AGRICULTURE AND RURAL DEVELOPMENT IN THE FUNCTION OF SUSTAINABLE DEVELOPMENT

ENERGY EFFICIENCY IN BUILDINGS - BASIS FOR ACHIEVING SUSTAINABLE SOCIO-ECONOMIC GROWTH IN BOSNIA AND HERZEGOVINA
SUSTAINABLE AGRICULTURE AS VISION IN MOROCCO & GREEN MOROCCO PLAN

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PLAN OF THE PRESENTATION

- Introduction
- Morocco & Agriculture
- Green Morocco Plan

- “Sustainability”: Research & Development
  1. Water Management
  2. Renewable Energy
  3. IPM & Organic Farming
  4. Climate Change

- Conclusion: Issues and Prospects
Kingdom of Morocco
Population

Reference: www.tradingeconomics.com
Evolution of Moroccan Gross Domestic Product (GDP)

Reference: www.tradingeconomics.com
AGRICULTURE Vs. Share of GDP

Reference: www.tradingeconomics.com : World Bank
AGRICULTURE & GDP

Reference: www.tradingeconomics.com
AGRICULTURE & PRODUCTIONS

- Number of farms: 1.5 million farms
- UAA equal to 8.7 Millions Ha, (whether 12% of total area) wich devided to:
  - Rainfed: 7.1 Millions Ha
  - Irrigated: 1.6 Millions Ha

### Crops

| Cereals: 5.3 millions Ha; 61% |
|-------------------------------|-----------------|-------------------|-------------------|
| Fallow; 1.1 million Ha; 13%   | Olive tree; 750,000 Ha; 8% |
| Sugar crops: 65,000 Ha; 1%    | Leguminous and forage; 700,000 Ha; 8% |
| Other crops: 750,000 Ha; 1%   | Fruits & vegetables; 360,000 Ha; 3% |
| Orchards: 265,000 Ha; 3%      | Citrus; 85,000 Ha; 1% |

### Livestock

<table>
<thead>
<tr>
<th>Sheep</th>
<th>Cattle</th>
<th>Goat</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 millions heads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.3 millions heads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.8 millions heads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 128 Dams
- Dam’s total capacity: 17 billion m³
- Agriculture use’s dam capacity (25 dams): 13.3 billion m³

AGRICULTURE & IRRIGATION

Reference: Ministry of Agriculture and Fisheries, Morocco (L'agriculture marocaine en chiffre, 2014)
<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Imports (Billions DH)</td>
<td>40,4</td>
<td>31,0</td>
<td>35,8</td>
<td>47,3</td>
<td>50,3</td>
<td>42,9</td>
<td>44,9</td>
</tr>
<tr>
<td>Cereals</td>
<td>17,4</td>
<td>8,9</td>
<td>11,9</td>
<td>17,3</td>
<td>19,2</td>
<td>12,8</td>
<td>16,6</td>
</tr>
<tr>
<td>Edible Oil &amp; Oilseeds</td>
<td>5,60</td>
<td>4,16</td>
<td>4,14</td>
<td>5,11</td>
<td>5,01</td>
<td>4,07</td>
<td>3,97</td>
</tr>
<tr>
<td>Raw Sugar</td>
<td>2,2</td>
<td>3,4</td>
<td>3,3</td>
<td>4,8</td>
<td>5,1</td>
<td>3,7</td>
<td>2,6</td>
</tr>
<tr>
<td>Milk &amp; Derivates</td>
<td>2,2</td>
<td>1,5</td>
<td>2</td>
<td>2,3</td>
<td>2,3</td>
<td>2,5</td>
<td>3,0</td>
</tr>
</tbody>
</table>

*Data until November 2014.

Reference: Ministry of Agriculture and Fisheries, Morocco (L'agriculture marocaine en chiffre, 2014)
## AGRICULTURE & EXPORTS

*Data until November 2014.*

<table>
<thead>
<tr>
<th>Product</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural Exports (Billions DH)</strong></td>
<td>15,2</td>
<td>14,8</td>
<td>16,7</td>
<td>19,3</td>
<td>18,0</td>
<td>21,0</td>
<td>18,6</td>
</tr>
<tr>
<td>Vegetables</td>
<td>4,3</td>
<td>4,8</td>
<td>5,1</td>
<td>6,0</td>
<td>5,7</td>
<td>6,9</td>
<td>5,2</td>
</tr>
<tr>
<td>Fresh Tomato</td>
<td>2,0</td>
<td>2,4</td>
<td>2,5</td>
<td>3,5</td>
<td>3,4</td>
<td>3,6</td>
<td>2,8</td>
</tr>
<tr>
<td>Fruits</td>
<td>5,0</td>
<td>4,1</td>
<td>4,8</td>
<td>6,0</td>
<td>4,9</td>
<td>5,8</td>
<td>5,0</td>
</tr>
<tr>
<td>Citrus</td>
<td>3,2</td>
<td>2,5</td>
<td>3,2</td>
<td>4,0</td>
<td>2,8</td>
<td>3,4</td>
<td>2,6</td>
</tr>
<tr>
<td>Canned (Fruits &amp; Vegetables)</td>
<td>1,7</td>
<td>1,6</td>
<td>1,7</td>
<td>1,6</td>
<td>1,6</td>
<td>1,6</td>
<td>1,8</td>
</tr>
</tbody>
</table>

Reference: Ministry of Agriculture and Fisheries, Morocco (L'agriculture marocaine en chiffre, 2014)
The Green Morocco Plan (GMP), established by the Ministry of Agriculture and Fisheries, aims to consolidate the success achieved and to meet new challenges facing Morocco's competitiveness, opening of markets and support sustainably development.

The program was launched in 2008 and was designed to make agriculture the main growth engine of the national economy over the next years. The GMP was structured around seven blocks/foundations and based on two pillars.
Block 1: Make agriculture a lever for growth during the next 10 to 15 years:

- The reinforcement of the role of agriculture in the Gross National Product (GNP), from 70 to 100 million DH;

- The creation of 600 000 new jobs;

- Fight against poverty and the foster the improvement of agricultural incomes;

- Increase the amount of exports from 8 to 44 million DH in the sectors where Morocco is competitive (citrus fruits, olives, fruits and vegetables);

- The launching of a new wave of investments estimated at 10 billion DH annually, with the start up of 1506 projects.

Reference: Ministry of Agriculture and Fisheries, Morocco (www.agriculture.gov.ma)
Block 2: Adopt aggregation as an organizing model:

The GMP is built on the principal of aggregation as a tool for the development of the agricultural sector; its implementation requires the creation of win-win partnerships between the upstream of production and the downstream of the commercial and/or industrial phase.

Block 3: Insure the global development of Moroccan agriculture, without exclusions:

Morocco is characterized by two types of agriculture: (1) Modern agriculture concerns 20% of the cultivated lands and (2) Tradition agriculture which occupies 80% of the usable agricultural surface and remains dependant on precipitation.

The GMP has adopted two pillars: Pillar I and Pillar 2.

Reference: Ministry of Agriculture and Fisheries, Morocco (www.agriculture.gov.ma)
Pillar I:

It focuses on projects that generally depend on private financing and develop highly-productive or high added value modern agriculture (milk, red and white meat, cereals in favorable, non-irrigated zones). The Pillar I strategy is expressed though the accomplishment of 961 aggregation projects, through the inclusion of 562 000 farmers and use of 75 billion DH in investments.

Pillar II:

It concerns the development of solidarity agriculture. The objective is to improve production in both vegetal and livestock sectors, in unfavorable zones, in view of improving the farmers' revenues. Pillar II projects are economically viable projects in marginal zones (unfavorable, non-irrigated zones, mountainous zones and oases), that essentially depend on direct aid from the State. They also take into account the conservation of natural resources.

Reference: Ministry of Agriculture and Fisheries, Morocco (www.agriculture.gov.ma)
Block 4: Promote private investment:

The objective is to attract an annual investment of nearly 10 billion dirham's (MAD) around a targeted «Moroccan supply.» To this end, the Investor’s Guide will present key information to domestic and foreign investors about the Moroccan agricultural sector while focusing on new measures and investment incentives provided by the Green Morocco Plan.

Block 5: Adopt a contractual approach to accomplish the GMP:

The implementation of the GMP requires the mobilization of all the actors from the different sectors, particularly the government and local and regional representatives, professionals and associations. Several types of partnerships are made: (1) Ministry of Agriculture VS the profession; (2) Ministry of Agriculture VS the aggregators; (3) The aggregators VS the aggregates.

Reference : Ministry of Agriculture and Fisheries, Morocco (www.agriculture.gov.ma)
Block 6: Sustain the development of Moroccan agriculture:

The strategy has planned the conservation of natural resources in view of insuring sustainable agriculture through the following steps:

- The integration of Climatic Changes dimension in the conception of the GMP;

- The conversion of nearly a million hectares from cereal crops to fruit tree plantations, which will help protect agricultural spaces;

- Experimental use of semi-desert zones to increase the usable agricultural area;

- Support for the water conservation projects (from 154000 ha to 692 000 ha);

- Support for the use of renewable energies (solar and wind energy, bio-fuels).

Reference: Ministry of Agriculture and Fisheries, Morocco (www.agriculture.gov.ma)
Block 7: The dismantling of the segmented framework:

For the successfully implementation, the dismantling of segmented framework plays an essential role. This dismantling concentrates on the following cross-sector issues:

• Property;
• Water;
• Fiscal Policy;
• The National Market;
• Accompaniment and follow through/evaluation.

Reference: Ministry of Agriculture and Fisheries, Morocco (www.agriculture.gov.ma)
Strategic objectives of Green Morocco Plan

“A sustainable agriculture is a system of agriculture that will last. It is an agriculture that maintains its productivity over the long run. It is both a philosophy and a system of farming”.

Reference: TNAU Agritech portal
“Sustainability” VS Research & Development

Reference: www.unesco.org
1. Water Management:

About 77% of Morocco’s irrigated lands still receive water through surface irrigation methods.

- The GMP program aims at conserving irrigation water by switching from surface to drip irrigation over a land area of approximately 550,000 hectares by 2020.

- Up until 2012, 333,000 hectares had been converted.

- The government is also subsidizing the cost of farm equipment needed for drip irrigation and providing crop seeds and seedlings adapted for such use.

Reference: Badraoui and Fayad, 2014
1. Water Management:

“SO, WE NEED the integration of a RESEARCH-PROGRAM and the implement of new methods and innovative technologies: drip-irrigation, monitoring irrigation according to microclimate, using tensiometers, selection of varieties tolerant to drought…”
2. Renewable Energy:

[Diagram of renewable energy systems, including solar panels, a water tank, and a wind farm, with text annotations.]
3-a. Integrate Pest Management (IPM):

• Applied & Fundamental Research on IPM in order to reduce the application of pesticides in agriculture:

- Naturals predators vs. Insecticides

- Biological products vs. Fungicides

- Mechanics methods vs. Herbicides

- Others ways: breeding/genetics, rotation, selection of the correct production, etc.
3-b. Organic Farming:

- Promoting productions with high values in the market without pesticides and chemicals fertilizers: Cactus, Argan, Medicinal plants, etc.

“Organic production in Morocco still very low even with the potential for growing organic!”

- Working on Research/Business plan on organic farming…
4. Climate Change:

Climate change will reduce main crop yields and increase agricultural production fluctuations.

The GMP has launched a variety of programs in order to improve overall adaptation to climate change in five regions of Morocco.

The key technologies to be adopted on a wide scale include soil-protection measures, such as no-till farming, the use of authorized high-yield drought-resistant crops and crop rotation through the planting of leguminous or oilseed crops after each grain harvest.

Morocco Organize the United Nation Conference on Climate Change “COP22” on November 7-18, 2016. So for sure, country is concerned. For more information: http://www.cop22.ma/en
4. Climate Change:

Once more, we need R&D in order to promote sustainability:

- Water Management

- Alternative energy; especially for irrigation.

- Studies on strategies of the application of fertilizers.

- Studies on the recycling of the wastes as an organics and minerals fertilizers uses for agriculture.

- Working on models of “Green city” & “Reforestation”

- Research on plant physiology, biotechnology & genetics.
CONCLUSION

• Morocco agriculture is in progress…
• However, “sustainability” is important to take in consideration.
  - ↓ Water use.
  - ↓ Energy use.
  - ↓ Application of pesticides and chemicals fertilizers.
  - ↓ Gas emission and respect the environment.

• Research program and innovation plan is required in order to achieve the goal.
- Not only in field; but, also in Social! & Education!
THANKS FOR YOUR ATTENTION!

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