

FEEDING TWO MILLION RESIDENTS AND TEN MILLION TOURISTS:

Food (in)sufficiency in the Canary Islands

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Abstract

The level of food self-sufficiency in the Canaries is low and decreasing. The growing demand for food, both due to demographic and touristic expansion and to the population's increased purchasing power, has not seen a corresponding increase in local food production. This paper details the factors behind the growing dependence on imported food, emphasising the role of insularity and the institutional framework of food production activity. Based on this diagnosis, the main courses of action are identified that could allow for the selective recovery of that portion of the local production that is intended for the internal market.

Keywords

Islandness, food sufficiency, vulnerability, Canary Islands

I. Islandness and food sufficiency

Food can be supplied in any territory through multiple combinations of local production and importation. The local supply is affected by the availability of natural resources (water, soil, climate, etc.) and the characteristics of the production system (property structure, capitalisation, technology, etc.). The demand side is conditioned by the size of the population and its purchasing power. High demographic densities, in turn, can reduce the availability of arable land and alter production costs as compared to other locations with more available land. Greater degrees of economic development tend to be reflected in a shopping cart that is more diversified and less dependent on the seasonality of local production and its range of foods. In this sense, the process of economic development promotes the openness of local systems and the exchange of foods through trade.

Within this general context, what is unique about the food supply under conditions of insularity? The economic effects of insularity are the result of combining the (reduced) size and (dis)connection of insular systems. The size, measured using economic (GDP), demographic (population) and geographic (size) variables, usually assumes that islands are small in comparison to mainland economic systems¹. The higher degree of exposure exhibited in small systems stems from the effects of scale, of the islands' smaller average size. The reason is obvious: if the planet were to be regarded as a single country, it would, by definition, be fully self-sufficient. Large states such as China or the U.S. are expected to have high degrees of self-sufficiency. The same can be said for the diversity of the food they produce. A country with a large expanse is more likely to enjoy a higher diversity of ecosystems and natural resources, a diversity that on smaller scales, with few exceptions, tends to be less. As a consequence, when evaluating the openness of an economic system, it is useful to compare similarly sized economies. An insular economy may in fact be more closed than its mainland counterpart once the size variable is taken into consideration.

The second dimension of the effects of insularity involves the connectivity the island maintains with the outside. While 'classical' analyses of insularity rely on concepts such as 'remoteness' and 'periphery', weighing the distance from the mainland as a drawback (disconnection) and a cause of higher supply prices, more recent analyses highlight the connectivity provided by maritime routes (see King, 2009:63 on 'nodal islands'). An economic assessment of the distance separating islands from mainland economies requires considering several nuances. First, the per unit and per kilometre transport costs are, save for certain exceptions, lower for maritime than land transport due to the lower physical friction between the vehicle and its surroundings. This is also reflected in this activity's carbon footprint. For example,

transporting 10 tonnes of cargo by ship from China results in 1.3 tonnes of CO₂ emissions. Transporting that same quantity from Alicante to Hamburg in trucks would emit 1.56 tonnes. (Amman et al, 2012: online).

Second, beyond energy efficiency, the cost of transport also depends on the technologies employed. Specifically, many islands played a historic role as supply sites in the expansion of intercontinental transport. Nowadays, the use of large container ships allows for continents to be linked directly without the need for intermediate sites, reinforcing the peripheral nature of insular economies as places with reduced market sizes. As a result, the effects of scale when supplying islands from the outside is evidenced in the smaller sizes and frequencies of the means utilised, generating higher costs. Third, the reference distance is not necessarily the nearest mainland coast. If the nearest site cannot offer a range of products or an appealing infrastructure, it may not present any supply possibilities. Relevant to this question are the institutional memberships of the islands in States or integrated economic blocks, since borders condition trading possibilities and costs (customs and non-customs duties, the extent to which States encourage trade through port infrastructure, etc.).

In this sense, institutional economics (North, 1990) recommend taking into account the context (embeddedness) and history (path dependency) of the systems analysed. When considering the time aspect, one should recall the insertion of many islands in maritime networks by European powers (eg Malta, the Canary Islands, the Azores and Madeira; Baldacchino, 2004). The overseas expansion of economic ties gave these islands a geostrategic value that had repercussions on the economic specialisation and their openness (*plantation islands*; Warrington and Milne, 2007). This international

specialisation, in turn, conditions the population of these islands by immigration with links to this selective globalisation through commercial ties. The local resource base is not interpreted in these contexts exclusively as a source of food for the resident population, because these resources can comprise comparative advantages in a context of international specialisation. For example, the comparisons by Gough et al. (2010: 5) among the islands of Anuta, Tikopia, Bellona and Ontong Java underscore how “by comparison Bellona and Ontong Java have changed rather faster and more comprehensively than Anuta and Tikopia, where commerce is largely absent and links with markets sporadic at best. Quite simply, geography matters.” When considering the spatial aspect, the geographic position of the island being analysed affects the natural conditions under which food is produced (tropical or subtropical locations, etc.); Greenland is not the same as Cuba. Different climates, geographies and soils require the adaptation of local food systems, and many traditional food patterns in island areas are related to this adaptation. This context must also include institutional integration. Islands can be independent States, parts of States or of other economically relevant supranational entities (one example being the European Union). This integration affects the competencies of local policies. As concerns food and agriculture, an island’s institutional status determines how much sovereignty it enjoys to craft and implement its own policies.

Of interest is how developed countries have used their sovereignty to maintain and even increase their level of self-sufficiency despite, in some cases, not having comparative advantages in terms of domestically produced foods. What are the arguments for justifying the objective of reaching or maintaining a minimum level of self-sufficiency? Food satisfies an inescapable physiological need: we need to eat. This characteristic transforms food into an individual and collective concern and gives it a strategic value. All communities are interested, insofar as they are able, in ensuring its future supply. As a result, it should come as no surprise that economic policies typically aim to safeguard the domestic food industry. The instruments for this defence have varied over time and according to the power of the communities involved. Another reason for valuing food products rests on their quality: a balanced range of products that is accessible by the entire population is supremely important to the health and performance of a society. Obviously this is affected not only by supply factors, since eating unhealthy foods can also be explained by the voluntary behaviour and preferences of the population, but the lack of a balanced supply undoubtedly has a disproportionate effect on this behaviour.

The strategic interest of food security is particularly relevant in the context of the higher vulnerability of small insular economies (United Nations, 1998). This vulnerability is exacerbated by the impact of climate change, particularly in some cases, such as those of the Pacific islands (FAO, 2008). Climate change is related to food supply both through its direct impact on local production and indirectly through imports. The goal of food security, defined as a situation in which “all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2002; Chapman, 2009: 11), places the emphasis on the goal of making the local system as resilient as possible to potential adverse events that could impact the food supply.

In light of the considerable importance of imported food in the supply chain of many islands, most of the recommendations made to achieve food security involve recovering and diversifying local food production instead of devoting a large area of what little arable land is available to cultivation for export or to land development (FAO, 2008: 9; a recent example for the Pacific islands is Barnett, 2011: 232). There are also cases,

however, of small islands whose populations feed themselves almost exclusively using locally grown food (Mertz et al., 2010). In these cases, food security could also be at risk if natural disasters were to suddenly and massively affect local production.

Given this interest in maintaining a minimum level of food self-sufficiency, the question arises regarding whether islands too can achieve this objective. The answer to this question depends on a combination of several interrelated factors. This paper analyses these factors in detail for the case of the Canary Islands. Before reviewing the evidence specific to the food market in the Canaries, a summary of its contextual characteristics is in order so as to relate the food and agricultural dimension to the islands' specific financial and demographic context.

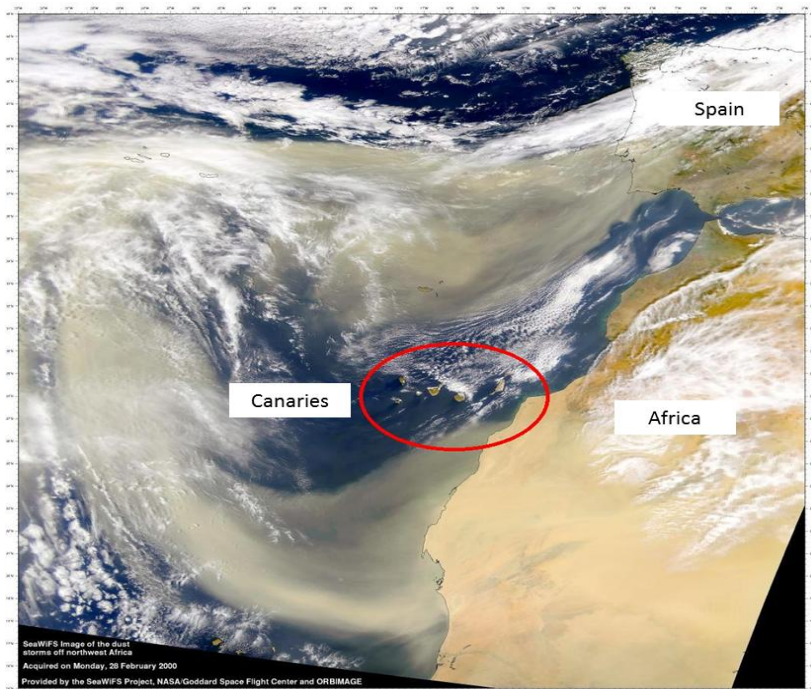


Figure 1 – Geographic position of the Canary Islands. (Source: NASA, 2000)

II. The context of the Canary Islands

The Canary Islands are an archipelago consisting of seven islands and several rocky islands with a surface area of 7,477 square kilometres between 27 and 29 degrees north and 13 to 18 degrees west. Located 100 kilometres away from Africa and over 1,000 from Europe, the Cold Canary Current flows around the island before joining the Gulf Stream. The islands are under the constant influence of the Azores High, responsible for the archipelago's humidity-laden northwesterly winds (Figure 1). With its subtropical climate, the Current and the High result in very mild temperatures with slight differences between highs and lows, with an annual average on the coast of between 18 and 21 degrees, around 11 degrees between 500 and 1500 meters and 9 degrees above that altitude.

The geologically young islands are volcanic in origin and still active. This means that few rocks have turned into soil, resulting in only 16% of the islands' surface being arable. They are also very mountainous for their small surface area – the Teide volcano on the island of Tenerife reaches an altitude of 3,718 metres and is only 10 kilometres away from the coast – meaning there are very steep gradients. The small area and the gradient have conditioned the farming possibilities, with the non-existence of metal or coal mines limiting industrial activities.

These factors, plus the climate and geographic location, have determined the economic growth model used in the Canaries throughout their history, a model that is supported by three pillars: a food production economy based on exports, a service economy tied to international commerce, and a favourable institutional framework that has eliminated every roadblock to those outside ties (Macías, 2001). At one time, the export agriculture - replaced in the 1960s by tourism – allowed for an influx of the currencies necessary for purchasing articles that were otherwise unobtainable. But alongside that agriculture there was always another intended to ensure the local population's supply of staple products. This aspect played a very important role despite its low level of capitalisation since, on the one hand, it served to keep salaries low, making exported articles more competitive, and on the other, when the exports struggled, it allowed the owning class to maintain its income level (Burriel de Orueta, 1982; Macías, 1981).

This connection between the two agricultural subsectors, however, began to unravel in the second half of the 19th Century, a schism that accelerated starting in 1900 and was complete after 1960. As improvements in international maritime transport led to lower freight costs, merchants in the Canaries opted to buy food from the outside, not only because it was cheaper, but because they could control the entire distribution process and thereby increase their profits. Agricultural production for local consumption thus started to languish, since it was unable to compete with the price of imported foods, being limited to those areas of the islands with little or no market access or practiced by the growing numbers of part-time farmers who use it to supplement incomes obtained from other economic activities (Sans, 1977 and 1981). Thus, the dishes typical of Canary Island cuisine, like *papas arrugadas*², are being prepared increasingly with products imported from Great Britain, Egypt or Israel and eaten with wines from the mainland (Nuez, 2008).

III. Estimating food sufficiency in the Canary Islands

III.1 Food demand

In recent decades, the size of the food market in the Canaries has grown both due to the expansion of the demographic base, which was 34% higher in 2010 than in 1995, and to the increased purchasing power of the population. Currently the Canary Islands archipelago is densely populated, with 2,115,049 inhabitants residing in an area of 7,447 square kilometres (1 January 2012), equivalent to a population density of 284 inhabitants per square kilometre. This situation is the result of high population growth in the 20th Century, particularly between the years of 1998 and 2008 and due primarily to immigration, with natural growth playing a minor role. To this resident population we must add the presence of approximately 10 million tourists every year who, when their average stay is translated into an average daily floating population, approximately amounts to a 10% increase (around 200,000 people).

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The trend in per capita income for residents of the Canaries has shown a meagre real increase (at 2000 constant prices) of 10% between 1995 and 2010 (Figure 2). The economic expansion had allowed for higher levels in 2005, but the contraction in the GDP during the subsequent recession and the continuing population growth resulted in a substantial reduction over a short period of time. In 2011, the per capita GDP in the Canaries was 19,806 euros, well below the Spanish average of 23,271 euros and the European Union (EU-27) average of 25,200 euros.

Indicator	1995	2000	2005	2010
Resident population	100	109	124	134
GDP (2000 prices)	100	124	146	148
pcGDP (2000 prices)	100	113	118	110

Figure 2 – Population, per capita income and GDP in the Canaries (1995=100).
(Source: INE.)

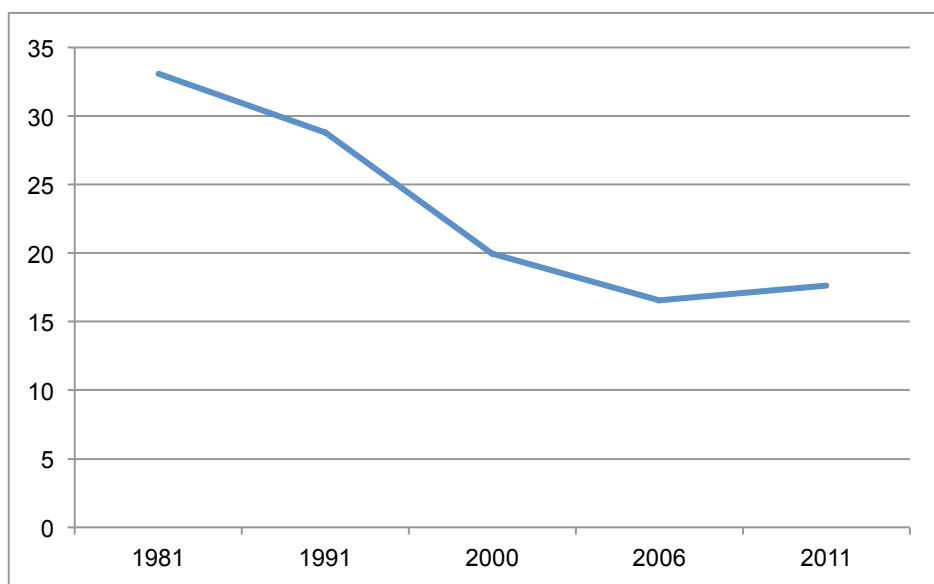


Figure 3 – Percentage of family expenses allocated to food and non-alcoholic drinks.
(Source: INE. Encuesta de Presupuestos Familiares [Family Budget Survey]).

As is usually the case, the process of economic development reduces the share of the amount spent on food products. While in 1981 food and drink purchases accounted for 33.1% of a family's expenses, that share had dropped to 17.6% by 2011 (Figure 3). The financial crisis that started in 2008 interrupted this structural trend, and the percentage of food expenditure is even seeing a modest recovery. The greater well-being of the population also changes the composition of the shopping basket (Figure 4), with more

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money being spent on animal products and processed foods at the expense of lower consumption of plant-based products. The exception in this area is fresh fruits and vegetables, whose higher demand-income elasticity allows them to maintain or even expand their position in the shopping basket.

Food groups	1988-1990		2008-2010	
	Volume	Value	Volume	Value
Meat	5.4	17.4	6.0	19.5
Fish	2.1	7.4	2.8	9.5
Milk and dairy products	16.1	16.8	15.6	15.8
Eggs	2.1	2.0	1.1	1.2
Bread and baked goods, cookies, cereals, chocolates	8.9	12.1	7.3	11.7
Rice, pasta, potatoes, vegetables	14.1	6.9	6.6	3.4
Oil	3.4	3.5	2.2	2.3
Fresh vegetables	8.0	6.5	8.1	6.5
Fresh fruits	14.8	10.3	13.2	9.7
Processed fruits and vegetables	1.4	2.7	2.5	3.7
Alcoholic drinks	3.5	4.4	3.1	3.2
Non-alcoholic drinks	16.6	6.6	27.1	7.2
Other	3.7	3.4	4.4	6.2

Figure 4 – Percentage distribution of the per capita expense (value) and consumption (volume) in Canary households by food group. (Source: Spain's Ministry of Agriculture, Food and the Environment.)

According to the statistics from the Food Consumption Panel of Spain's Ministry of Agriculture, Food and the Environment, the average annual amount spent by households in the Canaries on food and drink from 2008 to 2010 was 3.078 million current euros, with a volume of 1.5 million tonnes. This corresponds to a per capita volume of 765 kilograms a year and an annual budget of 1,555 euros. These data do not include consumption outside the home (HORECA: hotels, restaurant and catering) or the consumption of food not bought in markets. As a result, the food market volume in the Canaries measured as apparent consumption (production + imports – exports) will be noticeably higher³.

Changes in food demand in the Canaries involve a transition from a traditional food system to a modern one (Contreras and Gracia, 2005: 56) whose production is increasingly unrelated to the population, where access to food is primarily through the market mechanism with a distribution system centred around national and international chains and consumption patterns that are more and more homogeneous and independent of seasonal production. In this sense, changes in food consumption and purchasing habits in the Canaries have the same overall determinants as in developed countries: increasing numbers of wage earners with the corresponding effects on food

consumption (more eating out, higher appreciation for the ease of use of food products); changes in family structures (smaller households, demographic aging, cultural diversification through immigration, reduction in and externalisation of house work); changes in the food supply (industrialisation of production, concentration of the distribution system, foods from distant places, specialisation of local foods in certain segments); and changes in attitudes, ideas and values (greater individualism, diversification of life styles).

The specific aspects of the situation in the Canaries are related to the effects of insularity and their reliance on tourism. The remoteness of the primary food sources, with food imported from the European mainland, and the fragmentation of the archipelago into seven insular markets of widely varying sizes condition the food supply through transportation and transformation costs. Reconstituted foods and drinks abound in the Canaries (cost savings by eliminating cheap ingredients like water before transportation and adding it back in later), as do preserved foods (eg frozen meat). Moreover, the so-called “double insularity” affects the structure of a regional market in terms of having products produced on all seven islands. Despite the complementarities among the insular products, stemming from the islands’ different climatological and edaphological conditions, the inter-island transportation matrix for local foods is very underdeveloped.

The insular distribution structures, in turn, exhibit clear differences (Gutiérrez & Godenau, 2010), with the presence of large supermarket chains being more common in the islands with the largest market size (Gran Canaria, Tenerife), while in the smaller islands (El Hierro, La Gomera, La Palma), traditional commerce is more prevalent. The islands of Fuerteventura and Lanzarote, which cater more to tourists, have adapted their distribution structure to the presence of non-resident consumers (such as Cash & Carry stores). The 2005 Regional Accounting figures place the importance of consumption by non-residents at 30% of final domestic spending. Tourists consume food primarily in restaurants, with the amount of money they spend purchasing foods in retail stores being much less. The tourists, by and large, are from the north of Europe, meaning that their cultural affinities drive them to seek out foods that are “exotic” to them, while the local population is also confronted with “strange” foods on the shelves of supermarkets located in tourist areas.

III.2 Food supply

Having outlined the main characteristics of the food demand in the Canaries, we shall now summarise the trend in the supply, which is characterised by the gradual deagrarianisation of the economy of the Canaries throughout the 20th Century in value-added, employment and foreign trade terms (see Figure 5). This trend has been accompanied in recent years by reduced production in absolute terms; from 2000 to 2010, the farmed area shrank by 7% and the output from agriculture, livestock and fishing dropped 14%. According to the Spanish Regional Accounts, primary sector employment in the Canaries decreased by 29% between 2000 and 2009.

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Indicator	1985	1995	2000	2005	2010
Agrarian GVA/total GVA (current prices)	5.0	3.2	1.9	1.3	1.2
Agrarian GVA/total GVA (2000 prices)	3.5	2.9	1.9	1.3	1.3
Agrarian jobs/total jobs	15.7	8.2	3.3	2.3	2.0 (a)
Food exports (chap. 1 to 24)/goods and services exports	65.7 (b)	63.7	35.3	27.6	21.1

(a) 2009 data, (b) 1989 data

Figure 5 – Standing of the agrarian sector within the economy of the Canaries, 1985-2010 (percentages). (Sources: INE [Regional Accounts] and ISTAC [foreign trade]).

Agriculture in the Canaries has a dual structure. On the one hand, the export sector is concentrated in a few products: bananas, tomatoes, ornamental plants and flowers, mainly in coastal areas and with a more capitalised and professional production system (Cáceres, 2000; Cid and Pérez, 2008; Nuez, 2005); on the other, the sector that targets its products for the internal market is characterised by the fragmentation into many products made in small, family-owned farms (Rodríguez and Gutiérrez, 1999; Consejo Económico y Social de Canarias, 2009). This duality is reflected in the fact that exported crops accounted for 34.1% of the total farming production in 2010, while the livestock subsector, oriented mainly toward the internal market, represented 29.5%, primarily through the production of goat cheese and meat, pork meat and poultry eggs and meat.

Products	Value	%
AGRICULTURAL SUBSECTOR	455,825	70.49
Bananas	130,292	20.15
Tomatoes	62,054	9.60
Potatoes	27,981	4.33
Ornamental plants and flowers	54,808	8.48
Fruits	59,562	9.21
Wines	13,428	2.08
Other	107,699	16.66
LIVESTOCK SUBSECTOR	190,811	29.51
Meat	63,014	9.74
Milk	63,859	9.88
Eggs	45,150	6.98
Other	18,788	2.91
TOTAL	646,636	100.00

Figure 6 – Value of agricultural production (thousands of euros). Canaries, 2010. (Source: Council of Agriculture, Livestock, Fishing & Waters of the Government of the Canaries)

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Insular differences in demographic, economic and agricultural terms are significant. The islands of Gran Canaria and Tenerife (Figure 7) are usually referred to as the 'central islands' not only due to their geographic location in the archipelago, but also to their contribution to the population and GDP, representing over 80% of both variables (Figure 8). Their contribution to agricultural production is also high, though considerably below their demographic and economic contribution, meaning that the agricultural activity in the so-called 'peripheral' islands outweighs their demographic contribution (Figure 9). The exception to this rule is Lanzarote, where both variables are similar. The largest differences, which reflect a trend toward food self-sufficiency, are seen in the smaller western islands (La Gomera, El Hierro, and, to a lesser extent, La Palma). This situation stems from two issues. The first is their reduced connectivity with the two central islands, through whose ports imported foods enter the Canaries. The second is the difficulty of connecting different parts within these islands due to their steep orography. Both aspects limit access to outside food supplies, and when it does arrive, it is considerably more expensive than in the rest of the archipelago. This forces local production to increase to supply the island. Much of the livestock in the relatively cattle-rich areas of El Hierro and Fuerteventura is devoted to the production of cheese, with 5 to 10 litres of milk being required to produce one kilogram of cheese, a conversion that is not considered in the calculations used for Figures 8 and 9.

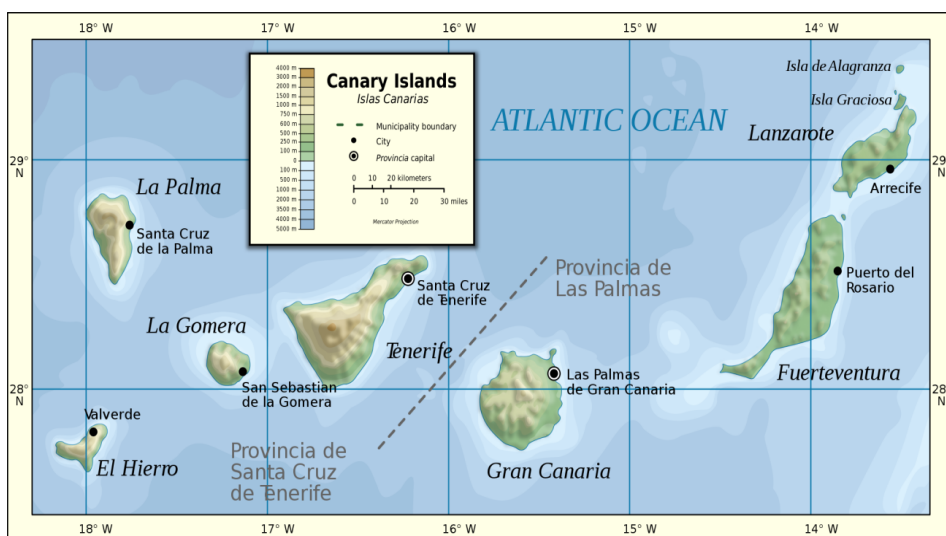


Figure 7 – Map of the Canary Islands. Source: www.zonu.com

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Island	Demographic weight 2008-10 (%)	% average GVApc 2009	Weight in GVA 2009 (%)	Per capita agricultural production 2008-2010 (kg) (a)	Weight of agricultural production 2008-2010 (%) (a)	Per capita livestock production 2008-2010 (kg) (b)	Weight of livestock production 2008-2010 (%) (b)
Lanzarote	6.7	109.6	7.2	181.1	7.4	69.7	5.4
Fuerteventura	4.9	116.8	5.3	45.1	1.3	345.0	19.5
Gran Canaria	39.9	98.6	39.9	193.2	39.6	84.5	39.0
Tenerife	42.8	99.6	42.4	124.9	31.7	51.7	25.6
La Gomera	1.1	100.7	1.1	405.5	2.7	178.4	2.2
La Palma	4.1	84.5	3.5	246.9	6.2	126.5	6.0
El Hierro	0.5	95.5	0.5	492.0	1.5	361.0	2.2

(a) Not including crops for export, industry and animal feed

(b) Not including other uses, mainly fertiliser

Figure 8 - Basic insular indicators: demographics, economy, agricultural production.
(Source: ISTAC, Council of Agriculture, Livestock, Fishing and Waters of the Government of the Canaries.)

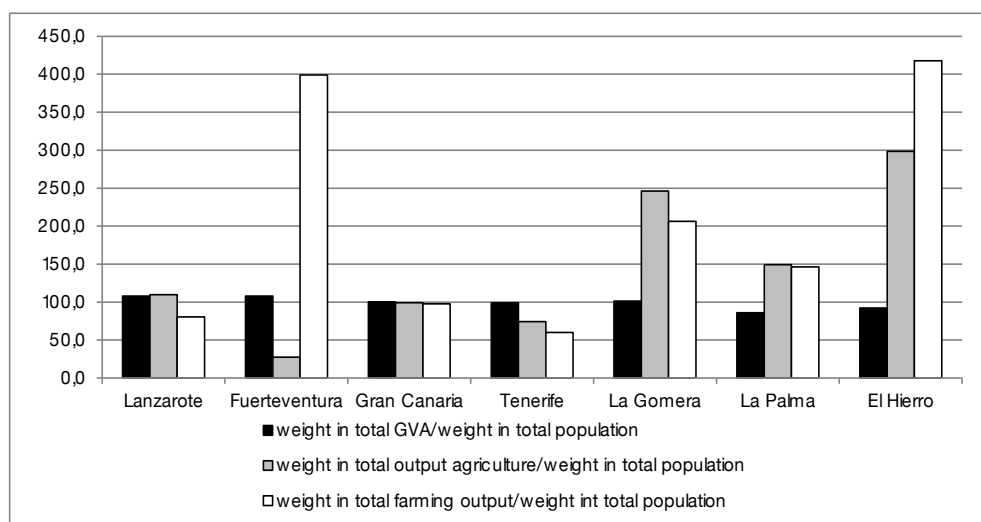


Figure 9 - Ratios (in %) between the economic and agricultural weights and the demographic weight (triennial average 2008-2010). (Source: ISTAC, Council of Agriculture, Livestock, Fishing and Waters of the Government of the Canaries.)

The supply of food also includes the food industry. Its share of the scarce industrial activity in the Canaries is high. According to the Regional Accounts, in 2010 industry accounted for only 7.4% of the GDP of the Canaries, but 20.3% of its added value and

26.7% of jobs corresponding to Food, Drink and Tobacco. The relative importance of the food industry is explained by the effects of insularity. The low unit cost of food in comparison to other manufactured goods conditions the advantage of those industrial activities that eliminate low-value components (eg dehydration) in order to save on import shipping costs and reconstitute the food allocated for the local market. Examples of this are soft drinks and dairy products. In contrast, that portion of the food industry devoted to transforming local raw materials is underdeveloped and devoted mainly to products like wines and cheeses.

Since islands are our concern, a brief reference to fishing activity is in order. Ascertaining the apparent available supply poses certain complications involving statistical sources for non-manufactured goods, but not so for preserved or processed food. Since the Canaries are used to offload the fish caught in the nearby Saharan banks by the fleets of various nations for subsequent redirection as both frozen and fresh product, it is difficult to quantify how much of the offloaded fish remains in the insular market. In fact, the foreign trade statistics show a net outflow of fish that exceeds the local production figures of the Fisheries Department of the Government of the Canaries. Judging by the data of the Food Consumption Panel of the Spanish Ministry of Agriculture, Food and the Environment, the average amount of fish products consumed in households in the Canaries in the 2008-2010 period was 20.96 kilos per person per year, though exactly how much of that was produced locally could not be accurately determined.

III.3 Food self-sufficiency

Trying to measure the level of food self-sufficiency in the Canaries based on the apparent consumption (production + imports – exports) is no simple matter, but some estimates can be made that will yield at least one figure with which to evaluate the situation. In order to calculate the food and agricultural balance we used statistics from the Customs Office, available on the website of the Canaries Statistics Institute. This yielded the import and export figures, with the local production figures being provided by the Canaries Agricultural Statistics published annually by the regional government's Department of Agriculture, though neither source is entirely reliable (Nuez and Redondo, 2008).

To carry out the calculations, the foreign balance for fruits was calculated using tariff entries HSN0801 to HSN0810, while that for vegetables relied on entries HSN0701 to HSN0714, not including bananas, tomatoes and cucumbers, products that are earmarked primarily for export. Wine used entry HSN2204 and grains entries HSN10 and HSN11, with flour being converted to its grain equivalent. As for animal products, tariff entries HSN0201 to HSN0210 were used for meat, HSN0401 to HSN0406 for dairy, with cheese, butter and powdered milk being converted to their liquid milk equivalents. For eggs we added tariff entries HSN0407 and HSN0408, converted into fresh egg equivalents, while entry HSN0409 was used for honey. These calculations, then, excluded fish and fish products, beef and processed meats, food products and preserves made with vegetables, and breads and baked goods.

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	A. Local production (MT)	B. Foreign balance (MT)	C. Available supply (MT)	% A/C
Average 1990-1992				
Vegetables (a)	223,455	64,223	287,678	77.68
Fruits (b)	89,961	112,126	202,087	44.52
Cereals and flour (c)	5,048	390,372	395,420	1.28
Wine (d)	17,800	47,575	65,376	27.23
Average 2008-2010				
Vegetables (a)	236,837	149,152	385,989	61.36
Fruits (b)	98,933	139,427	238,361	41.51
Cereals and flour (c)	2,190	384,993	387,183	0.57
Wine (d)	9,824	46,442	56,266	17.46

- (a) Not including tomatoes and cucumbers for export, (b) not including bananas for export, (c) flour converted into its grain equivalent, (d) local grape production converted into wine

Figure 10 - Apparent available supply of vegetable products (Tonnes). (Source: Council of Agriculture, Livestock, Fishing and Food of the Government of the Canaries. Customs Office. Compiled by authors.)

	A. Local production (MT)	B. Foreign balance (MT)	C. Available supply (MT)	% A/C
Average 1990-1992				
Meat	23.897	87.866	111.763	21,38
Dairy (a)	129.556	451.041	580.597	22,31
Eggs (b)	39.528	1.976	41.504	95,24
Honey	195	528	723	27,03
Average 2008-2010				
Meat	26.288	110.924	137.192	19,15
Dairy (a)	128.481	656.323	784.805	16,37
Eggs (b)	27.381	10.476	37.857	72,33
Honey	332	731	1.063	31,22

- (a) Dairy converted into its liquid-milk equivalent, (b) egg products converted into their fresh-egg equivalent.

Figure 11 - Apparent available supply of animal products (metric tonnes). (Source: Council of Agriculture, Livestock, Fishing and Food of the Government of the Canaries. Customs Office. Compiled by authors.)

In the early nineties, there were only two sectors that, properly speaking, could be considered to exhibit a high level of self-sufficiency in the Canaries: egg and vegetable production. In both cases, the local supply accounted for more than 75% of the apparent consumption, with the egg supply meeting practically all of the demand. The situation involving other food products, however, was far different, with imported foods dominating the market. This situation continues to the present day, though the preponderance of local vegetable products is not as evident.

In the case of eggs, the apparent consumption in the Canaries has dropped by 9%, in keeping with the general trend being seen in the entire Western world and attributable to changing consumption patterns. Local production has also decreased, by 31%, though it still accounts for 72% of the supply. As for vegetables, apparent consumption has practically matched the increase in population and is basically covered through imports. A second group is comprised by fruits and natural honey, where local production currently accounts for over 30% of the apparent available supply. The consumption of fresh fruits seems to have yielded some ground to other types of products, since the local supply has grown less than half as much as the population, with imported products once more gaining ground. In the case of honey, however, the amount of local product has increased by 70%, though it may be that the initial figure was underreported. The third block consists of meat, dairy and wine, the local production of which has less than a 20% market share and decreasing. In the case of wine, changes in consumption patterns have resulted in a reduction in the available supply of nearly 14%, in line with trends in the rest of the Western world. This reduction has affected mainly the wines produced in the archipelago. As for meat, the available supply is also growing at a rate below that of the population, accounting for little over half. The remaining amount is covered with imports, since the increase seen in local production appears to stem from a statistical defect. As for dairy, despite initiatives carried out by public administrations starting in the 1960s to provide the archipelago with a livestock of dairy cattle to complement the existing livestock of goats, the results have been insufficient to meet the growing demand for dairy products. The increase in the available supply, therefore, which has practically matched the increase in the population, has been the exclusive result of foreign production. Finally, the presence in the market of locally grown cereals is purely anecdotal. Following the elimination of import tariffs in 1900, the cultivated land area in the Canaries started to decrease gradually to the point where it has practically disappeared due to the massive import of grains and flour from abroad at international market prices.

IV. Determinants of decreasing food sufficiency

The decreasing level of food self-sufficiency in the Canaries can be explained by a combination of factors that represent the interaction between supply and demand in a market with a particular institutional configuration.

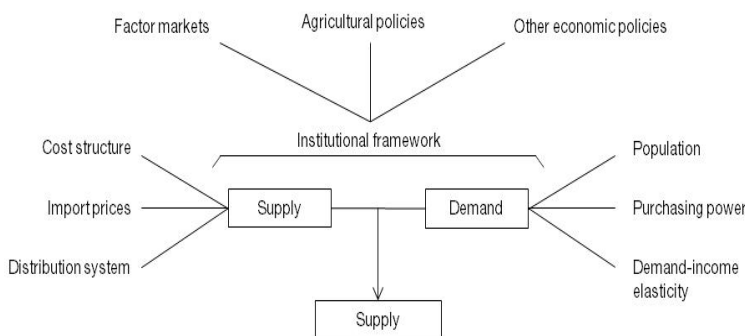


Figure 12 – Determinants of food self-sufficiency

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The demand for food has risen as a result of both the population's increased size and purchasing power. The demographic evolution has been expansive, with a decisive migratory influx from abroad, particularly from European and Latin American countries. Part of the demand is also provided by tourism. The growing amount of land occupied by residential and tourism activities has contributed to the increased cost and scarcity of this production factor, making the prices of arable land in the Canaries the most expensive in all of Spain's regions (Ministry of Agriculture, Food and the Environment, 2011).

The increased purchasing power also contributes to this growing demand for food, particularly for those products with high demand-income elasticity, such as those with high protein content, fresh perishables and products processed by the food industry. In the case of foods consumed by tourists, in addition to the cultural particularities of their culinary customs, a high percentage of their food expenses is associated with the hotel industry and not with purchases at retail establishments.

On the food supply side, the main aspect to consider is the competitiveness of the price of local products in comparison with imported foods. The competitive weakness of the local supply is manifested in more unfavourable cost structures resulting from a lack of resources (soil, water), the abrupt geography and the fragmentation of plots, as well as by inter-industry salary competition. The imported supply, in turn, must offset the cost of transporting these products to the Canaries, though the fraction of this cost in the final price is far outweighed by the cost disadvantages of local production. Particularly for products with a low unit value, the industrial transformation at the point of origin (eg dehydration) and destination (eg rehydration) contributes to reducing the impact of the costs of insularity.

Also, the high and growing concentration of retail stores run by multinational distribution chains poses the challenge of inserting local products into the shelves at these points of sale, which are supplied from large purchasing centres. The fragmentation of local production and its small horizontal integration in cooperatives devoted to the internal market in the Canaries hamper the commercial adaptation of local products to changes in the distribution network. Bearing in mind their limited price competitiveness, local products can only maintain or gain market share through non-price competitiveness, that is, by having the consumer accept their higher prices through product differentiation and market positioning. In the case of wines and cheeses, the price levels of quality local products are substantially higher than those of most imported products, a reflection of the success of this product differentiation in the eyes of the consumer. In the case of eggs, it is the added value of freshness that allows local production to maintain its place in the market in the face of cheaper imports. There are also untapped business opportunities to address the tourist demand for 'authentic' products, with the demand for agricultural tourism products being particularly unmet by a supply that scarcely conforms to the demands of tourism operators.

As concerns the institutional framework, the food and agriculture market is highly regulated and far from being 'free', given the importance society places on food safety and on protecting agricultural production. In the case of the Canaries, the islands are part of the European Union's Common Agricultural Policy (CAP) and its main export crops, bananas and tomatoes, are produced for the European market and protected under various regulatory mechanisms (Dupuis, 2003). If not for this privileged access to the European market, the presence of these crops in the Canaries would be reduced to a bare minimum.

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The act of belonging to Spain and the European Union shapes the competitive profile of the food and agricultural policies of the Canaries. This institutional framework can be summarised by the unique arrangement of integration in the European Union. The POSEI programme (acronym for Programme of Options Specific to the Remote and Insular Nature of the Canary Islands), established by Council Decision 91/314/EEC, notes the need to apply a set of measures specific to the farming, fishing and commercial activities in the Canaries while safeguarding certain customs and tax aspects that have characterised the economic history of the islands.

Direct aid in 2010	Thousands of euros
Total payments from the European Agricultural Guarantee Fund (EAGF) (a) = total aid from POSEI	268,400
- Specific supply arrangement	72,700
- Vegetable production subsidies	34,600
- Banana subsidies	141,100
- Animal production subsidies	20,000
Rural Development Programmes (RDP) (b)	19,300

(a) Payments with no modulation applied. The annual financial outlay is predefined in Article 23 of Regulation (EC) No. 247/2006.

(b) For programmes for the rural development of the Canaries and Spain: European Agricultural Fund for Rural Development (EAFRD) + national expenditure + regional expenditure.

Figure 13 – European Union aid to agriculture in the Canaries. Source: Spanish Agricultural Guarantee Fund (SAGF). (Taken from Massot, 2011: 27.)

The aim of the POSEI programme is to increase the share of the primary local sector in meeting food needs through subsidies to production and marketing. Thus, an aid programme is available per kilo of fruits and vegetables produced by those farmers who sell their products in the local market. The cultivation of potatoes is subsidised both by hectare and by yield marketed. Aid per hectare of vineyard is also available for the production of wines with protected appellations, as are subsidies for the processing and bottling of these wines. As for livestock products, the import of breeding stock is subsidised, along with the birth and slaughter of rams, the raising of goats and sheep, along with the commercialisation of milk, meat and eggs obtained from the islands' farms. To these measures we must add the Rural Development Programme subsidies aimed at improving competitiveness in the agriculture and livestock sectors, the main objectives of which are to modernise both farming and livestock operations as well as to provide increased value to farm products.

In spite of this objective, and indicative of the commercial sector's increased political power, production intended for export has managed to capture most of the POSEI aid. Of the programme's 268 million euros, 141 are earmarked for banana production, the main market for which is on the Spanish mainland. Likewise, of the 34 million in aid for vegetable production, 7 are for the commercialisation of fruits, vegetables and plants outside the Canaries, meaning that only 18% of EU aid to the farming industry in the Canaries is used to increase production for the local market.

Since an increase in the share of local production is practically unviable for some products, a Specific Supply Arrangement (SSA) was created to reward the importation of certain products (raw materials for the food and agriculture industry) for the purpose of balancing the cost of food in the Canaries with that typical on the European mainland. The effects of these measures have been contradictory. On the one hand, there has been an increase in the local production of fruits and vegetables. On the other, while the importation of cheaper cereals for the manufacture of animal feed so as to improve the livestock has benefited the income of local producers, the SSA subsidies have also made it possible for meat, milk and dairy products to enter the insular market in amounts and at prices that limit their marketing possibilities, and with it their growth (Redondo, 2009: 362).

Within the institutional framework affecting agricultural activity in the Canaries, a reference to the markets for the production factors (land and water in particular) is in order. In the Canaries, water is a scarce and privately-owned resource, meaning that historically its use has been diverted to those production sectors that were best able to pay for it (Aguilera, 2002; Nuez and Carnero, 2003). In the past this made it difficult for the agricultural production intended for the local market to access the resource since crops for export absorbed most of the available water. Today it is competition from urban and tourist areas that hampers its use for agricultural activity. In the real estate market, the most relevant institutional elements to agricultural production are the lenient rural zoning regulations in the face of pressure from urban development, the presence of wide-ranging natural protected areas with limited access to agricultural production, and the possibility of purchasing arable land for non-production purposes (speculation for future resale in a change-of-use context).

V. Perspectives for improving local production

The low level of food self-sufficiency in the Canaries is generating increasing social concerns (Bermúdez, 2007; González and Santana, 2007; Redondo, 2010). The stagnation, if not reduction, in the volume of food produced in the archipelago is the result of a set of factors in which political action/inaction plays a very important role. Despite the existence of numerous reports written by or for various public organisations, little has been done in their wake to halt or reverse the situation.

In 1996 the Parliament of the Canaries unanimously approved the final report of a commission to study the Specific Supply Arrangement, and which clearly stated how the level of self-sufficiency was regarded as excessively low. Godenau et al. (1997), in their report for the Government of the Canaries' General Directorate for European Affairs in the effect of the SSA on the archipelago's food and agricultural system, posed the problems in the application not only of that instrument, but of the entirety of the measures included in the POSEI programme. This same point was made two years later in a study for the Government of the Canaries' General Directorate for Economic Promotion (Martínez, 1999). The 2002 annual report of the Economic and Social Council of the Canaries (Consejo Económico y Social de Canarias, 2003) also noted the market distortions resulting from the application of that assistance. This same organisation's 2008 report featured a section specifically addressing the agricultural and livestock situation in the Canaries that reiterated these distortions. More recently, a report prepared by the consultancy Oréade-Brèche (2009) for the European Commission

noted the need to lower the level of aid and the volume of the SSA forecast plan for products that compete with local production in the Canaries.

Based on the premise that there are foods whose demand in the Canaries could not be met solely through local production in the archipelago, or if so only at costs that would make meeting such demand unviable (Machín and López-Manzanares, 2011), increasing the supply of a large number of locally produced items should be considered so as to keep the level of dependency on outside goods in check. There are several possible courses of action:

- First, in the area of agricultural policy, the practice of resorting to community policies (POSEI and RDP) could be shifted to place more emphasis on production intended for the internal market, thus giving less importance on the commercial aspect that supports imports through the SSA of foods that compete with local production intended for the internal market and specifically aids export crops.
- Second, industrial policies could be used to selectively promote the industrial transformation of local agricultural products. Such policies have been relatively successful with wines and cheeses, and the potential remains to diversify these local industries.
- Third, given the weakness in marketing local foods, their presence in distribution channels must be encouraged, paying particular attention to short channels and the 'experience economy' (Pine and Gilmore, 1998; Godenau, 2007). The advantage of the proximity of local products should be actively communicated as part of food and agricultural marketing (European Network for Rural Development, 2012). More favourable carbon footprints than for imported products and more direct contact with the producers and the manufacturing processes are just some examples of how the 'experience economy' can improve the non-price competitiveness of local products. Specific measures can consolidate the agro-touristic cluster.
- Lastly, in the legal-regulatory arena, support measures should reduce urban sprawl, reinforcing the effective implementation of a regulatory framework that is sufficiently powerful to protect agricultural land. Also of interest are modifications to the tax regime governing family farms and supporting the possibility of allowing families residing in urban areas to develop peri-urban agriculture. In general terms, access to the means of production (soil, water, financing) poses a significant obstacle to the development of new entrepreneurial initiatives in the industry.

The Canaries' history of agricultural exports and trade continues to weigh heavily on today's agricultural policies. The attention paid in recent decades to foods intended for the local market has not been enough to offset the disadvantages associated with production costs. Nevertheless, the key opportunities for the future of agricultural activity lie in the archipelago's internal market and not in exports. Building the structure for an inter-insular market, taking advantage of the proximity of local production and the high quality of some of the products made are arguments that cast the future of food self-sufficiency in a favourable light.

End Notes

¹ Moreover, it is typical to use States when delimiting the units being compared. Since islands have a high propensity to be Small Insular States, the average size of mainland States is bigger (Tagliani, 2011:58).

² Potatoes boiled with their skin in very salty water.

³ Apparent consumption implicitly includes the HORECA sector and personal consumption, but there are other factors that limit a comparison between the two ways of estimating market volume. Apparent consumption includes consumption by non-residents (tourists) but overestimates the local production of certain products due to record management deficiencies involving cultivated land area.

Bibliography

Aguilera Klink, F (2002) *Los mercados de agua en Tenerife* ('The water markets in Tenerife'), Bilbao: Bakeaz

Amann, S, Haunhorst, C, Ludwig, U et al (2012) 'Diarrea china en la UE' ('Chinese Diarrhea in the European Union'), *El País*, 28 October, online at: www.elpais.es - accessed July 2013

Baldacchino, G (2004) 'Autonomous but not sovereign? A review of island sub-Nationalism', *Canadian Review of Studies in Nationalism* v31: 77-91

Barnett, J (2011) 'Dangerous climate change in the Pacific Islands: food production and food security', *Regional Environmental Change* v11 (Suppl 1): S229-S237

Bermúdez Hernández, J.J (2007) *¿Por qué duerme la población y el sector agrícola ante la extinción de la actividad agropecuaria canaria?* ('Why does the population and the agricultural sector sleep while facing the extinction of the Canarian farming industry?') - online at: decrecimientoencanarias.blogspot.com.es/2007_06_01_archive.html - accessed July 2013

Burriel de Orueta, E (1982) *Población y agricultura en una sociedad dependiente* ('Population and agriculture in a dependent society'), Barcelona: Oikos Tau

Cáceres, J.J (2000) *La exportación de tomate en Canarias: Elementos para una estrategia competitiva* ('The Canary Islands' tomato exports: Elements for a competitive strategy'), Santa Cruz de Tenerife: Ediciones Canarias

Chapman; KR (2009), *Rapid Appraisal of the Bioenergy-Food Security Nexus in Pacific Island Countries*, FAO Sub-Regional Office for the Pacific Islands, Final Report, online at: www.sprep.org/att/irc/ecopies/pacific_region/498.pdf - accessed July 2013

Cid, M.C and Pérez, M.L (2008) 'El sector ornamental de Canarias' ('Canary ornamental sector'), *Horticultura*, n204: 60-69

Consejo Económico y Social de Canarias (2003) *Informe anual del CES, 2001-2002* ('Annual report of the Canary Islands Socioeconomic Council, 2001-2002'), Las Palmas de Gran Canaria, online at: www.cescanarias.org - accessed July 2013

----- (2009) *Informe Anual 2008* ('Annual report 2008'), Las Palmas de Gran Canaria, online at: www.cescanarias.org – accessed July 2013

Contreras Hernández, J and Gracia Arnáiz, M (2005) *Alimentación y cultura: Perspectivas antropológicas* ('Food and culture: Anthropological perspectives'), Barcelona: Ariel

Dupuis, I (2003) *Los efectos de las políticas comunitarias sobre las agriculturas de las regiones ultraperiféricas: el caso de las Islas Canarias* ('The effects of EU policies on agriculture in the outermost regions: the case of the Canary Islands'), La Laguna: Ediciones Baile del Sol

European Network for Rural Development (2012), *Local Food and Short Supply Chains*, *EU Rural Review*, n12, Summer 2012

FAO (2002) *The state of food insecurity in the world 2001*, Rome: FAO, online at: <http://www.fao.org/docrep/005/y4671e/y4671e06.html> - accessed July 2013

----- (2008) *Climate Change and Food Security in Pacific Island Countries*, Rome: FAO

Godenau, D (2007) 'El vino y la economía de las experiencias' ('Wine and the experience economy'), *Vinaletas, Cuaderno bianual de cultura y vino Tacoronte-Acentejo* v1: 46-57

Godenau, D et al (1997) *Informe sobre la incidencia del REA en el sistema agroalimentario* ('Report on the incidence of REA in the agri-food system'), Santa Cruz de Tenerife: Dirección General de Asuntos Europeos del Gobierno de Canarias

González Cortés, M.A and Santana Rodríguez, J.M (2007) 'Una Reserva Estratégica Alimentaria para Canarias' ('A Strategic Food Reserve for the Canary Islands'), *Información Veterinaria*, Septiembre: 20-24

Gough, K.V, Bayliss-Smith, T, Connell, J and Mertz, O (2010) 'Small island sustainability in the Pacific: Introduction to the special issue', *Singapore Journal of Tropical Geography* v31: 1-9

Gutiérrez Hernández, P and Godenau, D (2010) 'Oferta y demanda de servicios comerciales minoristas en Canarias' ('Supply and demand for retail commercial services in the Canaries'), in Montero Muradas, I and Gutiérrez Hernández, P (dirs), *La actividad comercial en Canarias: Dimensiones estructurales y empresariales* ('Commercial activity in the Canary Islands: Structural and business dimensions'), Santa Cruz de Tenerife: Fundación FYDE-CajaCanarias: 45-73

King, R (2009) 'Geography, Islands and Migration in an Era of Global Mobility', *Island Studies Journal* v4 n1: 53-84

Machín Barroso, N and López-Manzanares Fernández, F (2011) *Autoabastecimiento Agrícola en Tenerife. Implicaciones territoriales* ('Agricultural Self-sufficiency in Tenerife:

Territorial implications'), Santa Cruz de Tenerife: Servicio Técnico de Agroindustrias e Infraestructura Rural, Cabildo Insular de Tenerife

Macías Hernández, A.M (1981) 'El papel histórico de la agricultura de «subsistencia» en Canarias: un tema olvidado' ('The historical role of subsistence agriculture in the Canary Islands: a forgotten issue'), in *Canarias ante el cambio* ('The Canary Islands facing change'), Instituto de Desarrollo Regional, Universidad de La Laguna, Banco de Bilbao, Junta de Canarias: 101-112

----- (2001) 'La construcción de las sociedades insulares: el caso de las Islas Canarias' ('The construction of island societies: the case of the Canary Islands'), *Estudios Canarios. Anuario del Instituto de Estudios Canarios [2000]*, XLV: 131-160

Martínez Muñoa, A (1999) *El Régimen Específico de Abastecimiento de las Islas Canarias. Campañas 1992/93 a 1998/99* ('The specific supply arrangements of the Canary Islands: Campaigns from 1992/93 to 1998/99'), Santa Cruz de Tenerife: Dirección General de Promoción Económica de la Consejería de Economía y Hacienda del Gobierno de Canarias

Massot, A (2011) *La agricultura de las islas Canarias* ('Agriculture in the Canary Islands'), Dirección General de Políticas Interiores de la Unión, Departamento Temático B: Políticas Estructurales y de Cohesión, Agricultura y Desarrollo Rural, documento solicitado por la Comisión de Agricultura y Desarrollo Rural del Parlamento Europeo

Mertz, O, Bech Bruun, T, Fog, et al (2010) 'Sustainable land use in Tikopia: Food production and consumption in an isolated agricultural system', *Singapore Journal of Tropical Geography*, v31: 10–26

Ministerio de Agricultura, Alimentación y Medio Ambiente de España (2011), *Encuesta de precios de la tierra 2011* ('Survey of land prices 2011'), archived online at: www.magrama.gob.es/es/estadistica/temas/estadisticas-agrarias/Encuesta_Precios_Tierra_2011_tcm7-220709.pdf

North, D (1990) *Institutions, institutional change and economic performance*, Cambridge: Cambridge University Press

Nuez Yáñez, J.S (2005) *El mercado mundial de plátanos y las empresas productoras en Canarias, 1870-2000* ('The world banana market and production companies in the Canary Islands, 1870-2000'), Santa Cruz de Tenerife: Instituto de Estudios Canarios, ASPROCAN y Caja Rural

----- (2008) '¿Qué vino hemos bebido? Caracterizando la oferta disponible de vino en una economía abierta: Canarias, 1886-2006' ('Which wine did we drink? Characterising the available wine supply in an open economy: Canary Islands, 1886-2006'), *Territorios del Vino* n3: 38-64

Nuez Yáñez, J.S and Carnero Lorenzo, F (2003) 'El mercado del agua en Canarias: una perspectiva histórica' ('The water market in the Canary Islands: A historical perspective'), *Revista de Historia Económica* vXXI n2: 373-398

Nuez Yáñez, J.S and Redondo Zaera, M (2008) 'La Balanza Agroalimentaria de Canarias' ('The Canary Islands' agri-food balance'), *Hacienda Canaria* n24: 49-80

Oréade-Brèche (2009) *Évaluation des mesures mises en œuvre en faveur des régions ultrapériphériques (POSEI) et des petites îles de la mer Egée dans le cadre de la politique agricole commune* ('Evaluation of measures implemented in the outermost regions (POSEI) and the small islands of the Aegean Sea under the Common Agricultural Policy'), online at: ec.europa.eu/agriculture/eval/reports/posei/index_fr.htm. - accessed July 2013

Pine, B.J and Gilmore, J.H (1998) 'Welcome to the experience economy', *Harvard Business Review*, July-August: 97-105

Redondo Zaera, M (2009) 'Dudas y certezas sobre el sector agrario orientado al mercado interior' ('Doubts and certainties about the domestic market-oriented agricultural sector'), *Rincones del Atlántico* n6/7:352-367

Redondo Zaera, M (2010) 'Autoabastecimiento y soberanía alimentaria en Canarias' ('Self-sufficiency and food sovereignty in the Canary Islands'), *Mundo Rural de Tenerife* n9: 8-11.

Rodríguez Martín, A and Gutiérrez Hernández, P (1999) 'La agricultura en las Islas Canarias' ('Agriculture in the Canary Islands'), in Molina Ibáñez, M et al (coordinators) *El sector agrario. Análisis desde las Comunidades Autónomas* ('The agricultural sector: Analysis from the Autonomous Communities'), Madrid: Ministerio de Agricultura, Pesca y Alimentación, Ediciones Mundi-Prensa: 119-150

Sans, J.A (1977) *La crisis de la agricultura en Canarias* ('The agricultural crisis in the Canary Islands'), Las Palmas de Gran Canaria: Excma. Mancomunidad de Cabildos de Las Palmas

----- (1981) 'Sobre la funcionalidad de la agricultura canaria en el desarrollo económico' ('About the functionality of the Canarian agriculture in economic development') in *Canarias ante el cambio* ('Canary Islands facing change'), Instituto de Desarrollo Regional, Universidad de La Laguna, Banco de Bilbao, Junta de Canarias

Taglioni, F (2011) 'Insularity, political status and small insular spaces', *Shima: The International Journal of Research into Island Cultures* v5 n2: 45-67

United Nations (1998) *Development of a vulnerability index for small island developing States*, Report of the Secretary-General, United Nations General Assembly, Economic and Social Council Environment and sustainable development: implementation of the outcome of the Global Conference on the Sustainable Development of Small Island Developing States, online at: islands.unep.ch/d98-vul.htm – accessed July 2013

Warrington, E and Milne, D (2007) 'Island Governance' in Baldacchino, G (ed) *A World of Islands: An Island Studies Reader*, Charlottetown, Canada and Luqa, Malta, University of Prince Edward Island, Institute of Island Studies and Agenda Academic: 379-427