Do consumers buy organic food for sustainability or selfish reasons?

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Abstract:

The expansion of organic agriculture is a key issue in sustainable development. We study consumers' motives for buying organic food products by analysing the combination of goods in baskets purchased by a panel of French households. Organic proneness can be motivated by concern for sustainable development and/or by self-interest (health or product quality considerations). The pro-social motivation of consumers of organic products is inferred from the presence of 'Fair Trade' products in their baskets, whereas consumer self-interest is deduced from the presence of healthy and higher quality labeled products.

Our results on effective purchases indicate that buyers of organic products are primarily motivated by sustainability considerations, then by health and finally by expected quality improvement. However, certain household socio demographic characteristics impact on the ranking of self-interested motives. Higher education level, family size and organic loyalty have a positive impact on the quality-related motive for purchasing organic goods.

Keywords:

- Organic food
- Sustainability
- Consumers' choice
- Basket analysis

1. Introduction:

Sustainable development has become a key concern for many economic players. Governments have made it a priority for years to come, as has been reaffirmed by heads of States in Rio de Janeiro, Brazil, in June 2012 (cf. United Nations, 2012). Major industrial groups, such as Danone and Nestlé, proclaimed sustainable development as one of their corporate values (see reports of Danone, 2011, and Nestlé, 2012). Since the beginning of the 1990's, organic agriculture has also been benefiting from protection inside the European Union (EEC n°2092/91). The new policy rules of 2007 (EC n° 834/2007) impose the use of the European label for organic agricultural products. Article 1 outlines the beneficial attributes of the organic production method and highlights the fact that it responds to a consumer demand for sustainability.

I n addition to the usual quality/price ratio, consumers now incorporate various other considerations, such as respect for the environment or concern for socially acceptable working conditions, into their purchasing decisions (Agence Bio, 2010). This positive attitude towards sustainability seems to be revealed by food product choice, namely by consuming organic, as argued in Laureati *et al.* (2013). For the consumer, buying "green food" is mainly motivated by the desire to consume products that are healthful, nutritionally safe (i.e. of high quality) and/or respectful of the environment (see Guilabert and Wood, 2012; Wier *et al.*, 2008).[1] Concerning healthfulness, Gamet-Payrastre (2011) shows that, even if consumers are only exposed to a weak mix of pesticides, it can be harmful to their health in the long run, in particular because it increases the probability of developing cancer. According to Lairon (2011) and Worthington (2001), the nutritional quality of organic food is superior to that of conventional food, as it contains more antioxidants, vitamin C and dry nutrients (iron, manganese, phosphorus). Also, the agronomic meta-analysis of Europe conducted by Tuomisto *et al*. (2012) indicates that organic agriculture causes less environmental deterioration than conventional agriculture, as it preserves soil quality, biodiversity and the nitrate rate.[2]

All studies focusing on consumers' motives for buying organic conclude that the purchase of organic products is mainly motivated by self-interested concerns relating to health, quality and taste; rather than by ecological concerns relating to the environment and animal welfare. All these analyses rely either on surveys or on consumers' decisions in the lab (Kriwi & Mecking, 2012; Griffith & Nesheim, 2010; Mondelaers *et al.*, 2009; Bellows *et al.*, 2008; Wier *et al.* 2008; Dimitri & Oberholtzer, 2005; Magnusson *et al.*, 2003; Glaser & Thompson, 1999; Thompson & Kidwell, 1998). In contrast, results obtained by Durham (2007) and Agence Bio (2010), based exclusively on opinion surveys, show that the environmental criterion is the primary reason for consumers to purchase organic produce, followed closely by the health criterion. Intentions elicited through opinion surveys may be biased, as a consumer derives an enhanced sense of self-esteem from declaring that (s)he

[1] For a detailed review concerning the personal determinants of organic food consumption, see Aertsens *et al.* (2009).

[2] This comparison is valid if we consider the impact per hectare, and not per product unit.

purchases organic products to protect the environment. Thørgersen (2011) illustrates how this psychological mechanism applies to organic consumption.

Our objective is to determine the importance of each of these three motives (health, environment and quality) in consumers' demand for organic food. Accordingly, we analyze the effective behavior of consumers based on their basket purchase, rather than their declarations of intent, in order to answer the following two questions:

- Do consumers buy organic food for sustainability reasons or for private objectives (healthor quality considerations)?

- Does their socio-economic background influence the ranking of their motivations for buying organic food?

2. Materials and methods

2.1 Sample

The data used come from the TNS Worldpanel of Kantar for the year 2009 and display the purchases of 22 539 representative households of the French population by covering the usual food sales channels. These data are relevant to the study of organic product purchases, as sales of organic food products account for 45% in large and medium supermarkets (LMS) and for 40% in specialised shops.

The aim of this study is to analyze which kinds of labels, in addition to organic goods, are present in consumers' baskets, in order to reveal consumers' effective motivations. To do this, we have to select a common basket of staple goods. We choose eggs as the representative organic product, because they are commonly sold in mass retailers' stores and available in conventional or organic version. For the fair trade label, we select ground coffee, while margarine (enriched with omega 3-6 and standard) and cooked ham (superior quality[3] and standard) respectively serve as the health and the superior quality goods.. It could seem that organic consumers would not purchase margarine because of its artificial nature and functional health claims, but quick statistics do not support this conjecture. Among households in the panel, 62% of organic consumers also purchased margarine; this percentage is greater than 80% for ham and coffee. This is consistent with the findings of Aschemann-Witzel *et al.* (2013): organic consumers (even intensive ones) do consume goods with functional health claims.

Descriptive statistics for these products are shown in Table 2. We indicate the market share in terms of the revenue and in terms of the total quantity for each product. The market share of omega 3-6 enhanced margarine is significant, unlike the market share of AB eggs, FT coffee and, to a lesser extent, superior quality ham.

[3] The term "Superior Quality" includes "Label Rouge".

The largest price difference between the two versions of the same product is observed for eggs. The price of AB eggs is 114% higher than that of eggs produced in the conventional way. It is often claimed that the weak market share of AB products can be explained by this high price difference. However, Hassan *et al.* (2009) and Bunte *et al.* (2007) provide evidence to the contrary by showing that a decrease in the price of AB products does not lead to a substitution from conventional products toward organic products.

	Alternatives to conventional type	**Market share of the alternative (%)**		**Average unit price in euro (standard deviation)**		
		Value	Volume	Unit	Conventional product	Label product
Eggs	*Organic Agriculture*	7.30	6.20	6 eggs	1.26 (0.44)	2.7 (0.60)
Coffee	*Fair Trade*	4.40	4.18	1 kg	10.96 (0.61)	13.38 (0.57)
Margarine	*Ω 3-6 Enhanced (health)*	52.85	49.91	1 kg	3.21 (1.48)	5.40 (1.82)
Cooked Ham	*Superior Quality*	11.07	10.17	1 kg	11.00 (0.33)	15.09 (0.46)

Table 2: Descriptive statistics of the market for the year 2009

The TNS Worldpanel gave us access to information on certain household characteristics. We focus on family size, income and education level, each of which can influence purchasing behavior. Family size is expressed by the number of persons per household. Based on the monthly income per consumption unit[4], a binary variable is created that takes value 1 if the household income per consumption unit is above the median. The 'education' variable indicates whether or not the head of the household has a bachelor's degree. These socio demographic variables are those observed at the time of the purchase (in 2009). In addition, we calculate an 'organic behavior' variable that enables us to characterize the propensity of the household to consume AB labeled products. The latter is calculated using data from 2008 for the following three common consumption products: milk, yoghurt, and eggs. The 'organic behaviour' variable takes a value of 1 when the market share for organic produce per household for these three products is greater than the median (households that never consume AB products are excluded from this calculation). The descriptive statistics concerning these socio demographic variables are displayed in Table 3.

[4] Unit of consumption is defined in such a way that it takes into account the fact that the fixed costs of a household constitute a bigger burden for individuals who live alone. Therefore, a household consisting of one adult counts as 1 consumption unit, each additional adult (or child over the age of 15) count for 0.7 and the weighting for children is 0.5.

Socio demographic Characteristics	Mean	Standard deviation
Monthly income per unit of consumption	1 438 € (median: 1 296 €)	765 €
Family size (number of persons)	2,54	1,34
Consumption unit	1.97	0.8
Education level > bachelor's degree	41 %	--
Organic Behavior in 2008	12,91 % (median: 6 %)	33,5 %

Table 3: Descriptive statistics of socio demographic characteristics of households

2.2 The basket choice model

Russell and Petersen (2000) develop a global utility model that takes into account the fact that the utility derived from consuming a good may be affected by the consumption of other goods. They do not only analyse the binary decision to consume or not to consume a product, but also estimate the determinants of the purchase of a combination of goods (basket). The advantage of this basket approach is the possibility of estimating the joint probability of purchasing multiple goods based on baskets that have actually been chosen by the households considered. Furthermore, using Besag's theorem (1974), Russell and Petersen (2000) show that the probability that a household chooses a basket of goods can be calculated on the basis of the estimation of a standard conditional logistic model, where the choice set is comprised of all possible baskets.

The first step is to specify the model of choice for each good, conditional on the effective choice of other goods in each category. We can define the conditional utility of a consumer *k* from consuming product *i* as:

$$U(i,k) = Z(i,k) + \varepsilon(i,k) = \alpha_i + \beta_i\, p_{ik} + \sum_{j \neq i} \theta_{ijk}\, I(j,k) + \varepsilon(i,k) \qquad (1)$$

where $I(j,k) = 1$ if the consumer also bought the good j

The parameter α_i is a constant specific to the product. The price for product *i* paid by the consumer *k* is denoted p_{ik}. The final choice of the consumer for good *i* is also determined by the other goods in his basket. The term $\sum_{j \neq i} \theta_{ijk}\, I(j,k)$ enables us to take into account the choice dependence of good *i* on decisions concerning the other goods ($i \neq j$) in the basket. The parameter θ_{ijk} enables us to determine, for consumer *k*, the link between products *i* and *j*: $\theta_{ijk} > 0$ (resp. $\theta_{ijk} < 0$) implies that for goods *i* and *j*, the household *k* gains (resp. loses)

utility by combining both products[5]. Put differently, these goods can be viewed as complements (resp. substitutes) for consumer *k*.

The conditional probability of buying good i (given the choice for all other products) is the probability that $U(i,k) > 0$. If we suppose that the error term $\varepsilon(i,k)$ follows a Gumbel distribution, this conditional probability can then be written under the following logistic form:

$$P(I(i,k) = 1 | I(j,k) \text{ for } j \neq i) = \frac{1}{1 + e^{-Z(i,k)}} \tag{2}$$

where $Z(i,k)$ is the determinist part of the utility expressed in equation (1).

Besag's theorem (1974) allows us to switch from a model of choice for a single product to a model of choice for a set of products. It is possible to show that when the distribution for a conditional probability belongs to the exponential family and coefficients are symmetric ($\theta_{ijk} = \theta_{jik}$), then there exists a unique characterization of the joint law given the set of conditional distributions. Denoting the realization of basket $B(k)$ (where $X(i,b) = 1$ if the good *i* is in the basket *b*, and 0 otherwise) by $b = (X(1,b), \cdots, X(i,b), \cdots, X(N,b))$, and given equation (1) and (2), the probability of choosing basket *b* is given by:

$$P(B(k) = b) = \frac{e^{\mu(b,k)}}{\sum_{b^*} e^{\mu(b^*,k)}} \tag{3}$$

where b^* represents the 2^N possible baskets and $\mu(b,k)$ is the utility that basket *b* provides to the consumer *k*.

$$\mu(b,k) = \sum_i \alpha_i \, I(i,b) + \sum_i \beta_i \, P_{ik} \, X(i,b) + \sum_{i<j} \theta_{ijk} \, X(i,b) \cdot X(j,b) \tag{4}$$

This model can predict the probability of choosing each one of the 2^N baskets from the parameters that define the conditional logit models. The model represented by equation (4) then has the form of a standard conditional logit model where the set of possible choices is the set of baskets and $\mu(b,k)$ is the specification of utility. It can therefore be estimated by using the usual process of conditional logit. In fact, each basket can be considered as an alternative in the framework of a conditional logit model.

To take into account the socio-economic variables (D_k) that characterize the consumer k, θ_{ijk} has to be replaced by $\theta_{ij} + \gamma_{ij} D_k$ in equations (1) and (4).

We study the motives for purchasing the AB label using observed purchases of eight goods: we consider four products (eggs, coffee, margarine and cooked ham) in both their standard and alternative versions (organic agriculture, fair trade, health and superior quality respectively). We want to characterize combinations of the different products in purchased baskets in order to reveal the consumers' motives. We estimate the degree of complementarity between an organic product and a product with the 'fair trade' label, in order to quantify the

[5] It is assumed that the coefficients are symmetric: $\theta_{ijk} = \theta_{jik}$.

sustainability-driven behavior of the consumer; as well as the complementarities between the organic product and a 'healthy' or higher quality product (with Red Label), in order to qunatify the self-interested motives of the consumer.[6]

Purchases of every household are aggregated for the year to yield a household's basket of consumption among the set of 256 (2^8) possible baskets. Given that the panel lists the actual purchases of households, the prices of the alternatives they faced are not always known. Prices we do not observe are simulated from a random draw of a log normal law with mean and standard deviation based the empirical values for the year 2009 of purchases observed for the good in question.

3. Results and discussion

The results of the base model are shown in Table 4. The fit of the logistic estimation (R^2 = 0.29) enables us to interpret the results with generality. Constants associated with conventional products are higher than those associated with labeled products, except for margarine: this reflects the market shares presented in Table 1. Price coefficients are not significant: a change in price will not affect the probability of purchasing a good.[7]

Among the 28 parameters that measure the complementarity between each pair of the eight goods (θ_{ij}), 21 are significantly positive. This result is not surprising, as the analysis of the basket relates to common consumption goods, and the time unit considered is a year.

When we consider a pair of products (eggs/coffee, margarine/ham, coffee/margarine...), we observe the expected result that the complementarity between conventional products is stronger than between labeled products. However, the eggs/coffee pair is an exception as there is a stronger link between the labeled products (AB eggs and Fair Trade coffee) than between their conventional versions. This first result is consistent with a concern for production context on behalf of organic buyers. Besides, the complementarity between an organic product and a given labeled good is always higher than the complementarity between an organic product and the conventional version of that good. This observation remains true for fair trade coffee. It seems clear that information on the characteristics of a good matters to consumers who care about production techniques and/or social conditions.

[6] Buying "Fair trade" goods indicates a positive attitude towards sustainable development, as these products help improve the living and working conditions of small farmers and agricultural workers in disadvantaged regions. Functional health claims on products (like "Enriched in Ω-3 and Ω-6" for the margarine – an attribute which helps reduce cholesterol-related risks) are directed at consumers' self-interested motivations. The "Red Label" indicates that a product complies with a specific set of characteristics that result in a superior organoleptic quality level.

[7] This result is not surprising as we only consider the act of purchasing a good and not the quantity purchased. Bunte *et al.* (2007) showed that selling organic products at the price of conventional products in ten supermarkets in Holland for four months had very little impact on the demand for organic products.

		Eggs		Coffee		Margarine		Ham	
		Org. (j=1)	*Conv. (j=2)*	*FT (j=3)*	*Conv. (j=4)*	*Ω 3 & 6 (j=5)*	*Conv. (j=6)*	*Sup. Quality (j=7)*	*Conv. (j=8)*
Constant		-1.85** (0.11)	0.30** (0.08)	-3.24** (0.11)	-0.44** (0.06)	-1.80** (0.06)	-1.88** (0.06)	-2.99** (0.08)	-0.44** (0.08)
Price		0.02 (0.18)	-0.03 (0.29)	5.70 (4.70)	4.50 (2.75)	-2.47 (7.20)	-12.33 (8.63)	2.63 (3.25)	9.31 (5.52)
Eggs	Org. θ_{1j}		0.10* (0.06)	**1.14**** (0.05)	-0.10** (0.04)	**0.34**** (0.04)	-0.37** (0.04)	**0.61**** (0.04)	-0.33** (0.05)
	Conv. θ_{2j}	0.10* (0.06)		0.07 (0.07)	0.67** (0.04)	0.45** (0.04)	0.39** (0.04)	0.51** (0.05)	1.00** (0.05)
Coffee	FT θ_{3j}	**1.14**** (0.05)	0.07 (0.07)		0.77** (0.07)	0.15** (0.04)	-0.07** (0.04)	0.23** (0.04)	0.00 (0.06)
	Conv. θ_{4j}	-0.10** (0.04)	0.67** (0.04)	0.77** (0.07)		0.45** (0.03)	0.56** (0.4)	0.34** (0.04)	0.72** (0.04)
Margarine	Ω 3-6 θ_{5j}	**0.34**** (0.04)	0.45** (0.04)	0.15** (0.04)	0.45** (0.03)		0.82** (0.03)	0.41** (0.03)	0.20** (0.04)
	Conv. θ_{6j}	-0.37** (0.04)	0.39** (0.04)	-0.07** (0.04)	0.56** (0.4)	0.82** (0.03)		-0.00 (0.03)	0.60** (0.04)
Ham	Sup. Quality θ_{7j}	**0.61**** (0.04)	0.51** (0.05)	0.23** (0.04)	0.34** (0.04)	0.41** (0.03)	-0.00 (0.03)		1.30** (0.05)
	Conv. θ_{8j}	-0.33** (0.05)	1.00** (0.05)	0.00 (0.06)	0.72** (0.04)	0.20** (0.04)	0.60** (0.04)	1.30** (0.05)	

R^2= 0.22934. Standard deviations are given in parenthesis - Error of estimation is noted ** if <5% or * if <10%

Table 4: Estimates of the basic model parameters

By considering the cross-effects of an organic good with other labeled goods, we see that the utility that the consumer derives, after controlling for product and price effects, is higher when the organic good is combined with FT coffee than with omega 3-6 enriched margarine or superior quality ham. In fact, inequalities $\theta_{O/FT} > \theta_{O/Q} > \theta_{O/H}$ (significant at a level of more than 95%), enable us to say that the AB label exhibits the strongest complementarity with the 'Fair Trade' label.[8] This seems to indicate that organic buyers are more motivated by production characteristics (which may be social) than by health or quality considerations.

The impact of household characteristics on the probability of purchasing baskets ($\theta_{ijk} = \theta_{ij} + \gamma_{ij} D_k$) that contain an AB product is presented in Table 5. The estimated values of other parameters are similar to those of the base model. The strongest complementarity is

[8] Note that of all the complementarities between labels, the combination of 'Organic' and 'Fair Trade' is the strongest, since $\theta_{O/FT} > \theta_{O/Q} > \theta_{Q/H} > \theta_{O/H} > \theta_{FT/Q} > \theta_{FT/H}$. Moreover, this ranking remains true when the staple organic good considered is milk or yoghurt.

again between the organic and Fair Trade labels, whatever socio demographic variable is considered.

	Income $(k = 1)$	**Family size** $(k = 2)$	**Education** $(k = 3)$	**Organic Behavior** $(k = 4)$
	Cross-Effects			
$\theta_{13} = \theta_{31}$ Org-FT	0.85** (0.07)	1.18** (0.09)	0.85** (0.07)	0.44** (0.08)
$\theta_{15} = \theta_{51}$ Org-«Health»	0.15** (0.05)	0.82** (0.07)	0.49** (0.05)	0.02 (0.05)
$\theta_{17} = \theta_{71}$ Org-Quality	0.35** (0.06)	0.52** (0.07)	0.37** (0.05)	0.19** (0.5)
	Socio economic x cross-effects			
Benchmark	Income <Median	One individual	Education level <baccalauréat	Org. Consumption in 2008 <median
$\gamma_{13} \times D_k$	0.47** (0.08)	-0.02 (0.03)	0.59** (0.08)	1.60** (0.09)
$\gamma_{15} \times D_k$	0.34** (0.06)	-0.20** (0.02)	-0.34** (0.06)	1.04** (0.07)
$\gamma_{17} \times D_k$	0.43** (0.06)	0.03 (0.2)	0.52** (0.06)	1.02** (0.08)
R^2	0.29	0.29	0.29	0.31
Observations	5’747’445 (22’539x255)			3’891’810 (15’262x255)

Error of estimation is noted ** if <5% or * if <10%

Table 5: Estimates of the model with socio-economic variables

Higher revenue households display the strongest link between labels. Their perception of the organic label is also more “environmental” than that of other households.

Family size has no influence on the link between organic and Fair Trade, or between organic and superior quality labels. However, the more the household size increases, the less they purchase organic for a health motive. A higher household education level promotes the perception of organic as an environmental good and strongly diminishes the health aspect. Finally, large consumers of organic produce more frequently combine Fair Trade products than other products with the organic goods in their basket. This clearly demonstrates and reinforces the fact that convinced consumers of organic produce have altruistic motives. A summary of the impact of households’ socio demographic background on their motivations for buying organic is given in Table 6.

It is therefore clear that consumers’ concern for sustainable production conditions is always ranked as the #1 reason for consuming organic products, even though a household’s socio-economic background may influence their secondary motivation for purchasing organic goods.

Socio demographic	Low	High
Income	1. Production conditions; 2. Quality; 3. Health.	1. Production conditions; 2. Quality; 3. Health.
Education	1. Production conditions; 2. Health; 3. Quality.	1. Production conditions; 2. Quality; 3. Health (--).
Family size	1. Production conditions; 2. Health; 3. Quality.	1. Production conditions; 2. Quality; 3. Health.
Organic loyalty	1. Production conditions; 2. Quality; 3. Health.	1. Production conditions (++); 2. Quality; 3. Health.

Table 6: Organic motivation ranking by sociodemographic variables.

4. Conclusion

The aim of this paper is to analyse the purchasing motives of households based on their actual behavior. Using a basket estimation probability method, we find that consumers who buy an organic product have a higher probability of also buying a fair-trade labeled product, rather than a healthy or a superior quality product, independent of the price effect or the category of the good. Therefore, it seems that the purchasing motives of consumers of organic is more about the public attributes, like the social and environmental production conditions, than about private benefits. This means that consumers value the environmental characteristics related to organic agriculture more than the eventual personal benefits, such as better health due to the lack of pesticides on the products they consume.

In terms of socio demographic characteristics, we notice that both ‘education’ and ‘income’ effects reinforce the latter result: when the head of the household has a higher education level or a higher income, he puts higher value on the organic label for being respectful of the production conditions of the good (the environment).

A policy of price reduction will not lead new consumers to enter the market for AB products. Instead, as our conclusions and the study by Garcia *et al.* (2010) indicate, communication strategies aimed at furthering AB agriculture by increasing the demand for organic products should focus its efforts on conquering new consumers by emphasizing the environmentally friendly attributes of organic goods. Knowledge of consumers’ motives for purchasing AB products is essential for public authorities, who are always keen to increase organic production in order to promote a long-term sustainable development policy.

Two important issues relating to organic development warrant further research. The first is to consider the impact that mass food retailers' strategy of extensively using their private labels to promote organic consumption has, as this increases both the variety and price ranges of organic products available to consumers. The second concerns the link between organic production methods and the distance produce travel before commercialization, as traditional retailers may import organic goods to the detriment of their carbon footprint. For example, Europe consumes 47% of worldwide organic production, but only devotes 27% of its land to organic production, thereby making the importation of organic goods inescapable in order to satisfy its demand.

Acknowledgements: the authors gratefully acknowledge the financial contribution of the French National Research Agency (ANR: OCAD project, Decision ANR 11 ALID 002 03), as well as the helpful comments from the 134th EAAE Seminar "Labels on sustainability: an issue for consumers, producers, policy makers, and NGOs" held the 21st -22nd March of 2013 in Paris (France) and the environment seminar held the 12nd-13rd November of 2012 in Rabat (Morocco).

References

Aertsens, J., Verbeke, W., Mondelaers, K., & van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: A review. *British Food Journal, 111(10),* 1140–1167.

Agence Bio. (2010). *Baromètre de consommation et de perception des produits biologiques en France,* Paris : Rapport n° 1001174, 137 pages.

Aschemann-Witzel, J., Maroscheckb, N., & Hammb, U. (2013). Are organic consumers preferring or avoiding foods with nutrition and health claims? *Food Quality and Preference, 30(1),* 68–76.

Bellows, A., Onyango, B., Diamond, A., & Hallman, W. (2008). Understanding Consumer Interest in Organics: Production Values vs. Purchasing Behavior. *Journal of Agricultural & Food Industrial Organization 5(2),* available at: http://www.bepress.com/jafio/vol6/iss1/art2.

Besag, J. (1974). Spatial Interaction and the Statistical Analysis of Lattice Systems. *Journal of the Royal Statistical Society, B(36),* 192-236.

Bunte, F., Van Galen, M., Kuiper; E. & Bakker, J. (2007). *Limits to Growth in Organic Sales; Price Elasticity of Consumer Demand for Organic Food in Dutch Supermarkets.* The Hague: LEI Report 7.06.20; ISBN/EAN: 978-90-8615-127-1.

Danone. (2011). *Sustainability Report,* accessed on www.danone.com, 230 pages.

Dimitri, C. & Oberholtzer, L. (2005). *Market-led Versus Government-facilitated Growth: Development of the U.S. and E.U. Organic Agricultural Sectors*. ERS, USDA, Outlook Report (WRS-05-05), available at: www.ers.usda.gov/publications/WRS0505/wrs0505.pdf

Durham, C. (2007). The Impact of Environmental and Health Motivations on the Organic Share of Produce Purchases. *Agricultural and Resource Economics Review, 36(2),* 304-320.

EC (2007). *Council Regulation (EC) No. 834/2007, Organic production and labeling of organic products: L189/1, 20.7.2007.*

EC (2001). *Council Regulation (EEC) No. 2092/91, Organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs. L198, 22.7.1991.*

Gamet-Payrastre, L. (2011). Effets physiopathologiques des mélanges de pesticides Physiological impact of pesticides mixtures. *Cahiers de Nutrition et de Diététique, 46(2),* 82-85.

Garcia, C., Fearne, A. & Wood, L. (2010). The role of involvement in the attention paid by supermarket shoppers to organic products. *Journal of Innovation Economics, 1,* 127-144.

Glaser, L., & Thompson, G. (1999). Demand for Organic and Conventional Frozen Vegetables, paper presented at the *American Agricultural Economics Association Annual Meeting*, Nashville, United States of America.

Griffith, R., & Nesheim, L. (2010). Estimating Households' Willingness to Pay, *CEMMAP Working paper*, CWP24/10.

Guilabert, M., & Wood, J.A. (2012). USDA Certification of Food as Organic: an investigation of consumer beliefs about the health benefits of organic food. *Journal of Food Products Marketing, 18(5),* 353-368.

Hassan, D., Monier-Dilhan, S., Nichèle, V. & Simioni, M. (2009). Organic Food Consumption Patterns. *Journal of Agricultural & Food Industrial Organization, 7(2),* Pages 1–23, ISSN (Online) 1542-0485, DOI: 10.2202/1542-0485.1269;

Kriwy, P., & Mecking, R.-A. (2012). Health and environmental consciousness, costs of behaviour and the purchase of organic food. *International Journal of Consumer Studies, 36(1),* 30–37.

Lairon, D. (2011). Nutritional quality and safety of organic food: a review. *Agronomy for sustainable development, 30,* 33-41.

Laureati, M., Jabesb, D., Russob V., & Pagliarinia, E. (2013). Sustainability and organic production: How information influences consumer's expectation and preference for yogurt? *Food Quality and Preference, 30(1),* 1–8.

Magnusson, M. K., Arvola, A., Hursti, U.-K. K., Åberg, L., & Sjodén, P.-O. (2003). Choice of organic foods is related to perceived consequences for human health and to environmentally friendly behaviour. *Appetite, 40(2),* 109–117.

Mondelaers, K., Verbeke, W., & van Huylenbroeck, G. (2009). Importance of health and environment as quality traits in the buying decision of organic products. *British Food Journal, 111(10),* 1120–1139.

Nestlé. (2012). *The Nestlé Policy on Environmental Sustainability*. accessed on www.nestle.com , 7 pages.

Russell, G., and Petersen, G. (2000). Analysis of Cross Category Dependence in Market Basket Selection. *Journal of Retailing, 76,* 367-392.

Thompson, G., & Kidwell, J. (1998). Explaining the Choice of Organic Produce: Cosmetic Defects, Prices and Consumer Preferences. *American Journal of Agricultural Economics, 80,* 277-287.

Thøgersen, J. (2011). Green shopping: For selfish reasons or the common good? *American Behavioral Scientist, 55(8),* 1052–1076.

Tuomisto, H., Hodge, I., Riordan, P., & Macdonald, D. (2012). Does organic farming reduce environmental impacts? A meta-analysis of European research. *Journal of Environmental Management, 112,* 309-320.

United Nations. (2012). *Outcome of the Conference Rio+20*, Ref. A/CONF.206/L.1*, 53 pages.

Wier, M., O'Doherty K., Andersen L., Millock, K., & Rosenkvist, L. (2008). The Character of Demand in Mature Organic Food Markets: Great Britain and Denmark Compared. *Food Policy, 33(5)*, 406-421.

Willer, H., & Kilcher L. (Eds.). (2012). *The World of Organic Agriculture - Statistics and Emerging Trends 2012*. Bonn: Research Institute of Organic Agriculture (FiBL), Frick, and International Federation of Organic Agriculture Movements (IFOAM).

Worthington, V. (2001). Nutritional Quality of Organic Versus Conventional Fruits, Vegetables, and Grains. *The Journal of Alternative and Complementary Medicine, 7(2)*, 161-173.