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Agrarian Policy, Impact on the Food Offer and Health: Case of Algeria

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Abstract:

Agriculture is a structured set that can serve individuals to satisfy their dietary needs, through a suitable agrarian policy. In Algeria, since the independence to date several reforms have been applied, starting by the self-management and more recently the agricultural development; nonetheless, the country remains depending on the exterior, as food imports went from almost 14% in 1975 to reach 23.54% in 2020 A situation worsened by a demographic transition, in one side, that can be translated in numbers by 44,3 million inhabitants in 2020, in addition to an epidemiologic one, with the increase of non-transmissible diseases, mainly; obesity, high blood pressure, diabetes…, which keep the country in a precarious situation as it faces the price increase of food products on international markets. This is why a review of the agrarian policy should be contemplated in order to overtake these issues. In this context, our article comes within a preventive approach proposing an analysis of the Algerian agrarian policies from the independence until today's date, and their effects on both the food model and health, in addition to recommendations.

Keywords: Agrarian Policy, Food Offer, Food Model, Health, Algeria.
JEL Classification: Q150**;** Q180 **;** I120

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Introduction

Agriculture is, as François Quesney puts it, the real wealth any country can possess for it is tangible and meets a vital need. It combines a set of human and material production factors, in a well-established structure (Hersi, 1981), in order, to comply with the requests of consumers, industries, and trade (Oncken, 1888). Its importance has diminished as time passed in developed economies; however, it remains the corner stone, on which relies the development of any country (Néron, 2014).

Hersi (1981) stipulates that agriculture constitutes a strategic economic market, thus it must be analyzed in accordance with the specifics of each country; that is, the existing surface, the techniques used on the field, and the climate related issues that the country faces, in order to better research efficient means to be adapted, and implement more suitable policies.

In this context, we introduce the following principal question:

Is it possible to operate a transformation of the dietary consumption model (DCM) in Algeria through its food offer according to the agrarian policy (AP) that the country has been following since its independence?

In response to this question, two hypotheses are put forward, namely;

1. The AP Algeria has been following since its independence cannot guarantee the necessary food offer that could enable the adoption of a healthy DCM.
2. The Algerian DCM is unbalanced and should be improved.

In this context, our article suggests an analysis of the Algerian AP and its structure, since the independence to date, as well as its impact on the food offer, through its DCM and the citizens' health.

1- The Agrarian Policy in Algeria

In order to describe accurately the current agrarian structure in Algeria, we believe it is indispensable to give an idea about the former structure implemented during the French colonization (Amin, 1966), for it constitutes the reason behind the underdevelopment we are currently suffering from, as it lasted for more than 130 years according to Frank (as cited in Bedrani S. , 1981).

1-1- The Colonial Agrarian Structure

After the military conquest of the country, a dispossession of all fertile land was operated for the profit of the settlers, which according to Estoublon & Lefébure, led to the creation of a colonial agriculture within a legal frame under the Warnier Act (as cited in Alain, 1975).

After French settlers arrived in Algeria, according to Hersi (1981), they were allocated vast properties of fertile land, close to the cities and suburbs.

This lead to the creation of two distinct sectors: the first, modern with big cultivable properties, near transportation means, for settlers. The second traditional, made of small plots of land, poor, in remote areas, for the indigenous people of the country.

According to Hersi (1981), the agricultural production, mainly the settlers', was limited at farming cereals, grapes, and citrus trees, whose varieties and yield improved thanks to French banks that offered loans in order to satisfy the market needs in Paris. Nevertheless, and to the detriment of cereals, priority was given to vineyard and citrus farming, especially that the metropole was suffering from a pest devastating its vineyards (grape phylloxera).

Table 1: *Cereal (white wheat, durum wheat, barley, oats) and Wine Production in Algeria, 1850-1955.*

Year *	Cereals (in millions of quintals)	Year **	Cereals (in millions of quintals)	Wine (in millions of hectoliters)
1850-60	5,20	**1911-15**	21,00	7,4
1860-70	9,20	**1921-25**	16,10	8,5
1890-1900	15,70	**1926-30**	17,80	10,4
1900-1910	18,80	**1941-45**	13,50	9,5
		1951-55	21,00	15,6

Source: * Despois, 1964. ** Amin, 1966.

As a result, the country went from being a big exporter of cereals in 1830 to becoming a huge importer in 1942 according to Le Rapport Général du Plan de Constantine (as cited in Hersi, 1981).

This might had been worsened by the fall of the prices of cereals between 1926 and 1936, in addition to the very low yield of the indigenous subsistence and food-producing agriculture (Isnard, 1975) (*Cf*. Table 1).

To summarize the situation of the Algerian agrarian structure during the colonial era, according to La Charte de la Révolution Agraire & Perretti, it suffered utter decimation and destruction added to the impoverishment of indigenous farmers (as cited in Ait Amara H. , 1992; Hersi, 1981).

1-2- Evolution of the Agrarian Policy in Algeria

The AP in Algeria underwent several stages that we may summarize as follows:

❖ *Self-Management and Agrarian Revolution (1962-1979):* After independence, the first agrarian reform to be implemented was in 1963, by decrees concerning "the self-management of vacant property", through the nationalization of colonial land and the establishment of a so-called "self-

management" system, which were first instigated by the population's spontaneous occupation (12% of the rural population) of the land abandoned by settlers. A land that covered a surface of 2.5 million hectares (ha), representing 28% of the Utilized Agricultural Area (UAA) (De Villers, 1980; Adair, 1983). This was consolidated by the implementation of a Management Committee, whose role was to run the abandoned farms, in addition to create the National Office for Agrarian Reform (O.N.R.A), aimed at implementing operational regulations and establishing plans for the production equipment and trade's functioning, according to Hersi (1981).

The final goal of the self-management system was to challenge the colonial agrarian structure, by initiating the redistribution of colonial land to farmers and limiting the acquisition of land by the national bourgeoisie, through prohibiting land and production material trading, according to Dossier Documentaire (as cited in Hersi, 1981). The choices made during this period prolonged the suffering undergone during colonialization; they raised unemployment and intensified immigration that doubled, as well as rural exodus (Van Malder, 1975).

Eight years after independence, on November 1971, the agrarian revolution was declared through an edict implemented by the Council Chairman (as cited in Van Malder, 1975). It stated, according to De Villers (1980) &Van Malder (1975), an integral nationalization or a limitation of estates; nonetheless, according to Ait Amara (1992), it was not as radical as McArthur's. The private estate was subjected to a limitation, with the prohibition of any form of renting or sharecropping (Bournane, 1981), while an exclusion of absents, mainly urban citizens was operated, according to Dossier documentaire (as cited in (Hersi, 1981) and Ait Amara (1992).

Between 1972 and 1973, recovered plots of land were assigned to the National Fund of the Agrarian Revolution (FNRA), which was entirely managed by the Municipal Comprehensive Agricultural Cooperatives for Services (CAPCS) implemented in 1973 (Bessaoud, 1980).These cooperatives expanded to reach in 1979, 674 co-ops distributed over 703 municipalities throughout the country, according to La Charte de la Révolution Agraire. According to De Villers (1980) & Hersi (1981), this reform was better than the former one, as it extended to agrarian structures other than those known as colonial, with a new industrialization vision, through the heavy industry and the development of its equipment.

In this context, according to Hersi (1981), agriculture should follow its expansion, by classifying the agricultural farms in the following three categories defined by Art.24 of the Ordinance of November 8, 1971: "Private, Self-managed, as cooperatives belonging to former moujahidine, Allocated under the agrarian revolution". The surface either allocated or

kept by its owner, varying from a region to another, is calculated on the basis of the amount of money that a salaryman perceives, if he happens to work on a self-managed farm, accomplishing 250 days of work per year. It reaches the triple of this amount for an owner, while it is increased to 50% if the latter has two (2) sons. Regarding landowners subjected to the nationalization, they are compensated using bonds called "The Agrarian Revolution Bonds", paid off in 15 years with an interest of 2.5% per year. Concerning the pastorate, according to the JORADP, herds are allocated to shepherds by major stockbreeders (as cited in Van Malder, 1975).

The expected goal could not be achieved because, according to Ait Amara (1992) and the CNRA, only 7.2% of the private domain, representing 400,000 ha of a total 5.5 million ha, was retrieved with a redistribution in 1978 for approximately 15% of small and landless farmers (as cited in Bournane, 1981). According to Hersi (1981), climate hazards, and the +3% demographic increase of 1979 (ONS, 2012), in addition to the interest given to industrialization, while ignoring the transition delays of an agrarian structure that was still choking under the stagnation caused by the colonial structure, contributed in its demise.

According to Raffinot and Jacquemot, investments were economically viable, during the period 1967-73, thanks to oil earnings, external aids, and the revenues of migrants, and were by any means related to any internal market fed by a rapidly developing agriculture (cited in (De Villers, 1980). Consequently, the AP led to nothing but a socialist organization of the agriculture, characterized by the nationalization (MADR, 2012) and the salary system, according to Hersi (1981), with an increase of workers numbers beyond the real needs, an ignorance of seed sowing proceedings, and a deterioration if not near absence of outputs, which represented a 'quasi-immobilization of the agrarian structures'.

This might be attributed, according to Bessaoud (1980), MADR (2012), and Rousset, to the non-disruption of the existing real estate structures and production modes, as well as the focus on the liquidation of settlers' interests on oil wealth, an imposed collective management, and an industrialization without complete real estate restructuration (as cited in Van Malder, 1975). All these factors finally constituted a hindrance to the evolution of the life of farmers and represent, according to Olivier Marc (as cited in Hersi, 1981), the main reason behind the backwardness of the AP in Algeria.

❖ *First State agricultural economy reforms (1979-1999)*: It is in 1990 that the Real Estate Orientation Act (SGG, 1990), nullifies the 1971 Agrarian Reform Act, and gives the land back to its original owners, while allocating

individual rights on public land "transmissible and transferable right" for the eligible parties with a Land Use Right (Omari, Moisseron, & Alpha, 2012). Cooperatives, according to Ait Amara (1992), were dissolved and their associated land became new production units, called "Socialist Agricultural Domains (DAS)", as well as the properties of religious institutions (Waqf) and territorial communities (600,000 ha). In this context, two types of production units emerged, namely: Collective Agricultural Farms (EAC) of an average 80 ha, indivisible and allocated to 5 to 6 beneficiaries; and smaller Individual Agricultural Farms (EAI) allocated individually (Ait Amara H. , 1999). (Cf. Table 2)

Table 2: *Evolution of the Real Estate Structure in Algeria, 1963-1992*

Farm Type *	1963 Act	1971 Act	Total	Farm Type **	1992	
					Farm numbers	Surface (ha)
Self-management	2 330 807	-	2 370 807	**EAC**	28 707	1 910 109
Cooperative	-	964 482	964 482	**EAI**	17 632	222 246
Individual	-	157 278	157 278	**Total**	**46 339**	**2 132 355**
Total	**2 330 807**	**1 122 760**	**3 463 567**	**Pilot Farms**	**176**	**166 234**

Source: Personally constructed, from: Ait Amara, 1992*, 1999.**

In addition to the creation of Agricultural Chambers and the Agricultural products transformation, and the Supply Office were dismantled. Then, subsidies related to agricultural inputs, according to MADR (2012) & Ait Amara H. (1992, 1999), came to a near suppression. As a result, the small farming operations were abandoned, and the private property reemerged, announcing a return to the colonial structure. During the 1990s, the strategies dictated by international organizations (the IMF and the World Bank), resulted in the adoption of the Structural Adjustment Plan (PAS) according to Benachenhou (as cited in Omari, Moisseron, & Alpha, 2012), this caused a rapid inflation and an increase of the food dependency. In fact, they led, according to Ait Amara H. , 1992 & Omari, Moisseron & Alpha (2012), to no improvement of the existing agrarian structure, but rather triggered a slow death of the agrarian reform by allocating the undivided right (Bedrani & Bensouiah, 2001).

❖ *Stabilization, National Reconciliation and Emergency Actions (1999 to date):* By the end of the 1990s, passing the end of the Structural Adjustment Plan, the Algerian State engaged in a succession of agricultural reforms despite keeping the former structure. Consequently, no expected results

were achieved; the urban population continued its progression, according to the ONS (2012), from 31.40% on the first census of 1966, to 40% on the second census of 1977, before reaching 65.94% on the last one in 2008. This led to the neglect of the agricultural land left to suffer from an imposed rest, while the State expenses on food continued to increase exceeding 8,094 Million USD in 2020 (DGD, 2021).

In practical terms, for the agrarian structure, in 2010, under the agrarian reform, the Law no 10-03, setting the conditions and modes of exploitation of the agricultural land of the State Private domain (SGG , 2010), came to transform the right of perpetual possession, of 99 years, of the State Domain's private land, into a renewable 40-year-concession.

This transformation, according to Omari, Moisseron, & Alpha (2012), could be considered as hamstring for the farmer, for the reduction of the land possession time to a short period of 40 years to be renewed every time can create a feeling of instability. Besides, to get his supply of fertilizer or other, the farmer must undergo bureaucratic procedures, under which he has to submit legal documents delivered by a justice bailiff proving that he cultivates his own land. According to Charef, this situation led to the piling up of papers and shortages that impacted no other than the farmers themselves (as cited in Omari, Moisseron, & Alpha, 2012).

Finally, according to Hadibi, Chekired-Bouras & Mouhouche, and Moisseron & Clément, the source of the Algerian agricultural problem is the real estate, thus it must be reviewed through genuine studies. Factually, the Algerian agriculture, even after 60 years of independence is still revolving around a colonial agrarian structure, which discourages investors and entrepreneurs alike, because of its practices that are inadequate to its development (as cited in Omari, Moisseron, & Alpha, 2012).

2- Consequences of the Agrarian Policies in Algeria

The result of the AP led in Algeria, since the independence, can be illustrated through food offer, based on food availability, DCM, which is part of it, and its impact on health, observed through alimentary Non-Transmissible Diseases (NTD)

2-1- Food Offer

According to Combris, food offer, through agricultural production, as well as the consumer's purchase power play a vital role in the choice, diversification, and evolution of consumption, thus in the diet composition (as cited in CIV, 2009).

In Algeria, from the independence and until the 1970s, the food offer was managed by the State under a planned economy, in order to guarantee food

availability by providing basic products of wide consumption (Frahi, 1999). Due to a low local production of agricultural yield and food, the offer was, according to the ONS (2012), below the ever increasing population's needs, as it went from 10.67 million in 1963, to 13.30 million in 1970, before reaching 18.12 million in 1979, with a fertility index exceeding 7 children per woman by the end of the 1970s. Due to what the Algerian Finance Ministry characterized as a monopoly policy on imports that the Public Authorities were following while applying a price capping on the local market (as cited in Frahi, 1999), this situation, according to Hersi (1981) and Omari, Moisseron, & Alpha (2012), led them to guarantee food availability through imports associated to oil and gas exports. As of the 1980s and following the oil price collapse, the State, according to Frahi(1999) and Elloumi, started withdrawing progressively from its price support policy, before accelerating the process in 1986 until the end of the 1990s. This led to a price volatility on local markets with the absence of any form of administration, subjecting the food offer to the market mechanism. Unfortunately, this offer was insufficient, despite clearing former grazing land and re-planning the irrigation that increased by 27% between 1988 and 1998 (as cited in Bedrani & Bensouiah, 2001).

In the 2000s, with the end of the Structural Adjustment Plan, the food offer, (as cited in Omari, Moisseron, & Alpha, 2012), witnessed some changes through the dynamics of implemented agricultural programs like the National Plan for Agricultural Development, and the Plan of Agricultural Revival that came afterwards. Nevertheless, according to Adair and Benbekhti, it remained unstable, irregular and insufficient as it covered only 30% of the dietary needs, while depending heavily on imports (Ababba & Labsi, 2009). This was due to successive contradictory reforms, the relative ageing of the agricultural population, and an irrigation disparity between the North, the Steppes, and the South, in addition to the wide areas of fallow land, which even if continuously reduced, continued to occupy 1/3 of the UAA.

Furthermore, in 2020, according to DGD (2021), food imports reached 8,094 million USD, the equivalent of 23.54% of the entire national imports, indicating an increase of 0.28% compared to 2019, with 34.76% devoted to cereals. This illustrates the local food offer weakness, which persists to date (Cf. Table 3 and Figure 1).

Regarding food availability, which according to Rastoin, represents for any country the quantitative and qualitative supply of sufficient food during all the seasons of the year, in order to satisfy the population's needs, notwithstanding the origin of these food products; which may be produced in the country including all the sources of local food production, or

imported, or even allocated (food aides) (as cited in Kaabache, 2018; Action contre la faim International, 2010). At the international level, the FAO undertakes the evaluation of the food availability annually, based on dietary assessment reports submitted by each country, with the calculation unit being the "kilocalorie per person and per day" (Collomb, 1999).

Table 3: *Wheat Imports and Consumption in Algeria and the Rest of the World, 2003-2019* (**M:** Imports, **C°:** Consumption)

		2003/04	2005/06	2007/08	2009/10	2011/12	2013/14	2016/17	2017/18	2018/19
Algeria	**M**	3,933	5,469	5,904	5,167	6,500	7,484	8,414	8,172	7,000
	C°	6,800	7,500	8,050	8,550	8,950	9,850	10,350	10,450	10,650
Brazil	**M**	5,559	6,194	7,076	6,690	7,052	7,061	7,788	6,702	7,500
	C°	9,800	10,800	10,300	11,000	11,200	11,400	12,200	12,000	12,100
Egypt	**M**	7,295	7,771	7,700	10,500	11,650	10,150	11,175	12,407	12,500
	C°	13,300	14,800	15,800	18,100	18,600	18,500	19,400	19,800	20,100
EU-27	**M**	7,374	6,758	6,933	5,358	7,368	3,976	5,299	5,824	5,800
	C°	115,095	127,525	116,536	125,622	127,234	117,300	128,000	130,400	123,100
The world	**M**	103,475	113,307	116,433	135,397	153,797	162,479	182,256	182,977	177,986
	C°	588,373	624,435	617,676	654,270	697,309	698,271	738,992	743,017	737,874

Source: Personally constructed based on the reviewed data of: USDA, 2008/2013/2018/2019.

According to FAO, food availability in the Maghreb, quantitatively is low, compared to the rates shown in Northern Mediterranean countries, though it gets slightly closer in the case of Tunisia. However, qualitatively, the rates are very low, especially proteins, which are vegetal (as cited in Bedrani & Bensouiah, 2001; Allaya, Labonne, & Papayannak , 1988). For Algeria, in terms of quantity, food availability went from 1,569 Cal with 1,411 of vegetal origin in 1962, to 3,468 Cal with 3,072 of vegetal origin in 2019, still when it comes to quality, it remains unbalanced, with the predominance of vegetal proteins, namely wheat (FAO, 2021) (Cf. figure 1).

A DCM is a set of dietary behaviors and practices (Lambert, 1897) proper to a society. Besides, according to Poulain &Lambert, transmitted from generation to generation, it represents its values, and portrays during the consumption of a meal, the proprieties surrounding it, from its components, to the way it is prepared then consumed, as well as the types and quantities of products, in addition the times of consumption (as cited in CREDOC, 2011).

Today, it is accepted that food diets play a critical role in the implementation of preventive strategies and policies in the fight against health issues (WHO, 2003). In this context, the choice of a so-called "healthy" DCM, like the 'Mediterranean' is initially part of a food offer policy, aimed at guaranteeing food availability, considering the purchase

power that ensures access to food. Besides, it is part of a preventive policy, whose role is to direct individuals to take better decisions regarding their dietary consumption.

Currently, according to the WHO (2003), food offer is abundant; besides, individuals are adopting risky behaviors like following an unbalanced diet unseen among human societies for centuries, and reducing their physical activity. This results in the emergence of alimentary NTDs like type 2 diabetes and cardiovascular diseases (CVD), which represent one of the leading causes for premature death, and constitute an additional load for the already heavy State budget to bear.

According to Willett et al., the scientific community supports and recommends a Mediterranean DCM (as cited in Hachem, et al., 2016). While the WHO & Kelishadi et al. mention different studies, like the Francesco Sofi et al. (as cited in Combris & Soler, 2011) research, which proves the existence of a cause-and-effect relationship between a Mediterranean consumption and health. Shown in the case of its sample constituted of 1.5 million individuals who chose to adopt a Mediterranean diet, and had a reduced incidence of 9% for mortality and CVDs, and of 6% for cancers (as cited in Combris & Soler, 2011; Maire & Delpeuch , 2004).

Backed by other studies, especially Keys' (as cited in Hachem, et al., 2016) (In his study about seven countries. His observations indicate that the global mortality and the cardiovascular rate were lower among the cohorts that used olive oil as a principal fat source compared to those living in Northern Europe), the WHO, as from 1996, considered the Mediterranean diet as the DCM of choice against NTDs (as cited in Abis & Mombiela , 2010).

This consumption model, according to Allaya, Labonne, & Papayannak (1988), summarizes the link between the individual and his environment in his life mode and his attachment to nature. According to Willett et al., the model is characterized by an increased consumption of seasonal fresh vegetables and fruits, as well as legumes and dried fruits and vegetables; and a low consumption of dairy products (with the exception of fermented ones: whey [l'ben], curds [raïb]), and cheese (goat and ewe). It is also characterized by a moderate consumption of red meat (with the exception of mutton and goat) and a preference for fish and white meat (fowl), in addition to olive oil, spices, vinegar and lemon for seasoning, and wine as an accompaniment beverage consumed socially (as cited in Reguant-Aleix, 2012).

Nowadays, this Mediterranean diet, according to Allaya, Labonne, & Papayannak (1988), tends to evolve and change, joining the "western" diet. This is due in part to the technological development and consumers'

behavior, as they are keen to experience a certain level of modernity, following the transformation of life modes and urbanization, etc.

The Algerian DCM, according to the Typology of Food Models established by Malassis and Padilla, is part of a traditional-agricultural model (Malassis & Padilla, 1982). Because cereals, according to FAO (2021), take a big part of the population's consumption, as they represent over 50% of the consumed calories and over 60% of the proteins consumed in one food intake. The food intake in Algeria shows a constant predominance of cereals, starting from the independence and continuing today, what makes it unbalanced and had already been observed by both Autret in 1974 and Badillo in 1980 (as cited in Frahi, 1999) .

In order to observe the evolution of the Algerian model, consumption surveys have been undertaken every ten (10) years since the independence, by State statistical organizations. To date, five (5) surveys have been led, four (4) of them during the periods: 1966/67, 1979/80, 1988/89, 2000/01, and the 5th in 2011, by the National Office of Statistics (ONS , 2014).

The most recent of these surveys, according to the ONS (2014), informs us globally that the expense is estimated to be of 4,489.5 Billion DZD in 2011 (46.137 Billion Euros) with 71% related to the urban region with an amount of 3,194.1 Billion DZD (32.825 Billion Euros). According to the expenses structure for a household in 2011, 41.80% of the budget is dedicated to food (compared to 44.6% in 2000). A very important rate, especially if added to the 20% committed to dwelling and utilities, as well as the 12% for transport. Leaving the household with 25% of its budget to spend on the rest of its needs like health, education, etc.

If we analyze the details of the household's food budget, it is clear that 25% of it is allocated to the consumption of cereals in addition to milk and its derivatives; food supplies that continue to be subsidized even today. This indicates, according to Frahi (1999), that the consumer is rather attracted to low prices than making a personal choice. Besides, it informs us that his purchase power doesn't allow him to diversify his food intake and that the food offer is insufficient, which keeps his DCM traditional-agricultural.

Regarding the transformation noticed in food habits, it is important to underline that nowadays, according to Hoffman, Algerian consumers are influenced by globalization, urbanization, the change of work hours, single life… (as cited in Chikhi & Padilla , 2014; Allaya, Labonne, & Papayannak , 1988; Frahi, 1999). Their consumption, according to Chikhi and Padilla's study remains traditional, with a touch of modernity, as the semolina galette formerly prepared at home is replaced by the baker's bread, while traditional products like couscous, trida, etc. are substituted by industrial pasta. Concerning the choice of food, according to Jomori et al., it is also

influenced by the supply price, especially fresh vegetables and fruits that are expensive; resulting in the increased consumption of both wheat and derivatives as it is subsidized, and soft drinks that are consumed at over 50% as they are cheaper than fruits. Regarding the time dedicated to the consumption and preparation of meals, it is on average 1h23mn per day for the first and less than 1h 56 mn per day for the second, which is less than the time allocated to the same activities in France.

To summarize the situation, the Algerian DCM is based on gender. It is traditional for men, with a touch of modernity added by the consumption of beverages; however, for women especially the youngest ones, whose dietary preferences differ from the traditional dishes they have to prepare at home, they eat outside, food that might not be healthy but happens to be the only way they can achieve a certain dietary independence.

Finally, this diet, which is unbalanced, according to DGD (2021), coerces the country into importing huge quantities of cereals and derivatives. In fact, in 2020 it reached 34.76% of its total food imports, and led to rank Algeria among the biggest consumers of wheat in the world (USDA, 2019), subjecting it to the unpredictability of this crop's price on the international market.

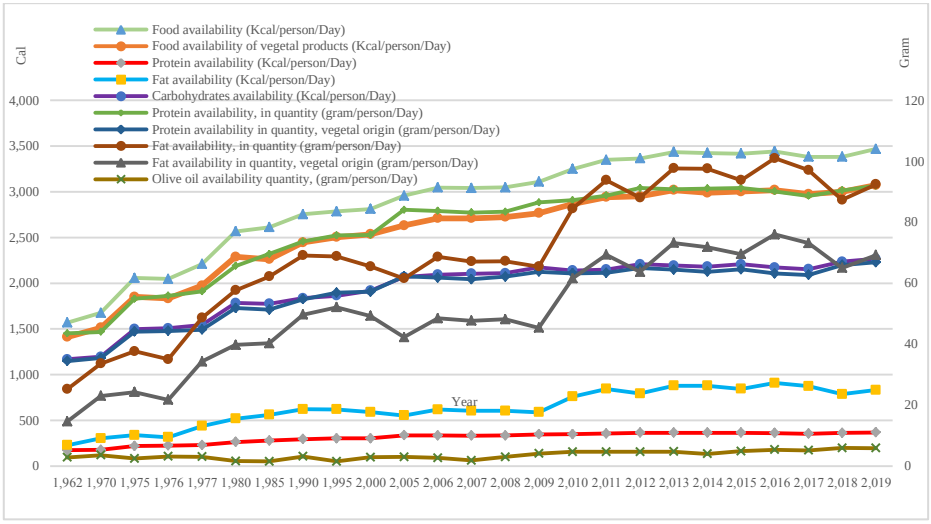
Food consumption provides individuals with the calorie intake essential to cover their nutritional needs, through the three vital nutritional elements: proteins, carbohydrates, and lipids, in order to achieve their growth and development, and maintain their bodies operational. If achieved, a balance between these nutritional elements determines the health state. For example, a diet providing a dietary intake rich in lipids and poor in carbohydrates might lead to obesity and develop into a risk factor for contracting NTDs like CVDs. Hence, a balanced diet must respect the proportions of vital nutrients and micronutrients like vitamins and minerals, which are needed in very small quantities though crucial for operating the human body's vital functions. In this context, nutritional norms were implemented by international organizations, with maximum and minimum limits, to keep individuals healthy (Anses, 2016).

In comparison with the Algerian population's calorie intake that we can follow through figure n°1, we notice that the daily food availability per citizen went from 1,569 Cal in 1962, to 2,500 Cal in 1984. This intake exceeds the nutritional norms of Harris and Benedict, especially since 1978 (2,344 Cal) as the evolution starts to be felt. On the other side, males' intake is insufficient, apart from the 50 + since 1979 (2,445 Cal).

This is followed by a constant improvement of the intake from 2,613 Cal in 1985 to 2,760 Cal in 1989. Though this evolution remains insufficient for men, apart from the 50 + since 1988, according to the norms shown by

Anses (2016) of Schofield et al. regarding women, the opposite seems to be true, as the intake exceeds their needs. As of 1990, the calorie intake evolves, going from 2,754 Cal to 2,970 Cal in 2003. Which is considered satisfying during the first years, but starts to become as unbalanced as women's intake, according to the nutritional norms of Mifflin et al. As from 2004, and according to the nutritional norms of Müller et al. and Henry, the Algerian population's calorie intake exceeds the nutritional norms' recommended rates. Which can result in overweight and obesity issues in the future, especially that the calorie intake reaches 3,493 Cal in 2019, though more than 88% of it remains vegetal.

Figure 1: *Food Availability (kcal/pers./ day), Algeria 1962-2018*



Source: Personally constructed based on data from the FAO: http://www.fao.org/faostat/fr/#compare, 2019; 2021.

With regards to nutritional elements, mainly lipids, the lipid availability rates have never reached the recommendations of international bodies. In fact, since the independence, the proportion went from 14.46% in 1962, to 19.82% in 1977, to 23.74% in 1982, to 22.23% in 1995, to 18.73% in 2005, to 25.21% in 2011, before reaching 23.99% in 2019.

For proteins, the proportion that seems more or less conventional went from 11.10% in 1962, to 10.38% in 1977, to 10.21% in 1982, to 10.87% in 1995, to 11.37% in 2005, to 11.60% in 2011, before reaching 10.61% in 2019. However, the unbalance concerns the proteins nature, with 70 to 80% of the protein intake being vegetal. Concerning carbohydrates, the amounts seem unbalanced, with the calorie intake going from 74.44% in 1962, to 60.80%

in 1977, to 66.05% in 1982, to 66.89 in 1995, to 69.90% in 2005, to 64.20% in 2011, before reaching 65.40% in 2019. This situation might be explained by the nature of the DCM followed by population, as well as the agricultural and dietary policies implemented during these periods. For example, the subsidy of food products of wide consumption like flour, bread, milk, etc., and the State fixed prices policy contributed to the rise of carbohydrate rich food products consumption (wheat contains 65 to 70% carbohydrates and 14% protein). It was after the implementation of the Structural Adjustment that animal lipid and protein availability (subsidy of milk especially) decreased, while carbohydrates availability increased, as the food products that continued to be subsidized during that recession period were flour and bread (wheat). A resumption of healthier consumption could be noticed during the 2000s after the PAS came to an end, and the implementation of a new Plan for Agricultural and Rural Development aiming at promoting food security, financed by inputs resulting from the rise of oil prices. This continued to be the case until 2014, when the State decided to reduce subsidies due to the 2008 crisis, which couldn't be overtaken. This led to a return to higher carbohydrate availability, a decrease of lipid availability, and an increase of vegetal proteins in 2019.

2-2- Health Impact

In 2019, the National Office of statistics estimated the Algerian population to have reached a number of 43 million persons with a male predominance (50.66%), while the global life expectancy was about 77.8 years in 2019 (ONS , 2022). According to the ONS, this population is subjected to the changes taking place in its local market, i.e., the introduction of modern products like soft drinks, refined oils, etc., in addition to an industrial policy with no link to nutritional standards and the increase of fresh produce prices (as cited in Chikhi & Padilla , 2014). Which according to Maire, Delpeuch & Henrichs, is leading to an increase of NTDs, added to the already existing nutritional deficiency diseases, causing an epidemiological (INSP, 2007) and dietary transition in the country, mostly affecting women (as cited in Chikhi & Padilla , 2014), with death rates reaching 57.4% in 2016 compared to 53% for men (INSP , 2016). The STEPwise Algeria study, published in 2018, reveals the current health situation of the Algerian population concerning NTDs (WHO & MSPRH, 2018). It confirms the results of former research works, according to INSP (2007), like Tahina in 2005, as well as the recent data published by the National Institute of Public Health (2016), informing us about the prevalence of overweight and obesity, which in addition to be important is also worrying. For both are part of the risk factors inhibiting all other nutritional diseases, and reach 55.6% (The

frequence of overweight is more important for men compared to women, which respectively of 34.3% against 33.2%. On the opposite, according to the WHO & MSPRH (2018), obesity rates are of 14.1% against 30.1%). Knowing that the rate of people who do not practice a physical activity of moderate intensity is 69.2% and that the rate of inactive women (83.8%) is higher than men (54.5%).

Furthermore, high blood pressure remains the most dominant disease in Algeria, holding 7.5% of total NTDs, and affecting women (10.0%) more than men (5.1%). In second position comes diabetes, with 5% of the population either suffering from high glycemic rates or being under medical treatment for diabetes. Besides, it affects women (5.4%) more than men (4.6%). Regarding CVDs other than High blood pressure, the rate is 1.2%. Moreover, the numbers of women (1.3%) affected are higher than men (1.1%) (MSPRH , UNFPA, & UNICEF, 2020).

Concerning the consumption of vegetables and fruits during a typical day, according to MSPRH, UNFPA, & UNICEF (2020), the answer is on average of 3.00, with 2.01 vegetables and 0.9 fruits. This data indicates that NTDs are increasing rapidly in Algeria and might raise the rates of illness and mortality on the medium and long terms. Especially that risk effects like obesity and cholestorolemia, etc. are not taken in consideration. Which adds to a low consumption of vegetables and fruits, an increased use of vegetal oils in food preparation (93.2%), and a lack of physical activity.

Conclusion

The implementation of a reform for a country is not an easy task; it rather needs the joint efforts of everybody in order to achieve it.

It seems that the food dependency the country is suffering from is the result of no other than the current AP, which was actually inherited from colonialism, destroyed by industrialization, and worsened by the demographic transition. Besides, this policy presents no global vision or perspectives and follows no logical or coherent vision. Regarding the national DCM, it reflects perfectly the State food offer, which in addition to be unsatisfactory, is subjected to the fluctuations of external markets.

An AP, if well defined, might play a crucial role, through agriculture, by increasing the food offer to such an extent it would be possible to redirect the current DCM, improve, balance, and transform it into a Mediterranean model. Such a diet can in fact reduce our consumption of harmful food products, decrease the incidence of alimentary NTDs, and delay their occurrence, while lowering their negative effect on the State budget.

Indeed, an appropriate food offer, associated to a preventive policy, through institutional approaches, namely school catering, education programs and

the media, can positively nudge the choice of consumers. However, we should be aware that such efforts can't have an immediate effect and should be expected to bear fruit in the medium and long term.

Finally, will the consequences of the 2008 economic crisis, Covid 19, and the conflict in Ukraine, which the world continue to suffer from today, push the country to review its economic policy, by restructuring its AP and redefining both its priorities and strategic choices?

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