

# ■ Impact political choice on food security in Morocco (soft wheat case)



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## Abstract

In Morocco, despite the efforts made by the State in order to achieve food security under the framework of the Green Morocco Plan (GMP), the government has not been able to solve the structural problem of production. In fact, the country remains highly dependent on the international markets and the economic situation of the exporting countries as well as on the commercial relations it has with them. According to studies made by international institutions (IFAD, WB, FAO), other underlying factors such as population growth, demand for biofuels, and climate change could lead to an international supply deficit on the horizon 2030, particularly in regions with high production and export of wheat. However, results in a narrowness of markets and, consequently, new international price shocks. In this context, the present work purpose was to assess the country's vulnerability to soft wheat supply in the face of threats from import markets by 2030. Using the simple linear regression model, we estimate the evolution of the three economic aggregates: production, consumption and import of soft wheat. The aim was to analyze the prospects of the political choice in terms of increasing the Rate of Consumption Cover (RCC) by the national production of soft wheat in the year 2030. According to our results, it turned out that the national supply could follow an upward trend in the year 2030, but would record a slow growth marked by a strong fluctuation. In addition to low productivity, there was also low quality of the local product, which probably leads to an acceleration of the import dependency ratio. However, in the face of expected threats in import markets, the prospects for political choice could cripple the situation by 2030 and place the country in a chronic state.

Key words: vulnerability, Rate of Consumption Cover (RCC), Soft wheat, political choice, Green Morocco Plan (GMP)

## Introduction

Today, faced with the potential threats on soft wheat import markets by 2030, the food issue in Morocco arises in terms of vulnerability. The low yields recorded nationally do not improve the rates of consumption coverage, leading to a strong dependence on international markets (MAPM, 2016). For good governance, the State should dispose an evaluation system to estimate the prospects of political choice to express the directions of its own policy in the face of food security issues (Rerhrhaye, 2018). Therefore, the paper addresses the following research questions: What is the potential of the soft wheat food supply? Would it be able to meet the growing demand for soft wheat and mitigate the likely risks expected in import markets? What are the exogenous factors that can lead to a deficit in the international supply of wheat and thus lead to a further rise in prices?

## Materials and methods

To project itself into the future, the diagnosis starts from the existing one, is firmly rooted in the history of the sector and then in the evaluation of its potential (Roger, 2005). Using historical data for the period 1980-2016, our method consists of projections of the three economic aggregates: Production, Consumption and Imports (of soft wheat).

### Estimation of the production of soft wheat

**(2030):** based on a chronological / time series corresponding to the period 1980-2016, the data concern both production and rainfall. Based on the simple linear regression model, we estimate the potential production of soft wheat based on climate variations. The inter-annual average rainfall is estimated at about 275 mm / year. Indeed, our estimation model is as follows:

$$F (P) = a_0 + a_1 * T + a_2 * P \text{ (Inter-annual rainfall)}$$

$$F (P^\circ) = \text{Production function}$$

$$T = \text{Trend (following a simple linear regression)}$$

The coefficient = corresponds to the annual growth rates of the production

### Estimated imports of soft wheat (2030):

Based on a time series corresponding to the period 1980-2016, the data concern imports of soft wheat. Based on the simple linear regression model, we estimate potential imports of soft wheat using the estimation model as follows:

$$F (M^\circ) = a_0 + a_1 * T$$

$$F (M^\circ) = \text{Imports function}$$

$$T = \text{Trend (following a simple linear regression)}$$

The coefficient = corresponds to the annual growth rates of the imports

### Estimation of the consumption of common wheat (2030):

Given the absence of annual data on the consumption variable, we have relied on the results of the surveys carried out by the Office of the High Commissioner for Planning (HCP) during the periods 1970 -1971, 1980-1981, 2000-2001 and 2005-2006, taking into account per capita consumption and population size. To estimate projections of future soft wheat consumption, we start with data on the amount available for consumption during the period

1980-2016, taking into account stock changes as follows: (Method adopted by the Ministry of Agriculture)

Quantity available for consumption of soft wheat: (Production + imports) (+/-) change in inventories

The projections of consumption by 2020 are obtained under the assumption that its evolution will follow a simple linear trend presented in the following form:

$$F (C^\circ) = a_0 + a_1 * T$$

$$F (C^\circ) = \text{Consumption function}$$

$$T = \text{Trend (following a simple linear regression)}$$

The coefficient = corresponds to the annual growth rates of consumption

Assessment of the food vulnerability of soft wheat: based on the results of estimates obtained on the import, consumption and production aggregates, we calculate the ratios as follows:

$$\text{Import Dependency Rate (IDR, \% (2030))} = (\text{Imports (2030)} / \text{Production (2030)}) \times 100$$

$$\text{Consumption Coverage Rate (CCR, \% (2030))} = (\text{Production (2030)} / \text{Consumption (2030)}) \times 100$$

NB: According to FAO (2008), the risk of vulnerability of the country with respect to food security is real when the IDR is greater than 50% and the CCR is less than 50%.

To estimate the three economic aggregates, we use EViews software as an investigative tool to structure and calculate statistical data. the following equations, we obtain:

$$- F (P^\circ) (2030) = -8731 + 700.8 * \text{Trend} + 56.85 * \text{Pluviometry}$$

$$- F (M^\circ) (2030) = 15505.26 + 323.90 * \text{Trend}$$

$$- F (C^\circ) (2030) = 17027.75 + 832.3254 * \text{Trend}$$

## Collection of data

The annual rainfall data were taken from the reports and archives of the Ministry Delegate in Charge of Water (MDCW) and the Directorate of Irrigation and Development of Agricultural Area (DIDA). Time series relating to production, collect and stocking imports for common wheat were extracted from the archives and bulletins of agricultural statistics of the Ministry of Agriculture, the Office of Foreign Exchange, the Inter professional of National Office of Cereals and Legumes

(ICLNO), the Agricultural Development Agency (ADA) and the High Commissioner for Planning (HCP) (Table 1).

**Table 1: Evolution of production, imports, collect, final stock of soft wheat (in 1000qx) and inter-annual rainfall (in mm) between 1980 and 2016**

Years	Production (In 1000 qx)	Imports (In 1000 qx)	Collect (In 1000 qx)	Final stock (In 1000 qx)	Pluviometry (mm)
1980-81	2817	18210	2133	1110	247.40
1981-82	7772	22441	485	-55	294.19
1982-83	7318	13692	4793	-276	198.83
1983-84	8182	19615	3562	-662	328.15
1984-85	10166	23049	3073	290	283.45
1985-86	18278	19224	3232	-1542	340.85
1986-87	13019	13124	9223	388	246.88
1987-88	22534	20905	5404	174	390.30
1988-89	21604	13396	9313	1056	365.30
1989-90	19972	10605	10148	-359	384.86
1990-91	27232	17608	5997	68	394.96
1991-92	8804	14748	10947	3166	286.58
1992-93	9417	24942	1290	-175	209.67
1993-94	31809	23281	890	-3150	341.65
1994-95	6520	7800	16814	1068	230.25
1995-96	36460	25908	502	-1352	588.74
1996-97	14349	11855	17364	746	426.88
1997-98	28341	21786	4322	-2402	424.23
1998-99	13540	20699	10889	2071	215.74
1999-00	9533	22540	8113	68	262.36
2000-01	22776	30036	4167	1906	312.89
2001-02	23252	23386	10924	1287	288.31
-03 2002	33806	22998	10131	742	395.31
-04 2003	35151	19298	15065	1869	468.56
-05 2004	21024	17441	18599	3414	220.83
-06 2005	42313	17754	16505	-503	420.98
-07 2006	10688	9867	24791	-846	245.00
2007-08	295 25	831 36	191 5	337 2	245.00
-09 2008	384 43	023 30	884 13	335 1	375.00
-10 2009	433 32	092 16	621 26	-656	605.00
-11 2010	699 41	208 31	411 18	241 4	488.00
-12 2011	431 27	957 28	579 22	836	239.00
2012-13	367 50	069 29	100 19	-939	450.00
2013-14	057 37	500 30	049 22	266 4	274.00
2014-15	582 56	342 30	767 15	126 -1	375.00
2015-16	561 18	073 33	649 14	700 3	97.00

Data source: NOICL, DIDA, MDCW, 2017

## Results and discussion

### a. Analysis of the potential of the international wheat market

As the coverage of consumption needs is dependent on import markets, the government should diagnose the situation of the supplier countries exporting soft wheat to Morocco. In response to low domestic soft wheat productivity, global market threats in the future may persist placing the country in a state of chronic dependence by 2030. Several structural factors can lead to new shocks in international prices. The first is the relationship between global wheat supply and demand by 2030. In fact, the demand for soft wheat would rise from around 840 million tons in 2000 to nearly 1420 million tons in 2030. International imports are expected to increase by 55%, from 470 to 730 million tons by 2030 and over the same period, production is expected to increase (with technological innovation) from 370 to 690 million tons (Table 2). In terms of global supply, low increase in global soft wheat productivity is mainly due to declining public support for agricultural research since 1990 (FAO, 2007; Ruttan, 2002). Given this situation, if this trend does not reverse, the narrowness of commodity markets will persist and the risk of food price shocks will increase. In response to changing food demand, world agricultural productivity is expected to outpace population growth and if not, demand will outstrip supply and food prices will rise.

Table 2: The global supply and demand estimation results for soft wheat (in 1000T)

between 2000 and 2030

Years	World wheat production (in 1000 tons)	Global demand for wheat (in 1000 tons)
2000	000 370	000 840
2030	000 690	000 420 1

The second factor is related to climate change. Projections on global climate change models point to a growing likelihood of droughts and floods in countries with high global soft wheat production by 2030 (Cline, 2007). This will contribute to the narrowness of the market and its instability by increasing the volatility of cereal yields and possibly causing a decline in world wheat production. Research undertaken on the

impact of global warming on average wheat production shows that average production will decrease (Rosenzweig et al., 2004) and could decrease by 5% from 1996 to 2060, even with moderate investment in climate change adaptation (Rosenzweig and Parry, 1994).

The third factor in the decline in global productivity is agricultural policies adopted by the wheat exporting countries. According to OCDE (2009, 2011) the replacement of price support policies with direct payments to farmers has reduced stocks in OECD countries compared to their high levels in the 1980-1990s. While a low stock level combined with tight markets and ever-increasing demand leads to a market that is more vulnerable to disruption (Rosegrant et al., 2008).

As for policy choices, the area of cereals, particularly that of soft wheat, is increasingly competing with other crops dedicated to subsidized biofuels, as raised by FAO (2009) as follows: "Policies that promote biofuels such as ethanol and biodiesel, coupled with high national tariffs discouraging biofuel imports, are pushing land-based agriculture to the detriment of food and pasture production". The pursuit of these policies will contribute to further reducing the size of the common wheat markets and pushing up the structural price of wheat in the world. According to FAO (2010) world exports of soft wheat represent only 18% of their world production, the rest is consumed locally. The slowdown in international supply would therefore lead to a decline in the size of the markets, which would result in large price variations and therefore a restriction of exports. This is the case of the last shock of 2007 and 2008 when some wheat exporting countries, such as Argentina, banned exports for fear of not being able to feed their populations. These bans contributed to the rapid escalation of prices on the world market. In fact, the smaller the market, the greater the fluctuation in international prices and the greater the likelihood of future price shocks (IFAD et al., 2009).

On the supply side, the financial crisis could reduce incentives to produce in the face of lower agricultural prices and reduced access to credit for farmers. Nevertheless, the net effect of the financial crisis on domestic production in Morocco will depend on the relative speed of the adjustment of producer prices and prices of

agricultural inputs. However, if input prices fall more slowly than producer prices, the farmer's margins will decrease, prompting producers to cut production. On the other hand, if the fall in prices follows that of producer prices, farmers may be encouraged to maintain production.

Beyond these structural factors, while the demand for human consumption of soft wheat is expected to increase by around 50%, meat and milk consumption will increase by 104% and 82% respectively between 2000 and 2030 (IFAD et al., 2009). This situation could lead to a decline in world wheat production and lead to further shocks in wheat prices. Without sufficient investment in yield improvement technologies, the expansion of soft wheat production may be compromised in the future. Finally, whether there is an international supply deficit or not, Morocco should reduce its dependence on wheat imports, particularly for soft wheat. What are the prospects for the Import Dependency Rate (IDR)?

### **b. Estimation of the potential constraints of the food security of soft wheat**

Following our estimation results, the potential production of soft wheat is expected to increase by 2030, rising from almost 31.5 million quintals in 2007-2008 to nearly 42 million quintals by 2030, an increase of about 32%. Over this same period, wheat consumption in Morocco is estimated to have increased by nearly 48%, from around 39.5 million quintals to around 58.6 million quintals (Figure 1).

Figure 1 : Estimate of the import dependency rate on soft wheat in the year 2030

Source: Results obtained by the authors

\*Using EVIEWS software we obtain the following equations:

$$- F \text{ (Production) (2030) = -8731 + 700.8*Trend + 56.85*Pluviometry}$$

$$- F \text{ (Imports) (2030) = 15505.26 + 323.90*Trend}$$

$$- F \text{ (Consumption) (2030) = 17027.75 + 832.3254*@trend}$$

Based on the results of our estimates reported in this figure, wheat consumption would continue to outpace production. The Consumption

Coverage Rate (CCR) could reach 70% by 2030, which is above the FAO vulnerability threshold of 50%. Whatever the convincing results, it should be remembered that the major food problem in Morocco is explained in terms of vulnerability, food demand will significantly increase by 2030 exceeding the rate of change in domestic production. Indeed, increasing the dependence on international markets for soft wheat would put the country in a vulnerable position, since the Import Dependency Rate (IDR) could stagnate between 43% and 50%.

## **Conclusion**

Faced with the various risks of food insecurity, the State must establish a good governance policy based on a deep and coherent reform, from which the strategic vision should focus on increasing productivity, especially in rainfed areas (Rerhrhaye and Ait El Mekki 2017). However, through the extension of arable land areas and the development of investments in research and development (R&D), productivity will have convincing results in terms of national quantity to increase the rate of coverage of consumption while improving income of small farmers. As for research and development (R&D), it will strengthen wheat quality and lead to a significant reduction in food vulnerability. Further studies are needed to investigate State policy mitigating internal and external factors involved in soft wheat supply security.



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