Holistic View and Future opportunities to Promote Sustainable Agriculture Development in Drylands: The Case of the Kingdom of Saudi Arabia

Dr. Mohammad Mathkar ALMUTARI

Ministry of Environment, Water & Agriculture
Riyadh, Kingdom of Saudi Arabia
Kingdom of Saudi Arabia

- Geographically the largest sovereign state in Western Asia with over 2.15 million km²
- It is the only country with both a Red Sea coast and a Persian Gulf coast, and most of its terrain consists of arid desert, lowland and mountains

Diverse Agricultural Zone conditions

- Mediterranean
- Semitropical
- Arid
- Mountainous
Goals for Sustainable Agricultural development

01. Protect and improve the use and sustainability of natural resources to contribute to achieving water security and environmental preservation

02. Enhance food security during normal and crisis situations

03. Balancing local knowledge through science based inclusive solutions

04. Create job opportunities and contribute to sustainable rural development in order to provide adequate living conditions for small farmers

05. Increasing the production efficiency, competitiveness and investment environment for agricultural products and services and enhancing their contribution to the economy

06. Enhance plant and animal health and safety, protect against diseases and pests infestations, and ensure product safety
SWOT analysis

**Strengths**
- Large areas suitable for various types of agricultural activities
- It provides renewable water resources and a mild climate
- Successful activities with extensive experience and leadership at the regional and international levels
- Various and specialized human experiences
- Great biological diversity

**Weaknesses**
- Limited database of the agricultural sector
- Sub-optimal operating procedures in monitoring and control
- Weak supply chain infrastructure (limited cold storage in ports and markets, few post-harvest packaging facilities)
- Low marketing efficiency of vegetables and fruits
- Limited use of modern agricultural practices, especially at the level of small farmers and the livestock sector
- Deficiency in the performance of most agricultural cooperative societies
- Lack of organized multidisciplinary research approach

**Opportunities**
- Directing agricultural activities according to the comparative advantages of the regions in order to improve productivity and enhance environmental sustainability and economic return for the sector
- Institutional innovations by Restructuring the current institutional situation and the privatization of some tasks and services
- Benefit from the development of agricultural technologies, methods and systems worldwide
- Unifying the efforts in the field of research and development and adopting the results of applied research
- Strengthening the work of government associations and raising public investment in technology and infrastructure
- Trade Liberalization
- Rationalize subsidies on agricultural inputs
- Agricultural diversification
- Increase inflow of institutional credit to dryland agriculture
- Networks and collaborations.

**Threats**
- Limited renewable water resources
- Unsustainable exploitation of natural resources (groundwater, pastures)
- Increasing costs of production, including energy, water and employment
- High risk and uncertainty in the sector due to climate factors, seasonal changes in demand
- High demand of agricultural inputs and their impact on price fluctuations at the global level
- Small-scale producers suffer from difficulties at the marketing level, which affects their profitability and the sustainability of their production
Examples of Transformation of Agricultural sector in the Kingdom of Saudi Arabia

Crop Patterns

Irrigation Systems

Fruits and Vegetables Production
Criteria for determining the priority of the cropping pattern

**Water security**
- Water requirements per ground unit
- Water use efficiency

**Food security**
- Average productivity per hectare

**Social importance of the crop**
- The cropping area of each governorate
- The area cultivated with the crop in each governorate

**Economic importance of the crop**
- Average production costs per unit area of prevalent crops
- Average gross profit per unit area of prevalent crops
- The economic value of a unit of water used in the production of the most prevailing crops
Share of different Irrigation techniques for crops in the Kingdom

- **Flood (Surface)**
  - Summer vegetables: 15%
  - Grains and feed: 4.8%
  - Winter vegetables: 20.3%
- **Drip**
  - Summer vegetables: 20.8%
  - Grains and feed: 2.4%
  - Winter vegetables: 50.3%
- **Sprinkler**
  - Summer vegetables: 25.3%
  - Grains and feed: 45%
  - Winter vegetables: 0%
  - Palm: 87%
- **Rain**
  - Summer vegetables: 37.3%
  - Grains and feed: 18.4%
  - Winter vegetables: 0%
- **Fruits (except palm)**
  - Summer vegetables: 7.9%
  - Grains and feed: 0%
  - Winter vegetables: 0%
  - Palm: 7.9%
  - Others: 0.6%
Contribution of Fruits and Vegetables

Contribution of greenhouses in the production of vegetables

Development of Fruit production

Production (tons)  | Contributing to the total vegetable production

- 2015: 257,000 tons (14%)  
- 2020: 407,000 tons (20%)  
- 2025: 550,000 tons (27%)  
- 2030: 800,000 tons (40%)  

Production (million tones)  | self-sufficiency %

- 2015: 1.84 million tones (70%)  
- 2020: 2.04 million tones (73%)  
- 2025: 2.30 million tones (80%)  
- 2030: 2.60 million tones (85%)
Way Forward/Conclusion

01
Numerous factors drive the sustainability in drylands, but Water is the most essential element to secure global food production in drylands

03
Cooperation and Technology sharing through collaborative programs

05
Government Policies, Programs, and Institutional reforms keeping in mind real time challenges

02
Science and technology based innovation-driven business models to promote sustainability and enhance productivity in drylands

04
Capacity building through Education, training, media campaigns and awareness programs for Adoption of the technology

06
Investments in agriculture development and modernization is a main catalyst to safeguard global food security
THANK YOU