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Citizen and consumer attitudes to food and food production in Norway[1]

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Abstract
This ESEE 2011 conference paper examines attitudes to private and public goods and bads from agriculture in Norway with a particular focus on organic agriculture. The issue is based on a survey among 939 Norwegians. The results show that the respondents strongly value public attributes of agriculture like a vivid countryside and cultural landscapes. Almost 60 percent of the sample emphasise that the government should aim to increase the production and sale of organic food. Respondents' behaviour as consumers were investigated by collecting and analysing data that indicate which conditions respondents find most important when they buy milk, eggs, carrots and ketchup. Important conditions were taste, fresh, produced in Norway and no use of pesticides or fertilizers. The most important reasons for buying organic food were avoidance of pesticides, health and environmental concerns.

1 Introduction

How we produce our food influence our environment and the society. This is due to the fact that agriculture produces multiple outputs that normally consist of a mix of private and public goods and bads (OECD, 2001). Private goods from agriculture include food and fibre and public goods includes biodiversity, cultural heritage, food security, food safety, landscapes and rural viability (Vatn, 2002). Examples of public bads are pollution and land-degradation. This paper analyses attitudes to private and public attributes of agriculture in Norway.

Norwegian agriculture is characterised by small scale agriculture that are highly governed by different policy measures and market arrangements. The average area of a farm holding is for example 21.8 hectare (Statistics Norway, 2010a) and the average number of dairy cows is 21.4. A large share of the milk and the sheep meat is produced in mountain areas and along the coast in Western and Northern Norway, and in some rural communities agriculture is an important sector together with other businesses for employment and settlement (Blekesaune, 1999; Refsgaard et al. 2010). Only 3% of the land area is cultivated and environmental problems have not been as severe as in most other western countries (Daugstad et al., 2006). In the period 2006–2008 Norway had the highest producer support estimate in OECD (OECD, 2009). There are substantial elements of rural policy within the agricultural policy and there are several policies that impact the multifunctional aspects of agriculture. Rural communities also have a long history of residents diversifying their income. On average only 30 percent of total income in farm households arises from agricultural activities, thus farm households are integrated into other social and economic activities (Bryden et al. 2011; Refsgaard and Johnson 2010). Generally, Norwegians' linkages to rural livelihood are rather strong as the settlement is quite dispersed around the country

Earlier studies have shown that Norwegian consumers regard domestically produced food as safe, and put great trust in Norwegian agriculture, food control and in food products (Storstad 2000, 2001). In 2009 only 1.1 percent of the total food grocery sales was sold as organic, while 4.3 percent of the total cultivated agricultural area was cultivated organically (SLF, 2010). The goals of the Norwegian government for organic food production and consumption are to achieve 15 percent of the food production and the food consumption as organic in 2020.

Two important arenas for humans to express their attitude to and influence the character of agriculture are the public decision making arena and the market-place for food. Humans are expected to take on different roles in these arenas, namely the role as a citizen (agency for the public interest) in the public sphere and the role as a consumer (maximization of individual utility) in the market-sphere (Sagoff, 1988). The multifunctional character of agriculture implies that by choosing what kind of food to buy, people affect the production of

agricultural public goods and bads. Food-buyers might, therefore, not merely act in the role of consumers but also in the role of citizens when purchasing food.

The purpose of this paper is to examine *what are Norwegians' attitudes to private and public goods and bads from agriculture in the public sphere and in the market sphere*. Attitudes to organic farming and food will be particularly examined. Analysing this issue could provide knowledge about how a citizen versus a consumer setting influences attitudes to agriculture and food and provide information that could be important for policy makers when formulating agricultural policies. Organic food and farming are studied since both public and private goods are relevant for that type of goods. To analyse the issue a survey was undertaken. The next section presents the data and methodology. Then follows the results of the survey and a discussion of the findings. Finally we conclude on the issues raised in this paper.

2 Data and methodology

To analyse the issues raised in this paper a web-survey was undertaken in September 2010. A representative sample of 939 Norwegians completed the survey.[2] The respondents were asked questions about their attitude to Norwegian agricultural policy and organic farming as well as their food consumer behaviour. Food consumer behaviour was studied with respect to what conditions are important when the respondents buy four essential food items, consumption of organic food and reasons for (not) buying organic food. The results of the survey was analysed using descriptive statistics, factor analysis and regression models.

The respondents were asked 18 questions about their attitude to agricultural policy (see table 1) and 12 questions (see table 3) about their attitudes to organic farming and food. The questions are formulated such that the respondent would image him/her in a citizen setting. Their attitude was measured by a 7 point likert scale. The questions about their attitude to agricultural policy were formulated such that the respondents had to make tradeoffs between inexpensive food and other considerations that could be important for Norwegian agricultural policy. Although there are several other important trade-offs when formulating agricultural policies, this is one of the tradeoffs that are most familiar and obvious for the respondents.

We employed an exploratory principal component analysis (PCA) with orthogonal varimax rotation to reduce the items concerning attitudes to agricultural policy and organic farming to a smaller number of underlying dimensions. Factor solutions with different numbers of factors were examined before structures were defined in order to have the most representative and simple sets of factors. Items with loadings less than 0.50, significant mixed-factor loadings, or communalities less than 0.50 were evaluated for possible deletion (Hair et al., 2006). We formed summated scales by combining all of the items loading highly on a factor into a single composite measure where these individual items were averaged. We checked for reliability (internal consistency within each dimension) with a series of diagnostic measures. Item-to-total correlations above 0.50, inter-item correlations more than 0.30, and a reliability coefficient (Cronbach's alpha) above 0.60 are deemed acceptable in exploratory

[2] A professional survey company was engaged to collect the data. This company has recruited a sample of more than 60,000 Norwegians who are willing to participate in online surveys on various themes. Members of this online sample receive survey invitations by e-mail. Descriptive data about those who have completed a particular survey are continuously updated, such that the final sample is ensured to be representative with respect to gender, age, and residence. People with university education were over-represented, and the sample was therefore weighted. In Norway, 27.3 percent of the population has higher education (Statistics Norway, 2010b), while in the sample 52.1 percent of the sample has higher education. The incentive for completing the survey of this particular study was a lottery with a digital camera at approx. NOK 3600.

research (Hair et al., 2006). We used the summated scales as measures in the subsequent regressions.

We performed multiple linear regressions to determine the degree of association between the identified factors and some explanatory variables. Background and attitude variables were used as explanatory variables. Variables with several missing observations were not included in the regression models. We encountered collinearity problems among some of the explanatory variables using variance inflation factors and condition indices. These variables were excluded from the models. White's test was performed and suggested no signs of heteroskedasticity.

To create a consumer setting the respondents were asked questions about which conditions that are important when they purchase four basic food items – milk, ketchup, carrots and eggs. The criteria for choosing the food items was that both plant and animal productions should be included, how common it is to by these products organically in Norway, that both unprocessed and processed products should be present and that both products that usually are produced in Norway and in other countries should be present. Consumption of organic food was studied by asking the respondents about how often they buy organic food (as often as they can, sometimes, rarely, never). Two ordinal logistic regression models were developed to analyse the characteristics of consumers with varying consumption of organic food. The respondents were also asked why they buy organic food and why they not buy (more[3]) organic food. They were presented different reasons (see table 8 and 9) that they could choose between in addition to an open option.

3 Results

3.1 Attitude to Norwegian agricultural policy and organic farming and food

The results of the questions showing respondents attitudes to agricultural policy are presented in table 1. We see that the majority of the respondents find all the different considerations in table 1 more important than inexpensive food. The considerations that they find most important concern a mixture of public (e.g. animal welfare, food security, vivid countryside and environmentally friendly agriculture) and private goods (tasty, safe and healthy food). The three most important considerations, i.e. that most respondents found important are tasty food, safe food and animal welfare, while the least important considerations were locally distinctive food, promoting organic farming and Norwegian food. Respondents agree most about tasty food, healthy food and animal welfare, while they disagree most about sustainable predator stocks, Norwegian food and preserving traditional small-scale farming.

[3] For those that buy organic food.

Table 1. Attitude to Norwegian agricultural policy in the survey[1]

No.	Inexpensive food is more important than:	Mean	Standard deviation	% that disagree[2]	% neutral[3]	% that agree[4]	N[5]
1	- animal welfare	2.24	1.49	83.8	7.8	8.5	924
2	- tasty food	2.27	1.44	85.2	6.4	8.4	926
3	- safe food	2.29	1.58	83.5	4.9	11.7	923
4	- healthy food	2.51	1.48	80.0	8.4	11.6	928
5	- food security	2.60	1.58	75.9	10.6	13.5	908
6	- vivid countryside	2.77	1.56	73.5	13.0	13.6	921
7	- environmentally friendly agriculture	2.83	1.49	72.1	14.5	13.4	926
8	- fair trade	2.86	1.60	69.8	15.5	14.7	921
9	- beautiful cultural landscapes	2.86	1.48	69.8	15.9	14.3	908
10	- reasonable farm incomes	2.89	1.61	69.0	16.0	15.0	924
11	- preserving traditions and cultural heritage	2.91	1.52	70.2	14.1	15.7	922
12	- wide range of food	2.98	1.54	69.4	12.1	18.5	925
13	- preserving traditional small-scale farming	3.05	1.68	66.3	14.3	19.4	918
14	- short-travelled food	3.25	1.57	59.3	21.8	18.9	909
15	- Norwegian food	3.30	1.67	59.5	16.3	24.2	923
16	- sustainable predator stocks	3.30	1.81	57.9	18.9	23.2	904
17	- locally distinctive food	3.36	1.55	56.0	22.4	21.6	925
18	- promoting organic farming	3.36	1.62	56.3	20.7	23.0	920

[1]Measured on a 7 point likert scale where 1 is strongly disagree and 7 is strongly agree
[2]Respondents that chose 1, 2 or 3.
[3]Respondents that chose 4.
[4]Respondents that chose 5, 6 or 7.
[5]N=939 originally, but those that answered 'do not know' are excluded.

We factor analysed the 18 agricultural policy statements (see table 2). Six items associated with low factor loadings or low communality was removed from the final PCA model (Statement 6, 7, 8, 10, 11, 12 and 16 in table 1). This model achieved an overall MSA of 0.95. Two factors were extracted that explained 68.5% of the variance. The following descriptive labels were given: '*Way of production and preserving traditional farming*' (factor 1) and '*Food attributes, animal welfare & food security'* (factor 2). The Cronbach's alphas for the two scales were well above the lower limits of acceptability for newly developed scales. We see that factor 1 represent statements that concern the importance of how food is produced (in Norway, locally, traditionally, organically) and statements that concern public goods from agriculture like cultural heritage and cultural landscapes. Respondents that find these issues important are likely to hold a romantic notion of traditional, national, small scale agriculture[4] and they are likely to believe that the quality of the food is influenced by how it is produced, even if the effects are not directly observable. It is, however, also likely that respondents finding these issues important are concerned about how the food is produced since they want to influence the character of agriculture. It is likely that they do not merely emphasise that inexpensive food is less important than Norwegian food, short-travelled food and locally distinctive food because they believe that this type of food possess high quality, but also because they want to support this type of agriculture.

[4] While small scale is not an intrinsic attribute of organic regulation, consumers do often assume that organic farms are small, family ran and mixed (Rigby and Bown, 2007).

Factor 2 represents statements that concern food attributes (safe, tasty and healthy food), animal welfare and one public good from agriculture (food security). These statements represent uncontroversial issues that most people would agree on and they are not directly related to traditional small scale agriculture.

Table 2. Attitudes to agricultural policy: Varimax rotated factor matrix

No.[a]		Varimax rotated loadings[b]		
		F1	F2	Commu-nality
	Way of production and preserving traditional farming (α=0.91)[c]			
15	Norwegian food	**0.80**	0.24	0.69
14	Short-travelled food	**0.79**	0.29	0.70
17	Locally distinctive food	**0.78**	0.27	0.69
18	Promoting organic farming	**0.73**	0.20	0.58
13	Preserving traditional small-scale farming	**0.73**	0.38	0,67
11	Preserving traditions and cultural heritage	**0.69**	0.46	0.69
9	Beautiful cultural landscapes	**0.65**	0.45	0.63
	Food attributes, animal welfare and food security (α=0.89)			
3	Safe food	0.26	**0.84**	0.77
1	Animal welfare	0.32	**0.81**	0.75
2	Tasty food	0.22	**0.79**	0.67
4	Healthy food	0.35	**0.76**	0.70
5	Food security	0.43	**0.70**	0,68
				Total
	Sum of squares (eigenvalue)	7.00	1.22	8.22
	Percentage of variance (%)	58.3	10.2	68.5

[a] Corresponds to the numbers in table 1.
[b] Factor loadings >|0.50| in **bold**. Variables included in the survey, but associated with low factor loading, high cross-loadings or low communality, were removed from the reported PCA model.
[c] Cronbach's alpha reliability coefficients.

The results of the questions about attitudes to organic food and farming are presented in table 3. We see that a majority of the sample emphasises that the government should aim to increase the production and sale of organic food and that they 'perceive?' organic farming as being superior to conventional farming with regard to environmentally friendliness, and animal welfare. A majority of the sample do, however, also emphasise that it is more important that the food is produced in Norway than it is organic. The statements that there are most agreement on are whether it is more important for them to buy short-travelled food prior to organic food and whether organic production is more animal and environmentally friendly than other Norwegian food production. The issues with most disagreement are whether organic farming should receive more government assistance than ordinary farming, and whether the government should aim to increase the production and sale of organic food.

Table 3. Attitude to organic farming and organic food in the survey[1]

No.		Mean	Standard deviation	% that agree[2]	% neutral[3]	% that disagree[4]	N[5]
1	The government should aim to increase the sale of organic food	4.76	1.58	59.5	23.7	16.7	870
2	The government should aim to increase the production of organic food	4.75	1.61	59.1	24.7	16.2	880
3	It is more important for me that that the food is produced in Norway than that the food is organic	4.72	1.54	55.2	27.2	17.6	896
4	Organic production is environmentally friendlier than other Norwegian food production	4.60	1.54	54.8	24.7	20.5	808
5	It is more important for me to by short-travelled food than organic food	4.48	1.43	46.6	36.0	17.5	869
6	Organic farming produces more biodiversity than other types of farming	4.47	1.51	47.3	32.9	19.9	763
7	Organic production is animal friendlier than other Norwegian food production	4.45	1.48	49.0	32.6	18.5	782
8	Organic food is safer than other types of food	4.27	1.54	46.9	28.0	25.2	833
9	Organic farming should receive more government assistance than ordinary farming	4.26	1.74	47.9	21.0	31.1	839
10	Organic farming produces a more vivid countryside than other types of farming	3.95	1.55	33.3	37.2	29.5	797
11	Organic farmers have more noble motives than other farmers	3.67	1.50	25.9	34.7	39.4	824
12	It is more important to buy organic food when the food is imported than when the food is Norwegian.	3.60	1.53	24.7	35.7	39.6	814

[1]Measured on a 7 point likert scale where 1 is strongly disagree and 7 is strongly agree
[2]Respondents that chose 5, 6 or 7.
[3]Respondents that chose 4.
[4]Respondents that chose 1, 2 or 3.
[5]N=939 originally, but those that answered 'do not know' are excluded.

We use factor analyses to create common factors for the 12 statements about organic farming (see table 4). Two items associated with low factor loadings or low communality were removed from the final PCA model (Statement 7 and 12 in table 3). This model achieved an overall MSA of 0.92. Two factors were extracted that explained 72.2% of the variance. Cronbach's alpha for the remaining items was 0.94. The following descriptive labels were given: '*Organic should be supported and is superior to conventional'* (factor 1) and '*Norwegian and local are more important than organic'* (factor 2). Factor 1 concern whether the policy makers should aim to increase the sale and production of organic food and to a greater extent should support organic farming than conventional farming. Other issues in factor 1 are whether organic is superior to conventional agriculture with respect to environmental impacts, safety, animal welfare, vividity of the countryside and the motives of the farmer. Factor 2 concern whether it is more important for the respondents that the food is short-travelled and Norwegian that organic.

Table 4. Attitudes to organic farming: Varimax rotated factor matrix

No.[a]		Varimax rotated loadings[b] F1	F2	Communality
	Organic should be supported and is superior to conventional (α=0.94)[c]			
2	The government should aim to increase the production of organic food	**0.88**	-0.07	0.78
1	The government should aim to increase the sale of organic food	**0.87**	-0.04	0.77
4	Organic production is environmentally friendlier than other Norwegian food production	**0.87**	-0.04	0.75
8	Organic food is safer than other types of food	**0.85**	-0.03	0.73
7	Organic production is animal friendlier than other Norwegian food production	**0.85**	-0.06	0.72
9	Organic farming should receive more government assistance than ordinary farming	**0.84**	-0.04	0.71
6	Organic farming produces more biodiversity than other types of farming	**0.82**	0.01	0.68
10	Organic farming produces a more vivid countryside than other types of farming	**0.77**	0.04	0.59
11	Organic farmers have more noble motives than other farmers	**0.71**	0.04	0.51
	Norwegian and local is more important than organic (α=0.69)[b]			
5	It is more important for me to by short-travelled food than organic food	0.05	**0.88**	0.77
3	It is more important for me that that the food is produced in Norway than that the food is organic	-0.09	**0.87**	0.76
				Total
	Sum of squares (eigenvalue)	6.24	1.54	7.78
	Percentage of variance (%)	56.7	14.0	70.7

[a] Corresponds to the numbers in table 3.
[b] Factors 1 and 2 are 'Organic is superior to conventional and should be supported' and 'Norwegian and local food is more important than organic food'. Factor loadings >|0.50| in **bold**. Variables included in the survey, but associated with low factor loading, high cross-loadings or low communality, were removed from the reported PCA model.
[c] Cronbach's alpha reliability coefficients.

Multiple linear regressions performed on the two factors of attitudes to agricultural policy and the two factors of attitudes to organic farming produced four statistically significant models (table 5). The adjusted R^2 ranged from 7% to 37%. The results for model 1 show that females, respondents that are living in rural areas, respondents that enjoy themselves in the countryside, respondents that often buy organic food, respondents that prefer healthy food, respondents that believe that food production influences the environment and respondents that are environmentally engaged are most likely to emphasise that the way of production and preserving traditional farming is more important than inexpensive food. We observe that whether the respondents enjoy themselves in the countryside are a stronger predictor than whether the person is living in rural areas or not. Education was the variable with least effect on attitudes to the way of production and the preservation of traditional farming.

Table 5. Multiple linear regressions of attitudes to agricultural policy and organic farming

Model	M1	M2	M3	M4
Explanatory variables	Inexpensive food is more important than way of production and traditional farming N=863	Inexpensive food is more important than food attributes, animal welfare & food security N=878	Organic is superior to conventional and should be supported N=757	Norwegian and local is more important than organic N=757
Gender (female=1)[a]	-0.36***	-0.34***	0.15	0.09
Young[b] vs. old[c]	-0.15	-0.21	0.29*	-0.07
Middle age[d] vs. old	-0.13	-0.20	0.15	-0.12
Education (BSc or higher=1)[a]	-0.01	-0.14	-0.15	-0.08
Unknown income / will not inform vs. low income[e]	-0.02	-0.10	-0.49**	0.32
Middle income[f] vs. low income	-0.04	-0.10	-0.26*	0.22
High income[g] vs. low income	-0.10	-0.33*	-0.09	0.27
Living in rural areas (=1)[a]	-0.23*	-0.13	-0.18	0.33**
Persons in the household	0.02	0.01	0.04	-0.05
Married/cohabiting/couple (=1)[a]	0.10	0.24*	-0.18	0.05
I prefer tasty food rather than healthy food[h]	0.13***	0.14***	-0.07**	0.08*
Food production influences to a minor extent the environment[h]	0.07**	0.09***	0.02	0.01
I am engaged in how I personally can protect the environment[h]	-0,17***	-0,12***	0,24***	0,17***
I enjoy myself more in the countryside than in the city[h]	-0.10***	-0.05	-0.01	0.08**
By organic food as often as they can vs. rarely or never	-0.42*	0.01	1.63***	-0.87***
By organic food sometimes vs. rarely or never	-0.26**	-0.06	0.92***	-0.18
F-value	13.24***	9.84***	28.59***	4.91***
R^2	0.200	0.155	0.382	0.096
R^2_{adj}	0.185	0.139	0.369	0.076

*p<0.05; **p<0.01; ***p<0.001

[a] Measured as dummy variables where 0 denotes otherwise.

[b] <41 years old, [c] 60 years or older, [d] 41–59 years old

[e] <300 000, [f] 300 000 – 599 000, [g] 600 000 or more NOK annually

[h] Measured on a 7 point likert scale where 1 is strongly disagree and 7 is strongly agree

The results from model 2 in table 5 show that females, high income versus low income respondents, marital status, respondents that prefer healthy food, respondents that believe that food production influences the environment and respondents that are environmentally engaged are most likely to emphasise that certain food attributes, animal welfare and food security are more important than inexpensive food. Although not significant at 5 percent level, the variables 'Middle age versus old' and 'I enjoy myself more in the countryside than in the city' had p-values below 0.06. Whether the respondents buy organic food as often as they can

versus rarely or never was the variable with least effect on attitudes to food attributes, animal welfare & food security. This indicates that animal welfare is not so important for respondents that buy organic food.

The results for model 3 show that young respondents are more likely than old respondents and that low income respondents are more likely than middle income respondents to emphasise that organic is superior to conventional and should be supported. It is further the case that respondents that prefer healthy food, respondents that often or sometimes buy organic food, and that are environmentally engaged are most likely to emphasise that organic is superior to conventional and should be supported. Although not significant at 5 percent level, the variables 'Gender' and 'Living in rural areas' had p-values below 0.07, indicating that there might be a tendency that females and respondents that are living in urban areas are more likely to emphasise that organic is superior to conventional and should be supported. The variable with least effect on attitudes to whether organic is superior to conventional and should be supported is 'I enjoy myself more in the countryside than in the city'.

The results for model 4 show that respondents living in rural areas, respondents that enjoy themselves most in the countryside, respondents that prefer tasty food to healthy food, respondents that are environmentally engaged and respondents that seldom or rarely buy organic food versus often are most likely to emphasise that Norwegian and local is more important than organic. The variable with least effect was whether the respondents believe that food production influences the environment. Hence, we observe that both respondents that support organic and respondent that find Norwegian and local to be more important than organic are environmentally engaged.

3.2 Consumer behaviour with regard to four basic food items

Table 6 presents the conditions that were most important for the respondents when they purchase eggs, carrots, milk and ketchup. We observe that the conditions most important for the respondents mainly consist of food attributes that concern taste, health, and freshness, but some of the issues are also related to how the food is produced and which is not necessarily directly beneficial for the respondents, e.g. use of fertilizers, produced in Norway, the cows have been grazing. Preferences for grazing cows could be related to concern for animal welfare, cultural landscapes and cultural heritage. Taste is important for all the food items, and produced in Norway and freshness is important for 3 of the items. We also observe that organic attributes like few additives, no use of pesticides and fertilizers and that the cows have been grazing are important for the respondents. Somewhat surprisingly, price is not so important.

Table 6. The five conditions that are most important for the respondents when they buy eggs, carrots, milk and ketchup[1]

	Percent of the sample that find the condition important			
	Eggs (N=222)	Carrots (N=249)	Milk (N=229)	Ketchup (N=239)
Favourable fat content			37.6	
Fresh[2]	39.7	57.64	61.6	
Looks appealing		62.50		
No/few additives				54.26
No sugar is added				48.96
No use of pesticides and fertilizers		55.46		46.03
Price	55.8			33.89
Produced in Norway	57.5	57.31	66.6	
Tasty	49.7	79.43	68.6	77.69
The cows have been grazing the whole summer			53.9	
The size of the eggs	39.8			

[1]The respondents were presented between 11 and 16 conditions for each food item and were able to mark maximum 5 conditions in addition to an open ended option. Conditions that are not included in the table (but was presented to the respondents for some or all of the food items) include that the hens have been free-range and outside, that the hens has been free-range, animal welfare, that the ingredients are not genetically modified, only fed with organic fodder, produced by a agricultural cooperative, short travelled, locally distinctive, long shelf life, colour of the eggshell, extra yellow yolk, strong taste, favourable vitamin, mineral and anti-oxidant content, low salt content.

[2]Eggs: only a few days old, Carrots: with tops.

3.3 Consumption of organic food

Only 6 percent of the respondents reported that they buy organic food as often as they can, 47 percent that they buy organic sometimes, 37 percent that they buy organic rarely and 10 percent that they never buy organic. The intensity of organic consumption among the respondents is therefore quite limited. Table 7 presents the results of two ordinal logistic regression models (Model A and B) predicting self-reported consumption of organic food. Model A only include socio-economic background variables. The results for model A show that females, educated respondents and respondents that buy food daily or more than weekly are most likely to consume organic food. Model B also include some attitude and behaviour explanatory variables. The results for model B show that females are more likely than males to buy organic food and that respondents that prefer healthy food rather than tasty food, respondents that are personally engaged in protecting the environment, respondents that emphasise that promoting organic farming is important and respondents that emphasise that organic farming should receive more government assistance than ordinary farming are most likely to buy organic food. Although not significant at 5 percent level, the variables 'Middle age versus old', 'Living in urban areas versus rural areas' and 'Throw away food less seldom than twice a week' had p-values below 0.09, indicating that there might be a tendency that these variables increase the probability of buying organic food. The variable with least effect was 'Middle income versus low income' and 'I enjoy myself more in the countryside than in the city'.

Table 7. OR Estimates for consumption of organic food by ordinal logistic regression[a]

	Model A N = 939		Model B N = 829	
	OR	95 % CI	OR	95 % CI
Female vs. male	2.291***	1.8-3.0	1.472*	1.1-2.0
Young[b] vs. old[c]	1.235	0.8-1.8	1.316	0.8-2.1
Middle age[d] vs. old	1.137	0.8-1.6	1.467	1.0-1.2
BSc or higher vs. otherwise	1.390*	1.0-1.9	1.269	0.9-1.8
Unknown income / will not inform vs. low income[e]	1.055	0.6-1.9	2.238*	1.1-4.6
Middle income[f] vs. low income	0.847	0.5-1.3	1.153	0.7-1.9
High income[g] vs. low income	0.997	0.6-1.6	1.346	0.8-2.4
Living in urban areas vs. rural areas	1.293	0.9-1.8	1.443	0.9-2.2
Persons living in the household	0.876*	0.8-1.0	0.845*	0.7-1.0
Married/cohabiting/couple vs. otherwise	1.317	0.9-1.8	1.348	0.9-2.0
Buy food daily or more than weekly vs. otherwise	1.485**	1.1-2.0	1.254	0.9-1.8
Throw away food daily or more than weekly vs. otherwise			0.605	0.3-1.1
I prefer tasty food rather than healthy food[h]			0.771***	0.7-0.9
I enjoy myself more in the countryside than in the city[h]			1.029	0.9-1.1
I am engaged in how I personally can protect the environment and natural resources[h]			1.545***	1.3-1.8
Inexpensive food is more important than animal welfare[h]			1.087	1.0-1.2
Inexpensive food is more important than promoting organic farming[h]			0.744***	0.7-0.8
Organic farming should receive more government assistance than ordinary farming[h]			1.635***	1.5-1.8

*p < 0.05, **p < 0.01, ***p < 0.001

[a]1=As often as they can, 2=sometimes/now and then, 3=rarely / never

[b] <41 years old, [c] 60 years or older, [d] 41–59 years old

[e] <300 000, [f] 300 000 – 599 000, [g] 600 000 or more NOK annually

[h]Measured on a 7 point likert scale where 1 is strongly disagree and 7 is strongly agree

In table 8 we observe that environmental, food safety and health concerns are the most important reasons for buying organic food for those that buy organic food often and sometimes. Good quality and especially animal welfare are relatively less important for these groups. The most important reasons for those that rarely buy organic food is 'do not know'. But also important for this group is environmental, food safety and health concerns.

For more than half of the reasons (no. 1, 3–5, 7–9, 13) we observe that these reasons are significantly most important for those that buy organic often, followed by those that sometimes buy organic and finally those that rarely buy organic. For three of the reasons (no. 2, 6, 14) we observe that these are significantly more important for those that buy organic as often as they can or sometimes than for those that buy organic rarely. These 11 reasons are related to avoiding harm from conventional food (pesticides, environmental harm, food-unsafety, fertilizers, additives, animal harm and extensive processing)[5], good quality (health and taste) and lifestyle. The only reasons that are significantly most important for those that buy organic rarely are that they do not know why they buy organic and that only organic food is available for the relevant foodstuff.

[5] Mentioned in declining importance.

Table 8. Why the respondents buy organic food by how often they buy organic food[1]

No.	Reasons	How often they buy organic food			Total
		As often as they can (N=61)	Sometimes/now and then (N=437)	Rarely (N=344)	N=939
1	Avoid pesticide remnants in the food***	73.8[a]	55.4[b]	21.9[c]	38.6
2	Healthy***	54.2[a]	50.9[a]	21.9[b]	35.2
3	Environmentally friendly***	59.7[a]	50.0[b]	17.7[c]	33.6
4	Safe food***	60.3[a]	39.8[b]	17.2[c]	28.7
5	Good quality***	45.2[a]	37.9[b]	17.9[c]	27.1
6	Good taste***	44.3[a]	36.3[a]	18.2[b]	26.4
7	Avoid use of fertilisers***	49.6[a]	36.7[b]	6.5[c]	22.7
8	Avoid additives in the food***	47.3[a]	29.8[b]	13.5[c]	21.9
9	Animal welfare***	35.3[a]	19.9[b]	7.9[c]	14.4
10	Do not know***	3.8[a]	3.7[a]	26.5[b]	11.6
11	Only organic food available for the relevant foodstuff**	4.6[a]	8.9[a]	14.7[b]	9.8
12	Visible in the shop	5.6	10.3	6.3	7.5
13	Fits my lifestyle***	29.6[a]	8.3[b]	0.5[c]	6.0
14	Gentle processing**	9.2[a]	6.6[a]	2.0[b]	4.4

[1]The respondents were presented 15 reasons for purchasing organic food in addition to 'do not know' and an open option. The respondents could mark as many reasons as they wanted.

The relationship between the reasons why they buy organic food and how often they buy organic food is analyzed by Chi-square tests. *p < 0.05, **p < 0.01, ***p < 0.001 (Marks whether how often they buy organic food has significant effect on whether the reason are chosen by the respondent)

a–c For the reasons where the Chi-square tests suggests that the overall effect of how often they buy organic food is significant, the differences between how often they buy organic food are analyzed by the Freeman-Tukey test. Different superscripts imply significant differences (p < 0.05). If, for example, two cells both have the superscript a, they do not differ, while if one of the cells has the superscript a while the other cell does not have this superscript, they differ.

In table 9 we observe that the absolutely most important reasons for not buying more organic food in the sample are expensiveness. Also important are availability (reason no 2 and 3) and the fact that the respondents do not perceive organic food to possess better quality (reason no 4 and 5). We observe great variation among the different organic buyers-groups concerning which reasons that are most important for them. Availability (reason no 6, 2 and 3) is the absolute most important reasons for not buying more organic food for those that buy organic food as often as they can. Expensiveness is significantly less important for this group than for the other groups. Expensiveness and availability (reason no 6, 2 and 3) are most important for those that sometimes buy organic food. Expensiveness and the fact that they do not perceive organic food to be superior to conventional food (reason no 4, 5, 7 and 9) are the most important reason for not buying (more) organic food for those that rarely or newer buy organic food. For all the reasons that emphasise that organic food are not superior to conventional food (reason no 4, 5, 7, 9 and 10) we observe a very clear pattern. These reasons become significantly more important the more infrequently the respondents buy organic food. With some exceptions, the general trend for the reasons that concern availability (reason no 2, 3 and 4), is that these reasons becomes more important the more often they buy organic food.

Table 9. Why the respondents do not buy (more) organic food, N=939[1]

No	Reasons	How often they buy organic food				
		As often as they can (N=61)	Sometimes (N=437)	Rarely (N=344)	Newer (N=97)	Total (N=939)
1	Expensive***	33.5[a]	59.92[b]	68.61[b]	59.02[b]	61.30
2	Too little range of organic food***	52.0[a]	47.25[a]	24.83[b]	9.30[b]	35.41
3	Not visible in the shop***	44.5[a]	37.39[a]	18.75[b]	4.01[c]	27.56
4	Organic food is not healthier than other food types***	0.9[a]	9.56[b]	31.36[c]	52.90[d]	24.48
5	Organic food is not tastier than other food types***	0.0[a]	11.60[b]	33.56[c]	56.72[d]	23.58
6	Unavailable***	60.9[a]	31.26[b]	8.23[c]	4.54[c]	21.98
7	Organic food is not safer than other food types***	0.0[a]	9.27[b]	27.38[c]	58.76[d]	20.44
8	Too little knowledge about organic food**	5.7[a]	21.56[b]	23.06[b]	7.69[a]	19.64
9	Organic food is not environmentally friendlier than other food types***	0.9[a]	7.75[b]	25.72[c]	47.46[d]	18.01
10	Organic food is not better for animal welfare than other food types***	0.9[a]	6.09[b]	20.30[c]	34.51[d]	13.90
11	Bad quality*	12.0	5.38	9.36	11.77	7.93
12	Do not know	7.7	4.74	3.52	2.50	4.25

[1]The respondents were presented 12 reasons for purchasing organic food in addition to 'do not know' and an open option. The respondents could mark as many reasons as they wanted

The relationship between the reasons why they buy organic food and how often they buy organic food is analyzed by Chi-square tests. *p < 0.05, **p < 0.01, ***p < 0.001 (Marks whether how often they buy organic food has significant effect on whether the reason are chosen by the respondent)

a–c For the reasons where the Chi-square tests suggests that the overall effect of how often they buy organic food is significant, the differences between how often they buy organic food are analyzed by the Freeman-Tukey test. Different superscripts imply significant differences (p < 0.05). If, for example, two cells both have the superscript a, they do not differ, while if one of the cells has the superscript a while the other cell does not have this superscript, they differ.

4 Discussion

In this paper we have found that when the respondents are asked in a citizen setting (i.e. what should be important when formulating agricultural policies) the majority of the respondents emphasise that 18 public and private goods from agriculture are more important than inexpensive food. More than 70 percent of the respondents find animal welfare, tasty, safe and healthy food, food security, vivid countryside and environmentally friendly agriculture more valuable than inexpensive food. Although supported by a majority of the respondents the least important consideration out of the 18 was to promote organic farming. Hence, we observe that although a majority of the respondents strongly value claimed attributes of organic farming like animal welfare, safe and healthy food and environmentally friendly agriculture promoting organic farming is seen as the least important consideration[6] when formulating agricultural policy. Possible explanations for this observation is that the confidence in conventional

[6]Out of the 18 consideration.

Norwegian agriculture and its private and public goods is high (Rønningen et al., 2004) and that other practises than organic are perceived to be important for securing sustainable agriculture. This is also illustrated by the fact that a majority of the respondents emphasise that it is more important that the food is produced in Norway than that the food is organic.

Other important results from this paper is that attitudes to Norwegian food, short travelled food, locally distinctive food, promoting organic farming, preserving traditional small-scale farming, cultural heritage and beautiful cultural landscapes are closely related. Females, people that enjoy themselves in the countryside, people that are concerned about health and the environment are most likely to find these issues more important than inexpensive food. We also found that attitudes to safe, tasty and healthy food as well as animal welfare and food security are closely related. Females, people that are concerned about health, and people that emphasise that food production influences the environment are most likely to emphasise these aspects are more important than inexpensive food. We also found that respondents that are environmentally engaged and respondents that often or sometimes buy organic food are most likely to emphasise that organic is superior to conventional and should be supported. Respondents that are environmentally engaged (together with respondents that rarely or never buy organic food) are however, also most likely to emphasise that Norwegian and local is more important than organic. It is therefore the case that environmental engagement increases the possibility for emphasising that organic, Norwegian and local food and food production is important.

Consumer behaviour was analysed with respect to conditions that are important when the respondents buy milk, eggs, carrots and ketchup. The conditions that were most important for the respondents concerned taste, freshness, healthy, produced in Norway, no use of pesticides or fertilizers, that the cows has been grazing and prize. Hence, we observe that the respondents are concerned about both public and private attributes of agriculture when they buy food.

For all the reasons that emphasise that organic food are not superior to conventional food (reason no 4, 5, 7, 9 and 10) we observe a very clear pattern. These reasons become significantly more important the more infrequently the respondents buy organic food. With some exceptions, the general trend for the reasons that concern availability (reason no 2, 3 and 4), is that these reasons becomes more important the more often the respondents buy organic food.

Health and environmental concerns were the two most important predictors and reasons for supporting organic farming and consuming organic food (table 5, 7, 8). Concern for animal welfare is less important. Our factor analysis indicated that there were no close relationship between concern for organic farming and animal welfare. Concern for animal welfare when formulating agricultural policies had no significant effect on the consumption of organic food and only 14 percent of the respondents reported that concern for animal welfare was an important reason for buying organic food.

Another important observation in our study is that support for organic, national and local farming and food goes hand in hand. Concern for the way of production (in Norway, locally, organic) and preserving traditional farming is positively correlated with preferences for rural livelihood and consumption of organic food. The results does, however, also show that when support for organic food and agriculture are isolated from support for local and national food and agriculture and when we study the consumption of organic food, we observe that preferences for rural livelihood is far from having a significant effect (p-values between 0.55 and 0.82), but that whether the respondents are living in rural areas almost has a significant negative effect on support for and consumption of organic food (p-values between 0.06 and 0.09). Preferences for rural livelihood and rural residence has, however, a significant positive effect on the likelihood of emphasising that Norwegian and local is more important

than organic. Hence, we observe that when it comes to what influences support for national, local, organic and traditional agriculture one have to separate between whether the respondent are living in rural areas and whether the respondents enjoy themselves in the countryside.

We also observe that females are more likely to support and consume organic food and farming than males. Somewhat surprisingly, we did not find a clear and consistent effect of education and income on the support for and consumption of organic food and agriculture. These findings are similar to Storstad, (2002). In our study, education had no effect on the support for organic food and agriculture or on the consumption of organic food[7] and income has no significant effect on the consumption of organic food[8]. Low income respondents were, however, more likely to emphasise that organic is superior to conventional and should be supported than middle income respondents.

Although promoting organic farming is seen as the least important consideration when formulating agricultural policies, we observe that more than 50 percent of the sample emphasise that promoting organic is more important than inexpensive food, and that almost 60 percent of the sample emphasises that the government should aim to increase the sale and production of organic food. Hence, we observe that promoting organic food and farming is supported by a majority of the sample. To achieve this, one of the important challenges is to increase the consumption of organic food. Our results show that reducing organic food prices and increasing the availability of organic food is important in that respect.

5 Conclusion

The results in this paper show that Norwegians emphasise that several public goods and food attributes like animal welfare, tasty, safe and healthy food, food security, vivid countryside and environmentally friendly agriculture should be more important than inexpensive food when formulating agricultural policies. When asked in a consumer setting the results show that Norwegians value taste and health attributes of food, but also that they are concerned about that the food is produced on Norway, the use of pesticides and fertilisers and that the cows has been grazing. Also in a market sphere setting we observe that price is not so important for the respondents.

Only 6 percent of the respondents report that they purchase organic food as often as they can, and promoting organic farming was seen as the least important consideration out of 18 considerations when formulating agricultural policies. We do however, also observe that about 60 percent of the sample emphasise that the government should aim to increase the sale and production of organic food. Health and environmental concerns are the most important reasons for consuming organic food. Reduced prices on organic food and improved availability are important means for increasing the consumption of organic food according to our results.

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[7] When attitudinal and behaviour explanatory variables were included.

[8] Except that respondents with unknown income or respondents that would not inform about their income were more likely than low income respondents to consume organic food.

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