

Food and Agriculture Organization of the United Nations

Session 4: Innovation, Technology & Adoption to Enhance Resource use Efficiency



Drylands of NENA Region: Integrated Approaches and Sustainable Natural Management to Enhance Resilience and Food Security

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The Drylands



- *Water:* 1/3 of humanity in drylands, with ~8 % of the World's renewable water.
- *Poverty:* major dryland systems of Africa, Asia and LA host about half of the World's poor.
- *Food security:* global drylands grow about 44% of the world's food and support 50% of the world's livestock, and still face major challenges of food insecurity and **malnutrition**.

• Land degradation &

desertification: Long-term failure to balance human demand for ecosystem services and what the ecosystem can supply.

Source: Map http://oceanworld.tamu.edu/resources/environment-book/aridlanddegradation.html; Millennium Ecosystem Assessment (2005



NENA as a hotspot

- The region spans over 14% of Earth land surface and hosts 10% of its population.
- Land mostly arid or semi-arid (~ 87 % predominantly desert); arable land is only ~6.8 %
- Agriculture is an important source of income for many countries in the region
- High population growth & urbanization: population projected to double by 2050!
- Shrinking natural resources: Rainfall predicted to decline by 20–40 % in a 2°C world
- Climate: aridity, drought, desertification, water scarcity etc.
- Yield gap



SDG Target 2.3: By 2030, double agricultural productivity and incomes of small-scale food producers

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Smallholder Farmers in the eye of the storm

Climate Effects

- Rising temperatures
- Changing precipitation
- Sea level rise
- Extreme weather events



Development trends

- Population dynamics
- Globalisation & trade processes
- Demand for natural resources
- Mitigation policies

Environmental impacts

- Loss of biodiversity
- Decrease of land productivity
- Ocean acidification
- Water scarcity
- Depletion of fish stocks
- Glacier retreat
- Salinization
- Desertification

Smallholder Farmers

Socioeconomic vulnerability

- Food insecurity
- Poverty/lack of income
- Social exclusion & inequalities
- Lack of institutional support
- Increased migration

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Reducing vulnerability and enhancing resilience in the drylands



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ORIGINAL PAPER

An integrated agro-ecosystem and livelihood systems approach for the poor and vulnerable in dry areas

Maarten van Ginkel • Jeff Sayer • Fergus Sinclair • Aden Aw-Hassan • Deborah Bossio • Peter Craufurd • Mohammed El Mourid • Nasri Haddad • David Hoisington • Nancy Johnson • Carlos León Velarde • Víctor Mares • Andrew Mude • Ali Nefzaoui • Andrew Noble • K. P. C. Rao • Rachid Serraj • Shirley Tarawali • Raymond Vodouhe • Rodomiro Ortiz

van Ginkel et al. - 2013



Distinction between focus on reduced vulnerability & risk and focus on enhancing resilience



Dryland agriculture: Water as a catalyst & driver for R&D





Hand in Hand Geospatial Platform

Evidence-based, countryled initiative to accelerate agricultural transformation and sustainable rural development to eradicate poverty (**SDG 1**) and end hunger and all forms of malnutrition (**SDG2**)



Integrating FAO data on Soil, Land, Water, Climate, Crops, Fisheries, Livestock, Forestry, socioeconomics, etc.

https://data.apps.fao.org/

https://www.youtube.com/watch?v=xKON7YWWXUI

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Main challenges in the drylands related to land, soil and water resources

- Water scarcity,
- High climatic variability,
- Frequent and recurrent droughts,
- Land and soil degradation (Desertification),
- Rapid population growth,
- Widespread poverty/migration, and
- Climate change

... Bio-physical, Social and Economic

Land degradation and Desertification

Erosion by water and wind

Decline of soil organic carbon

Decline of soil fertility

Lowering water table

Increase in soil salinization

Pollution of soil and water

- resources
- Increased stoniness Loss of vegetation cover and biodiversity
- ... Interrelated and cyclic



SDG 15.3.1

- *"Proportion of land that is degraded over total land area"*
- Land Degradation Neutrality LDN targets
- Soil Organic Carbon stock as an indicator for monitoring degraded land and soil degradation.
- FAO's Global Soil Partnership has been working on mapping soil threats since 2017 using a country driven approach. So far, the GSP has published the first ever soil organic carbon map (GSOCmap), and is currently working on mapping soil salinity and soil erosion at the global level.





FAO comprehensive approach for enhancing sustainable management of natural resources: assessment, planning, management and monitoring





Promote implementation of **sustainable land management** and sustainable **soil** management (SSM) to **combat land degradation** and **restoration of degraded land**.

Integrated water management in dryland farming: Capture and efficient use of precipitation to decrease water deficit, Supplemental irrigation through nonconventional water sources, Nutrients recycling

Strengthen communities' adaptation and resilience to land degradation and water scarcity (insurance, saving schemes, employment creation, social protection).

Promote sustainable food systems; reduce food waste and loss; for resource efficient production and sustainability.

Build the capacity of technical staff and small-scale farmers and local community to adapt to new technologies/practices (farmer field schools).

Promote participatory land use planning and integrated landscape management to enhance productivity and sustainability.



Integrated approach for land, soil and water resources management in the drylands

- FAO integrated approaches to support sustainable use of resources: land resources planning, water resources management, sustainable land/soil management, integrated landscape management, ecosystem restoration.
- **Promote enabling environment** to foster uptake and widespread implementation of sustainable options (training, incentives, finance, policies, institutions, private sector, investment).
- Enhancing resilience and food security through sustainable land, soil and water management, responses to disasters and risks: COVID-19, drought, sand and dust storm, others...