

**“SECURING WATER FOR ALL – The critical need for coherence in policies and actions”**

November 18-19, 2015 – Gulmohar Room, Indian Habitat Centre, New Delhi, INDIA

## What is Water Security?

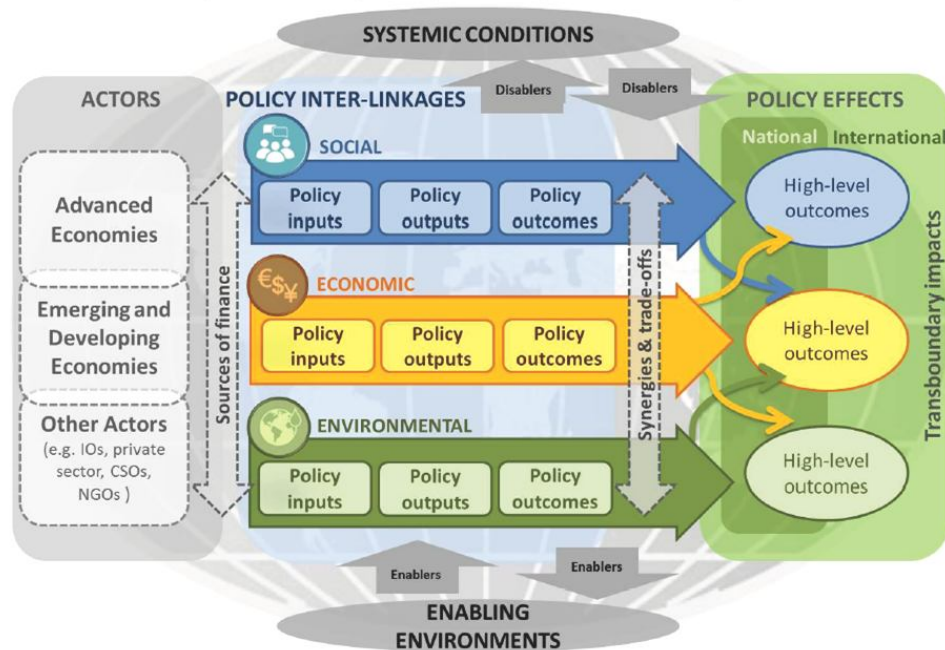
**Water Security** is defined as the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters and preserving ecosystems in a climate of peace and political stability.



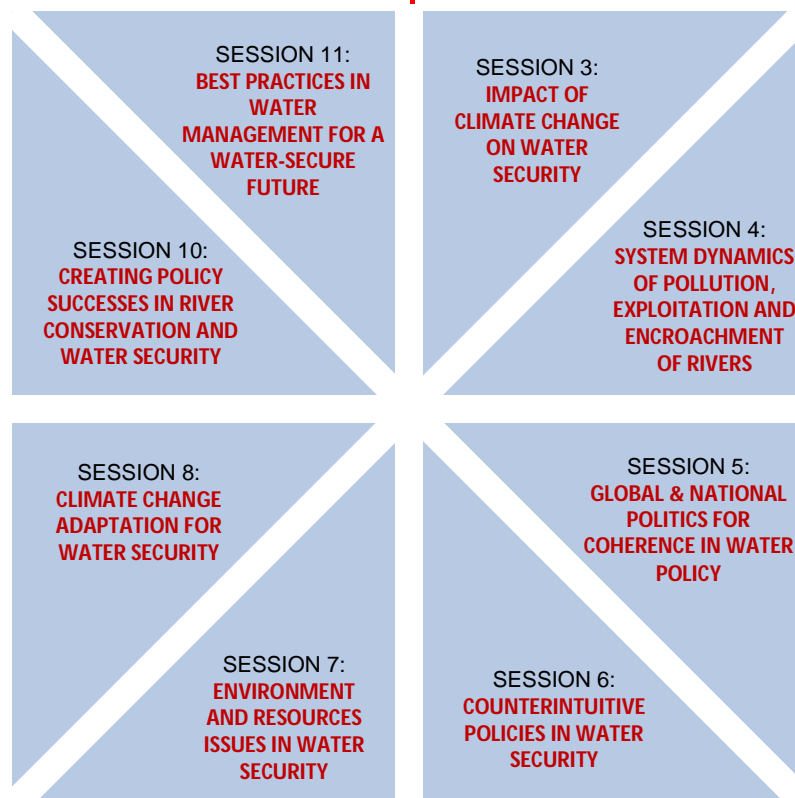
## SESSION 1—Opening Session

**Water Security** is defined as the capacity of a population to safeguard **sustainable access** to adequate quantities of 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.

## Analytical Framework for Policy Coherence for Water Security Development



Source: OECD PCD Unit, inspired by the work of UNECE/OECD/Eurostat Task Force on measuring sustainable development.



### Knowledge Partners:

## SESSION 2—PLENARY SESSION: Systems, Inter-linkages & Policy Coherence

THE DEBATE NEEDED TODAY: And its underlying premises for sustainability

Water underpins the very fabric of human life – our food and drink, the clothes we wear, the landscapes we enjoy, the societies we live in, the length and quality of our lives. The essential role that water plays in national life – in food, energy, land and soil security, in infrastructure, economic growth, healthcare, education and culture – makes water a central concern for national policies.

The Venn diagram on the right captures **today's discussion needs and its underlying premises for sustainability**:



'Policy Coherence Analysis' attempts to integrate the economic, social, environmental and governance dimensions of sustainable development at all stages of domestic and international policy, as in the following tabulation:

TARGETS	GOAL Securing sustainable water for all	Keys:
Universal access to safe drinking water, sanitation and hygiene		ECONOMIC
Sustainable use and development of water resources		SOCIAL
Equitable, participatory and accountable water governance		ENVIRONMENTAL
Reduce untreated wastewater, nutrient pollution & increase wastewater reuse		ECONOMIC
Reduce mortality and economic loss from water-related disasters		SOCIAL

*Note:* This visualization of the subjective estimates, rather than any attempt at numerical precision for the intensity of each pillar of sustainability, is indicated in the diagram above.



### SESSION 3: Impact of Climate Change on Water Security

Water security is under severe pressure from many sources: population explosion, rapid shifts of people from rural to urban areas, the impact of dietary change as countries develop, increasing pollution of water resources, the over-abstraction of groundwater and the significant issues created by climate change. Climate change affects water resources through its impact on the quantity, variability, timing, form, and intensity of precipitation. Session 3 discusses the impact of climate change on water resources, in the South Asian context.

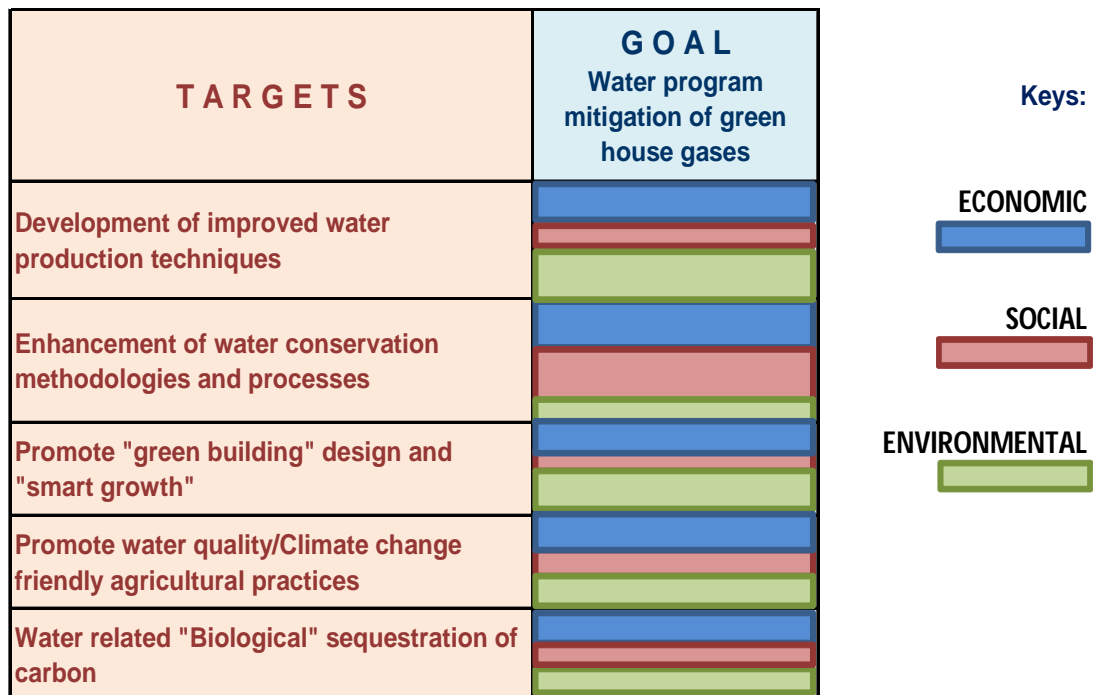
**COP 21 in Paris will hopefully provide a blueprint and catalyst for future international climate action.**



Additional effects of climate change that impact water resources include increased evaporation rates, a higher proportion of precipitation received as rain, earlier and shorter runoff seasons, increased water temperatures, and decreased water quality, in both inland and coastal areas.

Increased evaporation rates are expected to reduce water supplies in many regions. More frequent and severe droughts arising from climate change will have serious management implications for water resource users. Water users will eventually adapt to more frequent and severe droughts, in part by shifting limited water supplies towards higher-value uses. Rising surface temperatures are expected to increase the proportion of winter precipitation received as rain, while rising sea levels could also directly reduce water quality and availability in coastal areas, and indirectly cause water tables in groundwater aquifers to rise.

#### Sample of 'Policy Coherence Analysis'



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## SESSION 4: System Dynamics of Pollution, Exploitation & Encroachment of Rivers

River issues are broadly categorized into three parts: *pollution*, *encroachment* and *over-exploitation*. Water pollution is a chemical or biological substance that builds up in the environment enough to be toxic, harmful, or a nuisance to humans, other animals, or other living things. Ever-larger stretches of rivers in India are becoming so polluted that their water can be used for fewer and fewer uses and the quality of water in an increasing number of aquifers is being similarly degraded by human use and saline invasion.

There is a need of adopting a different and more holistic approach taking the river and not the city as the unit of planning. The essence of this approach is not just to focus on river pollution but to aware all the stakeholders more comprehensively on catchment area treatment, protection of flood plains, ensuring ecological flows and restoration of the river ecosystem. Each dimension has its own peculiarities to deal with. The following collection of images demonstrate the dynamics of each system:



### The need for a systems based approach:

Water management solutions should be considered in the context of the entire water system, from 'cloud to coast' as well as the implications immediately upstream and downstream. In this 'systems' approach, all types of water must be considered together and in this context, the flows and uses of water in a catchment area feeding the soil (green water), free water in rivers and reservoirs (blue water) and used or waste water (grey water) **all** need to be included.

The systemic studies and analysis of pollution, exploitation and the encroachment of rivers are discussed in Session 4.

## SESSION 5: Global & National Politics for Coherence in Water Policy

More than a billion people currently live in water-scarce regions and almost 3.5 billion could experience water scarcity by 2025. Increasing pollution degrades freshwater and coastal aquatic ecosystems. Climate change is poised to shift precipitation patterns, speed glacial melt and intensify floods and drought.

**Yesterday's debates on water security focuses on (for example):**

Supply side Challenges	Demand side challenges
<ul style="list-style-type: none"> <li>• Capacity addition &amp; required capital investments</li> <li>• Increased environment impact</li> <li>• Contamination from seawater intakes</li> <li>• Maintaining potable water quality</li> <li>• Water reuse and renewable water resources</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing demand with growth &amp; development</li> <li>• New residential and industrial hubs</li> <li>• Cost of water production &amp; tariffs</li> <li>• Wastage, leakage and distribution losses</li> <li>• Strategic storage and reservoir management</li> </ul>

### Issues of policy and governance:

The impact of policy in one nation can impact on the water security of other nations. There is a need for governance at all scales – global, regional, national, local, as well as at the catchment level and a need for linkages between these scales.

Tackling threats to global water security requires responses tailored to the political, social, economic, environmental, financial and cultural conditions of coordination at the nation's, state's and local levels.

Adaptive management systems provide a method for building flexibility into policy and decision-making, to manage risk and to allow for new knowledge inputs.

### Sample of 'Policy Coherence Analysis'



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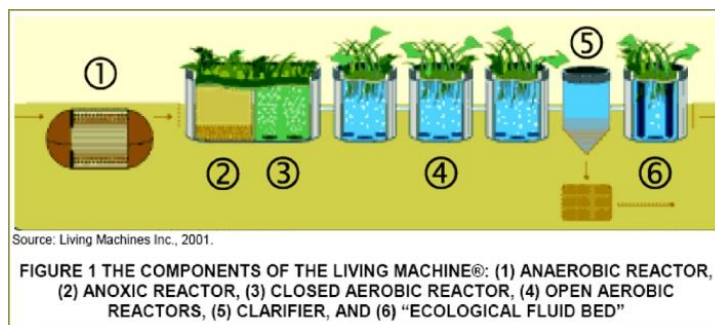
## SESSION 6: Counterintuitive Policies in Water Security

**A counterintuitive proposition is one that does not seem likely to be true when assessed using intuition, common sense, or gut feelings.**

For instance, conventional wisdom promotes the idea that modern and industrialized version solutions for agriculture, is the most efficient way of farming. However, the **System of Crop Intensifications (SCI)**, and the **System of Rice Intensification (SRI)** in particular, when implemented successfully in very different cultures and climates, the farmers are able to produce more rice using less water, seeds, agrochemical inputs, synthetic fertilizers, pesticides, herbicides, and often with less labor (once the methods are mastered). By reducing the negative environmental impacts of rice production, thus making water security more resilient. These methods are producing similar effects also with other crops such as wheat, ragi, sugarcane, mustard, and various legumes (grams). Hence, a counterintuitive policy for promoting water security would be to **promote SCI/SRI, in place of modern and industrialized solutions for agriculture.**



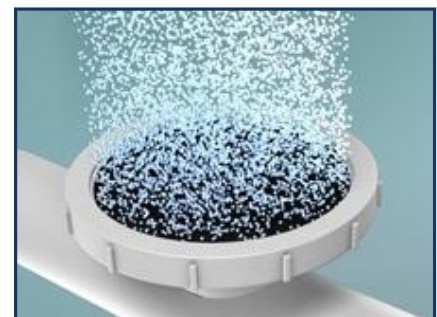
Picture from Dr. Khidhir Hameed, Senior Rice Scientist, MRRS, Najaf ... comparing effects of SRI (left) with non-SRI (right) management practices



**Eco-Machines**, which are based on natural, biomimicry approaches for the treatment of polluted water, are cost competitive to build and less expensive to operate than conventional waste-water technologies. Living Machine technologies are basically ecologically waste water treatment systems, where

waste water comes in, is taken up by the bacteria, converting waste water to high quality reusable water streams.

**Fine bubble diffused aeration systems**, which are sustainable, energy efficient systems available in the market today. The potential of fine bubbles in the treatment of water and improvement in water quality is enormous, particularly in developing countries suffering from water pollution and shortage. There will be a broad spectrum of business potentials using Oxygen, Nitrogen and a host of other gases that will benefit from fine bubble technology in the coming years, including the food (fish-growing) sector, a multitude of cleaning uses, medical applications (such as cleaning of foot sores in Diabetic patients) and other areas.



**Failure to adopt and adapt counterintuitive policies could land humanity in sudden catastrophic outcomes, as food riots, climate change, and other social and environmental imbalances lead to societal collapse.**

## SESSION 7: Environment & Resource Issues in Water Security

Despite the ongoing effects of climate change, mis-governance and policy incoherence, we will need to:

- Protect and restore our water supply to ensure that drinking water is safe; and
- Ensure that aquatic ecosystems sustain fish, plants, and wildlife, as well as economic, recreational, and subsistence activities.

The tabulation below indicates that Asia has sharply declined to have the lowest per capita water availability, by continents.

Per capita water availability by region, 1950-2000					
Region	1950	1960	1970	1980	2000
	('000 m <sup>3</sup> .....)				
Africa	20.6	16.5	12.7	9.4	5.1
Asia	9.6	7.9	6.1	5.1	3.3
Latin America	105	80.2	61.7	48.8	28.3
Europe	5.9	5.4	4.9	4.4	4.1
North America	37.2	30.2	25.2	21.3	17.5

Source: N.B. Ayibotele. 1992. *The world's water: assessing the resource*.

It would therefore appear that focussing on:

- Food** [which is a nexus of Water, Energy and Land (Soils)];
- Reforestation** (or **Forest Restoration**); and
- Governance**

would be the highest common factors for solving all our problems.

**Coherent policies and actions** for the promotion of **good governance**, **forest restoration** and **food production** can solve all our problems, including the current focus on **securing water for all**.

### Sample of 'Policy Coherence Analysis'



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## SESSION 8: Climate Change Adaptation for Water Security

Adaptation to climate change for 'Water Security' is mainly about appropriate adaptation measures built upon known land and water management practices to foster resilience to future climate change, thereby enhancing water security. Any adaptation measure, however, needs to be assessed for inadvertent adverse effects, in particular on the environment and on human health. Adaptation is:



- Transformative and requires a collaborative, problem-solving approach, especially in a resource-constrained environment.
- An active approach to understand vulnerability, reduce risk, and prepare for consequences while incorporating new science and lessons learnt

Adapting to increasing climate variability and change through better water management requires policy shifts and significant investments that should be guided by the following principles:

- Mainstreaming adaptation within the broader development context;
- Strengthening governance of water resources management and improving integration of land and water management;
- Capacity-building on climate, water and adaptation measures, and investing in comprehensive and sustainable data collection and monitoring systems;
- Building long-term resilience through stronger institutions and water infrastructure, including well-functioning ecosystems;
- Investing in cost-effective water management and technology transfer;
- Increased national budgetary allocations and innovative funding mechanisms for adaptation through improved water management.

### 'Policy Coherence Analysis'



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## SESSION 10: Creating Policy Successes in River Conservation & Water Security

Well-functioning coordination at different levels – from national to river basin and sub-basin – and joint planning involving different interests are important for the sustainable management of water resources.

**Good water governance is essential to achieving water security, and requires well-designed and empowered institutions with supporting legislative and policy instruments.**

A human rights-based approach to water security addresses critical gaps and bottlenecks, and emphasizes the establishment of regulatory functions and mechanisms for efficiency, participation and accountability.



However, reaching effective and balanced intersectoral governance is complex, and solutions have a high degree of context specificity.

Some of the ways to protect river water sources are:

- Prevent deforestation and destruction of grasslands – nature's water filters;
- Restore forests and grasslands that have already been lost or damaged, to prevent sending erosion into our waters;
- Equip farmers with practical ways to keep harmful run-off out of our waters
- Restore floodplains that act as sponges and send water down into groundwater supplies and filter pollution out of rivers;
- Create new science that helps pinpoint the greatest threats to our waters and the most effective ways to combat them, *sustainably*.

Transboundary waters pose enormous challenges for achieving water security in systems, such as river or lake basins and aquifers, which are shared across political boundaries. In such cases, water-related challenges are compounded by the need to ensure coordination and dialogue between sovereign states, each with its own set of varied and sometimes competing interests.

Policy-makers need to identify existing capacities, as well as gaps, in order to properly address the water security challenge. Capacity development is a long-term process based on incentives, good governance, leadership, and knowledge management and transfer, which need to be continuously adapted according to stakeholders' feedback and needs.

## SESSION 11: Best Practices in Water Management for a Water-Secure Future

### Evolution of Water Security concepts

There is considerable scope to improve water resource utilization, as the amount of food produced per unit of water input is low, and access to water serves neither socio-economic nor environmental objectives.

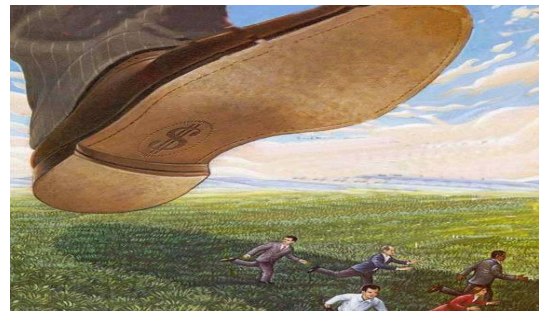
Water scarcity occurs when the demand for freshwater exceeds supply in a specified domain. It arises as consequence of a high rate of aggregate demand from all water-using sectors compared with available supply, under the prevailing institutional arrangements and infrastructural conditions.

### The Club of Rome—India's view

Global society should reduce its ecological footprint per unit of consumption, and start doing so in time to avoid global overshoot. **The task would be greatly simplified if human society moved away from its fascination with growth, both in population and economic value.**

*For example: Large scale food production has become a money-driven business instead of a health-driven business.*

**Non-renewable resources** are used to transport food over large distances causing a **third of all man-made emissions**, while losing quality, nutrients and freshness in the process.



### Some of these Best Practices

**The innovation:** Pits which were dug to concentrate rainfall onto crop roots were made larger, and manure was added to them during the dry season. Tree seeds in the manure sprouted with the crops and these tree saplings increased soil fertility, shielded crops from overwhelming heat, and acted as windbreaks. At the macro level, areas with trees are more efficient for water harvesting than areas without. Water tables in the areas with tree farming have risen since the method gained popularity, despite a growing population.

**System of rice intensification:** In a recent article, another agricultural approach was explored in depth: the system of rice intensification (SRI). Through applying zero cost techniques to rice farming, small scale rice farmers have increased their crop yields by anywhere from 30-50% while reducing water and chemical usage. SRI is now estimated to be used by 4-5 million farmers worldwide.

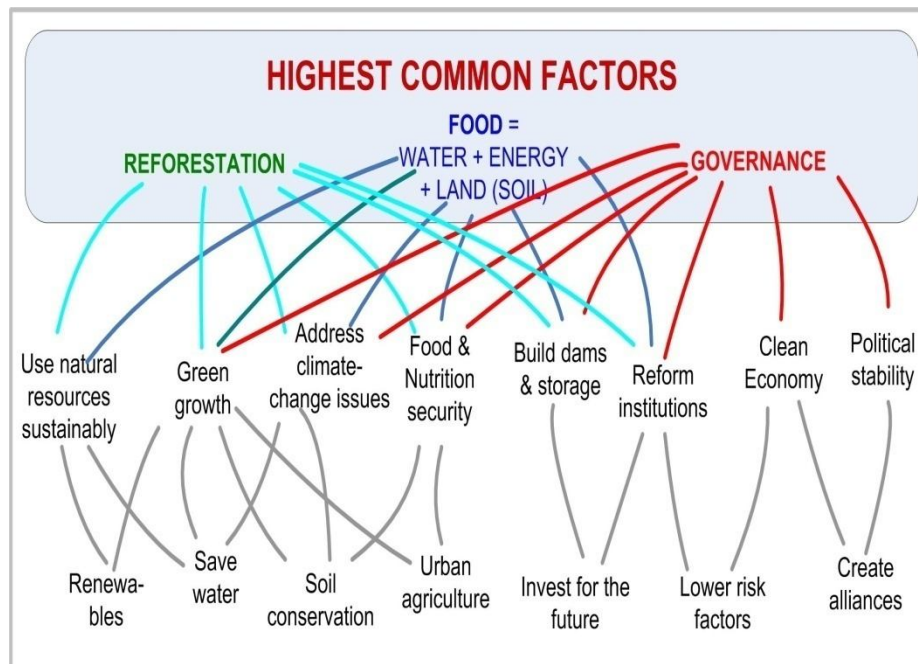
**Urban Agriculture/Vertical Farming:** Between 50% - 70% of people will live in urban and peri-urban areas by 2050. This implies that massive quantities of food will need to be transported from food-growing hubs in the rural areas to the food-consumption centers in urban/peri-urban areas and large rural towns. One solution is to create local sustainable economies around small-holder and urban artisanal farmers, with democracy based upon self-governing principles.





## SESSION 12: CONCLUSIONS & CLOSURE

How to obtain security in general with minimum environmental impact



It would therefore appear that focussing on: (a) **Food** [which is a nexus of Water, Energy and Land (Soils)]; (b) **Reforestation** (or **Forest Restoration**); and (c) **Governance** would be the **highest common factors** for solving all our security-related problems.

- **Good water governance** (a) relies on **well-designed, empowered institutions** to enact and enforce legislative and policy instruments and (b) are conducive to the **attainment of predetermined social, economic and environmental goals** associated with water security.
- **Reforestation** helps not only to green our environment, it also **naturally promotes food, water, energy & land (soil) security, by promoting biomimicry and reducing the burden of actions for creating a sustainable world, on humanity.**
- **Food** [which is a nexus of Water, Energy and Land (Soils)] is the **ultimate product** that is needed for **human development, security and peace.**

We conclude that **coherent policies and actions** for the promotion of **good governance, forest restoration and food production** can solve almost all our security-related problems, including the current focus on **securing water for all.**