

# Trends in food availability in Spain – the DAFNE III project

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## **Introduction**

Household Budget Surveys (HBS) collect data on food availability at household level, taking into consideration the households' purchases, together with contributions from own production and food items offered to members as gifts. They are country-representative surveys, conducted at periodic time intervals by the National Statistical Offices of almost all European countries. Due to their characteristics, HBS can represent a source of dietary data which form the basis for a database with several characteristics, notably: i) international scope, ii) reliance on data collected with a similar baseline methodology that facilitates eventual comparability; iii) representativeness of the underlying population, iv) linkage to explanatory demographic and socio-economic factors; v) study size large enough to generate precise estimates for inherently complex patterns; vi) regularly updating; vii) and last, but clearly not least, affordability.

Since 1990, the DATA Food NETWORKING (DAFNE) initiative has been working towards the development of a food database, using dietary and complementary data collected through the national HBS (Trichopoulou A, Lagiou P (eds) 1997 & 1998). The recently concluded DAFNE III project was aiming at enriching the database with multiple HBS datasets from the participating countries, in order to compare the food habits of European populations and to further monitor overtime trends in food availability and in the socio-demographic determinants of food choices.

In this context, the present report presents data on the availability of 15 main food groups among the Spanish population, over a period of 20 years.

## **Material and Methods**

### **Material**

Data collected through the Spanish HBS of 1980-81, 1990-91 and 1998-99 were integrated in the central DAFNE database and were analysed in the context of the DAFNE III project. The sample unit was defined as: “the person or group of persons occupying a principal family dwelling, or part of it, consuming and/or sharing food and other commodities as part of one and the same budget; the latter being considered as the common fund which allows the housewife, or other person in charge of administering the household, to cover household expenses”. The definition also includes private households based in community dwellings, provided their expenses are independent from those of the community (Varela G, Moreiras O, Requejo A, 1985; Varela G, Moreiras O, Carbajal A, 1995; Moreiras O, Muniz J, Carbajal A, 1997).

A two-stage sampling scheme was used with first stage unit stratification, a separate sample being designed for each province. The first stage units are made up of the census sections, into which the country was divided at the time of the survey. The second-stage units are the family dwellings existing in the census sections selected for the sample. There is no sub-sampling within these units, and the survey covers all the households and persons (household members) habitually residing therein. Even though complying with conditions mentioned above, people in domestic service, guests and persons who left permanently the household before the first day of the survey were not considered as members of the surveyed households.

The selection of the households' sample is random and self-weighted at stratum level in each province; that is, all the households in one stratum have the same chance of being included in the sample. Samples of 30,331 households (1980-81), 21,155 households (1991-92) and 14,644 households (1998-1999) were chosen as being statistically representative of the Spanish population as a whole, and of each of the provinces and autonomous communities that comprise it. Table 1 presents the distribution of households by autonomous communities in the most recent 1998-99 HBS.

**Table 1.** Distribution of households participating in the 1998-99 Spanish household budget survey, by autonomous communities

<b>Autonomous Community</b>	<b>No of households</b>
ANDALUCÍA	1.742
ARAGÓN	700
ASTURIAS (PRINCIPADO DE)	697
BALEARES (ISLAS)	564
CANARIAS	703
CANTABRIA	331
CASTILLA - LA MANCHA	723
CASTILLA Y LEÓN	1.097
CATALUÑA	1.655
CEUTA Y MELILLA (CIUDADES AUTÓNOMAS)	182
COMUNIDAD VALENCIANA	1.252
EXTREMADURA	542
GALICIA	1.113
MADRID (COMUNIDAD DE)	1.289
MURCIA (REGIÓN DE)	546
NAVARRA (COMUNIDAD FORAL DE)	363
PAÍS VASCO	786
RIOJA (LA)	359
<b>TOTAL</b>	<b>14.644</b>

Each household was surveyed for seven days, all primary data were collected trimesterly, and the sample was evenly distributed over the 52 weeks of the survey year. The amounts of all food and drink entering the selected households (whether purchased; obtained from garden allotments, farms or other business; or received as payments in kind) were recorded every day for one week, and were expressed in units of weight or volume. In certain cases, the amounts paid or the retail price value of each of the items consumed were only recorded. The number of persons who had lunch or dinner in the household needed also to be specified.

#### **Harmonisation of food and complementary information**

The raw HBS data were forwarded to the coordinating centre and were harmonised according to the DAFNE methodology (Lagiou P et al, 2001). Individual daily availability was estimated under the assumption of equal distribution of food within the household and during the survey period. Food availability was further estimated

according to the locality of the dwelling (rural, semi-urban and urban), the educational level of the household head (illiterate/elementary education not completed, elementary education completed, secondary education not completed, secondary education completed and college/university). Only for the 1990-91 HBS data, were variables related to the profession of the household head available and thus food availability was studied in relation to the professional status of the employed household head (manual vs. non-manual). Lastly only in the 1998-99 HBS and again because of the availability of corresponding variables, was food availability further estimated for 8 types of household composition (households with: one adult member; two adult members; one adult member and children; two adult members and children; adult and elderly members; children, adult and elderly members; one elderly member; two elderly members).

## **Results**

Table 1 presents the mean daily individual availability of 15 main food groups in Spain, by year of survey. The mean availability of the same food groups by educational level of the household head and again by year of survey are presented in table 2. In table 3, food availability values are presented over time and according to the degree of urbanization of the residence area. The effect of professional status (manual vs. non-manual) on the household's food choices was studied using data collected in 1990-91 and is presented in table 4. Lastly, table 5 summarises the dietary choices of eight household types, selected to be studied in the DAFNE project. Findings presented in table 5 are based on the most recent Spanish HBS data of 1998-99.

## **Discussion**

With the exception of fruit and vegetable juices and non-alcoholic beverages, the daily individual availability of all foods decreased with time (table 1). The daily availability of potatoes, pulses and alcoholic beverages reduced more than 50% during the 20-year period of 1981-1999. Reduction around 40% was noted in the availability of cereals and products, vegetables (fresh and processed), added lipids, sugar and sugar products. No evident explanation can be provided for these

observations. It should however be noted that a new, aggregated food codification system was used in the most recent Spanish HBS. Thus, the 258 food codes considered in the 1980-81 and 1990-91 surveys were reduced to 78 codes in 1998-9. It cannot however be safely argued that the change in the food codification system is responsible for the observed reductions in the daily food availability, since substantial decreases are also observed when comparing the 1980-81 with the 1990-91 food data, which were collected using the same food codification system.

Recently collected data on the daily consumption of eight major food groups may point towards a systematic underestimation of food availability. With the exception of sugar and sugar products, the consumption values, reported by a dietary study elaborated by Spanish Ministry of Agriculture Fisheries and Food (Ministerio de Agricultura, Pesca y Alimentación, 2000), are higher than the availability values estimated for the Spanish population through the 1998-9 HBS.

Educational attainment seems to be affecting the daily food choices (table 2), with households of highly educated heads preferably consuming juices and other non-alcoholic beverages, according to the 1998-9 data. Again based on the most recent data, households of low educational status recorded the highest availability of vegetables and fruits. Fruit availability in particular, decreased among households of secondary education and rose again in households whose head is a college or a university graduate. This observation may reflect the combined effect of tradition, among people of low education, and of current nutrition campaigns, among individuals of higher education. The differential effect of educational level to the daily food availability remains unchanged over time in the case of cereals and products, potatoes, pulses, meat and products, sugar and sugar products; with availability values reducing as the educational level improves.

The degree of urbanization of the permanent residence area does not seem to differentiate the availability of fish and seafood, fruits, added lipids and alcoholic beverages and differences in their availability observed between rural and urban areas in early eighties seem to be tailing off in late nineties. In general, people residing in urban households report lower food availability. There is apparently some element of

confounding, with respect to food availability, between locality and educational level since urban localities are characterised by higher average levels of educations.

In accordance to what is generally reported in the literature, households whose heads are manually occupied recorded higher food availabilities, probably reflecting the higher energy demands of their profession. Recent data on the daily food availability among eight different household types (table 5) revealed that, in most cases, households of one member (adult or elderly) recorded higher values, when compared to two member households. The above does not stand in the case of pulses, sugar and sugar products (households of two elderly members recorded higher availability than single elderly households did), meat and products (there is no difference in the availability when households of one or two adult members are compared) and alcoholic beverages, with two-member households recording higher availabilities. In general, food availability in households with children is lower to that reported in households without children. The estimation of individual availability though by simply dividing household availability by the number of household members does not allow age differences to operate and may thus result in underestimating the availability among the adult members of the household.

In the case of Spain, the HBS records are the nationally representative data most close to consumption. Therefore, using data from HBS for nutritional purposes is very important for time evolution analyses within countries and for international comparisons.

## References

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**Table 1:** Overall mean food availability in Spain, by year (quantity/person/day).

<b>Food Group</b>	<b>1980/81</b>	<b>1990/91</b>	<b>1998/99</b>
<b>Eggs</b> (pieces)	0.78	0.56	0.32
<b>Potatoes and other starchy roots</b> (g)	203	143	86
<b>Pulses</b> (g)	25	18	11
<b>Nuts</b> (g)	0.9	2.1	0.9
<b>Cereals and cereal products</b> (g)	290	206	170
<b>Milk and milk products</b> (g)	423	398	341
<b>Meat and meat products</b> (g)	187	176	139
<b>Vegetables (fresh and processed)</b> (g)	209	179	121
<b>Fish and seafood</b> (g)	75	74	61
<b>Fruits (fresh and processed)</b> (g)	284	289	195
<b>Total added lipids</b> (g)	74	59	45
<b>Olive oil</b> (g)	48	38	30
<b>Alcoholic beverages</b> (ml)	176	110	74
<b>Non alcoholic beverages</b> (ml)	330	358	377
<b>Sugar and sugar products</b> (g)	50	35	27
<b>Juices (fruit and vegetable)</b> (ml)	8	18	30

**Source:** the DAFNE databank.



**Table 2:** Mean food availability in Spain, by educational level of the household head and year of survey (quantity/person/day).

Food Group	1980/81					1990/91					1998/99				
	EI	EC	SI	SC	C/U	EI	EC	SI	SC	C/U	EI	EC	SI	SC	C/U
Eggs (pieces)	0.75	0.80	0.81	0.79	0.81	0.58	0.57	0.50	0.50	0.53	0.34	0.33	0.29	0.29	0.31
Potatoes and other starchy roots (g)	250	198	158	140	123	190	141	105	99	94	119	96	78	65	58
Pulses (g)	30	25	17	17	12	23	19	14	13	11	13	12	9.4	8.4	7.1
Nuts (g)	0.8	0.9	1.0	1.1	1.2	1.8	2.1	1.5	2.4	2.2	1.1	0.9	0.8	0.8	0.9
Cereals and products (g)	344	282	240	227	218	255	205	167	161	155	209	179	164	148	137
Milk and products (g)	420	425	415	426	433	410	399	388	371	389	351	342	335	328	353
Meat and products (g)	189	192	172	174	164	183	182	159	160	147	157	149	134	129	113
Vegetables (g)	209	206	198	240	186	190	179	177	154	173	129	124	108	114	128
Fish and seafood (g)	72	76	77	77	67	71	76	76	68	70	58	64	55	62	65
Fruits (g)	272	288	289	290	297	314	284	285	265	278	216	202	172	180	206
Total added lipids (g)	79	75	66	70	55	70	59	50	48	52	55	49	39	41	37
Olive Oil (g)	53	47	40	45	29	43	37	33	31	36	32	33	25	27	28
Alcoholic beverages (ml)	191	183	143	136	126	128	107	100	99	95	74	69	73	82	76
Non alcoholic beverages (ml)	319	334	338	320	382	377	344	426	335	374	353	355	371	426	422
Sugar and products (g)	55	50	43	43	42	43	35	26	27	28	30	26	26	25	27
Juices (fruit and vegetable) (ml)	10	7	7	5	7	17	17	25	21	22	29	26	34	34	32

EI: Illiterate/Elementary education incomplete, EC: Elementary education completed, SI: Secondary education incomplete, SC: Secondary education completed, C/U: College/University

Source: the DAFNE databank

**Table 3:** Mean food availability in Spain, by locality of the dwelling and year of survey (quantity/person/day).

Food Group	1980/81			1990/91			1998/99		
	Rural	Semi-urban	Urban	Rural	Semi-urban	Urban	Rural	Semi-urban	Urban
Eggs (pieces)	0.80	0.75	0.78	0.59	0.57	0.55	0.36	0.31	0.30
Potatoes and other starchy roots (g)	242	210	177	167	177	127	97	108	78
Pulses (g)	32	24	21	23	19	16	13	11	9.2
Nuts (g)	0.8	0.9	0.9	2.4	1.8	2.0	1.0	0.8	0.9
Cereals and cereal products (g)	347	298	253	244	226	188	189	182	161
Milk and milk products (g)	427	412	425	413	405	390	367	335	332
Meat and meat products (g)	202	182	181	197	174	168	159	141	132
Vegetables (g)	208	196	216	179	176	179	119	113	122
Fish and seafood (g)	70	72	79	72	77	74	60	64	61
Fruits (g)	257	277	303	289	284	290	193	194	196
Total added lipids (g)	82	74	70	64	64	57	49	47	43
Olive Oil (g)	54	47	45	39	38	37	32	28	29
Alcoholic beverages (ml)	217	184	148	131	126	98	74	74	73
Non alcoholic beverages (ml)	315	322	342	336	341	370	349	399	385
Sugar and sugar products (g)	59	51	44	43	39	31	30	26	25
Juices (fruit and vegetable) (ml)	9	10	6	15	18	20	29	33	30

Source: the DAFNE databank

**Table 4:** Mean food availability in 1990-1 in Spain, by professional status of the household head (quantity/person/day).

Food Group	Professional status	
	Manual	Non-Manual
Eggs (pieces)	0.54	0.52
Potatoes and other starchy roots (g)	139	104
Pulses (g)	17	13
Nuts (g)	2.2	2.0
Cereals and cereal products (g)	208	167
Milk and milk products (g)	379	377
Meat and meat products (g)	177	159
Vegetables (fresh and processed) (g)	161	161
Fish and seafood (g)	69	70
Fruits (fresh and processed) (g)	268	266
Total added lipids (g)	53	51
Olive Oil (g)	34	34
Alcoholic beverages (ml)	112	92
Non alcoholic beverages (ml)	305	349
Sugar and sugar products (g)	32	27
Juices (fruit and vegetable) (ml)	18	19

Source: the DAFNE databank

**Table 5:** Mean food availability in 1998-9 in Spain, by type of household (quantity/person/day).

Food Group	Type of household							
	One adult	Two adults	One adult and children	Two adults and children	Adults and elderly	Adults, elderly and children	One elderly	Two elderly
Eggs (pieces)	0.49	0.39	0.26	0.27	0.35	0.32	0.48	0.41
Potatoes and other starchy roots (g)	97	89	81	68	110	124	127	128
Pulses (g)	15	12	8.7	8.6	13	9.2	14	17
Nuts (g)	1.5	1.2	1.0	0.8	1.1	0.6	1.9	1.0
Cereals and cereal products (g)	196	187	154	157	182	170	227	195
Milk and milk products (g)	424	379	343	323	358	360	498	417
Meat and meat products (g)	168	167	124	123	154	137	181	164
Vegetables (fresh and processed) (g)	206	163	101	93	143	113	230	183
Fish and seafood (g)	84	83	47	50	72	62	82	76
Fruits (fresh and processed) (g)	337	246	163	154	238	172	370	316
Total added lipids (g)	67	53	31	35	53	42	74	69
Olive Oil (g)	53	33	20	22	37	24	60	50
Alcoholic beverages (ml)	102	106	36	67	86	71	53	96
Non alcoholic beverages (ml)	488	471	416	370	398	365	440	330
Sugar and sugar products (g)	35	28	20	25	29	29	33	36
Juices (fruit and vegetable) (ml)	30	33	56	36	21	22	23	22

Source: the DAFNE databank

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