Technology Transforms Sustainable Development Challenges to Opportunities

ESCWA Technology Centre

Economic and Social Commission for Western Asia

UNITED NATIONS

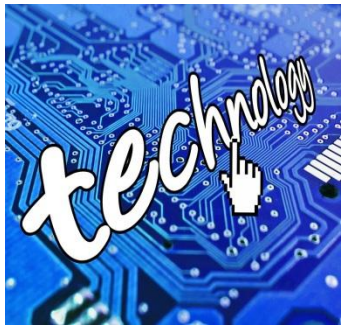
الاسكوا

ESCWA

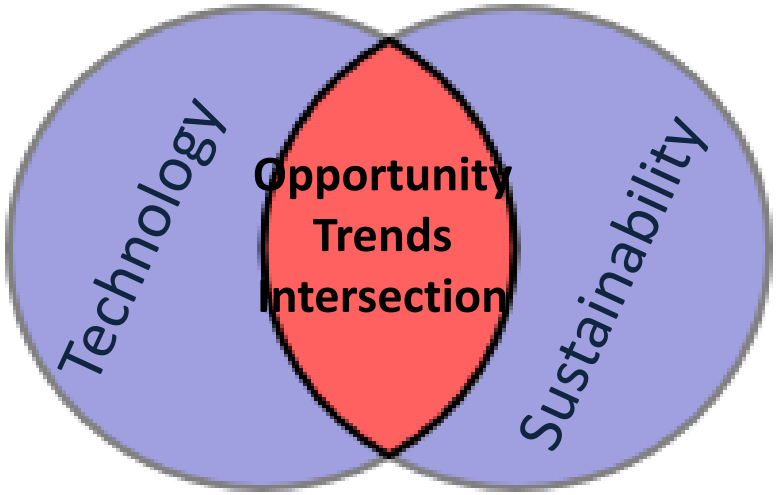
40 YEARS

“We need more advances. This is an era of remarkable opportunity. If we implement the two important visions of the 2030 Agenda and the Paris Agreement in full, we will be living in a much better and more prosperous world”

UN Secretary-General Ban Ki-moon, “Summit on Science and Technology Enablement for the Sustainable Development Goals.” **Nov 29, 2016 at the New York Academy of Sciences**



"behind every global risk the world faces hides multiple opportunities to innovate and create better, more prosperous, and sustainable societies."



AREAS DISRUPTIVE TECH Globally

"water, education, IT, and energy, will be disrupted by technological innovations and reshaped

- "innovative opportunity related to water tops the list of the most impactful and actionable opportunities"
- peer-to-peer energy sharing and trading on digital platforms is a market ready for take-off.
- Blockchain is an open source digital ledger Transforming role of the service provider to that of the consumer enabler

OPPORTUNITY RANKING 2017 UNGC

AMONG TOP 10 BY TECH LEADERS:

SMART WATER TECH #1

BUSINESS OF POWER #4

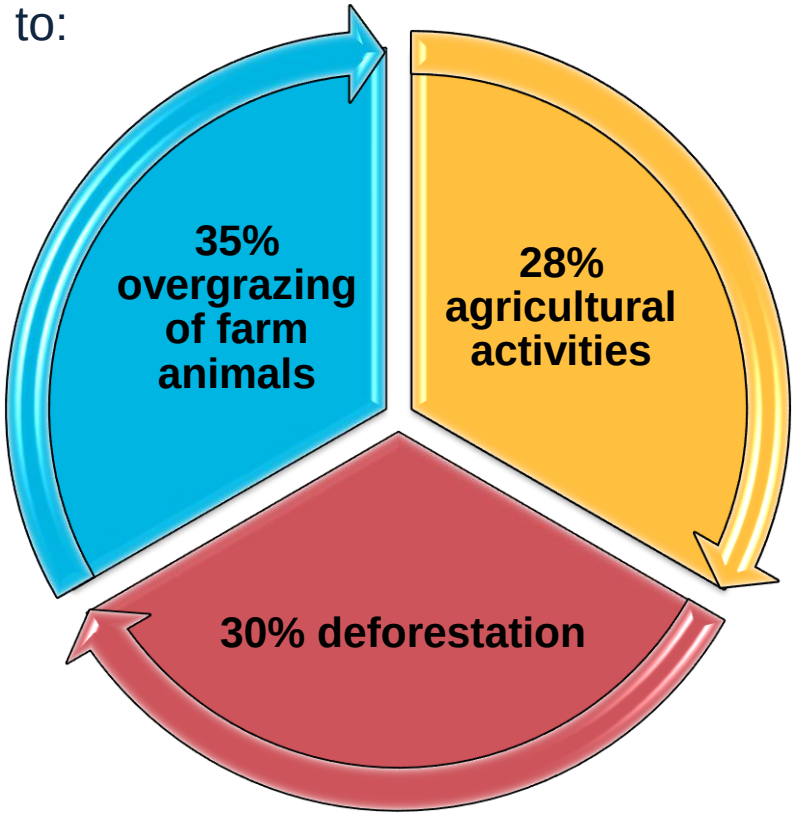
KEEPING SOIL ALIVE #5

MOISTURE TECH #6

LIVING ON AIR #9

I. CHALLENGE: SOIL DEPLETION

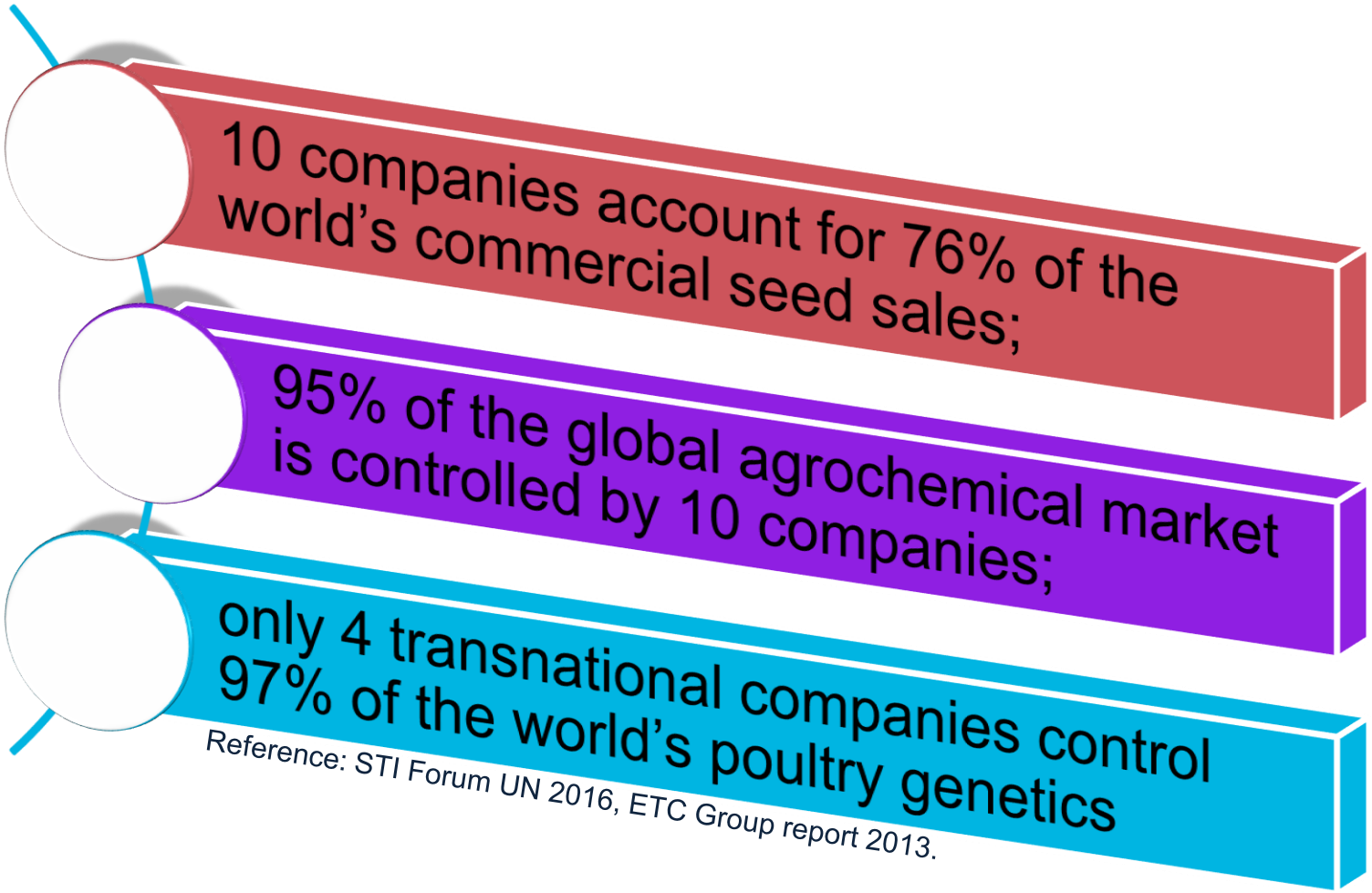
- Approximately 40 percent of soil used for agriculture around the world is degraded due to:



- Food production must increase by 70 percent between now and 2050 according to FAO.
- Humans worldwide obtain more than 99.7 percent of their food (calories) from the land.

- Each year we lose about 100,000 km2 of cropland due to soil erosion

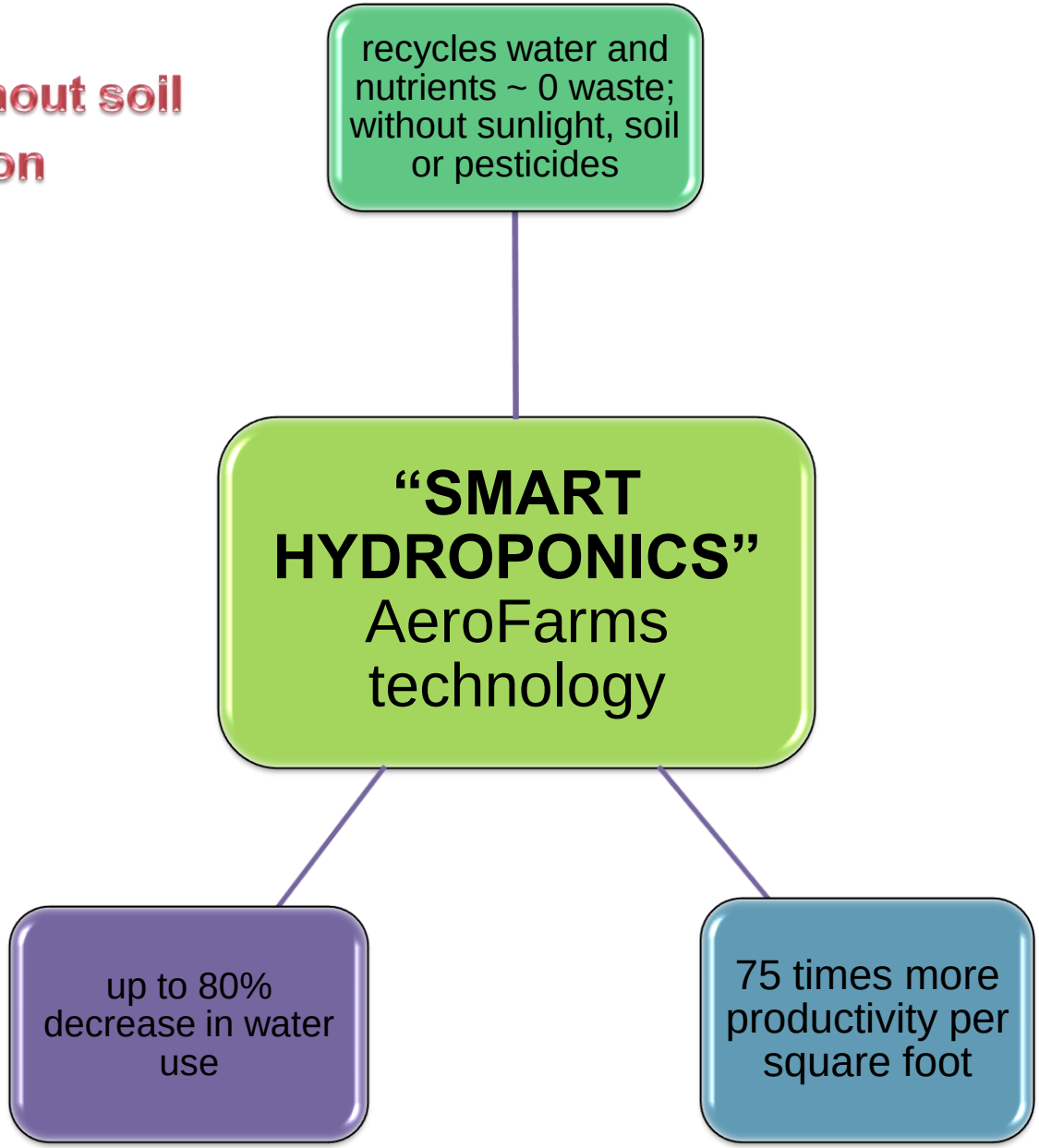
Reference: GLOBAL OPPORTUNITY REPORT 2017 DNV-GL, UNITED NATIONS GLOBAL COMPACT, SUSTAINIA



Reference: STI Forum UN 2016, ETC Group report 2013.

I. OPPORTUNITIES:

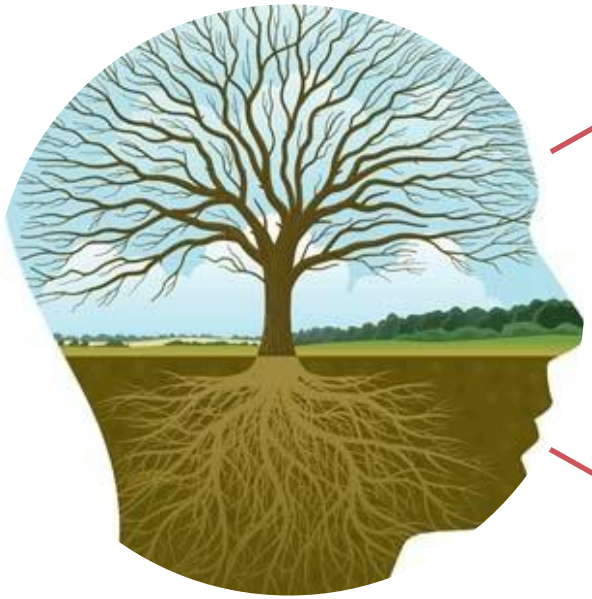
I.1 LIVING ON AIR without soil and reduced reliance on water and fertilizer



I.2 KEEPING OUR SOILS ALIVE

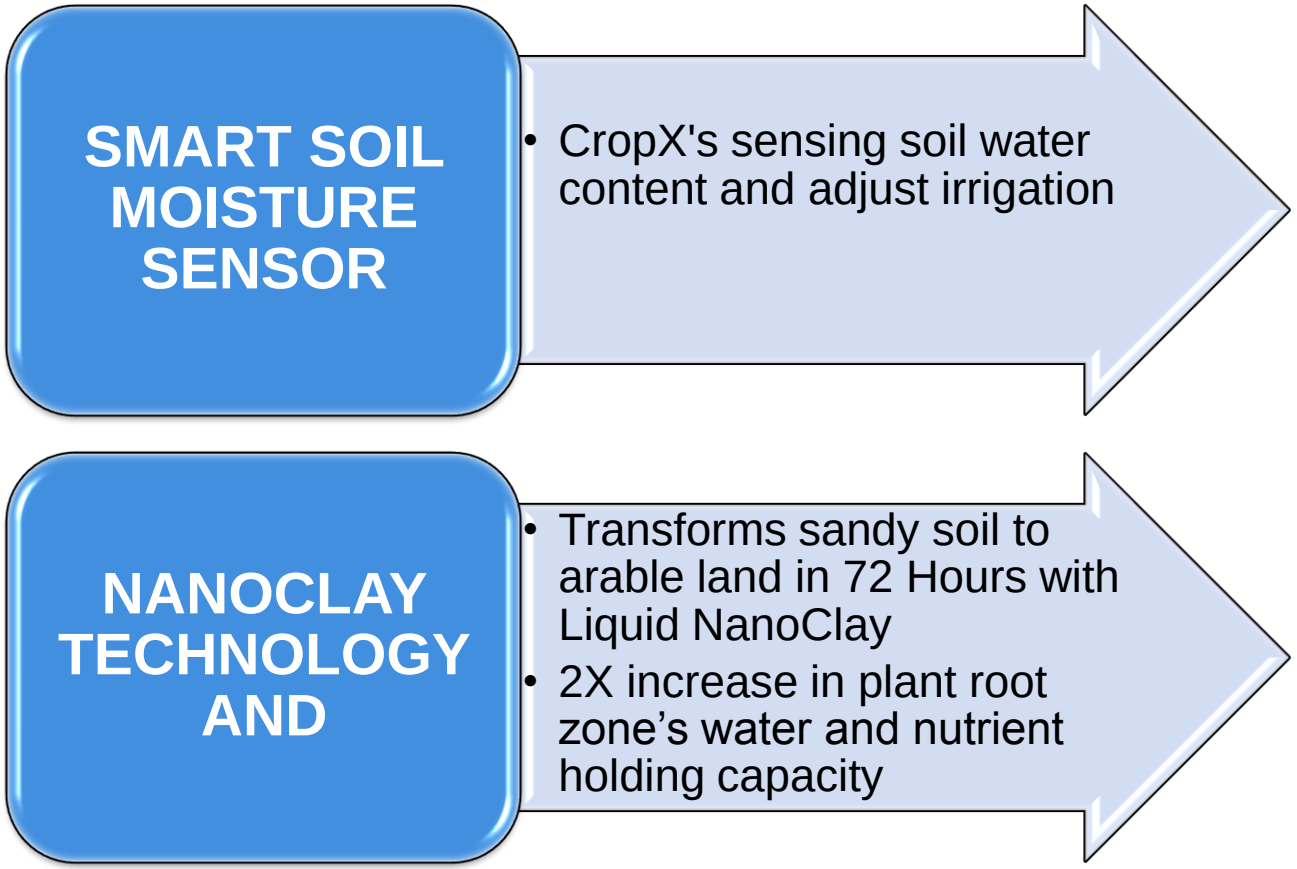
adding supplements of good bacteria and fungi (powders, liquids or seed coating)

GETTING TO THE ROOT



- increases root growth and increased water and heat stress tolerance
- increases the availability of nitrogen or phosphorus to plants in the soil

I.3 MOISTURE TECH soils act like sponges, Water Retention membranes



CHALLENGES TO Opportunities

BUSINESS OF POWER

- microgrids connect individual energy producers and consumers
- sharing economy, trade surplus of renewable electricity production
- blockchain technology, trading: solar panels, smart meters, software
- storage cloud platforms, network batteries, panels, energy-efficient

SMART WATER TECH

- Smart water tech, sensors and cloud data management
- adaptive and connected networks
- reduced water and energy consumption
- Smart sensors on pipes, management to detect leaks, measure rainfall, pH, temperature, turbidity, flow, pressure, contamination
- smart sensors Wi-Fi for cloud storage and management of water

STI in SD:
EXAMPLES from Arab countries

- Oman:
  - De ionization for saline water purification through nanotechnology 2013
  - Textile treatment of industry effluents using nanotechnology 2012
  - Solar nano photo catalyst in RO process 2012
  - Nanooxide self cleaning surface panels 2013
  - Titanium oxide solar panels 2014
  - Solar energy in RO pre treatment process 2008

SAMPLE: ARAB RESEARCH IN STI FOR WEF

Priorities	Organization	Field	Programs
Water efficiency technologies	**Kuwait Institute for Scientific Research (KISR)**	Desalination Wastewater & Aquifer Recharge Water Analysis Resource Management	- Innovative Desalination Technologies Program (IDT) - Innovative Technologies for Wastewater Treatment and Reclamation Program (ITWTR) - Thermal Desalination Technologies Program (TDT) - Water Resources Management and Allocation (WRMA) Program
Water desalination Technologies	**Water Desalination and reuse Center, (KAUST) KSA**	Water Desalination Membranes Technology Environment	- Water Desalination and Reuse - Innovations In Desalination Processes And Systems - Materials and Membranes for Water, Energy and Environment - Sustainable Water Technologies in Industry and Agriculture / Aquaculture
	The Middle East Desalination Research Center (MEDRC) OMAN	Solutions to Fresh Water Scarcity	- Thermal Desalination technologies - Membrane Desalination technologies - Hybridized Systems: Studies for development of hybrid desalination

SAMPLE: ARAB RESEARCH IN STI FOR WEF

Priorities	Organization	Field	Programs
Water desalination Technologies	**Qatar Environment and Energy Research Institute (QEERI)**	sustainability of water resources, waste water treatment and reuse.	- Innovative Way to Remove Heavy Metals from Water - Membrane Development: technologies for addressing global water and energy issues in a sustainable manner
	Water, Energy & Environment Center, Jordan University	Water and energy technology development	- Drinking water management. - Irrigation management.
	Advanced Water Technology Group,(AWT) KSA	**Desalination Powered by Solar** Renewable Energy and water desalination	- SWRO Features - Optimization - Solar Features

SAMPLE: ARAB RESEARCH IN STI FOR WEF

Priorities	Organization	Field	Programs
Water desalination Technology	**Masdar Institute UAE**	**The Institute Center for Water and Environment (iWater)** Clean water production technology and Climate change	Water and environmental technologies, including - Water and waste water treatment, - Water re-use and recycle, - Advanced materials for water applications - Water and environmental resource management engineering
	The Royal Scientific Society, (RSS) Jordan	Water Technologies Renewable Energy	- Nanotechnology in water and wastewater treatment: safe method for disinfection. - Developing new and innovative onsite wastewater treatment method: Drawer Compacted Filter
Scientific agriculture research	**The Arab Center for the Studies of Arid Zones and Dry Lands, (ACSAD)**	ACSAD Conducts research into the development of the arid and semi-arid areas of the Arab World	Integrated development projects, which include: - The Date Palm Research - Monitoring and combating desertification project, and - Agricultural Technology Development and Transfer to Farmers project.

SAMPLE: ARAB RESEARCH IN STI FOR WEF

Priorities	Organization	Field	Program
Scientific agriculture research	**The National Center for Agriculture Research and Extension, Jordan**	Improving agricultural production Achieve and maintain food sufficiency	- Improvement of Water Irrigation Management in Jordan and Lebanon - Irrigation Management Information System Program in Jordan and the Middle East (IMIS). - Treatment and Reuse of Wastewater in Agricultural Production Program - Agricultural Utilization of Low-Quality Water - Ultra-High-Frequency Irrigation for Increased Agricultural Efficiency - Middle East Irrigation Management Information System Project
	Agriculture Research Center Egypt	Transfer of new technologies	- Development of functional markers through association analysis of candidate genes for drought tolerance in barley

NEEDS

- Transforming local Research projects into pilot plants, and products

- Enabling role of STI in meeting growing population dignified living essentials with sustained natural resources management

- “People in Crisis” how can STI facilitate practical solutions and the demographic data while securing people rights