Amatya_USA</td>
<td>Impacts of switchgrass intercropping in traditional pine forests on hydrology and water quality</td>
</tr>
<tr>
<td>Baerwolf_GERMANY</td>
<td>Short rotation coppice strips integrated with site-typical crop rotation</td>
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<tr>
<td>Baez_MEXICO</td>
<td>Climatic and edaphic zoning supports rational land use planning and water use in sugarcane production</td>
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<tr>
<td>Boehmer_GERMANY</td>
<td>Buffer strips consisting of fast growing tree species / agroforestry crops or wild and blooming plants next to water bodies capture nutrient runoff from the adjacent arable land</td>
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<tr>
<td>Goldner/Moore_USA</td>
<td>Perennial biomass crops on environmentally sensitive land in the US</td>
</tr>
<tr>
<td>Herbes/Brummer_GERMANY</td>
<td>AquaMak: Improving water quality by harvesting water plants for biomass utilization</td>
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<tr>
<td>McGrath_AUSTRALIA</td>
<td>Integrated woody biomass cropping for salinity control in dryland agriculture in Australia</td>
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<tr>
<td>Neary_AUSTRALIA</td>
<td>Appropriate BMPs can allow harvesting of fast growing trees along riparian Streamside Management Zones and still maintain good water quality</td>
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<tr>
<td>Negri_USA</td>
<td>Bioenergy crop buffer zone in Central Illinois</td>
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<tr>
<td>Neto_BRAZIL</td>
<td>Transforming the sugarcane ethanol industry to address water challenges in Brazil</td>
</tr>
<tr>
<td>Parra_PARAGUAY</td>
<td>Vinnasae concentration in ethanol plants to facilitate water reuse in fermentation and vinnasae recycling to the field improving soil productivity while avoiding water contamination</td>
</tr>
<tr>
<td>Pecly/Moraes_BRAZIL</td>
<td>Anaerobic digestion of vinnasae to produce biogas for electricity and nutrient recirculation to fields improving soil productivity while avoiding water contamination</td>
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<tr>
<td>Philippidis_USA</td>
<td>Low-cost outdoor algae cultivation and production of sustainable biofuels: design to achieve high algae productivity while minimizing water and energy use</td>
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<tr>
<td>Pieroni/Bezzi_ITALY</td>
<td>Livestock waste to biogas: the Italian BiogasDoneRight model</td>
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<tr>
<td>Tabata/Hayashi_JAPAN</td>
<td>Biogas from livestock waste to reduce pollution in Lake Tai, China</td>
</tr>
<tr>
<td>Watson_SOUTH AFRICA</td>
<td>Producing electricity from biomass from terrestrial invasive alien plants</td>
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</tbody>
</table>
Call for examples

Call for Examples of Positive Bioenergy and Water Relationships

- Many options exist, both feedstock production and conversion
  - Water quantity, not only about reducing water use
  - Water quality, e.g., nutrient and sediment loads
- Innovation in response to policies and regulation
- Promotion of attractive options to secure licence to operate
- Biomass and bioenergy products might sometimes be a “by-product” and the main driver is to address environmental concerns
Workshop plan

Workshop on Examples of Positive Bioenergy and Water Relationships

25 August 2015, Tuesday
09.00 – 09.30 Participant’s registration
09.30 – 09.45 Opening and Introduction
Andrea Boccia, GBEP Secretariat
Göran Berndes, IEA Bioenergy
09.45 – 10.15 Overview of the examples received and selected
Göran Berndes, IEA Bioenergy
10.15 – 10.30 Coffee break
10.30 – 11.30 Session I: Bioremediation and Riparian Buffer Zones
Moderator: Shabir Ghazewala, King Mongkut’s University of Technology, Thailand
- Bioremediation of industrial drainage water with S. ooghnica
  Ahmad Abdellai, Desert Research Center, Egypt
- Bioenergy crop buffer zone in Central Illinois
  Cristina Negri, Argonne National Laboratory, USA
11.30 – 12.30 Session II: Waste-to-Energy and Water-Smart Processes
Moderator: Uwe Frischknecht, IEA Bioenergy
- Livestock waste to biogas: the Italian CogrigoEnergetica model
  Guido Bocci, Consortio Italiano Biogas e Gasificazioni, Italy
- Biogas from livestock waste to reduce pollution in Lake Tai, China
  Takashi Hasek, Ministry of Agriculture, Forestry and Fisheries, Japan
- Waste-to-bioenergy in Argentina
  Maria Rosa Muzzio, Ministry of Agriculture, Livestock and Fisheries, Argentina
- Transforming the sugarcane ethanol industry to address water challenges in Israel
  Andre Elia, UNICA, Brazil
13.00 – 14.30 Lunch break
14.30 – 15.30 Session III: Agroforestry, Intercropping and Rotational Cropping
Moderator: Göran Berndes, IEA Bioenergy
- Impact of established intercropping in traditional pine forests on biodiversity and water quality
  Diveshada Amarte, Center for Forestry Education Research, USA
- Short rotation coppice strips integrated with site-specific logging
  Manuela Rieger, Thuringia State Institute for Agriculture, Germany

15.30 – 15.45 Coffee break
15.45 – 16.45 Session III (continued)
- Integrated woody biomass cropping for salinity control in dryland agriculture in Australia
  John Mc Grath, Department of Parks and Wildlife, Western Australia
- Potential biomass crops on environmentally sensitive land in the US
  Kenneth Moore, CentUSA Bioenergy, Iowa State University, USA
19.00 Dinner (at own cost)

26 August 2015, Wednesday
09.30 – 10.30 Session IV: Controlling Growth of Invasive Species
Moderator: Andrea Boccia, GBEP Secretariat
- Producing electricity from biomass from terrestrial invasive alien plants
  Helen Watson, University of Kwazulu-Natal, South Africa
- Aquabio: improving water quality by harvesting water plants for biomass utilization
  Vasco Brayner, Institute for International Research on Sustainable Management and Renewable Energy, Germany
10.30 – 10.45 Coffee break
10.45 – 11.30 Lessons learnt and recommendations for dissemination, scaling-up and capacity building
Uwe Frischknecht, IEA Bioenergy
11.30 – 12.30 Q&A and Discussion
12.30 – 13.00 Conclusions
Göran Berndes, IEA Bioenergy
13.00 – 14.30 Lunch
Workshop plan

- Web broadcasting
- Lunch in this house
- Documentation:
  - DVD
  - GBEP report on good examples
  - Task 40-43 publications
  - Scientific publications
- AG6 will discuss further adventures tomorrow after lunch
- AG6 dinner tonight
  - Sergel Plaza lobby 18:40
  - Kafé Himlavalvet 19:00
Workshop plan

• Lessons learnt and recommendations for scaling-up and replicability