Report *Spotlight on 'bioenergy and water'*

Objective of the report:
Water has been identified as a potentially limiting factor for bioenergy development. In a world already facing water stress, largely due to over 70% of freshwater being consumed by the agricultural sector, bioenergy development is likely to add to this – through feedstock production and conversion processes - and hence increase the pressure. At the same time, bioenergy development may help increase access to water by leveraging the introduction of efficient water management techniques, by increasing soil absorption capacity in dry areas, by providing energy for water pumping and cleaning water.

While bioenergy impacts should not be considered in isolation of broader watershed management issues, this report will provide an overview on the **particularities of the nexus between bioenergy and water**. It will zoom in on areas of critical importance, hint at current limitations on available science and tools, and offer an outlook on ways to address some of the identified risks.

Process for the development of the report:
This proposed outline is meant to kick off a process, and should not be viewed as set in stone. Critical input is expected to be developed at an initial workshop gathering international water and bioenergy experts. The report will build on available science, and participants to the initial workshop will contribute to the development of the different chapters, making this report the reference document on the issue.

Proposed outline

1. **The bioenergy & water nexus**
   - 1.1 Introduction: Overview of the topic/linkages & relevance with regard to sustainable development
   - 1.2 Particularities of bioenergy: a consumer of water and enabler of clean water services
   - 1.3 Understanding watershed functionalities and differences (e.g. water stressed areas)
   - 1.4 A glimpse at the larger picture: Future developments of water needs (issues: effect of population growth/movements, changes in demand for other uses, seasonal, cyclical (e.g. el Nino) and long-term (climate change) variability) and (bio)energy needs and potentials

2. **System boundaries (bioenergy production & related impacts to water) ➔ analytical approach**
   - 2.1 Definition of the system boundaries:
     - o geographical vs. sectoral scope
     - o localized vs. life-cycle (cross-sectoral)
     - o drivers & dynamics
     - o system wide/cross-sectoral approach (all water users) vs. incrementality of bioenergy
   - 2.2 Current/existing approaches – benefits and limitations
     - o What do we know about water stress in a specific setting?
     - o How to deal with system boundary related issues

3. Bioenergy related water use intensity/efficiency

3.1 Water use intensity/efficiency along the bioenergy supply chain, taking into account the variability between different types of crops, agriculture management systems and conversion technologies (e.g. water footprint, LCA)

3.2 Social, environmental and economic impacts of bioenergy production on water availability
- o General introduction (not bioenergy specific)
- o Parameters for trade offs (competing and alternative uses, alternative development paths)
- o How to measure (bioenergy specific) impacts?: Local (direct) and broader, regional (cumulative) impacts (➔ see chapter on boundary discussion)

3.3 Mitigation strategies - Solutions for reducing water use/increased efficiency along the supply chain taking into account other water users than bioenergy (trade-offs/bigger picture)

4. Bioenergy related water quality

4.1 Water quality along the supply chain taking into account the variability between different agriculture management systems and conversion technologies

4.2 Social, environmental and economic impacts of bioenergy production to water quality
- o General introduction (not bioenergy specific)
- o How to measure (bioenergy specific) impacts?: Local (direct) and broader, regional (cumulative) impacts (➔ leading to the system boundary discussion in Chapter 4)

4.3 Mitigation strategies – Solutions for reducing water pollution along the supply chain taking into account other water users than bioenergy (trade-offs/bigger picture)

5. The role of policy formulation and instruments for the management of bioenergy related water impacts

5.1 The role of policy in dealing with bioenergy related water stress/pollution based on informed decisions on trade offs

5.2 Tools to support policy formulation and implementation
- o Tools like the DST, BEET, BEFS
- o Spatial planning (e.g. land-use plans, agro-ecological zoning, mapping of water stressed areas, IWRM-Plans, environmental flow assessments)

5.3 Findings on how to achieve good management (including handling of distribution/allocation issues)

5.4 Integration into broader agricultural and energy policies as well as in everyday life

6. The role of sustainability criteria, indicators and certification schemes for bioenergy related water impacts

6.1 Overview of existing sustainability criteria, indicators and certification schemes related to bioenergy and water stress/pollution, e.g. GBEP, RSB, RSPO, BSI, EU: overlaps and gaps
6.2 Benefits and limitations of certification schemes for better water management in the context of bioenergy production

7. Recommendations & Way ahead (+ implementation steps?)

7.1 Collection, summary and further elaborations on the intermediary recommendations and conclusions reached in the previous chapters
- o Preserving and sharing the resource: informed planning and effective monitoring

- Further research, data gathering and technology development
- Better agricultural and conversion practices for water conservation
- The least water intensive pathways the greater development benefits
- Capacity building
- Integrated approach (bioenergy only one water user amongst many)
- Ground truthing of the findings of the report
- …

Case studies will be used throughout the report to illustrate the discussed/analysed issues and consequences!