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Sustainable Agriculture Development in Drylands in the Arab Region

By El Mostafa Darfaoui, AOAD Consultant
1. Introduction,
2. Sustainable Agriculture Development (SAD) in Drylands definition,
3. Consequences of non-sustainable Agriculture,
4. Application of Sustainable agriculture practices,
5. Food Security and SAD Strategies in the Arab Region,
6. Conclusions and Recommendations.
Drylands at a glance

- Drylands include dry sub-humid, semi-arid, arid or hyper-arid climates,
- They represent about **40% of the earth’s land surface,**
- They are home to more than **2 billion people.**
- They contribute to **50% of the livestock production,**
- Drylands are often characterised by **water scarcity, low vegetal cover, meagre soils**, lower productivity, higher population pressure and **land degradation.**


Map: [https://treeyopermacultureedu.com/chapter11-dryland-strategies/](https://treeyopermacultureedu.com/chapter11-dryland-strategies/)
A brief on the Arab Nation (AN)

- **22 States, 10.3% of the global land area**
- **Drylands** and deserts represent **80%** of the region.
- Population of **440 million** (2019), growth rate of 2.2% (global average 1.25%).
- **Forests**: 52 million hectares (**4%** compared to **30% worldwide** in 2015)
- **Rangelands**: 397 million hectares (30%)
- **Agriculture**: 71 million hectares (6%), 14 million ha **irrigated** (20%)
- **Livestock**: 60 million heads of cattle, 276 million small ruminants and 17 Million camels.

*Sources: (AOAD Statistics 2016, FAO, FRA 2015, WB, 2014)*
What is Sustainable Agriculture Development in Drylands (SADD)?

- **Cope with Dry Environment:**
  - Water shortage & drought,
  - Poor soils,
  - Hot temperatures,
  - Limited resources,
  - Inflated population
  - Relatively high rate of poverty,
  - Lower technicity,
  - Fragile environment,
  - Land degradation

- **Produce food, feed and fiber, and assure Food Security for all** (FS is when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life.)

- **Assure Sustainability** (Productivity, profitability, quality of life, and conservation and expansion of the resources and biodiversity).

- **UN: CCD, FCCC, CBD …

- **SDG**

- **National context**

- **Adopt** integrated approaches at various scales (farm, ecosystem, community, national, regional and global levels)

- **Good practices**
Sustainable Development Agriculture in Drylands: Options and Practices

- Scientific Research,
- Extension,
- Capacity building,
- Dvpt. & Transfer of technologies.

- Water:
  - Saving, management, conservation, rain water harvesting...

- Soil:
  - Management, conservation, sound fertilisation

- Forest and rangelands sustainable management

- Waist:
  - Harvest and consumption to be Reduced

- Livestock:
  - Sustainable management/ production, genetics and health

- Integrated Pest Management

- Appropriate Technology
  - In all aspects of agriculture

- Agriculture
  - Conservative, Organic, Agroforestry

- Land Restoration
  - Afforestation/ reforestation, land rehabilitation...

- Sound Markets and trade

- Social dimension, participatory and gender approaches

- Sound Agroindustry
  - To increase products value and create jobs

- Sustainable aquaculture to produce food and protect aqua systems
Consequences of non-sustainable Agriculture in the Arab Region and in the World

- Expansion of intensive agriculture aiming at maximizing the production of food and fiber at the expense of the natural resources and environment, led to land degradation and desertification of about 19.2% of the global land surface and reaching up to 73% in some countries in the Arab Region. Degradation takes diverse forms (UNCCD):
  - Change in land cover, deforestation,
  - Loss of Biodiversity,
  - Drop in productivity,
  - Soil deterioration, desertification, sand and dust storms.
  - Poverty, Hunger and Migration,
  - Drop in resilience to droughts and to CC...
Land Productivity Trend 2000-2015

<table>
<thead>
<tr>
<th>(Area in km² 1000s)</th>
<th>Declining</th>
<th>Stressed</th>
<th>Stable or increasing</th>
<th>No data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
<td>%</td>
<td>Area</td>
<td>%</td>
</tr>
<tr>
<td>Tree-covered areas</td>
<td>1 296.3</td>
<td>4.8</td>
<td>1 989.9</td>
<td>7.3</td>
</tr>
<tr>
<td>Grassland</td>
<td>2 748.1</td>
<td>14.8</td>
<td>2 248.6</td>
<td>12.1</td>
</tr>
<tr>
<td>Cropland</td>
<td>1 440.3</td>
<td>10.5</td>
<td>1 433.5</td>
<td>10.4</td>
</tr>
<tr>
<td>Wetland</td>
<td>95.3</td>
<td>2.8</td>
<td>125.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Total</td>
<td>5 580.0</td>
<td>8.9</td>
<td>5 797.9</td>
<td>9.2</td>
</tr>
</tbody>
</table>

- **Globally**, 76% stable/increasing, & **18.1%** of land productivity is declining/stressed
- The greatest decline in grasslands and croplands,
- **In the Arab Region**: stable in 62% of the lands, increased in 6% and **declined/stressed in 32%**,
- There is greater loss in productivity in the Arab Region

Sources: UNCCD. 2019. ICCD/CRIC(17)/2* And AOAD.2019. First Arab Report on LDN.
Proportion of degraded land relative to total land area (SDG indicator 15.3.1) as reported by UNCCD parties

- Land degradation **globally** ranged between 0 and 73%, with **19.2%** avg.
- It was more intense in **Asia (24%)**, South America and certain **African** countries (17%).
- In the **Arab Region** avg. **7.3% (1-73%)** (A report by ACSAD in 2003 estimated the LDD in the AR at 60%).
- The **default data** provided by the UNCCD and utilised by Arab countries seems to **underestimated** the phenomenon and **proves** the need for **adapted** approaches, methods and techniques for dry lands.

**Sources:** UNCCD. 2019. ICCD/CRIC(17)/2*
Causes of land Degradation in the AR

**Direct causes:**
- Improper management
- Overexploitation of land resources
- Disturbance of the hydraulic cycle
- Deforestation
- High livestock stocking rates and overgrazing
- Urban and industrial activities
- Pollution by industrial and agricultural chemicals

**Indirect causes:**
- Population pressure
- Wars and conflicts
- Poverty
- Land tenure
- Shortage in labour force
- Poor governance, policies,
- Low level of education,
- Lack of efficiency.
The main threats in the AR are from loss of habitats, overexploitation and changes in land use.

In Asia, mainly deforestation and habitat loss.

In Africa, overexploitation and habitat loss.

Reported threats to associated biodiversity, by region

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>297</td>
</tr>
<tr>
<td>Asia</td>
<td>505</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>212</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>779</td>
</tr>
<tr>
<td>Near East and North Africa</td>
<td>293</td>
</tr>
</tbody>
</table>

**Notes:** A “response” is a mention by a specific country of a specific component of biodiversity (species or higher taxonomic group). No data are available for North America or the Pacific. Analysis based on 91 country reports. Source: Country reports prepared for The State of the World’s Biodiversity for Food and Agriculture.
## Reported levels of adoption of selected management practices and approaches, all production systems aggregated

<table>
<thead>
<tr>
<th>Management practices and production approaches</th>
<th>Africa</th>
<th>Asia</th>
<th>Europe and Central Asia</th>
<th>Latin America and the Caribbean</th>
<th>Near East and North Africa</th>
<th>North America</th>
<th>Pacific</th>
<th>Non-OECD</th>
<th>OECD</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic agriculture</td>
<td>7</td>
<td>37</td>
<td>6 (67)</td>
<td>18 (78)</td>
<td>8 (50)</td>
<td>4 (31)</td>
<td>1 (100)</td>
<td>3 (30)</td>
<td>31</td>
<td>43</td>
</tr>
<tr>
<td>Low external input agriculture</td>
<td>7</td>
<td>37</td>
<td>5 (56)</td>
<td>11 (48)</td>
<td>5 (31)</td>
<td>3 (23)</td>
<td>1 (100)</td>
<td>1 (10)</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>Sustainable soil management</td>
<td>9</td>
<td>47</td>
<td>5 (56)</td>
<td>11 (48)</td>
<td>9 (56)</td>
<td>3 (31)</td>
<td>1 (100)</td>
<td>1 (10)</td>
<td>27</td>
<td>39</td>
</tr>
<tr>
<td>Management of micro-organisms</td>
<td>8</td>
<td>42</td>
<td>5 (56)</td>
<td>6 (26)</td>
<td>2 (25)</td>
<td>3 (31)</td>
<td>0 (0)</td>
<td>1 (10)</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Conservation agriculture</td>
<td>9</td>
<td>47</td>
<td>4 (44)</td>
<td>9 (39)</td>
<td>9 (56)</td>
<td>4 (31)</td>
<td>0 (0)</td>
<td>1 (10)</td>
<td>28</td>
<td>39</td>
</tr>
<tr>
<td>Integrated plant nutrient management</td>
<td>8</td>
<td>42</td>
<td>5 (56)</td>
<td>15 (65)</td>
<td>8 (50)</td>
<td>3 (23)</td>
<td>1 (100)</td>
<td>2 (20)</td>
<td>28</td>
<td>39</td>
</tr>
<tr>
<td>Integrated pest management</td>
<td>7</td>
<td>37</td>
<td>6 (67)</td>
<td>15 (65)</td>
<td>8 (50)</td>
<td>5 (38)</td>
<td>1 (100)</td>
<td>3 (30)</td>
<td>30</td>
<td>42</td>
</tr>
<tr>
<td>Pollination management</td>
<td>5</td>
<td>26</td>
<td>3 (33)</td>
<td>11 (48)</td>
<td>7 (44)</td>
<td>3 (23)</td>
<td>1 (100)</td>
<td>0 (0)</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Enrichment planting</td>
<td>7</td>
<td>37</td>
<td>5 (56)</td>
<td>8 (35)</td>
<td>6 (35)</td>
<td>4 (31)</td>
<td>0 (0)</td>
<td>1 (10)</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>Reduced impact logging</td>
<td>7</td>
<td>37</td>
<td>3 (33)</td>
<td>10 (43)</td>
<td>4 (25)</td>
<td>1 (8)</td>
<td>0 (0)</td>
<td>1 (10)</td>
<td>18</td>
<td>25</td>
</tr>
</tbody>
</table>

### Genetic improvement

| Domestication                                | 7      | 37   | 6 (67)                  | 10 (57)                        | 4 (25)                    | 2 (15)        | 0 (0)   | 1 (10)  | 20   | 28    | 10 (53) | 30 (33) |
| Base broadening                              | 6      | 32   | 6 (67)                  | 10 (43)                        | 5 (31)                    | 3 (23)        | 0 (0)   | 2 (20)  | 22   | 31    | 10 (53) | 32 (35) |

### Notes

- The figures indicate the number (and percentage) of countries reporting the respective practice or approach in one or more production-system categories. Blue-colored cells indicate cases in which 50 percent or more of the countries report the practice or approach. Analysis based on 91 country reports.

### Source

Country reports prepared for The State of the World’s Biodiversity for Food and Agriculture.
Food Security and Sustainable Agriculture Strategies in the Arab Region
### Cereals, Potatoes, Pulses, Vegetables, Fats & Oils, Eggs, Milk & Dairy Products

<table>
<thead>
<tr>
<th>Self Satisfaction Rate (%)</th>
<th>RED MEAT</th>
<th>POULTRY MEAT</th>
<th>FISH</th>
<th>FRUITS</th>
<th>DATES</th>
<th>SUGAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average 2009-2013</td>
<td>82.0</td>
<td>66.8</td>
<td>104.8</td>
<td>97.5</td>
<td>98.1</td>
<td>38.1</td>
</tr>
<tr>
<td>2016</td>
<td>84.4</td>
<td>67.4</td>
<td>106.6</td>
<td>99.8</td>
<td>115.3</td>
<td>50.3</td>
</tr>
<tr>
<td>Progress 2009-2016</td>
<td>2.5</td>
<td>0.5</td>
<td>1.8</td>
<td>2.3</td>
<td>17.2</td>
<td>12.2</td>
</tr>
</tbody>
</table>

### Red Meat, Poultry, Meat, Fish, Fruits, Dates, Sugar

<table>
<thead>
<tr>
<th>Self Satisfaction Rate (%)</th>
<th>CEREALS</th>
<th>POTATOES</th>
<th>PULSES</th>
<th>VEGETABLES</th>
<th>FATS &amp; OILS</th>
<th>EGGS</th>
<th>MILK &amp; Dairy PRODUCTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average 2009-2013</td>
<td>46.4</td>
<td>100.0</td>
<td>73.7</td>
<td>100.7</td>
<td>44.5</td>
<td>96.2</td>
<td>88.1</td>
</tr>
<tr>
<td>2016</td>
<td>37.7</td>
<td>92.3</td>
<td>48.4</td>
<td>100.2</td>
<td>40.4</td>
<td>91.3</td>
<td>80.6</td>
</tr>
<tr>
<td>Progress 2009-2016</td>
<td>-8.7</td>
<td>-7.7</td>
<td>-25.3</td>
<td>-0.5</td>
<td>-4.1</td>
<td>-4.8</td>
<td>-7.5</td>
</tr>
</tbody>
</table>

In 2007, the Riyadh Arab Summit approved the Strategy and Called on the States and AOAD to embark on implementing it in coordination with all the concerned parties.

**Objectives:**

1. Strengthen food security,
2. Assure the sustainability of the Arab agricultural resources,
3. Strengthen the holistic approach in the Arab agricultural systems,
4. Achieve a common Arab agricultural policy,
5. Assure stability and increase resilience of the Arab rural communities.

AOAD and the Arab countries collaborate to implement this strategy with FAO and the other national, regional and international organisations and Funds and the private sector.
Progress in the implementation of the strategy in Arab States

For the 2017-2021 period:

<table>
<thead>
<tr>
<th>Projects which are implemented or under implementation</th>
<th>Total Number of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects with known budgets</td>
<td>Number</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Total</td>
<td>1881</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Projects prepared lacking funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>150</td>
</tr>
</tbody>
</table>

For the 2017-2021 period: The budget required to implement the Strategy’s programmes and projects during this period is: 20.846 Billion US$ (B$)

<table>
<thead>
<tr>
<th>investment costs</th>
<th>Operating costs</th>
<th>vegetal production</th>
<th>livestock sector</th>
<th>Public funding</th>
<th>Private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.086 B$</td>
<td>3.760 B$</td>
<td>66.62 B$</td>
<td>33.38 B$</td>
<td>44.8%</td>
<td>55.2%</td>
</tr>
</tbody>
</table>
Other Arab strategies aimed towards Sustainable Dryland Agricultural Development

At the Regional Level
- Arab Strategy for Aquaculture 2017 - 2037
- Arab Strategy for Water Security 2010 - 2030
- Arab Rangeland Strategy 2020 - 2040
- Arab plan to support countries to achieve LDN 2018 – 2030

At the National Level
- National Sectorial Strategies and Action plans concerning all Agricultural Sector.
- National Action Plans, voluntary goals and commitments to major Environmental UN Conventions, including UNCCD, UNFCCC, CBD, ...and the UN SDG.
Conclusions and recommendations

1. SAD in drylands offers solutions to overcome water scarcity, produce enough food and fiber, achieve LDN, SDG, conserve biodiversity and face CC.

2. Dryland areas are lagging behind in terms of adoption of the Sustainable agriculture development practices,

3. The G20 can and are called upon to provide the assistance to drylands’ countries, farmers and livestock producers, communities and organisations, operating in these areas, in terms of:
   - Funds,
   - Scientific and technical assistance,
   - Capacity building,
   - Information management and extension.
Thank you