

# Economic, Food and Water Security: A UNESCAP Regional Study

*The 2nd Asia Pacific Water Summit (2<sup>nd</sup> APWS)*

*Technical Workshop*

*18 May 2013, Chiang Mai, Thailand.*



Dr Larry C.Y. Wong  
Program Director, TIES

*[The views expressed herein are entirely those of the author and do not necessarily reflect the position of the agency he serves]*

# INTRODUCTION

Based on **Position Paper on Economic, Food and Water Security in the Asia and the Pacific: Towards Efficient and Sustainable Development within the Green Growth Paradigm**

Presents the status of **economic, food and water security** in the Asia and Pacific with three case studies – **China, Mekong River Basin and Malaysia** - anchored around water security and with a focus on the **trade-offs** of water allocation between **food and other economic sectors** within the **green growth** paradigm, towards ensuring **efficient, inclusive and sustainable development**.



## KEY TAKE HOME MESSAGES

- Continue addressing challenges and issues confronting water and food security and impact on economic growth and sustainability of individual countries and the region as a whole, along the guidelines of **ESCAP's 'Low Carbon Green Growth Roadmap'**.
- **The increasing role of the private sector** – less 'silo'ed than Government and regional cooperation arrangements, **so moves faster** in terms of cross-border supply chains and trading networks as well as virtual water. Should be **leveraged to foster good green growth** practices to enhance regional Water and Food Security.
- **The need to strengthen and orchestrate food and water supply chains-** private sector efforts in **integrating ASEAN-wide and Asian-wide modern farming** along agri-food supply chains and international trading networks should be encouraged. Need to build in **technology and innovation transfer**, supply network serving both domestic and international markets.
- **Supply-side management** – An important aspect is **effective pricing** of the increasing scarce resource water and consequently food. To increase supply and productivity, steps should be taken to **exploit biotechnology** and **innovation** as well as **infrastructure** (inter-modal logistics and ICT). We need use water and energy **more efficiently** in the production of food and other economic activities; **promote ecosystem services** as public goods; and encourage **public-private partnerships** along entire agri-food supply chain.

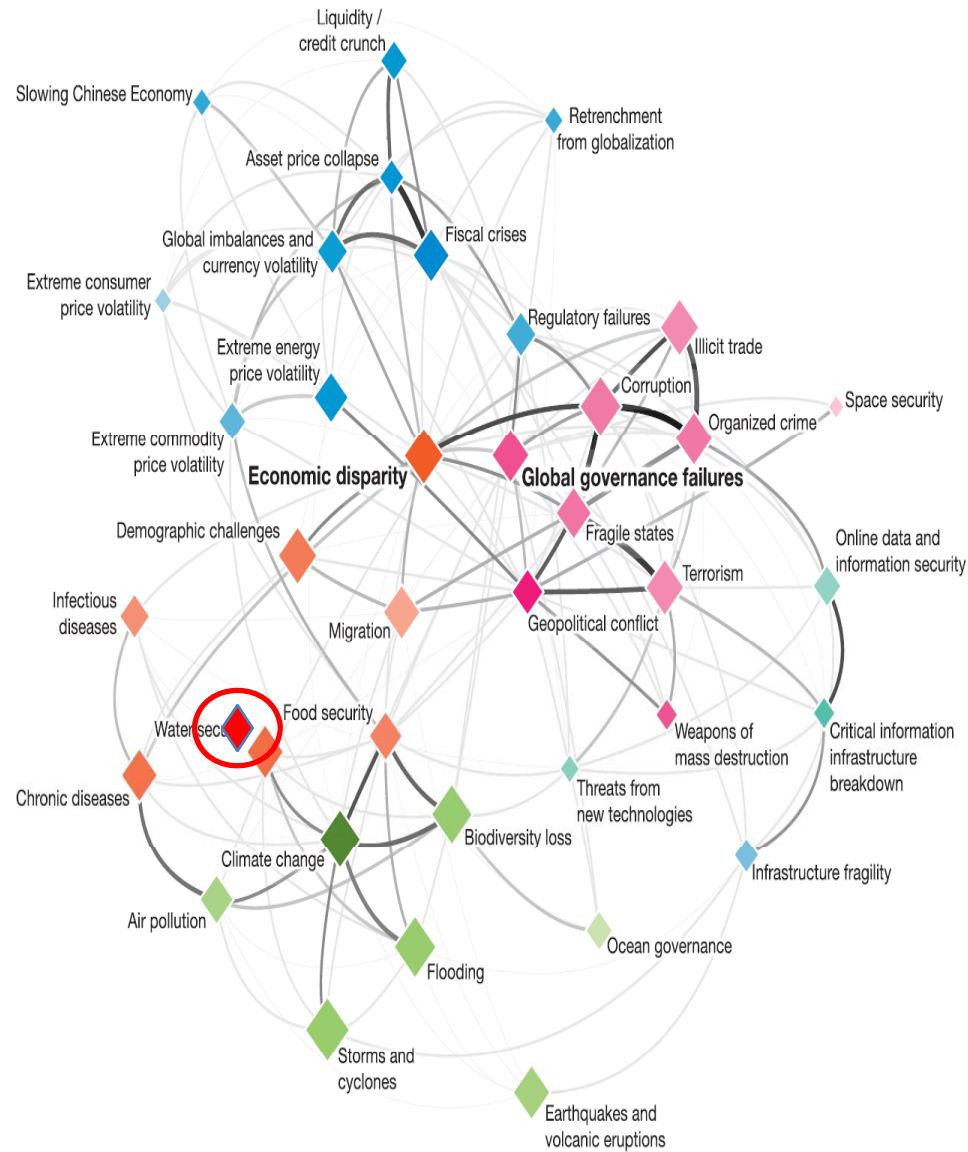


## KEY TAKE HOME MESSAGES (Cont'd)

- ***Demand-side management***– Strive at sustainable food consumption by **reducing demand** through **reduced wastage**, especially at **consumer level**, modifying **consumption patterns**, diversification of **diet** and increase **efficiency of use**. Water (and energy) wastage is embedded in food wastage and excessive consumption, especially of processed/value-added food
- ***New dynamics*** – **price volatility** is one of the key risks in considering the interdependencies of the water and food (as well as energy). New consideration has to be undertaken **in 'getting prices right'**
- ***We are dealing with a 'Wicked Problem'*** – The **complexity** of the **interconnections** requires a **major rethink** of sustainable economic, food, water security. Viewing the nexus as a wicked problem calls for **an integrated information management system**. It is recommended to develop **public and policy dialogues** utilizing **Issues Based Information System (IBIS)** approach.



# WHY WATER SECURITY?



“In **19 11**, John Muir observed how, ‘When we try to **pick out anything by itself in nature, we find it hitched to everything else in the Universe**’. A **century later**, a gathering of the **World Economic Forum** discovered the **same phenomenon**. Four hundred top decision-makers listed the myriad of **looming threats to global stability**, including famine, terrorism, inequality, disease, poverty and climate change. Yet when we tried to address each diverse force, we found them all attached to **one universal security risk: fresh water**”

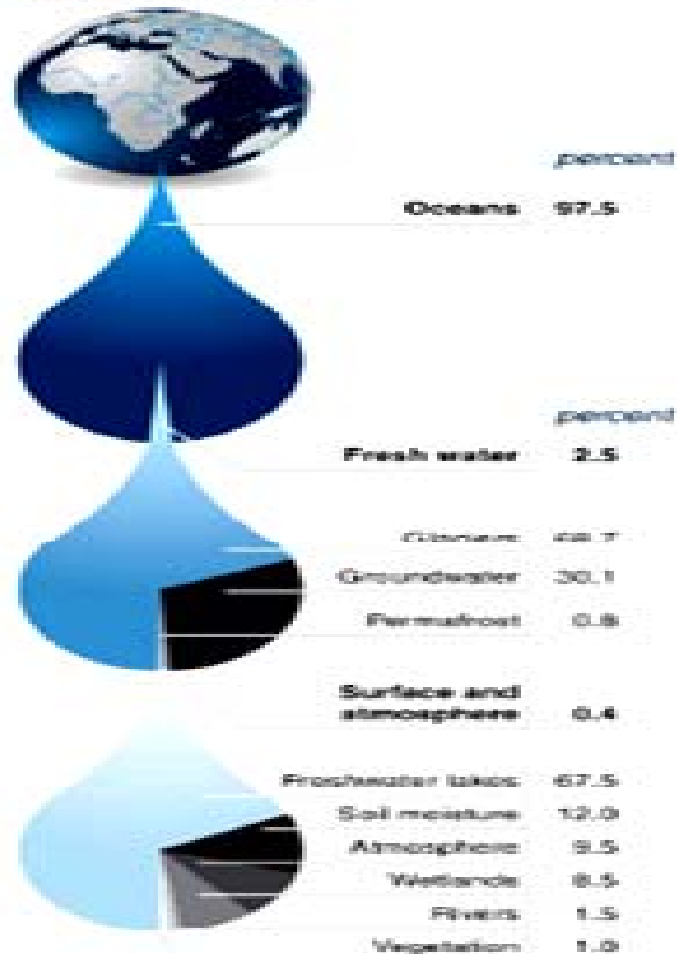
– Margaret Catley-Carlson, Patron, Global Water Partnership 2008-2010, Chair of World Economic Forum Global Agenda Council on Water Security



# WATER IN PERSPECTIVE

## The Earth's Water

### Water Distribution



### Freshwater Use



### Freshwater Use



**NOTE:** When humans use water, they affect the quantity, timing, or quality of water available to other users. Water for human use typically involves withdrawing water from lakes, rivers, or groundwater and either consuming it so that it reenters the atmospheric part of the hydrological cycle or returning it to the hydrological basin. When irrigated crops use water, it is consumptive use—it becomes unavailable for use elsewhere in the basin. In contrast, releasing water from a dam to drive hydroelectric turbines is generally a nonconsumptive use because the water is available for downstream users but not necessarily at the appropriate time. Withdrawals by a city for domestic and industrial use are mainly nonconsumptive, but if the returning water is inadequately treated, the quality of the water downstream is affected.

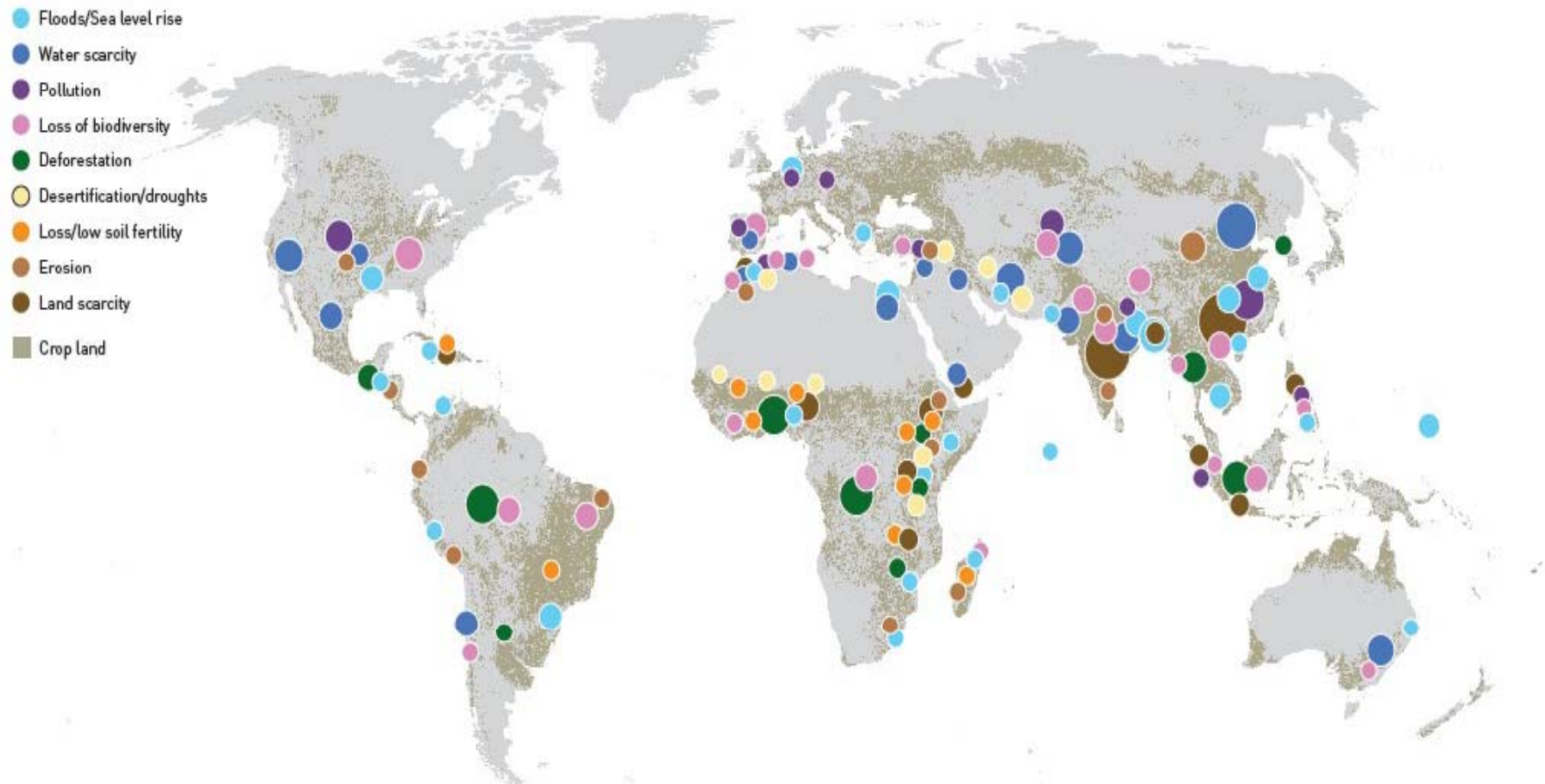
Source: Multiple, as quoted by World Bank, 2010.





# OVERVIEW OF WATER AND FOOD SECURITY

FIGURE 3.3: GLOBAL DISTRIBUTION OF RISKS ASSOCIATED WITH MAIN AGRICULTURAL PRODUCTION SYSTEMS – A SCHEMATIC OVERVIEW



Source: This study

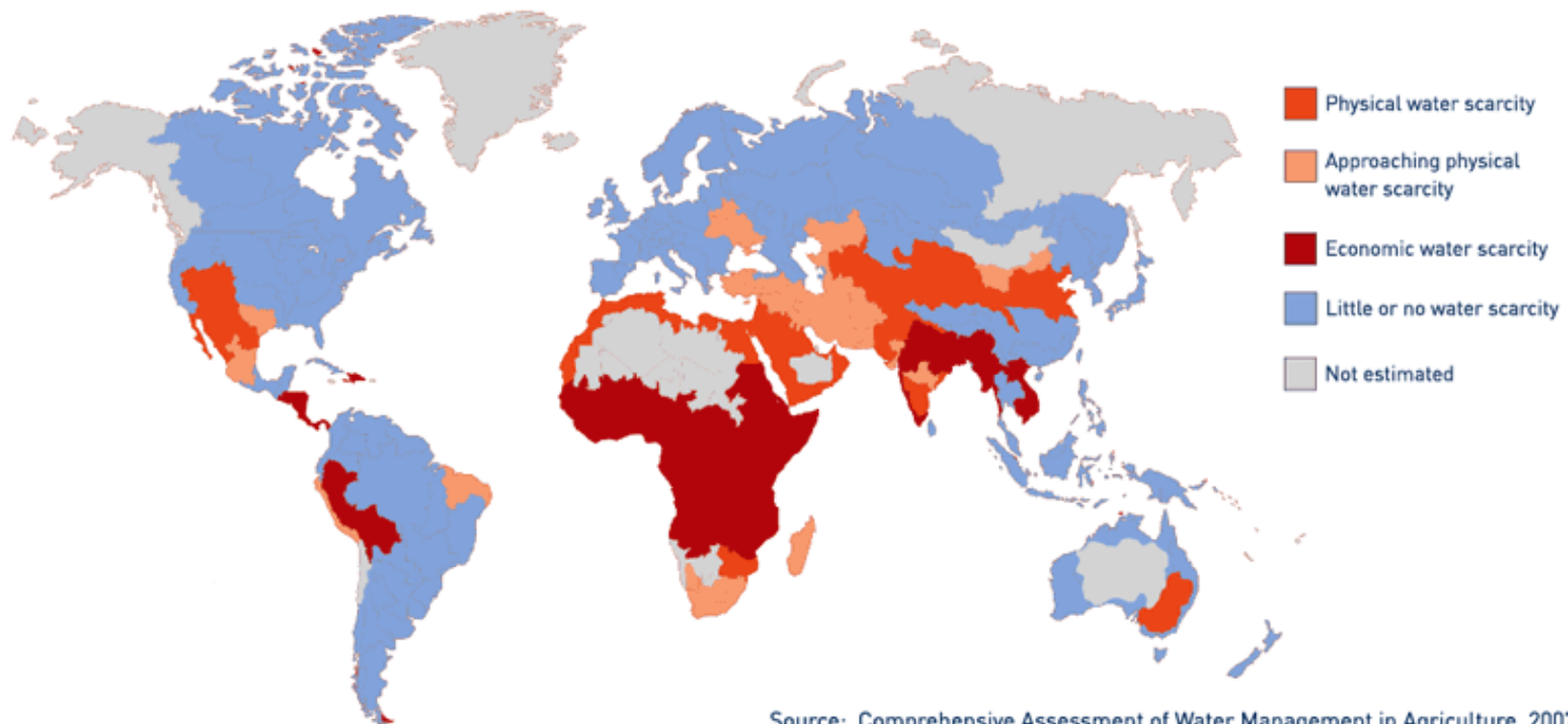
Geographical hot spots for water-food nexus  
(Source: FAO, 2011)



# SOME BACKGROUND INFORMATION

## AREAS OF PHYSICAL AND ECONOMIC WATER SCARCITY

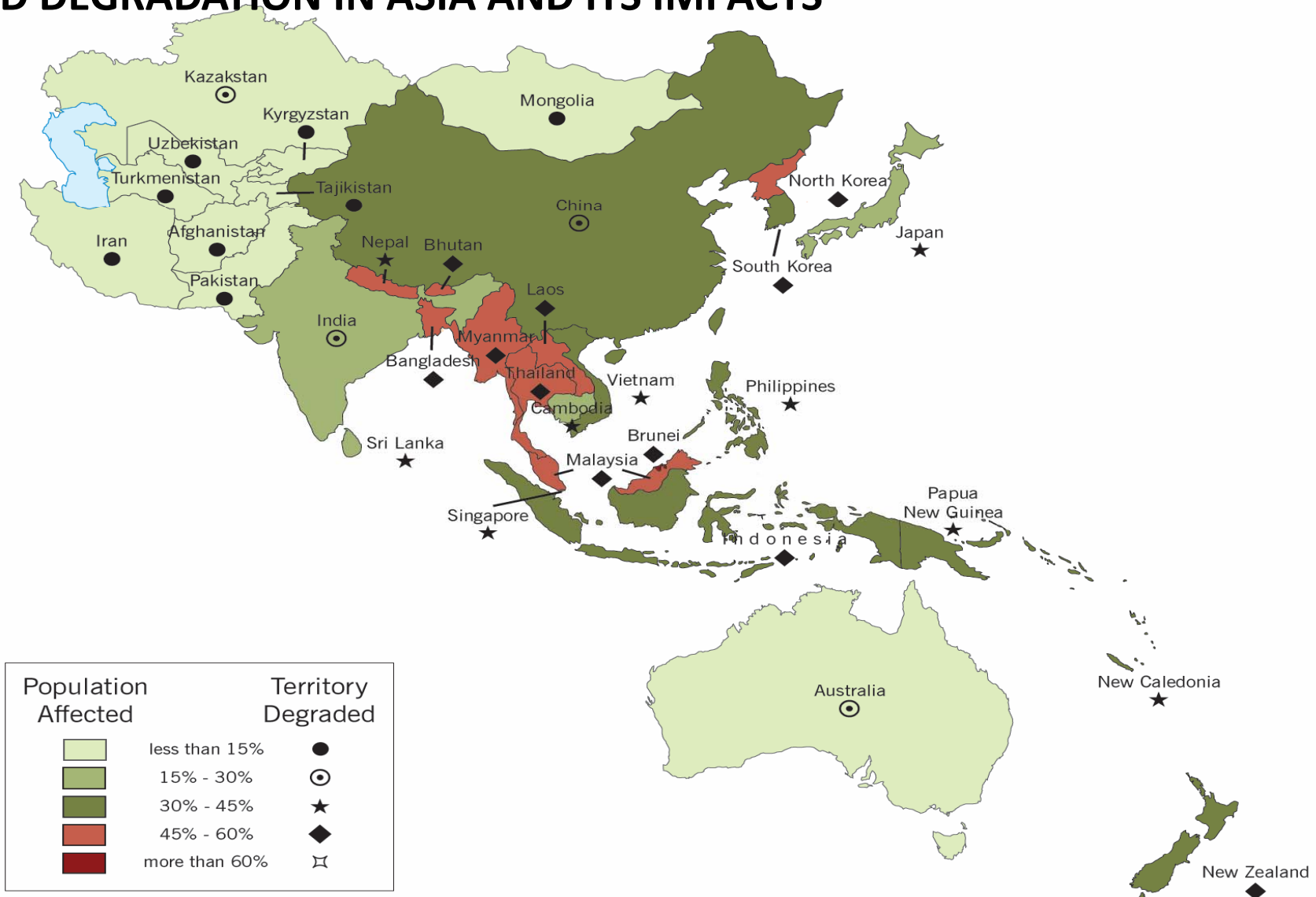
- Physical water scarcity**  
water resources development is approaching or has exceeded sustainable limits). More than 75% of the river flows are withdrawn for agriculture, industry, and domestic purposes (accounting for recycling of return flows). This definition—relating water availability to water demand—implies that dry areas are not necessarily water scarce.
- Approaching physical water scarcity.** More than 60% of river flows are withdrawn. These basins will experience physical water scarcity in the near future.
- Economic water scarcity**  
(human, institutional, and financial capital limit access to water even though water in nature is available locally to meet human demands). Water resources are abundant relative to water use, with less than 25% of water from rivers withdrawn for human purposes, but malnutrition exists.
- Little or no water scarcity.**  
Abundant water resources relative to use, with less than 25% of water from rivers withdrawn for human purposes.



Source: Comprehensive Assessment of Water Management in Agriculture, 2007



# LAND DEGRADATION IN ASIA AND ITS IMPACTS



<sup>44</sup> Derived from Zhanguo Bai, David Dent, Lennart Olsson and Michael E. Schaepman, "Global Assessment of Land Degradation and Improvement 1: Identification by Remote Sensing," *Report 2008/01* (Rome: Food and Agriculture Organization; Netherlands : International Soil Reference and Information Center, 2008)

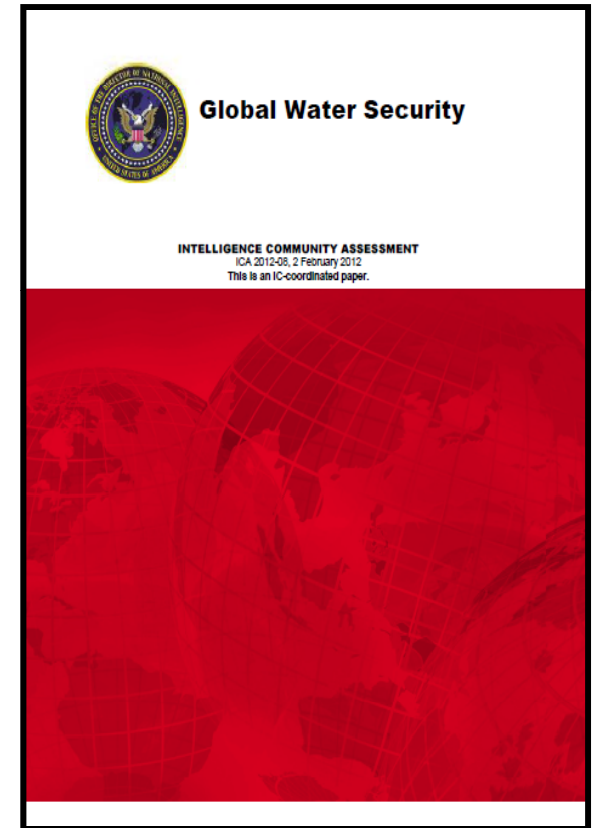


# WATER SECURITY AND SOCIAL STABILITY: WORLDWIDE GROWING CONCERNS FOR WATER-ENERGY-FOOD NEXUS

## e.g. Recent U.S. Intelligence Community Assessment (2012)

During the next 10 years, many countries.....will experience **water problems**—shortages, poor water quality, or floods—that will risk instability and state failure, increase regional tensions, .....

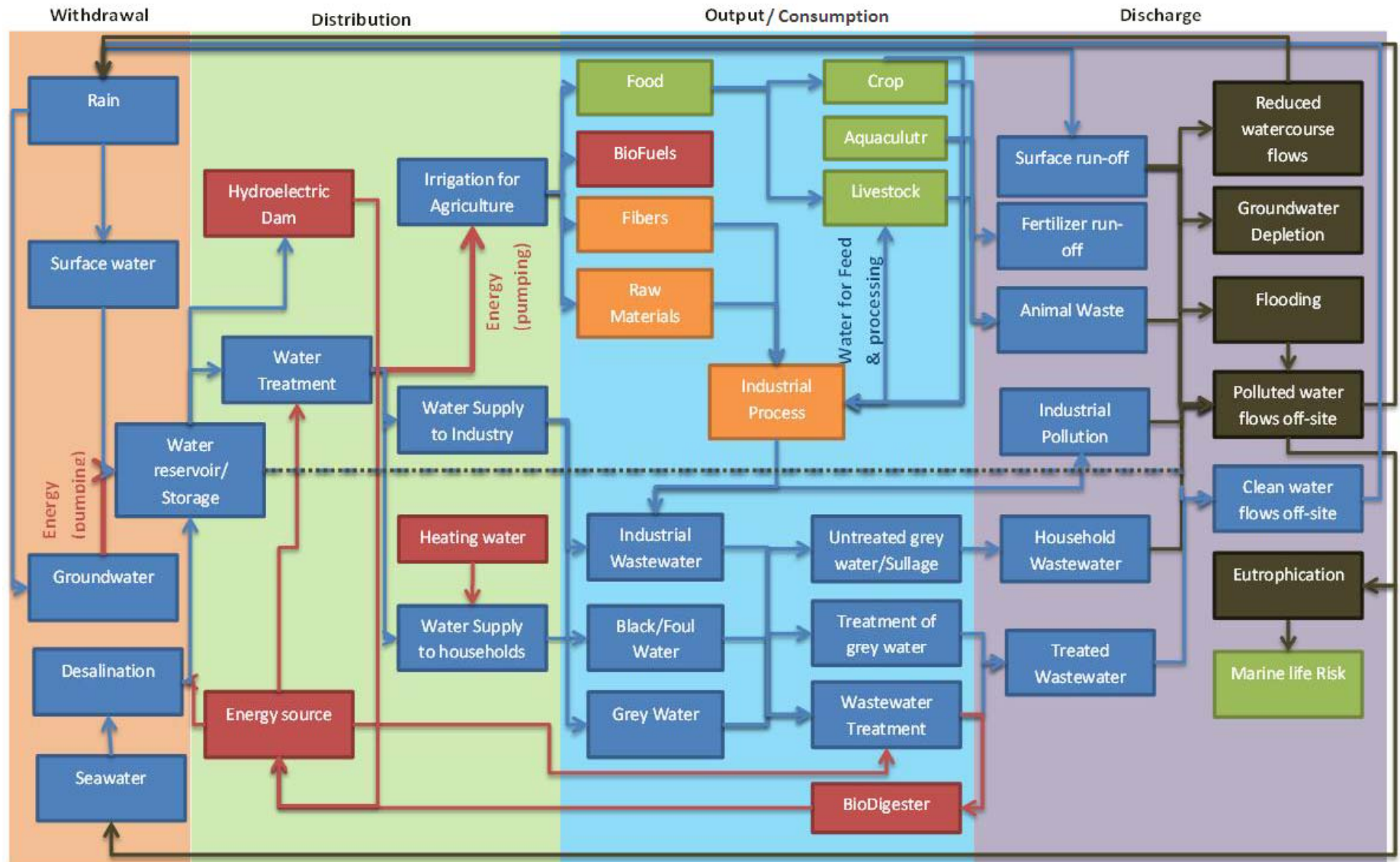
Between now and 2040, **fresh water** availability will not keep up with demand unless we have more effective management of water resources. Water problems will **hinder the ability of key countries to produce food and generate energy**, posing a risk to **global food markets and hobbling economic growth.**



.( Global Water Security U.S. INTELLIGENCE COMMUNITY ASSESSMENT-ICA 2012-08, 2 February 2012)

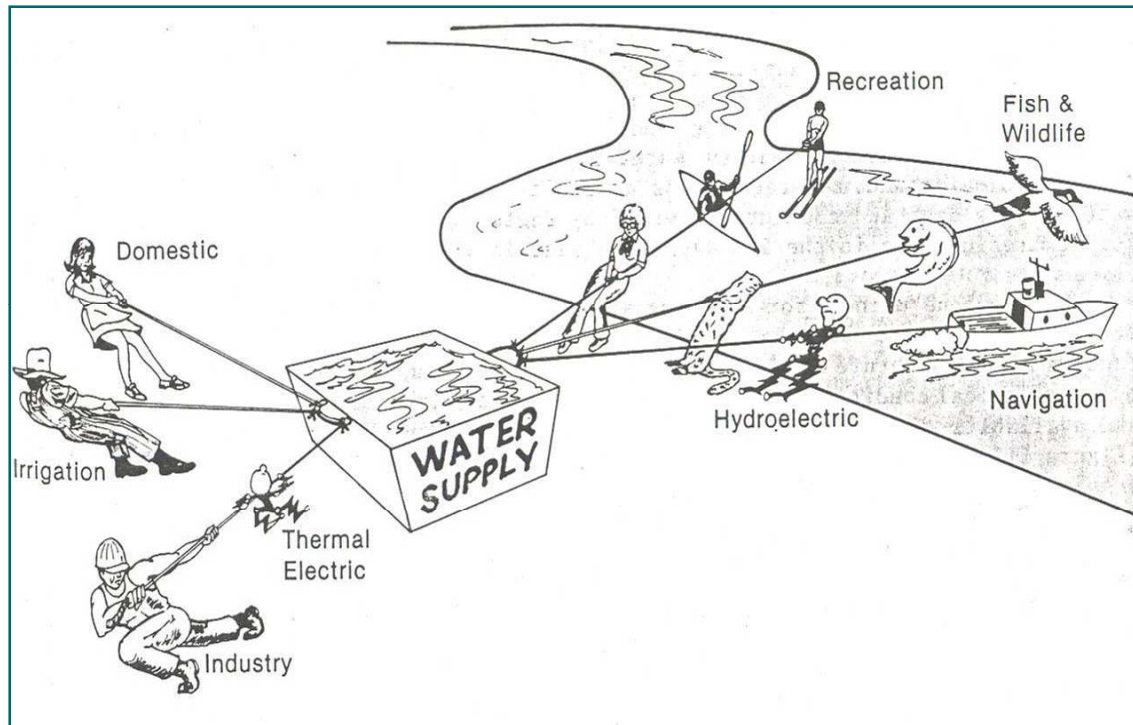


# WATER SUPPLY CHAIN – LINKAGES & IMPACTS



# WATER POLICY PROCESS – SOME REALITIES

View from the policy trenches



**Competing interests + Confusing array  
of laws + Multiple agencies /  
overlapping jurisdictions =**

**Tug of war – or Gordian Knot?**



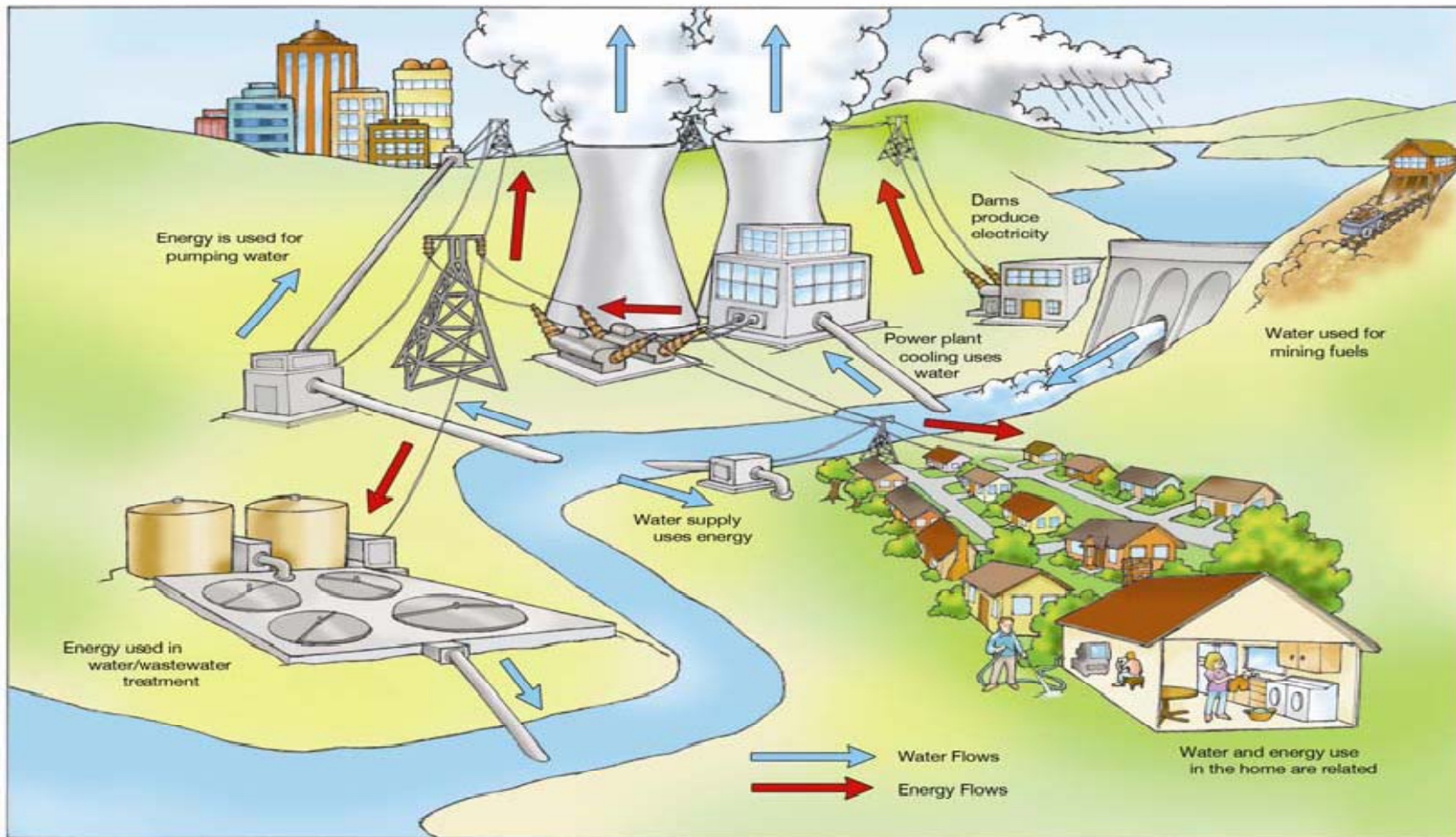
“We are not all in this together” (Doug Kenney, CU Natural Resources Law Center)

- Some interests have better (more senior) rights
- Any change can affect multiple users/values
- Policy discussions – often contentious
- Transparency & high quality information needed



# HOW ENERGY AND WATER ARE RELATED

Water is a critical input to the production, processing and transformation of fuels. Energy is also critical in the extraction, treatment and distribution of water.



## ASIDE: ROLE OF THE SEA

- Sea covers **> 70 % of Earth's surface**, constitutes **> 97 % of total water** - surprisingly the sea do not feature in either water or food security discussions!
- The sea is **a tremendous growth medium** - animal and plant life – e.g. the **biodiversity** in the **Coral Triangle in ASEAN**. Fish, crustaceans, molluscs, seaweed and algae abound. In fact, **spirulina** which was considered by NASA as a 'complete' and hence a potential 'space' food was cultivated using deep sea water. Some points to the potential in **wave and geothermal energy** and there is on-going work on the **desalination of seawater using microbes**.
- The coastal Korean city of **Yeosu** hosted the **International Expo 2012** - May to August 2012 offshore (where the Theme Center is Korea's first floating ocean structure), with the theme of '**Living Ocean and Coast**' aimed at green growth towards opening up a brighter future for the sea and humankind. It also mainstreamed the potential of the '**blue economy**' offered by the sea. **International Symposium** on the '**Future of the Ocean Economy**' alongside the **theme of green growth**. It also discussed a blueprint for the future marine environment as well as considered the future of the traditional maritime economy, such as shipping, ports, aquaculture, and the cruise industry, to the future of **a new maritime economy** including **marine biotechnology, the oceanic plant industry, ocean energy, and the development of future marine resources**.





## KEY TAKE HOME MESSAGES

- Continue addressing challenges and issues confronting water and food security and impact on economic growth and sustainability of individual countries and the region as a whole, along the guidelines of **ESCAP's 'Low Carbon Green Growth Roadmap'**.
- **The increasing role of the private sector** – less 'silo'ed than Government and regional cooperation arrangements, **so moves faster** in terms of cross-border supply chains and trading networks as well as virtual water. Should be **leveraged to foster good green growth** practices to enhance regional Water and Food Security.
- **The need to strengthen and orchestrate food and water supply chains-** private sector efforts in **integrating ASEAN-wide and Asian-wide modern farming** along agri-food supply chains and international trading networks should be encouraged. Need to build in **technology and innovation transfer**, supply network serving both domestic and international markets.
- **Supply-side management** – An important aspect is **effective pricing** of the increasing scarce resource water and consequently food. To increase supply and productivity, steps should be taken to **exploit biotechnology** and **innovation** as well as **infrastructure** (inter-modal logistics and ICT). We need use water and energy **more efficiently** in the production of food and other economic activities; **promote ecosystem services** as public goods; and encourage **public-private partnerships** along entire agri-food supply chain.



## KEY TAKE HOME MESSAGES (Cont'd)

- ***Demand-side management***– Strive at sustainable food consumption by **reducing demand** through **reduced wastage**, especially at **consumer level**, modifying **consumption patterns**, diversification of **diet** and increase **efficiency of use**. Water (and energy) wastage is embedded in food wastage and excessive consumption, especially of processed/value-added food
- ***New dynamics*** – **price volatility** is one of the key risks in considering the interdependencies of the water and food (as well as energy). New consideration has to be undertaken **in 'getting prices right'**
- ***We are dealing with a 'Wicked Problem'*** – The **complexity** of the **interconnections** requires a **major rethink** of sustainable economic, food, water security. Viewing the nexus as a wicked problem calls for **an integrated information management system**. It is recommended to develop **public and policy dialogues** utilizing **Issues Based Information System (IBIS)** approach.



## CONCLUSION

- Economic, Food and Water Security are **increasingly complex**, requiring **multi-scale and/or polycentric governance** buttressed in a proper understanding of their interdependency as well as with other evolving nexus/nexi and dynamics.
- Will require **trans-disciplinary, networked solutions** factoring in supply chains and trading networks and new dimensions and dynamics rather than **isolated solutions aimed at just one problem, issue or even sector**.
- **Food, Water and also Energy** security will play a major role in the well-being of nations in the Asia Pacific region as they are crucial to the attainment of the sustainable development goals as they represent the **three basic resource pillars**, that is, food and water serves as basic social needs; water is needed by all in the environment and has often proved to be a limiting factor and yet at times, water can be so destructive (for example, the 2011 flood in Thailand); and energy is often considered the driver of economic growth, if not life itself.
- Guided by the **new dynamics in food and water security**, we should also be wary of being **trapped in the mindset of the 1970s** and ignoring the **realities of the 2010s** when formulating food and water security policy and strategies. We must be vigilant **not** to continue to be **rice-centric, production-centric, supply-centric, public sector-centric, and nation-centric**.



## CONCLUSION (Cont'd)

- With increasing interconnectivity afforded by ICT and new technology, there will be increasing interdependence between technology, productivity and economic, food and water Security - so need to view areas as **food ecosystems** and hence increasingly develop and **apply systems and trans-disciplinary approach**. Interesting work is being conducted incorporating **'complex theory'**, involving systems approach innovatively by **combining hard and soft systems analysis**, coupled with systems to manage information/knowledge. This will be **better suited to deal with increasingly 'wicked' problems**.
- New dynamics arising from **food-water-energy nexus**, **green growth** and **increasing role of private sector** requires an **urgent rethink** of economic, food and water security and the development of a **new framework** for regional/national/policy dialogue in order to get the basics and balance right. In this regard, there will be an increasingly **important role for ESCAP** to facilitate the formulation of strategies and programs through shoring and sharing amongst countries in the region, ultimately targeted at inclusive and sustainable growth in each member country as well as Asia and the Pacific as a whole.
- This underscores the continuing importance of ESCAP's ability **to investigate, interpret, inform and influence** policy and business decisions at the national and regional levels.



# THANK YOU!

[www.isis.org.my](http://www.isis.org.my)

[larry@isis.org.my](mailto:larry@isis.org.my)

