



THE WATER SECURITY NEXUS (Economic Activities and Development)

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Key Highlights

- Economic activities and development in the water security context requires **analyzing the availability of adequate water allocations for the key sectors of human development viz. food, energy, industry, transport, and tourism.**
- IRWM framework cannot serve the emerging areas of water insecurity.
- Water security has received increased attention** over the past decades in both policy and academics communities.
- Water security for the protection of adequate water supplies requires **maximizing water-use efficiency, developing new supplies, and protecting water reserves.**
- The water security-economic activity-development nexus also embeds the goals of **securing water for people's livelihood while safeguarding ecosystem services.**

Water Security- Concept and Context

Water is the most valuable commodity on Earth and a finite natural resource. Water scarcity, water hazards, water pollution, and other water-related issues affect regions around the world, and sometimes in ways that are not always visible. **Water insecurity affect hundreds of millions of people, and this insecurity will increase over the next 100 years as many of the most vulnerable areas experience population growth and the impacts of climate change worsen** (Hanjra & Qureshi, 2010).

Water security addresses a wide range of complex issues given its link to various other sectors of society (definition and conceptual framework below). Integrated Water Resource Management (IWRM) has served as a framework for water managers and policy makers for many years, however as our understanding and knowledge of water insecurity and other socio-ecological issues becomes greater new issues arise that cannot be addressed by the IWRM framework.

UN Water synthesis of 2013 presented aspects of the water nexus: drinking water, ecosystems, climate change, water supply for food and energy production, governance, transboundary cooperation, political stability and financing.

"The capacity of a population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability." (UN Water, 2013)

Economic Activities and Development Dimension in the Water Security Nexus

Water is different from other natural resource because it is both a social and economic good, as well as a renewable and exhaustible natural resource. Because of this the true economic cost of water is often overlooked and pricing of water is either under or overestimated. Therefore, due to water's complex nature it should be considered as a **special economic good**. Economics of water and water related activities should ensure it is accessible to all, while at the same time garnering profits for public utilities to maintain services and infrastructure. The economic and development activities in the Water Security Nexus are various, diverse, complex and multi-faceted; the table below lists examples that illustrate this argument.

Water Security Nexus-Key Sectors Solutions, Best Management Practices and the Way Forward

- | Water and Food Nexus: | Solutions, Best Management Practices and the Way Forward |
|---|---|
| <ul style="list-style-type: none"> Most water-consuming activity is agricultural irrigation- accounting for 70% of total water withdrawals, > 90% consumptive water use and most important factor in the future trends of water consumption (World Bank, 2014). Based on water resource management projections for 2050, to feed 2 billion more people requires increase in 50% agricultural production and 15% increase in already-strained water withdrawals (World Bank, 2014). | <ul style="list-style-type: none"> Increasing crop production through reliable and sustainable water distribution. For example, in Kyrgyzstan from 2000-2013 more than \$20 million was designated to increase crop production in former state and collective farms (Meerbach, 2013). Introducing integrated water and environment management projects will benefit fishers and people bordering the sea through improved water quality, fishery stocks and biodiversity. Water planning and supply is also important. |
| <ul style="list-style-type: none"> Over 1.2 billion people lack access to electricity (World Bank, 2014). Estimates shows that by 2035, global energy consumption will increase by 35% (World Bank, 2014). Currently water withdrawals for energy are estimated at around 15% of global water withdrawal (World Bank, 2014). | <ul style="list-style-type: none"> Hydropower on small and large scale is currently the world's largest source of affordable renewable low carbon energy (World Bank, 2014). International Bank for Reconstruction and Development (IBRD) provided Vietnam \$330 million of funding for Trug Son hydropower project. This project is unique, and aims to provide low cost electric power in a safe and environmentally sustainable way. |

- Water and Industry Nexus:**
Major industries requiring water:
- Oil and Gas Industry
 - Mining Industry
 - Electric Power Generation Industry
- In the oil and gas industry, water is mostly used in production and refining, gas production, and liquefying natural gas processes, as well as for shipping and transportation.
- For example, in 2008 total water use in seven mines in Arizona ranged from 1 to 33.5 Mm³ (Cubic Megametre). The same year total water use in five Anglo American mines in Chile ranged from 1.3 to 18.2 Mm³.

- Water and Tourism Nexus:**
- Tourists use more water when on holidays. Average estimates are 300L/day (direct water use) during holiday time, compared to 160L/day during non-holiday time (Gössling, 2013).
 - By 2020, tourism use of water resources are likely to increase as the number of tourists, hotel standards and water-intense activities increase (Gössling et al., 2013). In comparison to other economic sectors, there are no specific regional or national water use statistics for tourism; tourism-related water use is being researched in various aspect viz. accommodation and activities.
 - Guest rooms can account for significant water usage (i.e., toilets, showers, etc.). Efficient "mini-flush" toilets can replace older 12 liters toilets to reduce water consumption. Additionally, low flow showerheads can use 7L/minutes compared to older 13L/minute shower heads (Gössling et al., 2013).
 - The Inter-Continental (Sydney, Australia) has installed multiple water restrictors in their bathrooms, kitchens, urinals, and laundry, all together these restrictions have reduced water usage by 30% (Smith et al., 2009).

The Value in Understanding the Water Security Nexus

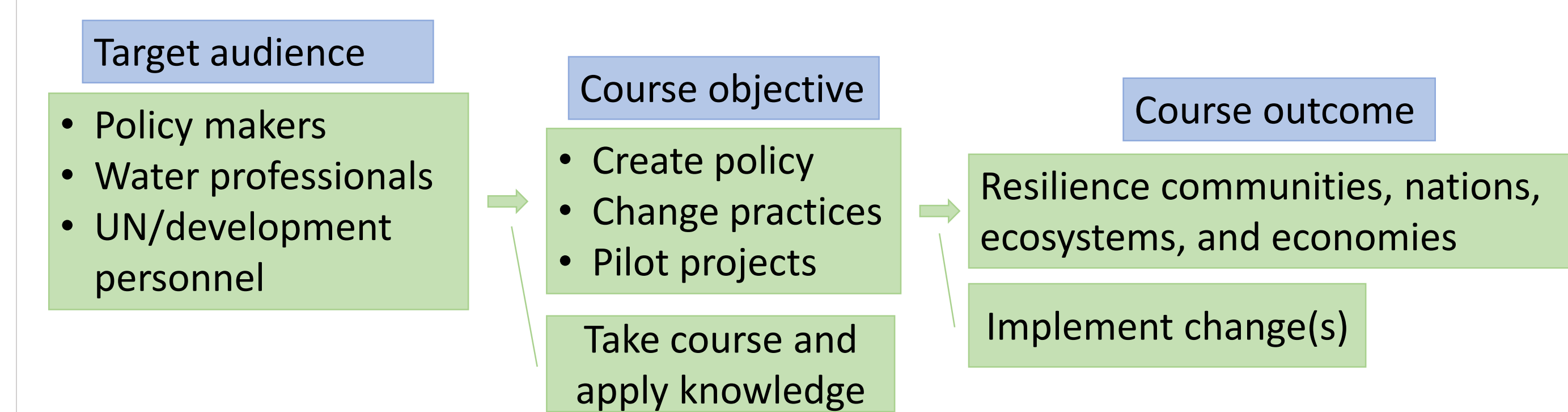
The Global Water Partnership (2010) report states that a water secure world harnesses water's productive power, integrating water resources management across all sectors: *finance, planning, agriculture, energy, tourism, industry, education, and health.*

Spain is the largest semi-arid country in the European Union, because of this the country has faced political issues in developing a comprehensive water policy. Spain illustrates the need for countries to take a complex multi-goal management approach to water security, and develop water policy that addresses the ecological, socio-economic, and socio-political issues. Israel has taken a holistic approach to water security based on it's 70 years of experience in natural security and water management. Nations such as the U.S., the U.K., Spain and others are collaborating with Israeli experts for setting water security standards (López-Gunn et al, 2016).

Recognizing that water is the central for achieving many of the Sustainable Development Goals (SDG's) and targets, addressing water management by employing the 'water security nexus' context can also assist to create a sense of priority to tackle economic and development objectives set for mitigating the water crisis.
The global '2030 Agenda' is calling for the nations and communities to set a collective action plan to achieve the agreed conservation, economic and development goals.

Addressing Global Water Security – Online Course (in development)

UNU-INWEH has taken a proactive approach towards addressing water security related goals and targets. We are currently developing a online course that will help educate professionals on the processes and conditions needed for safe, secure, sustainable and sufficient water for community development.



The course outline is inspired from the water security conceptual framework of the UN water- more details accessible at: <http://wlc.unu.edu/>

Concluding Notes

- In future there will be less water available for economic activities and development practices.**
- For future **economic interventions and development initiatives** in the water sector **smart and innovative strategies and policies should be introduced**, water security conceptual framework could provide a reference for design, planning and action agenda.
- Water security agenda aims to fill the gaps in the IWRM framework**, while providing a holistic approach to address multi-faceted issues in the water sector (water insecurity, water crisis, etc.).
- Public-Private Partnerships should be introduced** so that developing countries can address the challenges of sustainability and financial viability due to inescapable realities of the economic and development sectors of the larger water nexus

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