



ICID Young Professionals e-Forum (IYPeF)

Water-Food-Energy Nexus in a Changing World

Background Note for Discussion

6 – 27 April 2017

Introduction

Water, energy and food are essential for human well-being and sustainable development. Global projections indicate that demand for freshwater, energy and food will increase significantly over the next decades under the pressure of population growth and mobility, economic development, international trade, urbanization, diversifying diets, cultural and technological changes, as well as climate change and other natural processes (Hoff 2011)¹. The link between water, energy and food is inextricable in that water is an input for producing all kinds of agricultural crops and along the entire agro-food industry and supply chain. Energy in turn is required to produce and distribute water and food through processes such as pumping ground or surface water, powering tractors and irrigation machinery, and to process and transport agricultural goods. In more explicit terms, using water for irrigation might promote food production but it can also affect river flows and hydropower potential; growing crops under irrigation for bioenergy production can increase overall water exploitations and threaten food security; upgrading surface irrigation systems into more efficient pressurized techniques may conserve water but may also lead to higher energy consumption. Understanding and recognizing the diverse synergies and trade-offs involved between the three components is, thus, critical to ensure balance between water, energy and food security.

To this end, the global community is well aware of food-energy-water challenges, but has often addressed them in isolation, within sectoral margins. At the country level, fragmented sectoral responsibilities, lack of coordination, and inconsistencies between legal and regulatory frameworks has led to misaligned benefits and stress to the natural resources.

With a particular relevance to the Irrigation and Drainage sector, there lies the key question of food security in many developing countries. Food and Agriculture Organization (FAO) predicts that by 2050, population growth will result in doubled demand for food globally (FAO, 2008 B)². The resulting present and anticipated challenges entail that innovative approaches have to be adopted to increase food production in order to meet the growing demand. Irrigation development is thought to be a preeminent strategy to answer food security challenges which now claims close to 70 percent of all freshwater withdrawals made for human use. In this perspective, many developing countries are vesting ambitious plans to expand irrigated agriculture. Strategies mainly highlight a shift from public to private investment and from larger to smaller-scale systems in irrigation by promoting the idea of affordable and effective irrigation to poor farmers worldwide. The resulting rewards of higher outputs, incomes and better diets are, however, at the expense of higher water and energy consumption.

Hence, the water–energy–food nexus is being promoted globally as a conceptual tool for achieving sustainable development by recognizing the fact that efforts to address only one part of this systematic problem and neglecting other inherently interlinked facets will lead to undesirable outcomes and jeopardize sustainability. A nexus approach that reduces tradeoffs and builds synergies across sectors, and helps to minimize costs and enhance benefits for people and nature has to be explored instead of the contemporary

¹ Hoff, H. 2011. Understanding the Nexus. Background Paper for the Bonn2011 Conference: The Water, Energy and Food Security Nexus. Stockholm, Sweden: Stockholm Environment Institute (SEI).

² FAO (Food and Agriculture Organization of the United Nations). 2008b. Mapping poverty, water and agriculture in subSaharan Africa. J.-M. Faurès and G. Santini (eds), Water and the Rural Poor: Interventions for Improving Livelihoods in subSaharan Africa. Rome, FAO. <ftp://ftp.fao.org/docrep/fao/010/i0132e/i0132e03a.pdf>

management approaches targeting different natural resources independently. Similarly at a practical level, nations' policy decision-making needs to consider broader influences and cross-sectoral impacts if water, energy and food security are to be simultaneously achieved.

Objectives

This discussion on the topic of *Water-Food-Energy Nexus* has the following objectives:

1. Bring Young Professionals in contact with the experts in the field.
2. Highlight the views of Irrigation & Drainage Young professionals in a global channel of communication with regard to the concept and application of Water-Food-Energy Nexus approach.
3. Bring together Young Professionals to discuss the actual challenges and potential solutions on the topic from the stand points of Irrigation and Drainage segment.
4. Discuss the promising long-term role of Irrigation and Drainage young professionals in the promotion and adoption of the nexus approach

Expected outcomes

1. What should be the role of the Irrigation and Drainage sector in advancing and applying the nexus approach?
2. How do Irrigation & Drainage project planners and financiers evaluate water, energy and food issues and their interactions in project development and implementation process?
3. Are there any concrete examples of scenario planning collaboration or programs in place with Irrigation and drainage organizations to tackle interconnected resources challenges?
4. What could be done to improve existing trends in projects planning, implementation, reporting and disclosure as to promoting greater consideration to the interactions between water, food and energy?
5. What type of new approaches in irrigation and drainage would be preferred and needs to be adopted in order to directly add towards concept development and application?
6. How could Irrigation and Drainage Young Professionals be integrated as part of future national and global discussions as well as movements towards the promotion and adoption of the nexus approach?

Discussion mentors

1. Charlotte de Fraiture, PhD, MSc., Professor of Hydraulic Engineering for Land and Water Development, UNESCO-IHE Institute for Water Education as discussion mentor, and
2. Mrs. Adey Mersha, PhD Researcher, UNESCO-IHE Institute for Water Education, as discussion coordinator, will follow the idea exchange on the forum and provide their inputs and guidance from time to time or whenever they feel necessary, thereby steering the group to possible answers to the identified questions.