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SUSTAINABLE FOOD SECURITY IN MOROCCO: CHALLENGES & OPPORTUNITIES

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ABSTRACT

Food security is a major issue and constant challenge in the developing world. Morocco has reached the target of the first MDG and, since 1990-1992, has maintained the prevalence of undernourishment level of 5%, but it remains vulnerable to climate change in case of recurrence of drought and external shocks. Researches on food security in Morocco and its relationship with sustainable development are not been sufficiently developed in the direction of proposing models of sustainable food security strategies. Then, this study aims to clarify the relationship between food security and sustainable food chain and to propose a roadmap for food security in Morocco, learnt from the visit study to Singapore as a leading country in food security. According to GFSI (Global Food Security Index) of the Economist Intelligence unit, Singapore is ranked second in the world after United States in 2015. Results outline the issues and challenges of food security at both global and national levels and highlight the strengths and weaknesses of food security in Morocco via the analysis of the Moroccan's food security balance through the GFSI (Global Food Security Index) of the Economist Intelligence Unit. Finally, this study proposes a roadmap to ensure sustainable food security in Morocco focused on two strategic pillars: governance and organizational pillar and technical and financial support pillar. The first pillar concerns the establishment of a national authority in charge of coordination and implementation of food security strategies. The second pillar includes a set of recommendations related to technical and financial support aspects as optimizing storage foods, increasing agricultural productivity via agro-ecological intensification and sensitizing farmers in adoption of sustainable agriculture principles.

Keywords: *food security, sustainable food value chain, sustainable development.*

INTRODUCTION

The issue of sustainable development is today at the heart of both south's and north's countries' development strategies and policies. These countries are looking increasingly sustainable and inclusive development models.

Given the importance of sustainable development for humanity, the 193 United Nations member states adopted on September 25, 2015 the program for 2030

which includes the three dimensions of sustainability: economic, social and environmental. It consists of 17 Sustainable Development Goals (SDGs) that will build on the progress made within the framework of the Millennium Development Goals (MDGs).

Food and agriculture are at the heart of the SDGs, including the first SDG “Eliminating poverty in all its forms and everywhere in the world”, and the second SDG “Eliminating hunger, food insecurity, improve nutrition and promote sustainable agriculture”. Food security and its relationship to natural resources and rural development appear behind each goal on UN Agenda.

Agriculture as a primary sector has a strategic and central role in ensuring food security of a country. A more productive agriculture can improve food security via available commodities in larger quantities and at lower cost and more easily accessible.

Morocco has reached the target of the first MDG and, since 1990-1992, has maintained the prevalence of undernourishment level of 5%, but it remains vulnerable to climate change in case of recurrence of drought and external shocks. Researches on food security in Morocco and its relationship with sustainable development are not been sufficiently developed in the direction of proposing models of sustainable food security strategies.

Then, this study aims to clarify the relationship between food security and sustainable food chain and addresses the following fundamental questions:

- What is food security?
- What place must have food security in a sustainable food value chain?
- How secure it is Morocco? What are the strengths, weaknesses and challenges of food security in Morocco?
- What are the opportunities of Morocco to ensure its food security?
- How to ensure sustainable food security in Morocco?

MATERIAL AND METHODS

This study is inspired from the Food Security, FAO report on the World, the Economist Intelligence Unit (EIU) report on the Global Food Security Index (GFSI) and the visit study¹ to Singapore, which has allowed us to inquire of the Singaporean strategy for food security.

Taking into account the different dimensions of food security and its underlying dynamics, the EIU developed the GFSI². Its calculation is based on the method of scoring selected indicators based on expert analysis of the EIU and consultation with a panel of food security experts. The scores are calculated from the weighted average of the underlying indicators that scale from zero to 100, where 100 (the

¹ Visit study “ Building Food Security ” is part of the Singapore Technical Cooperation Program in support of the G20 developing countries and non-member countries such as Morocco. It aims to understand current trends and issues of food security in the 21st century and inquire about the experience of Singapore on management issues and food security challenges.

² The Global Food Security Index is a dynamic index constructed from 28 indicators measuring the affordability, availability and quality of food products to 109 countries.

most favourable). The overall score for the GFSI (on a 0-100 range) is calculated from a simple weighted score³.

In comparison with indicators defined by the FAO and the GFSI, it seems that GFSI is more comprehensive and complete in terms of inclusion of other indicators such as food safety, food losses, and access to finance for farmers and the volatility of agricultural production. It is based on indicators of FAO and opts for ranking and scoring methods to better facilitate data analysis and guide the development of food security in a country. In addition, the data of each country through the GFSI is updated by the EIU. Therefore, we opted for the choice of this index for analyzing food security in Morocco. In the final, the methodology for this study followed these steps:

- Bibliographic review about food security and sustainable development approaches
- Data analysis of the food security of Morocco through the GFSI
- Visit Study in Singapore as a leading country in food security.

RESULTS AND DISCUSSION

Food security and sustainable food value chains: a close relationship

Over the past decade, the value chain has become one of the main approaches for thinking and practice in the field of development. In the agricultural sector through the Moroccan Green Plan⁴, value chains are the basic approaches to the formulation of projects (first pillar and second pillar) of this plan.

The functioning of the food value chain highlights the complexity of the environment in which it operates and its four main basic functions: production, processing, distribution and consumption. This complexity refers to an essential element of the basic food value chain, which is its governance structure (David, 2015).

In fact, a food chain qualified as sustainable and accessible to the poor, has to ensure food security. At the same time, ensuring food security is designing a food chain that assures main dimensions of food security, namely availability, accessibility, stability, safety and quality of foods offered to consumers.

This close relationship between food security as sustainable agricultural development objective and the food value chain as an approach and tool for development of the agricultural sector requires public policies to develop food value chains with food security as a core and a guiding force of its functioning. Therefore, consultation and coordination around a clear and precise vision of food security between the different actors of the value chain is essential.

³ From EIU report on GFSI.

⁴ The Moroccan Green Plan is the agricultural strategy of the country focused on 2 pillars: the first concerns the development of small agriculture and the second aims the development of investment in modern agriculture.

Morocco's ranking

According to the GFSI index of 2015, Morocco is ranked 62th out of 109 countries (Fig1). This ranking is considered less advanced considering the agricultural potential of Morocco.

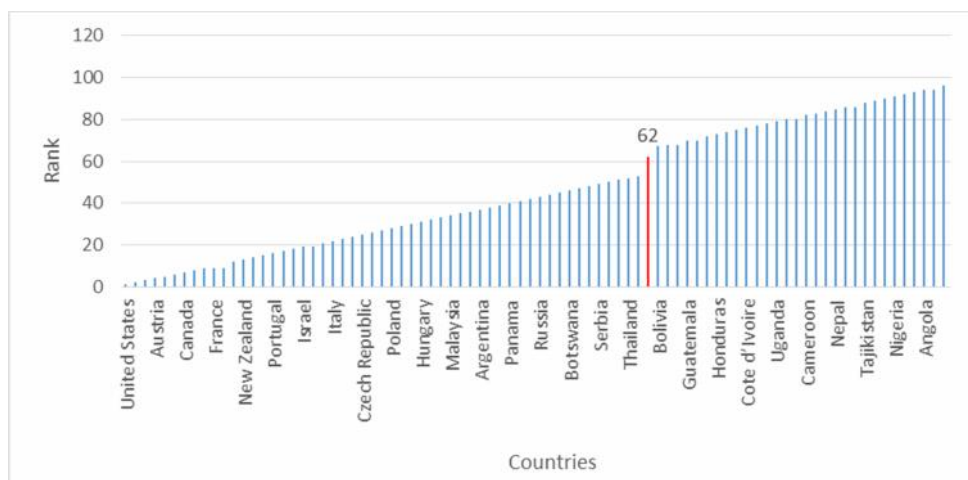


Figure 1. Morocco's ranking

*Source: EIU 2015

Strengths and Weaknesses of food security in Morocco

For Morocco, each category mentioned above of GFSI and its indicators is synthesized in the following graphs⁵:

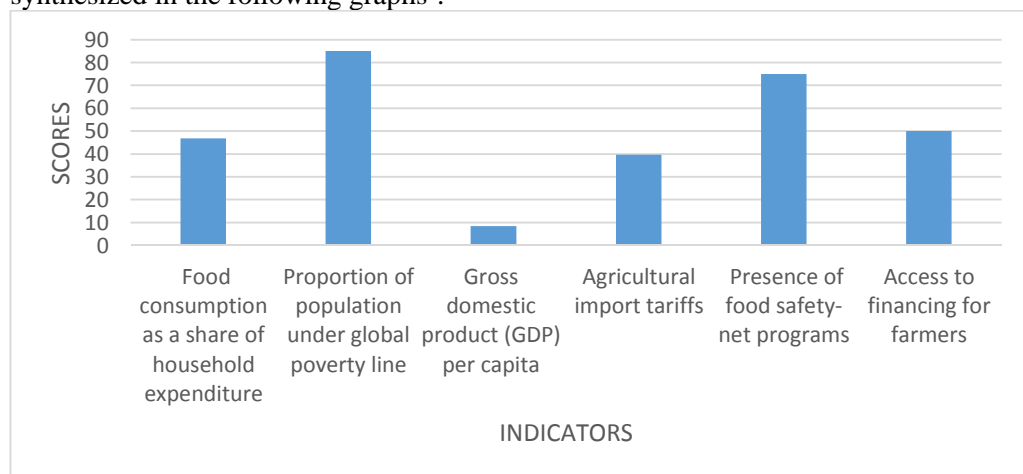


Figure 2. Affordability indicators of GFSI for Morocco on 2015

⁵ Graphs illustrate the data collected from indicators of each category of GFSI (EIU)

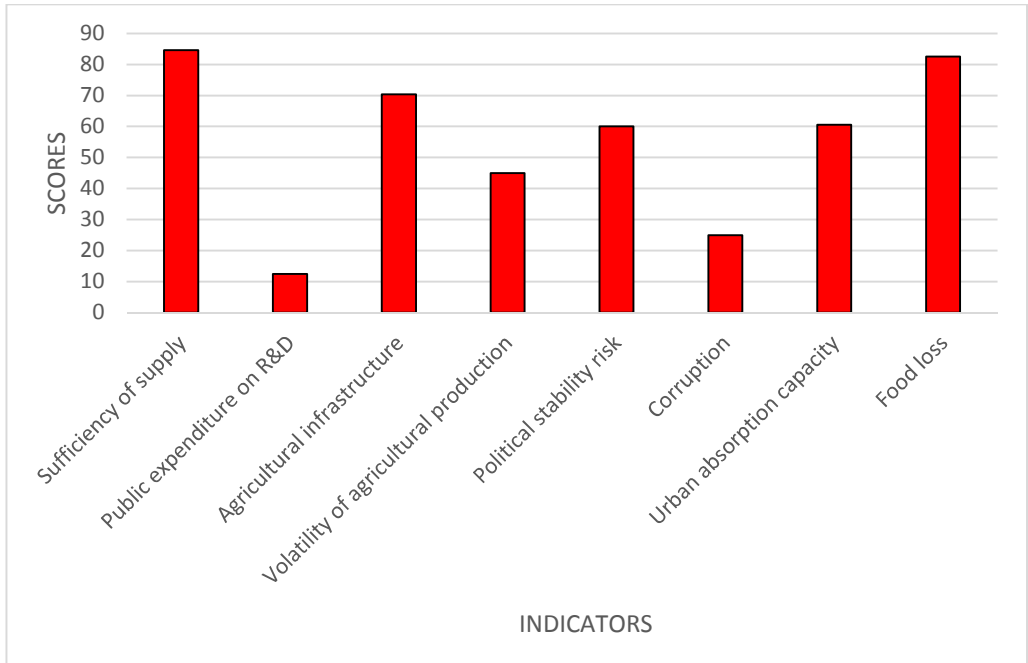


Figure 3. Availability indicators of GFSI for Morocco on 2015

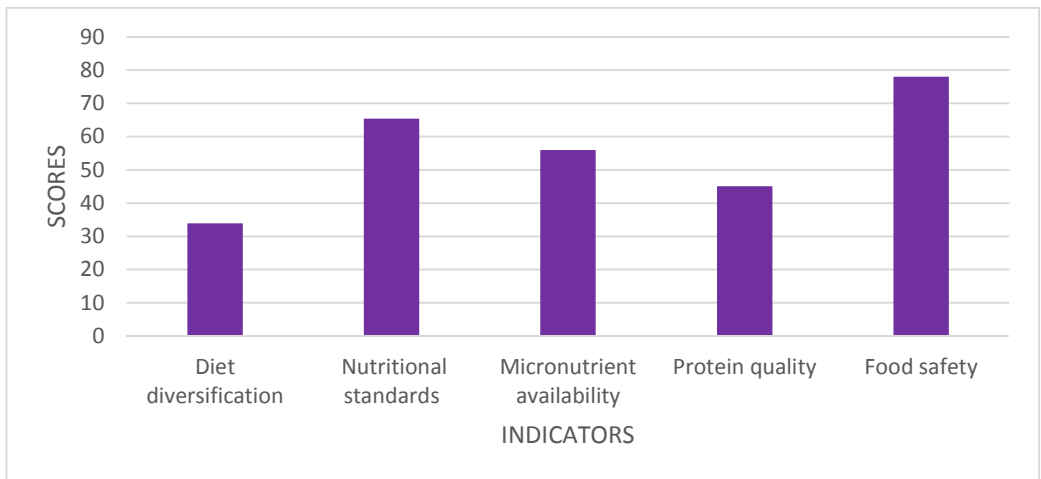


Figure 4. Quality and safety indicators of GFSI for Morocco on 2015

It is clear from those graphs that Morocco has strengths and weaknesses that focus on the specific indicators representative of the basic criteria for classifying

countries with each other. The main strengths concern the following indicators with high scores:

- Sufficiency of supply
- Proportion of population under global poverty line
- Food loss
- Food safety and presence of food safety-net programs
- Agricultural infrastructure
- Political stability risk.
- The negatives points that Morocco is expected to make efforts to improve them are:
 - Gross domestic product (GDP) per capita, which does not encourage the household food consumption and dietary diversification
 - Public expenditure on agricultural research and development (R&D) is low to improve agricultural production
 - Corruption and its negative impact on agricultural development
 - Access to financing for framers is still modest.

Agricultural import tariffs deemed high due to the need to protect agricultural products in the framework of the tariff policy of Morocco, particularly for animal products, dairy products, grains and fruits and vegetables.

These weaknesses are facing two major risks having a negative impact on food security of Morocco. This is, firstly, episodes marked by a sharp rise in world agricultural prices (most recently in 2008), whose impact has been mitigated by subsidies of wheat flour and sugar prices and energy. Secondly, recurrent drought due to climate change, which are regularly subject to emergency programs in various forms, ranging from livestock backup programs (in the form of subsidies to cattle feed) to job creation projects and rural incomes⁶.

In addition, food security in Morocco is subject to the following main challenges:

- Need to improve the productivity of agricultural lands to track demographic changes and ensure the prevalence of undernourishment level of 5% (FAO,IFAD,WFP, 2015)
- Sustained increase in food demand
- Internal factors of production increasingly rare, especially the recoverable water and better governance of water resources management (M'hamed, 2008)
- Upgrading of family farming and small dominant agriculture in terms of agricultural productivity to secure food supply in the country (Maros, 2008)

⁶ The emergency program to manage the rainfall deficit in the crop year 2015-2016 includes the following components: 1. livestock Backup Schedule 2. Plantation maintenance Irrigation 3. Supervision of crops of irrigated perimeter 4.Compensation of affected farmers 5. Implementation of pillar II project's creators of income and employment 6.Access to drinking water in rural areas.

- Local development in lack of innovation.

Opportunities for ensuring food security in Morocco

To meet the food security challenges, opportunities exist and Morocco does not miss assets to be exploited in a sustainable and integrated clear vision:

- Diversity of climate and territories

Climate, bio-geographical and cultural diversities of Morocco offer a variety of cultivars, animal breeds and rich local knowledge of production. Our farmers have shown in the past a good individual and collective capacity to manage local agriculture.

- Hydro-agricultural skills recognized

In terms of water management for irrigation, Morocco has a rich expertise and it is in the transition to localized irrigation. The National Irrigation Water Saving Program aims to equip 550,000 Ha in 2020 including 330,000 ha by individual reconversion to localized irrigation and 220,000 hectares by the collective reconversion. The achievements have reached 75% of the planned program⁷. Similarly, Extension Program of Irrigation aims to enhance 1.5 billion m³ of water through the creation of irrigation scheme downstream of dams built or underway of construction. This program will improve the distribution of irrigation water and increase agricultural production.

- Public Private Partnership in irrigation

The Public Private Partnership in irrigation is an effective tool for achieving performance improvement objectives for agriculture irrigation in terms of water resources development and improving the efficiency of irrigation systems and sustainability of irrigation schemes. Two major successful projects were implemented and include the Project for the Protection of citrus in El Guerdane on an area of 10,000 ha and the development project of the area Azemmour -Bir Al Jadid an area of 3,200 Ha.

- Agricultural research

The role of scientific and agronomic research has a great contribution to guide agricultural production in a sustainable vision. Sustainable intensification of production systems also involves the implementation of conservation farming techniques and agro-ecology. Indeed, National Institute of Agronomic Research in Settat showed that farmers moved to no-till direct seeding (6,500 ha in 2013) achieved an average performance gain of 30 to 40%, a water efficiency gain of 60

⁷ Source: DIAEA/Ministry of Agriculture and Maritime Fisheries.

%, a decrease in energy consumption by 70% and an organic matter in soil enrichment from 3 to 14% (SESAME, 2013).

Singapore’s experience in Food Security
Why Singapore?

Singapore is a small country of 714 km² with very limited natural resource, located at the southern tip of the Malay Peninsula between the mainland of Malaysia and Indonesia. It is one of the few countries, despite its limited resources, has developed an expertise and advanced technology in the field of food safety. According to the GFSI (2015), Singapore is ranked second in the world after the United States. Indeed, despite its limited resources and its reliance on imports of agricultural products by more than 90% of food needs, Singapore focused its food security strategies on the transformation and enhancement of agricultural imports.

To achieve this objective, the Agri food Veterinarian Authority of Singapore has reviewed and reaffirmed its food supply resilience and food security strategies after extensive consultations with the private sector and other government agencies (Robert, 2015). These strategies are part of the Road Map of Singapore synthesized in the following figure⁸:



Figure 5. Food Security Roadmap for Singapore

⁸ Source : Nanyang Technological University NTU of Singapore, 2015.

Learned lessons

It's clear that food security is now a major issue both for developed countries than in developing countries. The lessons learnt from Singapore's experience in food security, are summarized as follows:

- Food security must be a national priority of a nation with all its stakeholders (private, public, NGOs, municipalities and regions, others) and around which there is an attachment of a whole country.
- The adoption of an integrated system of food security management with a single national authority responsible for coordination and communication between the different stakeholders involved in the formulation and implementation of strategies with one unique objective: ensure sustainable the country's food security.
- In the 21st century, food security of a country is closely linked and connected to regional and global food security (PS Paul, 2014).
- Food security is multidimensional: several factors influence the four dimensions defined by the FAO including availability (production, exports / imports), physical access (market, logistics, infrastructure and value chains), affordability (pricing and employment), use (health and nutrition, hygiene and sanitation, storage facilities / processing, food safety).
- A change in the approach to food security is needed: from one dimension to another, from one sector (agriculture) to another, from procurement (supply) to the influence of food demand, from rural to urban and from self-sufficiency to self-reliance.
- The role of agriculture as the locomotive sector of the food security of a country.
- The inclusive agribusiness as key to food security.
- Food security should be the core and the guiding force of the whole chain of sustainable food value.
- Food security is closely linked to climate change and its impact on agricultural production.

Proposal of a roadmap for sustainable food security in Morocco

Inspired by Singapore's experience in terms of food security strategies, we propose priority actions for the development of a roadmap to ensure sustainable food security in Morocco. This roadmap is centered around two strategic pillars:

- ***Governance and Organizational Pillar:***
 1. Establishment of a national authority in charge of coordination and implementation of food security strategies
 2. Adoption of the integrated management approach.

- **Technical and financial support Pillar:**
- 1. Establishing and updating of a database of food security through the selection of a battery of strategic and operational indicators to measure food security;
- 2. Optimizing storage of food products;
- 3. Use of financial instruments to cope with food price volatility in the short-term;
- 4. Promotion of agro-ecological intensification to increase productivity of agricultural water and resilience of systems (agro-forestry-pastoral, storm water, irrigation), based on both local knowledge, research and innovation;
- 5. Awareness of family agriculture to food security issues and climate change through training activities;
- 6. Integration of small farmers in food value chains;
- 7. Training and sensitization of value chains actors on the management of food losses;
- 8. Encouragement of R & D in reducing food losses and recycling;
- 9. Strengthening of the effort of the state in terms of irrigation water saving and mobilization of conventional and unconventional water;
- 10. Promotion of Public Private partnership on projects / programs to increase food security;
- 11. Promoting nutrition in rural areas through training of agricultural workers in nutrition, food safety and food preservation issues
- 12. Strengthening food safety measures throughout the food chain;
- 13. Strengthening of price control and supply the domestic market with quality foods.

CONCLUSION

In conclusion, food security includes economic, social and environmental components involving all stakeholders of a nation. Morocco faces increasing risks of " exogenous shocks" in food security (volatile global markets and climate change), when the internal factors of agricultural production are increasingly rare. Moreover, food demand is experiencing a steady increase due to population and economic growth on the one hand, and the transition to a diet rich in calories, on the other.

In Morocco, the development of solutions that reconcile the search for food security considering climate change, water scarcity and grouped in a road map, seems a priority and complementary to the Moroccan Green Plan's efforts to establish a sustainable agriculture.

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