SUSTAINABLE AGRICULTURE IN THE DRYLANDS

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Introduction

•Dryland agriculture: characterized by land use systems across the desert, arid, semi-arid and dry sub-humid agro-ecologies.

Communities living in these "difficult" environments have developed resilient farming systems comprising *interalia*:

- Use of grasslands that support almost half of livestock globally;
- niche crop/commodity production systems;
- forestry/agroforestry to sustain highly adapted livelihood systems.

Dryland agriculture constitutes >44% of global agricultural production and contains significant agrobio-diversity. And drylands contribute to 50% of the livestock production, globally.

Sustainability of agricultural production systems = highly judicious use of resources: knowledgeintensive use of biomass; soil fertility management, efficient water use technologies, and contextappropriate production and protection measures.

Other features of Dryland farming systems:

- Some 33 % of the global human population and 50% of a range of livestock productionsystems.
- Plant and animal health is crucial for the production of food for human consumption.
- Plant pests and diseases are important threats to farming community-livelihoods especially in developing countries where agriculture is the main source of income.
- •A very high proportion of agriculture production is lost annually due to destructive pests and diseases – (the latest Desert locust plague).



Challenges for Dryland Agriculture

• First and foremost – limited access to poor quantity and quality of water = limited biomass



 These factors have a combined impact on food productivity and production – leading to huge biological yield gap

Overcoming Challenges & Opportunities

 Traditional sustainable resource management systems are breaking down: demographic pressures; climate change etc.

 Coupled with weak institutions: agricultural advisory services and so, poor access to knowledge of cutting-edge technologies, new practices /techniques for marginal farmers (with no decision tools).

•Agriculture in the drylands can thrive through:



A holistic approach to Food Systems for sustainable production in drylands in order to deliver on SDG 1& 2 with links to the entire 2030 Agenda.

What can we learn from IFAD's grant portfolio?

Target groups

• The Fund's target groups and their household food-security strategies predominantly located in harsh, marginalised agro-ecologies;

Tailored Investments

 Over the past four decades IFAD has invested more than USD 2 billion in the development of best-bet technologies with particular reference to those in remote, risk-prone and marginal areas and marginalised target groups.



Examples in Water Resource management: <u>Alternatives for Smallholder Irrigation</u>

Emphasis on Demand Management

• More Crop per Drop

Renewed interest in provision of supply

• More Drops on the Crops

More Crop per Drop? Alternatives for Smallholder Irrigation

Community Level Tools for decision making and implementation should include:

- ✓ sustainable, healthy, and ecologically sound management of smallholder irrigation
- Smallholders using manpower or pumps
- ✓ Small multi-purpose reservoirs
- Larger government sponsored smallholder schemes



Atriplex/barley alley cropping

Adoption of high impact Forage Legumes

Promotion of rotations of barley with forage legumes (Vicia and Lathyus spp.)

Improved breeds of small ruminants – better adaptability and more efficient feed conversion



Example of sheep Feeding on Barley Stubble

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Innovations in breeding

EFFICIENT FEED CONVERSION



EARLY WEANING





Protection technologies in desert conditions with net-houses

- With IFAD and AFESD support ICARDA and NARS have developed net houses throughout the Arabian Peninsula since 2008 (Arabian Peninsula Regional Programme).
- Soil-less agriculture (Hydroponics) in UAE.
- Protected agriculture is very promising (e.g, Afghanistan, Yemen): Net-houses allow vegetable production in desert conditions 8-9 months of the year with high yield. Net benefits same as cooled greenhouses in 12 months due to energy savings.



Technologies for storable, transportable feed



The promise of new technologies for sustainable food systems in the drylands

Fourth industrial revolution technologies – examples:

