



Balancing Water Needs for Sustainable Biofuels

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This presentation aims to highlight the challenges posed by land and water resources to the sustainable production and supply of biofuels. It also highlights some of the policy interventions needed for effective water management to aid in effective biofuel production.

Rising global population has resulted in higher demand for food and energy supply. With issues of climate change and depletion of fossil fuels, there is an increased thrust to look at developing cleaner fuels. Biofuels are rapidly emerging as a possible solution to the energy crisis in the world today, and great strides have been made in this area to ensure high utility, economic feasibility and social desirability. However, while the issue of large land acquisitions and land-use change have dominated recent sustainability discussions, a much overlooked factor is the effect of biofuel production on water use and availability.

Though water is globally renewable, where demand exceeds the naturally renewable supply on a local scale, its supply is finite and competition between users can arise. If the ecological and hydrological demands are not met as a minimum, then the sustainability of the water system is threatened. Climate change makes effective water management even more important.

Already, over 70% of fresh water is used for agriculture to meet food, feed and fibre needs. In 2007, the Integrated Water Management Institute concluded that there will not be enough water and land to feed the world in 50 years if we do not change our current water management practices. And this is before biofuel mandates are taken into consideration.

An analysis of effective biofuel production is incomplete without looking at the effects of crop production, and biofuel production facilities on land and associated water requirements. A rise in biofuel production affects land and water in many ways¹, some of which are:

- Increased demand for irrigation water for biofuel crops
- Increased water demand in ethanol processing factories
- Pollution of groundwater through increased use of agro-chemicals
- Expansion of the agricultural frontier to other natural areas, affecting their role in the water cycle
- Possible impact of future (second generation) biofuel technologies

Currently biofuel production accounts for around 1 percent of global water use. In 10 years time, under current conditions, this will double to 2 percent. Globally, this may not seem concerning, but already the effects are being witnessed locally. In the United States, numerous communities have stalled the development of ethanol plants due to their high withdrawal needs in areas where aquifers are already threatened. A bioethanol development on the Tana wetland in Kenya was halted due to concerns about unsustainable water extraction, affecting wildlife and livelihoods, including of pastoralists from Ethiopia who use the region in the dry season.

The amount of water and land required to produce the same amount of biofuel tends to vary across regions and type of feedstock used, making it imperative that biofuel policies be adapted to regional circumstances.

¹ Meijerink, Gardien, Hans Langeveld, and Petra Hellegers. *Biofuels And Water: An Exploration*. Issue brief. Wageningen University and Research Centre, Apr. 2008. Web.

An oft-cited example of a thirsty plant is sugarcane. In Brazil, most sugarcane is produced through rainfed agriculture, but this is not the case for other countries. For example, South Africa plans to increase biofuels production through sugarcane but have already used up most irrigation potential.

Beyond issues of quantity and quality of water are concerns related to access and equity. Particularly in developing countries, it is vulnerable people – especially women and children – who end up paying more for water, whether through money or time spent in collecting water from increasingly further places. Water issues are further complicated because water can be diverted to meet other demands such as high value cash crops – including biofuels.

IUCN advocates that the bioenergy sector must ensure that any use of water for biofuel production is sustainable and does not reduce the water security of poor people or the health of ecosystems on which they depend. In this way, IUCN promotes the implementation of environmental flows, which refers to the allocation of fresh water in river and lake basins to maintain ecosystems and their benefits to people.

For example, in the Pangani River Basin in Tanzania, subsistence farmers, commercial plantations, commercial agriculture, urban areas, hydropower and fishermen are all affected by changes in flows. IUCN and other partners have joined with the Pangani Basin Water Office to implement the Pangani River Basin Management Project. Part of the project has been to develop carry out an Integrated Flow Management assessment, which included hydrology, river health, estuary health and socio-economic studies that explored the impact of changing flows on each sector including the environment. The study provides a guide to inform future water management decisions.

The energy sector more broadly, and especially the biofuels industry, can learn from such experiences and make sure to include water in their considerations. While this is not evident in many biofuel policies and mandates, the voluntary standards community has taken on board the importance of water. For example, the Roundtable on Sustainable Biofuels (RSB), a multi-stakeholder platform has developed 12 principles and criteria. Water is included in a number of the principles, and is the focus of one in particular (see box 1).

Given that the agricultural sector is already facing increasing water stress, it is imperative that any biofuel developments follow best practice and are considered as part of a broader land and water use planning, involving relevant stakeholders. With climate change, such best practices should be extended to agriculture more broadly, to the benefit of nature and the future generations that depend on its valuable services.

Box 1: Roundtable on Sustainable Biofuels Principles and criteria version 1.0

Principle 9: Water

Biofuel operations shall maintain or enhance the quality and quantity of surface and ground water resources, and respect prior formal or customary water rights.

Criterion 9.a Biofuel operations shall respect the existing water rights of local and indigenous communities.

Criterion 9.b Biofuel operations shall include a water management plan which aims to use water efficiently and to maintain or enhance the quality of the water resources that are used for biofuel operations.

Criterion 9.c Biofuel operations shall not contribute to the depletion of surface or groundwater resources beyond replenishment capacities.

Criterion 9.d Biofuel operations shall contribute to the enhancement or maintaining of the quality of the surface and groundwater resources.

For further information, see <http://cgse.epfl.ch/webdav/site/cgse/shared/Biofuels/Version%20One/Version%201.0/09-11-12%20RSB%20PCs%20Version%201.pdf>