A New Vision for IWRM
A Systems Approach to Delivering Water to Society
14th September 2023 – Beijing

IWRM Taskforce

Dr. Rabi Mohtar
Governor – World Water Council
Chair – WWC Task Force on IWRM
Professor – Texas A & M, AUB

Mark Smith
Director General – IWMI

Tuğba Evrim Maden
SUEN

Jennifer Sara
Global Director – World Bank
Co-Chair – WWC Task Force on IWRM

Dr. Sasha Koo-Oshima
Deputy Director of Land & Water – FAO

Gustavo Saltiel
Global Lead for Water Supply and Sanitation – World Bank

Yong-deok Cho
Secretary General – AWC

Jorge Werneck
Director - ADASA

Shweta Tyagi
Chief Functionary – IWF

Colin Herron
Global Water Partnership

TEXAS A&M UNIVERSITY
WORLD WATER COUNCIL
TURKISH WATER INSTITUTE SUEN TÜRKİYE SU ENSTİTÜSÜ
Food and Agriculture Organization of the United Nations
AUB American University of Beirut Faculty of Agricultural and Food Sciences
THE WORLD BANK IBRD • IDA
Adasa
IWMI International Water Management Institute
AWC Asia Water Council
India Water Foundation
Global Water Partnership

TOGETHER WE MAKE WATER A GLOBAL PRIORITY

Water is Key to Sustainable Development

TOGETHER WE MAKE WATER A GLOBAL PRIORITY

IWRM Pillars

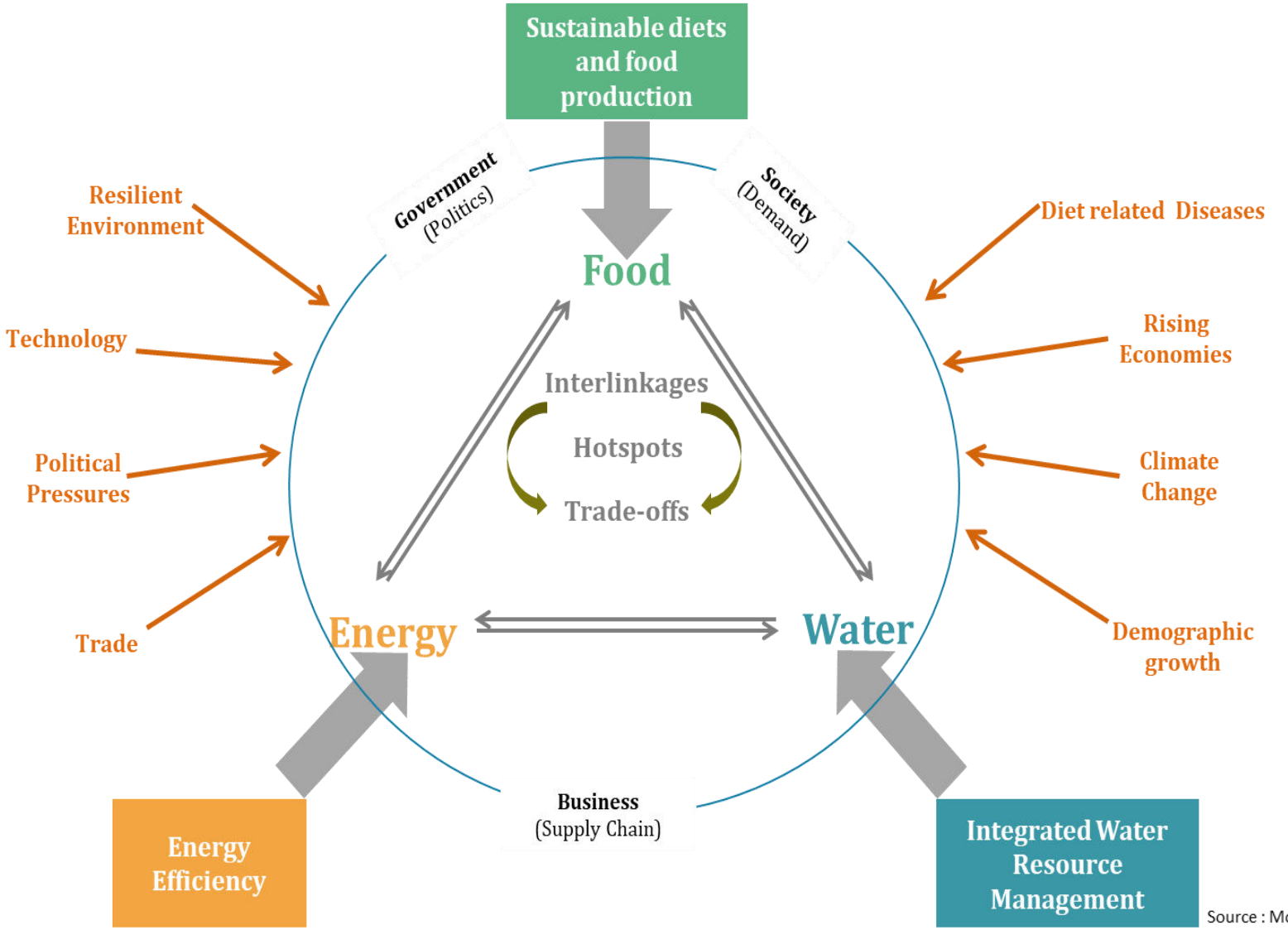
Enabling Environment	Institutions & Participation	Management Instruments	Financing	Dynamic Management	Bridge Strategies
Laws and policies • Frame water resources management within a country and between countries **Water User** • Cross-sectoral and upstream-downstream dialogues • Basin committee **Co-operation** • Within international river basins (transboundary)	• Basin and other water sector organizations at different levels in the government, NGO's and private sectors • Effective co-ordination mechanisms • Planning process	• Assess water resources • Set up communication and information systems (Data & Info sharing) • Resolve conflicts in allocation of water • Establish regulations • Undertake development works • Ensure accountability Develop organizational capacity • Co-ordinate	• Financing organizations and investment Co-operation. • Revenue Raising • Establish financing arrangements Establish self-regulation Research and develop	• Learning, adaptive, deliberative, for complex systems change. • Social learning processes backed by data, communications, and empowerment	• Problem solving under a guiding strategy, enabling collective action to solve priority problems. • Platforms that bring sectors and stakeholders together.

Source: (GWP Technical Committee, 2005), (Smith & Clausen, 2015)

Shortcomings In Current Water Management

1. Sectoral silo approach has been unsuccessful in addressing the resource allocation crisis holistically and from a system perspective
2. Discipline focused water management fails to predict emerging hotspots or regions with impending resource allocation challenges (climate, population, land-use, etc.)
3. Sectoral focus does not consider effects on multiple sectors and multiple stakeholders
4. It does not consider the associated trade-offs with resource allocations in a particular scenario outside the water sector
5. It lacks the analytical methodology to identify holistic solutions and capitalize on the synergies between the multiple sectors
6. Current water management does not provide an opportunity for all involved stakeholders to be a part of an equitable decision-making process
7. It cannot be relied on to frame long term sustainable policies as impacts of climate change and economic growth in future pose unprecedented challenges

Need For System's Approach



Source : Mohtar, 2020

Approach

1. Explored **interlinkages** between **Water** and other sectors like **Food, Energy, Health and Education** to understand and help achieve **synergies** between these sectors
2. Studied IWRM **implementation** in different countries
3. Collected **success stories** on effective implementation of solutions in the **context of water-energy-food-health system and circular economy approaches towards achieving SDGs**
4. Developed a **vision** and **roadmap** for optimizing the water management (at the appropriate scale) that would accelerate **implementation of SDGs** through interlinking water and non-water sectors including health, education, energy, agriculture, industry
5. Developed an **implementation strategy** to identify and assess potential **trade-offs/synergies** and propose solutions considering the entire system
6. Plan to disseminate the knowledge of **systems thinking** in water management through a formal and informal training on W-E-F-H-E Systems thereby enabling learners and practicians to analyze trade-offs as part of their activities

Selected Lessons Learned from Case Studies

1. Planning, execution, and success of water projects needs the participation of all key stakeholders
2. River basin planning works best when an appropriate institutional framework is in place
3. Because of the extended healing period following stress in water bodies (lakes, groundwater, etc.), prevention and preparation are far more beneficial than restoration
4. Effective water management must address the entire hydrological cycle: surface and subsurface waters cannot be managed independently of the ecosystems on which they rely
5. Good water management necessitates maintaining a balance between groundwater pumping and aquifer recharge

Selected Lessons Learned from Case Studies

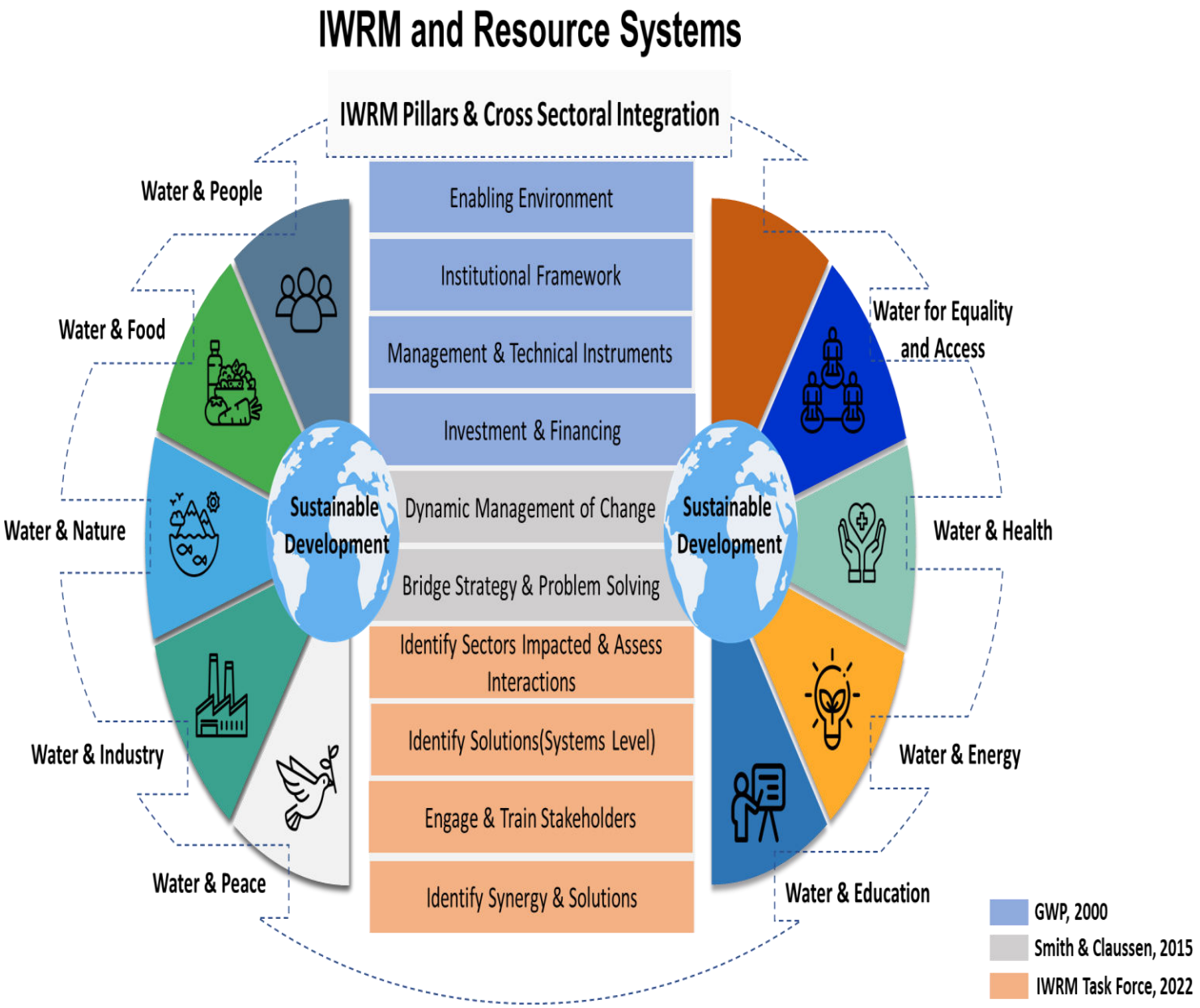
6. The potential benefits of collaborative water resource management can act as accelerators for larger regional collaboration, economic integration and development, and even conflict avoidance
7. Economic analysis can help make the case for international river cooperation by identifying and measuring the potential incremental benefits of cooperation, determining the distribution of benefits among riparian parties, and assessing the feasibility and fairness of alternative management and investment scenarios
8. The participation of government officials is important for galvanizing local political support for advocacy efforts and increasing trust in research findings
9. Trust is earned via sharing of decision-making authority and the willingness of bureaucratic administrations to negotiate
10. Need to address problems across interlinkages at systems level

Benefits Of System's Approach

Type of benefit	Particular
Economic	Equitable & Efficient water supply for industry and agriculture
	Water recycling, reuse, and waste reduction
	Sustainable sanitation (minimization of pollution and waste reduction)
	Efficient irrigation systems
	Fishing and other natural resources for economic activities
Ecological	Maintaining the natural water cycle and other natural nutrient cycles
	Ecosystems Role in Erosion Regulation
	Ecosystem's role in replenishing subterranean and surface water resources
	Role of ecosystems in water purification and pollution regulation
	Role of ecosystems in flood regulation
	Role of ecosystems in climate regulation
	Role of ecosystems in air quality regulation
Social	Water of high quality for human consumption, health, and sanitation demands
	Waste transportation by water
Ecosystems	Natural and cultural heritage: water resources and ecosystems for recreation, tourism, and sports
	Conservation of sacred sites and rare species
Political	Democratic processes to ensure equitable participation and distribution of water rights and responsibilities
	Inclusion of women in water resources planning and decision-making
	Stakeholder cooperation and collaboration in water resource development, use, and management
	Financial Support

Source: (Biswas, 2004; Stephan et al., 2018)

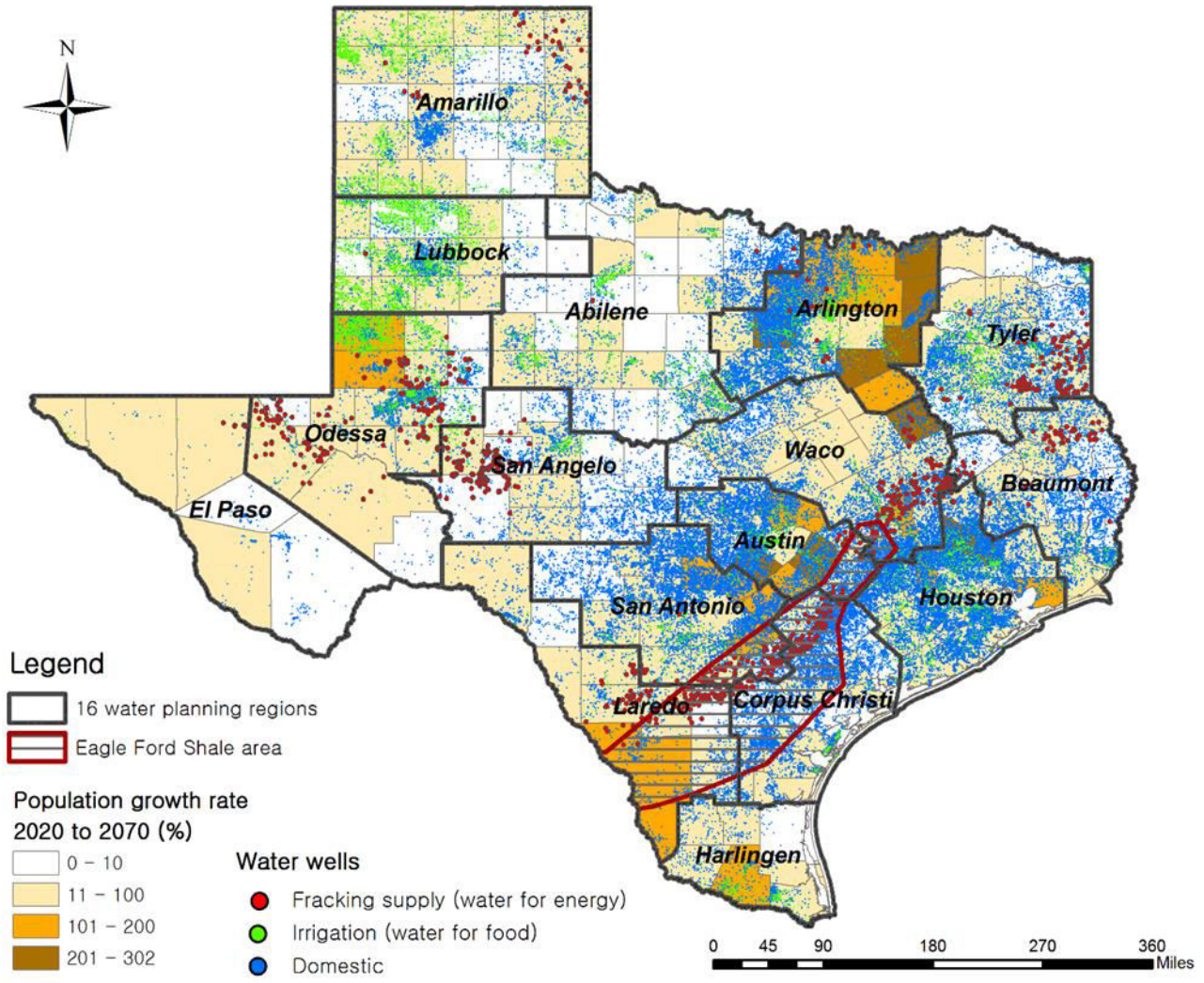
A New Vision For IWRM



Implementation Strategy

1. **Define** water management hotspot for the region under consideration.
2. **Identify** stakeholders and sectors impacting and being impacted by water challenge related to the identified hotspot.
3. **Identify** and **Quantify** interlinkages between water and the other sectors and hotspot identified earlier.
4. **Model** the system and develop implementation scenarios to simulate and analyze the effects on all stakeholders and sectors involved.
5. **Identify** trade-offs associated with each scenario.
6. **Assess** trade-offs and identify solutions considering the entire system.
7. **Identify** synergies among various stakeholders and scenarios.
8. **Communicate**, **train** and **engage** stakeholders on solutions for the water challenge.

Texas Water Gap



Texas Water Gap

Lubbock:

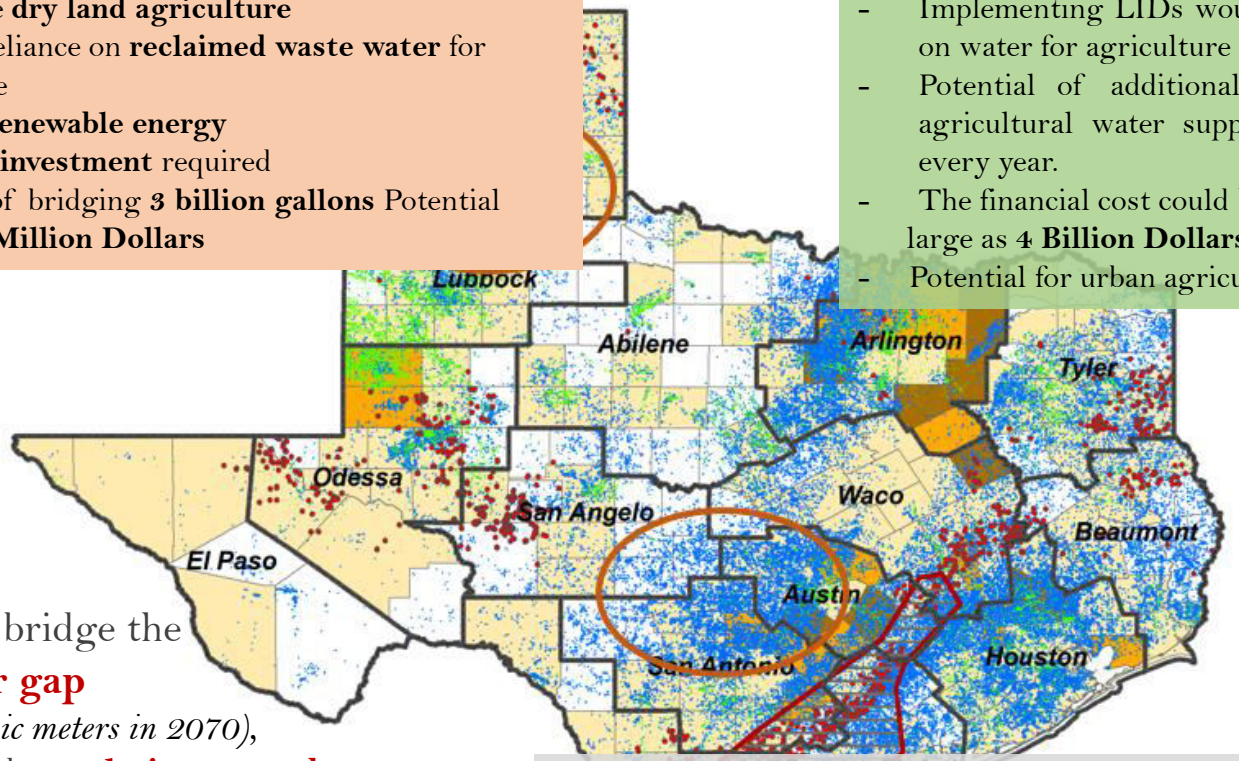
- Encourage **dry land agriculture**
- Increase reliance on **reclaimed waste water** for agriculture
- Invest in **renewable energy**

→ **Financial investment** required

→ Potential of bridging **3 billion gallons** Potential cost: **121 Million Dollars**

San Antonio Region:

- Implementing LIDs would elevate some of the stresses on water for agriculture
- Potential of additional **47 billion gallons** to the agricultural water supply in the San Antonio region every year.
- The financial cost could be as large as **4 Billion Dollars**
- Potential for urban agriculture



How can we bridge the **Texas water gap** *(8.9 Billion cubic meters in 2070)*, given projected **population growth** &**climate change stresses**, while accounting for :

- **variable water availability**
- **water demanding sectors**
- across **different regions** of the state?

Eagle Ford Shale:

- The shale development in Eagle Ford increases the **groundwater** consumption in South Texas
- The future net benefits of hydraulic fracturing industry are huge for counties and Texas, but the amount of benefit will change if we **put more value on other natural resources such as water**.

STOTEN Special Issue: reporting on the San Antonio Case Studies of the Texas A&M WEF Nexus Initiative (2015-2018).

Implementation Levers

1. Technological solutions

Examples:
Water sector – Desalination
Energy sector – Energy production/utilization with lesser water footprint
Agri sector – Dryland farming and dry farming

2. Policies and incentives

Long run sustainable policies and incentives to support such policies

3. Education and awareness for changing behaviors

Behavioral and anthropological changes through education to increase awareness and also to change behavior towards utilization of these resources; for instance; reducing the waste in water, energy and food and other resources to promote ecosystem health and human health

THANK YOU