

Public opinion on UK milk marketing and dairy cow welfare

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Abstract

Interview questionnaires were administered to the general public in central Scotland and northern England during summer 2007 to investigate consumer awareness of UK dairy production methods, welfare issues and recognition of 'quality assurance' product logos. Fifty percent of respondents gave UK dairy animal welfare a positive rating. Recognition of individual quality assurance logos was poor and 75% of respondents stated that they did not intentionally seek to buy products with any of the logos. Respondents' perceptions of good dairy welfare included: appropriate feeding, good stockmanship, plenty of space, freedom to roam/free range and environmental cleanliness. Half of respondents felt they were poorly informed about food production and the majority of respondents (68%) would like more information on food production. Respondents believed that information on animal welfare provided by veterinarians and farmers would be reliable. Most respondents (93%) said they would pay more for good dairy welfare. The findings show that the general public are interested in animal welfare but could be better informed on dairy animal production and welfare. Veterinarians and farmers may have a potentially important role in providing this information with increasing demand for higher welfare provenance products potentially helping to improve animal welfare.

Keywords: animal welfare, consumers, cows, dairy, labelling, organic

Introduction

Despite increasing consumer concern regarding food production, including animal welfare (Verbeke & Viaene 2000), the level of public understanding of dairy production and animal welfare is unclear. In addition to animal health issues, Government legislation and commodity economics, consumer demand can greatly influence the food and farming industry. There has been a growth in demand for animal products from systems which are deemed to be associated with improved animal welfare, for example free-range eggs (British Lion Eggs 2008) and organic milk (DairyCo Datum 2008a) and it has been hypothesised that animal welfare concerns will become more important in the future (Verbeke & Viaene 2000). However, the extent of UK consumers' knowledge of current and future dairy production methods and how they relate these to animal welfare issues is not known. Consumers may express their preferences in their buying power, but research has shown that positive responses to questions on animal welfare are not always reflected in decisions at the point of purchase (Layton & Bonney 1999; María 2006). Many consumers are removed from food production and therefore do not have a direct role in, or accurate knowledge of, the food chain. The majority of consumers rely therefore on legislation and labelling of food products to provide them with the information on product provenance and production methods on

which they base their choices. A number of product-labelling schemes exist which aim to assure consumers that basic standards have been adhered to in the production of the product (ie the Red Tractor logo of the Assured Food Standards Scheme) and/or certain welfare standards have been maintained during production (ie the Freedom Foods Scheme from the RSPCA). However, it is not known how much emphasis consumers place on the logos when buying milk, whether they understand what they mean and whether they believe it represents an animal welfare benefit. Doubts have been raised as to the effectiveness of the Red Tractor logo being understood by consumers to represent a farm assurance scheme (British Agriculture Marketing 2005).

The veterinary profession is heavily involved in the promotion and maintenance of animal welfare on farms, through disease surveillance, treatment and the promotion of preventive healthcare through herd health planning. Veterinarians are integral to the establishment and maintenance of good welfare on farms as they have both the scientific knowledge (Main & Cartledge 2000) and, most importantly, the trust of the farmers to advise on herd care (Orpin 2000). For veterinarians to advise effectively on the welfare of production animals, it is important to gain an understanding of both the producers' problems and the consumers' demands; the 'Whole Food Chain Approach'. A better understanding of consumer perceptions of welfare

Table 1 Breakdown of the age groups of the respondents.

Age group (years)	Count	Percentage of respondents
< 20	22	6.1
20s	60	16.5
30s	50	13.8
40s	76	20.9
50s	65	17.9
60+	90	24.8
Total	363	100

would be beneficial in an attempt to address public concerns and to improve welfare schemes and product labelling.

This study aimed to address a gap in the body of knowledge about consumer perceptions of UK dairy production and animal welfare by investigating current consumer awareness of dairy production methods and associated welfare issues. It also aimed to investigate whether consumers recognise and correctly understand some of the current 'quality assurance' product logos applicable to dairy products.

Materials and methods

A questionnaire was designed to ascertain consumers' opinions on a range of factors associated with dairy production welfare and was split into four sections: socio-demographic information of the study population; purchasing habits; labelling; perceptions of welfare in general. The purchasing habits section related to whether consumers bought and consumed dairy products. Questions relating to labelling sought to determine if consumers seek out particular logos when shopping and tested recognition of a limited range: the Red Tractor, Soil Association, Freedom Food and Organic Milk Suppliers Co-operative (OMSCo) logos. The general welfare section investigated the perceptions of respondents in relation to different dairy cow husbandry systems and aimed to determine which factors people associate with good animal welfare. The questionnaire also asked how much respondents were prepared to pay for milk if good animal welfare could be guaranteed.

The questionnaire format was designed so that information about participants' background were followed by an initial question asking to rate welfare in current UK dairy systems based on their current perceived understanding. This approach ensured that more detailed welfare questions asked later did not influence their initial overall welfare rating. The questionnaire was rigorously pre-tested and refined during its development and the finalised questionnaire can be seen in *Appendix 1*. Approval was sought from the institutional Ethics and Welfare Committee prior to administration. The questionnaires were administered by face-to-face interview and took between five-to-ten minutes to complete. The same two researchers interviewed respondents in both Scotland and England in the following areas:

Glasgow, Edinburgh, Stirling, Hamilton, Clydebank, Helensburgh, Newcastle-upon-Tyne, Northallerton and York. Interviews were conducted mostly during the week; however, some questionnaires were also administered during the evening and the weekend to obtain a good cross-section of participants. The general public were approached directly in the street and asked to participate voluntarily. Questionnaires were administered in July and August 2007.

Data analysis

An inclusion criterion for further analysis of data from a questionnaire was that the questionnaire was completed in full. Data were entered into a Microsoft Access (Microsoft Corp 2003) database and analysed using MINITAB 14 (Minitab Inc 2003) and Microsoft Excel (Microsoft Corp 2003). Chi-squared tests were used to investigate the responses from different groups of participants, where significance was defined as $P < 0.05$.

Results

Sampled population demographic

Of 367 questionnaires started, 363 were completed (99% completion rate) of which 59% were women and 41% were men. All age group categories were represented, although there tended to be more older respondents (Table 1). Although the majority were British, a wide range of ethnic backgrounds and occupations were represented (data not shown), suggesting a good cross-section of the public were interviewed. Twelve percent of respondents stated that they had lived or worked on a dairy farm, 52% of respondents had visited a dairy farm at some point and 36% had no exposure to dairy farming.

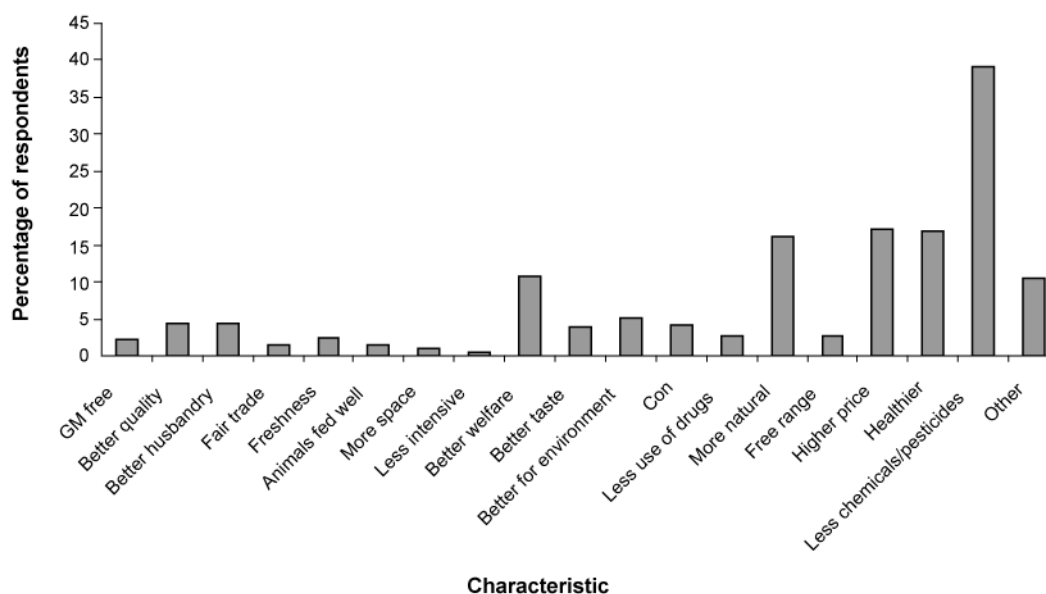
Perceptions of dairy animal welfare

Fifty percent of respondents gave dairy welfare a positive rating of good or excellent, 22% gave a negative rating (poor or very poor) and 28% stated that they didn't know. A significant difference in perception of welfare between age groups was found ($P = 0.03$) but the data showed no discernible pattern. Consumers aged < 20 and in their 20s and 50s were more likely to give a positive dairy welfare rating. People aged 60 and over were more likely to give a negative dairy welfare rating. There was no difference in welfare rating responses between those respondents who consumed dairy products and those that did not ($P = 0.29$).

Purchasing habits

Ninety-six percent of respondents consumed dairy products, with 86% consuming every day; reasons provided by the 4% of non-consumers were allergy, veganism and fat content concerns. When asked an open question about which main factors determined their choice of milk, respondents cited fat content as being the main factor (56% of respondents). Other important factors were whether the milk was organic (17%) and price (15%). Animal welfare concerns were cited by less than 10% of purchasers. As expected, most food purchases were made through supermarkets, with only 10% of respondents stating they bought food mostly from local shops (non-supermarket).

Figure 1



Characteristics which respondents associated with organic farming.

Thirty-one percent of respondents said that they bought organic milk some or all of the time and 58% said that they bought other organic foods. There was no relationship between buying organic milk and gender. However, there was a correlation between gender and the likelihood of purchasing other organic foods, with women more likely than men to purchase organic food ($P < 0.01$). Respondents who had been to university were more likely to buy organic milk ($P = 0.03$) and there was a trend towards buying other organic foods ($P = 0.06$) when compared to people whose highest education level was high school or college. A relationship between age group and organic milk purchasing was seen, with respondents in their 40s and 50s more likely to buy organic milk ($P = 0.02$). There was no correlation between the presence of children at home aged under 16 and respondents' purchasing organic milk. An increased proportion of respondents cited purchase of organic milk when their perception of dairy welfare was poor or very poor ($P < 0.01$).

Perception of organic farming

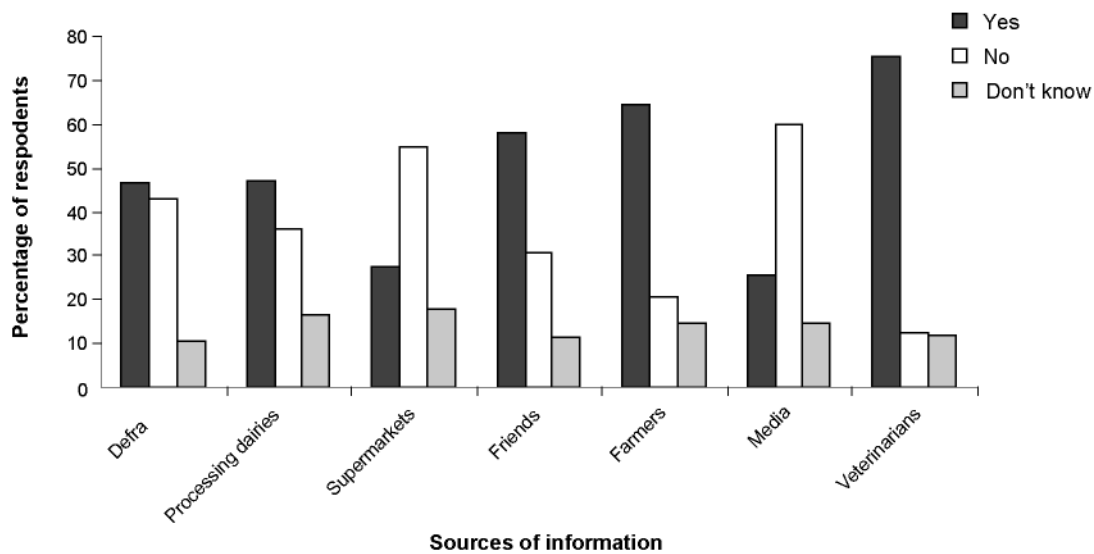
Consumers were asked an open question about what characteristics they associated with organic farming. As shown in Figure 1, a wide range of responses were given with the most common being that organic farming used 'less chemicals/pesticides' than conventional farming (39% of respondents); other frequent responses were 'higher-priced produce' (17%), 'healthier produce' (16%), 'more natural (production) methods and products' (16%) and 'better animal welfare' (11%).

Logo recognition

Thirty-eight percent of respondents stated they recognised the Red Tractor logo. Of those, 39% thought it meant 'assured food standard', 38% thought 'British produce', 14% thought 'quality food' and 24% stated that they didn't know what it meant despite recognising it (more than one answer was possible for these questions). Thirty-seven percent of respondents stated they recognised the Soil Association logo; 26% of those thought it meant 'organic food standard', 24% thought 'organisation which certifies organic food', 23% thought it meant that 'soil quality' was monitored, 17% thought it meant 'no pesticides or chemicals' and 17% stated that they didn't know what it meant. Twenty-two percent of respondents recognised the Freedom Foods logo; 36% of those thought that it meant 'better animal welfare' on farms, 24% thought that it meant farms were 'RSPCA monitored' and 22% stated that they didn't know what it meant. Thirteen percent of respondents recognised the OMSCo logo; 52% of those thought that it meant 'assured organic milk', 26% stated that they didn't know what it meant, with other respondents citing a range of perceptions including 'organic milk promotion' and 'healthy'.

Only 25% of respondents reported intentionally purchasing products that displayed one or more of the specified logos. The most sought after logo was of the Soil Association (14% of participants) closely followed by the Red Tractor (12%). Only six percent reported seeking the Freedom Foods logo and relatively few participants look for the OMSCo logo

Figure 2



Respondents' opinions as to whether information on animal welfare from different groups is reliable.

(< 1%). Respondents' recognition of logos varied according to their experience of dairy farms, with those who had reported visiting or having lived or worked on a dairy farm more likely to recognise any of the logos than those who had never been to a dairy farm ($P < 0.01$). A significant relationship between respondents' perception of dairy welfare and stated purchase of products with a logo was observed ($P < 0.05$). Interestingly, those that thought dairy welfare was poor or very poor and those that thought it was good or excellent were more likely to state buying products with logos. Those who were unsure regards dairy welfare were less likely to state purchase of a logo product. A number of reasons were given by consumers when asked why they did not look for logos, the most common reasons were 'do not know meaning' (36% of responses), 'never noticed' (23%), 'don't care' (13%) and 'too expensive' (7%).

Knowledge of food production

Fifty percent of respondents felt that they were not well informed about food production, as opposed to 23% who felt they were well informed and 27% who felt they were informed only on some types of food. However, 68% of respondents said they would like to know more about how their food is produced. Feeling informed about some or all aspects of food production had no significant relationship with respondents' recognition of the Red Tractor logo. However, feeling informed did have a relationship with recognition of the Soil Association logo ($P < 0.01$), with tendencies to relationships with the Freedom Foods logo ($P = 0.08$) and the OMSCo logo ($P = 0.05$).

Information about animal welfare

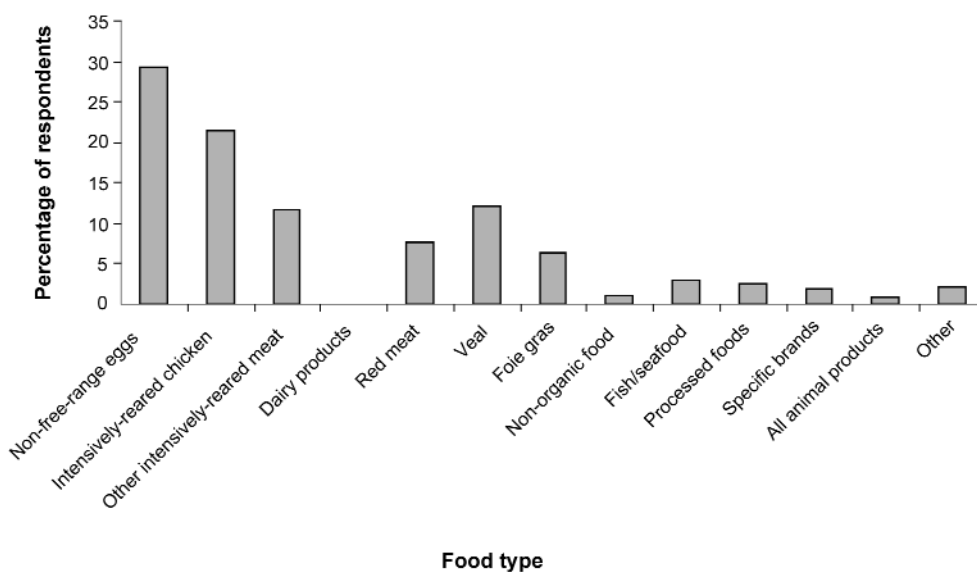
Respondents felt that veterinarians (76% of respondents) and farmers (65%) were the most reliable when providing

information about animal welfare. Conversely, the media (60%) and supermarkets (55%) were felt to be the most unreliable (Figure 2). A mixed response was given to this question with respect to information given by the Government/Defra, where 43% of respondents felt that the Government/Defra was reliable and 47% felt they were unreliable. Respondents' level of education affected their perception of whether the Government gave reliable information on animal welfare; those whose highest level of education was high school were more likely to say that the Government is unreliable and those who had been to university were more likely to say that the Government is reliable ($P < 0.01$). However, when asked who has the most power to affect animal welfare, the Government was the most frequently given reply, cited by 38% of respondents. This was followed by consumers (cited by 27% of respondents), then farmers and supermarkets (each cited by 13%) and, finally, veterinarians and animal charities (each with 4%). In this question, participants were only able to choose one option (the group of people that they thought had the most power to effect change).

Effect of animal welfare concerns on purchasing habits

Just over half of respondents (55%), reported that concerns about animal welfare prevented them from buying specific food products. More women than men reported that concerns on welfare would prevent them from buying food products ($P = 0.001$). Variation between age groups was also seen, although the trend was not simple; the under 20s and 60s and over age groups were less likely to stop buying specific food products whereas the people in the 20s, 30s, 40s and 50s age groups were more likely to stop buying food products for welfare reasons ($P < 0.05$). Differences were seen when consumers' level of education were

Figure 3



Types of food that respondents' reported they stopped buying* due to welfare concerns.

* Vegetarians were recorded in all of the categories that included meat products. Those participants who mentioned they were vegetarian for reasons unrelated to animal welfare were not included in this graph.

compared. Respondents who had been to university were more likely to report they stopped buying products because of welfare concerns, whereas those where the highest level of education was school or college were less likely to report they stopped buying products due to welfare concerns ($P < 0.001$). None of the respondents stopped buying dairy products due to animal welfare concerns (Figure 3). The most avoided types of produce were 'non-free-range eggs' and 'intensively-reared chicken'.

Views and perceptions of animal sentience and welfare

Nearly all respondents (99%) thought that animals feel pain (< 1% disagreed and < 1% did not know). In addition, 83% of participants agreed that animals have emotions, while 10% disagreed and the remainder (7%) said that they did not know. Respondents associated a wide range of attributes with good animal welfare (Figure 4). The most common were appropriate feeding (39% of respondents), good stockmanship (35%), plenty of space (26%), freedom to roam/free range (19%) and environmental cleanliness (20%). Respondents were able to give as many answers as they felt appropriate, therefore the number of factors mentioned were unlimited.

Housing of dairy cows

Participants were asked whether they thought keeping cows permanently indoors was acceptable and the majority, (95%), thought not (Figure 5). Keeping cows tethered was considered unacceptable by the majority (95%). Most participants (73%) felt it was acceptable to keep cows outdoors in summer and indoors in winter and there was a

fairly even divide between acceptable (29%) and not acceptable (32%) for keeping cows outdoors all year round. More than half (56%) of respondents believed organic dairy cows have better standards of welfare compared to non-organic dairy cows, while 18% of respondents stated that they didn't know and 24% believed there is no difference in welfare between the two systems. Only a minority (2%) of respondents thought that organic had worse welfare than non-organic cows.

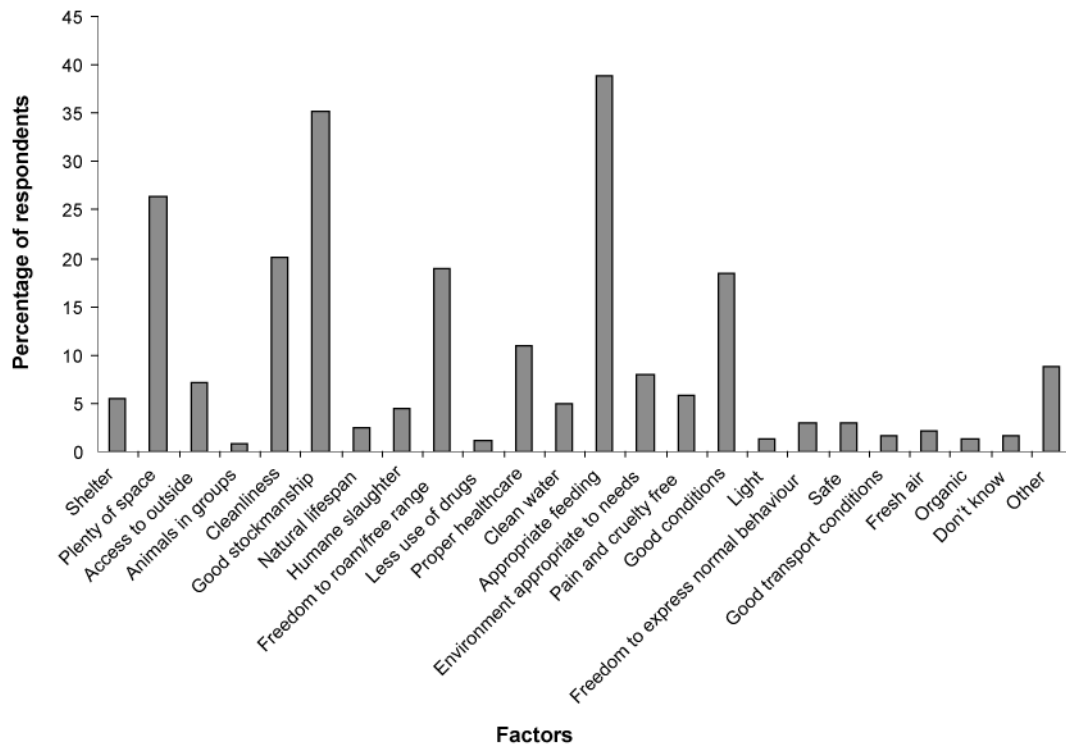
Life expectancy of a dairy cow

Requesting an estimate of the life expectancy of a dairy cow was used to assess respondents understanding of dairy systems. The mean (\pm SD) response from participants when asked to estimate the average dairy cow's life expectancy was 10 (\pm 8.8) years, whereas the mode and median responses were 10 and 8 years, respectively. The range of life expectancy estimates ranged between 1 and 75 years.

Perception of some economic factors of the dairy industry

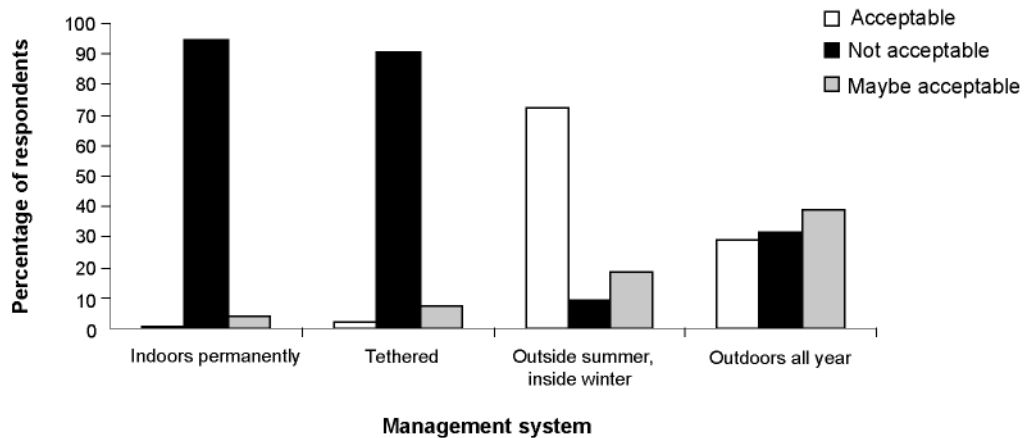
Respondents' estimates of the retail cost of purchasing two pints of milk varied considerably, with the mean (\pm SD) response at 84 (\pm 32) pence, whereas the median and mode responses were 80 and 60 pence, respectively (range 2 to 300 p). Most respondents (92%) stated they would pay more for milk if good welfare could be guaranteed, with 37% of respondents stating they would pay more than 30% extra if welfare could be guaranteed. The mean (\pm SD) response from respondents when asked what they thought farmers were paid per two pints (approximately one litre) of their

Figure 4



The factors respondents associated with good animal welfare. Cleanliness refers to any comments that involved the cleanliness of the housing/conditions the animals were kept in. A large number of participants mentioned 'good conditions' in response to this question, therefore to avoid confusion it has been included as a separate category.

Figure 5



Respondents' opinions of different UK dairy husbandry methods.

milk was 16 (± 10) pence, whereas the median and the mode responses were 15 and 20p, respectively (range 0 to 50p). There was a tendency ($P = 0.07$) for respondents that stated recognising the Red Tractor to be prepared to pay the higher percentage price increases for welfare assured milk. This relationship was

more clearly seen for those consumers who recognised the Soil Association logo being prepared to pay the higher percentage price increases for welfare assured milk ($P < 0.001$). No relationship was observed with respect to willingness to pay and recognition of either the Freedom Foods logo or the OMSCo logo.

Discussion

This study highlights a number of factors relevant to dairy animal welfare in the UK. The importance of the consumer with regards to driving improvements in animal welfare is dependent on consumers purchasing animal-derived products from systems of higher welfare. However, how this information is conveyed to the consumer and whether they take a rational approach to additional labelling information is open to debate (Köster 2009). The questionnaire design was such that leading questions were avoided and open questions were used where relevant to represent, as accurately as possible, the views of responding consumers. During pre-testing, it became apparent that many participants were unaware of many aspects of dairy production that may have welfare implications and were unfamiliar with some technical or animal health terms, for example they did not understand what the terms 'mastitis' or 'stockmanship' meant. Collectively, the findings indicate that consumers' general dairy farming knowledge is limited. Analysis of open questions was difficult in some cases due to the multiplicity of responses, hence participants' responses were categorised according to the subjective collective opinion of the research group entering the data. Interpretation of questionnaire data gathered from consumers in this way should be cautious, as many aspects of food purchasing behaviours are not readily accessed by means of a simple questionnaire structure (Köster 2009). However, it is of interest to know what arguments or perceptions consumers use to explain their behaviour and to obtain information on present and past behaviour as this can be a reasonable indicator of actual behaviour.

Demographic data

Nearly half of respondents had been to university, with 72% of people interviewed having undertaken some form of higher education. This is higher than reported in previous studies. A report by Market Research UK for the Scottish Executive Environment and Rural Affairs Department (SEERAD 2003) found that only 33% of the Scottish population had gone on to some form of higher education. The time lapse since the 2003 survey and the fact that the current study was conducted in both Scotland and England cannot account fully for such a large variation between results. Possible reasons for the increased percentage in the current study could be due to questionnaire administration often being in, or near, university towns (Glasgow, Edinburgh, Stirling, Newcastle and York) and there may have been a bias towards university graduates in those participating.

Dairy welfare rating

The question asking people to rate their overall impression of animal welfare on dairy farms was deliberately placed early in the questionnaire to avoid the influence of subsequent questions and to get respondents' immediate reactions. Interviewers avoided mentioning the word 'welfare' when explaining the content of the questionnaire at the beginning, saying instead that it was about 'dairy production and food labelling'. This is because 'welfare' can be an emotive (both positive and negative) term.

However, this lack of warning could account for some of the people who answered 'don't know'. Overall, people seemed positive about current animal welfare in the dairy industry which is in accordance with previous consumer surveys (María 2006). Half of respondents gave dairy animal welfare a positive rating, with only 22% giving it a negative rating and, of these, only 3% said it was very poor. This could be because consumers tend to view dairy animals as being reared in pasture-based systems and inherently have outdoor access which is associated with good welfare. However, a high proportion seemed unsure of welfare status (28%), perhaps due to lack of knowledge or interest. There was no evidence that welfare rating was associated with dairy consumption.

Purchasing habits

Unsurprisingly, most food shopping was found to be undertaken in supermarkets, which corresponds with the market share of food spending in the UK, generally. The major determinant of respondents' choice of milk was the fat content; which may reflect the image that milk has of a relatively 'high fat' product and that semi-skimmed milk is seen as a healthier alternative, with this type of milk the most commonly purchased type (DairyCo Datum 2008b). Whether milk was organic or not was the second most commonly stated reason for milk choice; interestingly coming ahead of price. Whether this represents animal welfare concerns or health concerns for the consumer is hard to define.

Approximately one third of respondents bought organic milk and more than 50% of people bought organic food. The Milk Development Council (MDC) report into the Market Prospects for Organic Milk (2002) states that between 2001 and 2002, approximately 10% of British households purchased organic milk, so the current study would suggest that this number has increased significantly in the following five years. A correlation between gender and organic food purchasing was found in both the MDC study (2002) and the current study, with women more likely than men to buy organic food; however, the current study found that there was no relationship between gender and buying organic milk. In family households, women are more likely to be the main food purchaser (Harnack *et al* 1998; Kjaernes 2006) and therefore play a key role in family nutrition. Consideration of targeting food welfare labelling towards women may be controversial but may reflect the consumers at point of purchase. No effect of having children at home was found in relation to buying organic milk which is in accordance with the MDC study of 2002. This may suggest that concern for child health does not influence milk purchasing choice, although organic foods are often chosen by households with children (Soil Association 2008). The current study also found that people in their 40s and 50s were more likely to buy organic milk, this again is in agreement with the 2002 MDC report. It could be hypothesised that older households have more disposable income to spend on more expensive organic products. Additionally, the current study found that respondents' who had been to university were more likely to buy organic milk, which may

relate to earning potential, or educational experiences in the broadest sense, or peer group pressure.

The results show that the characteristic most commonly associated with organic farming by respondents was less use of chemicals or pesticides. This finding is supported nationally (MDC 2002) and internationally by an American survey for Whole Foods Market which found that 70% of consumers said they purchased organic food to avoid pesticides (Whole Foods Market 2005). This perception of 'residue free' is strongly enhanced by the manner in which organic farming systems are marketed and explained in the UK by organic certification bodies. In this study, respondents also associated organic farming with better animal welfare, more natural produce, higher priced produce and healthier produce. These characteristics match up with some of the top ten lifestyle statements cited by heavy organic buyers (MDC 2002).

Logo recognition

Generally, logo recognition by respondents was poor. Similar proportions of respondents recognised the Red Tractor (38% of respondents) and Soil Association (37%) logos. Previous work (SEERAD 2003) reported that 18% of grocery shoppers were aware of the Red Tractor logo, 18% were aware of the Soil Association logo and 14% were aware of the Freedom Foods logo. The results of the current study would appear to show that awareness of the Red Tractor, Soil Association and Freedom Foods logos has increased over the past four years; however, the majority of people still do not recognise the logos or know what they mean. When asked the meaning of the logos shown, many respondents answered by simply reading what it said on the logo itself, implying that they did not previously know. In both the current study and the 2003 SEERAD study, a high percentage of respondents thought that the Freedom Foods logo implied that the product was 'animal welfare-friendly'. However, understanding of what this meant was very varied as some respondents in the current study believed it related to fishing practices such as 'dolphin-friendly' tuna. The SEERAD survey presented interviewees with a series of options whereas the current survey asked an open question regards logo meaning; both surveys found similar results. The current survey confirms that few people are clear on exactly what each logo means.

Poor logo recognition and understanding would imply a lack of education regarding food labelling amongst the general population. As most respondents did not intentionally purchase products with any of the logos shown, it would suggest that the logos, in terms of informing the consumer to enable them to make informed purchases, are not effective. The Soil Association logo was the one most likely to be sought after and this may be linked both to the frequency it is seen and the types of food that are labelled; it can be seen on products ranging from milk and vegetables to chocolate, and may be sought actively by 'heavy' organic purchasers (defined as the < 10% of consumers who make up 80% of expenditure (MDC 2002)). The fact that consumers sought to buy organic products, rather than

British Farm Assured, may be a reflection of increased or more successful marketing of organic produce or a better understanding of the meaning of organic compared to Farm Assured. This study found a degree of 'labelling fatigue', scepticism and over-exposure to different label types on food products: 'green labels' were associated with organic produce; products with logos were perceived as too expensive or not widely available and some consumers felt that they did not have time to look for them whilst shopping. Responder comments included that the "keeping your heart healthy logo" was the one logo looked for and that it would be too time consuming to research the meaning of all labels. Effective food labelling is clearly an issue; the 2007 Eurobarometer study reported that 54% of consumers find it difficult to identify welfare-friendly labelled products. In a report, the Farm Animal Welfare Council (2001) recommended that "careful thought be given to devising and enacting a labelling system appropriate for highlighting the welfare aspects of livestock production systems". It would seem there is still scope for improved information transfer to the public regards food labelling, particularly with respect to welfare or production associated traits.

Respondents' who reported having visited, lived or worked on a dairy farm may be more likely to recognise product logos because they are more interested or familiar with farming and food production. It would have been of interest to qualify the experience of farming reported in this study, as there was an unexpectedly high proportion of respondents (64%) who reported a dairy farm experience. Previous work has suggested that consumers' background greatly affects their perceptions of livestock welfare, particularly their encounters with farming (Velde *et al* 2002). The current study is in accordance with this, which may support farm visits as part of a wider consumer education proposal.

Understanding of food production

The majority of respondents felt that they were either not well informed about how their food is produced or only well informed about some products and would like to know more about food production. This concurs with wider EU studies (Harper & Henson 2001; Eurobarometer 2007). However, respondents may feel an obligation to respond to these questions with answers they think that are 'wanted' or socially acceptable. Bennett and Blaney (2002) reported on the effect of social consensus on respondents' perceptions of animal welfare and this should be considered when gauging public response. It is recognised that animal welfare is value laden and therefore subject to this phenomenon.

Information about animal welfare

Higher levels of consumer trust in bodies involved with the food chain is associated with a higher level of confidence and, in particular, the aspects of care (de Jonge *et al* 2008), reliability and openness (Kjaernes 2006) have been emphasised. Consumers' trust in food manufacturers has the greatest impact in the food chain (de Jonge *et al* 2008), which is difficult to relate to the dairy industry as milk is not 'manufactured' and liquid milk, especially, is subject to relatively limited processing. Most respondents regarded

veterinarians and farmers as reliable sources of information relating to animal welfare which concurs with other, wider EU studies (Kjaernes 2006; Eurobarometer 2007). Thus, it may be advantageous for these groups to engage in education roles. However, many respondents mentioned that, although they would trust veterinarians, they very rarely, if ever, have contact with them, with the same presumed of farmers. This lack of contact may be part of the reason why these food-chain actors are less important in consumers' overall trust. Within European food provision networks, where there is often an impersonal relationship between producer and purchaser (Kjaernes 2006), generating trust in the producer is important. This requires effort on the part of the producer chain to be open, reliable and have a recognisable identity. Some farmers are able to connect directly to the consumer via farmers' markets, which seem to be increasingly popular and may give opportunities to raise animal husbandry awareness. Buss *et al* (2006) state that veterinary medicine as a profession should take steps to uphold and communicate production animal welfare standards to the wider community; the current study supports this and emphasises that modern food animal veterinarians must engage with the consumer. Bracke *et al* (2005) discussed the difficulties in developing monitoring systems for farm animal welfare; they emphasised the importance of communication between influential and motivated stakeholders as critical to the success of reliable systems. Pragmatic ways for veterinarians and farmers to provide information to consumers about food production are difficult, especially as most respondents did not feel that the media gave reliable information. Consumer mistrust of the media is variable; in the current study, respondents stated that within the media they may not trust newspapers but believe television programmes, concurring with wider EU opinions (Eurobarometer 2007) where 51% of respondents would see television as a preferred source of information. Examples of influential UK television programmes include the increase of up to 50% in free-range poultry sales (The Grocer 2008) seen after the series of programmes in late 2007 and early 2008 by Hugh Fearnley-Whittingstall and Jamie Oliver on intensive poultry production. However, it should be considered that consumers' views on animal welfare can be greatly influenced, both positively and negatively by media coverage.

Participants' trust of the Government, with respect to animal welfare information, was divided according to education level in this study. The reason for this seems unclear, although it may be a reflection of the Government's reputation for setting legislative standards, combined with a perception of mishandling animal health-related situations, such as the UK outbreak of foot-and-mouth disease in 2001. Whatever the reasons are, they are not obvious but mistrust of politicians with respect to food has been reported across Europe by Kjaernes (2006).

As consumers do not recognise or understand product logos very well, there is an obvious and pressing challenge to address this through appropriate educational messages.

Alongside more information on production, a desire to have 'easier-to-read labels' was expressed in the current study and this may suggest that certification schemes should reconsider how, and what, their logo is communicating to consumers. Education of consumers about food production at school, perhaps through visits to farms, may be an effective approach if, as shown in the current study, farm experience leads to better logo recognition. The importance of knowledge about farming leading to greater value attributed to producers was also reported by the Eurobarometer study (2007). Work in Spain suggested broad popular support for animal welfare education in school (María 2006) and this could be considered in the UK curriculum. However, the theory that improved understanding of logos will lead to change in the way consumers determine their food choice is dependent on the theory of reasoned action. In relation to food purchasing especially, this has been shown to not consistently apply and past behaviour, habit and unconscious actions have a potentially greater effect on food choices (Kjaernes 2006; Köster 2009). Therefore, investigating ways to change food habit formation are required. It is unrealistic to expect consumers to consider their food purchase choice each time they purchase milk (Kjaernes 2006). Labelling is less subject to fixed or habit behaviour than early life experience (Köster 2009), so it may be that concentrating food-related behaviours and education to younger age groups may be important ways to increase habitual purchase of higher welfare food products.

The effect of welfare concerns on purchasing habits

Just over half of participants felt that concerns about animal welfare prevented them from buying specific products, suggesting there is a potentially large economic driver of welfare standard-setting. Women were more likely than men to cite non-purchase of food products for welfare reasons which concurs with previous work (Beardsworth *et al* 2002; María 2006). This may mean that women care more about the animals in the production system, but the relationship between gender and food purchasing is complex, as discussed by Beardsworth *et al* (2002) and includes moral dimensions as well as health, nutrition and body image. Several studies have reported that females show higher levels of positive behaviours and attitudes toward animals in a variety of situations compared to men (Herzog 2007), including treatment of farm animals (Serpell 2005). It is possible that this increased awareness of food animal welfare may relate to the increased purchasing of organic foods by women found in the current study, although other factors such as health issues may also be involved.

The under 20s and over 60s were also less likely to stop buying products due to welfare reasons. This may be because the under 20s are often still at home and therefore do not do most of the shopping, or that they are less aware of issues about food production compared to older people. The 60s and over age group may include pensioners with less disposable income and therefore may not be able to afford organic or free-range products. Respondents who had been to university were more likely to stop buying products

due to welfare concerns. This may be explained by a higher level of interest in animal welfare, due to greater exposure to animal welfare information or by peer pressure whilst in higher education. Alternatively, this relationship may not be knowledge-based but is related to how much they earn; university-educated respondents may have greater earning potential and thus, more disposable income.

Non-free-range eggs and intensively-reared chicken were the most frequently avoided foods based on welfare reasoning (this study was conducted prior to high profile media coverage of intensive poultry production). None of the participants said that they would stop purchasing dairy products (although a few people avoided all animal products in which dairy would be included). It may be that respondents do not seem to consider dairy welfare often because they feel that cows are generally kept in quite good conditions, as shown by the largely positive rating of dairy welfare.

Views and perceptions of animal sentience and welfare

Most people thought that animals feel pain and have emotions, although fewer participants said 'yes' to animals having emotions. This question provoked more thought and people who said that animals did have emotions often referred back to a pet they had owned. Relating to prior animal exposure, especially with pets, has been shown previously to influence value development towards all animals (Serpell 2005). Although fewer respondents have been shown to attribute cognitive abilities to farm animals than companion small animals (Levine *et al* 2005), consumers have been shown to consider pain as an important factor in farm animals including poultry (Hall & Sandilands 2007). Members of the public who expressed the view that animals are sentient and feel pain are likely to have based this view on either analogy to humans (behavioural and neurological similarity, and evolutionary continuity) or on a non-inferential argument that our knowledge of animal consciousness derives directly from our interactions with animals (Allen 2004).

The question on what comprised good animal welfare was open, so answers from respondents had to be categorised. Many respondents mentioned 'good conditions' but often could not define what they meant by this. Velde *et al* (2002) found that interviewed consumers were also quite vague about what constituted good welfare, again highlighting a lack of knowledge of animal production systems, although consumers' definitions of good animal welfare included mental well-being as well as purely physical attributes. In the current study, respondents thought that animals should be 'kept well' but they often were not sure how this was done, or what it meant, thus it was given a separate category. Surprisingly, many participants associated appropriate feeding with good animal welfare; similar results were also reported by the SEERAD study (2003) and by Hall and Sandilands (2007) with respect to poultry. Appropriate feeding included those people who said 'good food', 'enough food' and 'not fed other animal products'. This emphasis on appropriate diet may be linked with the BSE outbreak and the publicity around it but, even so, the

frequency of response regarding feed to be an important welfare issue was unexpectedly high. Many respondents gave the response 'well looked after' or 'nice farmer' as regards to what they perceived to be good welfare and these were included under good stockmanship (although few people used this precise term). The high frequency of responses that implied good stockmanship may not be unexpected, as good handling and kind treatment are issues that people are aware of and can visualise, especially if they have prior animal ownership (Serpell 2005). Many people mentioned 'space', 'freedom to roam', 'free range' and 'access to outside' as good welfare attributes. These are all environmental factors that people may visualise when they think about dairy cow husbandry systems. Many respondents also mentioned that environmental cleanliness was important for good animal welfare along with good health-care and appropriate veterinary treatment. Participants generally seemed to have a broad, overall view of what kinds of things improved animal welfare. Interestingly, more than half of respondents stated that they thought welfare is better on organic dairy farms. Currently, there are no data in the literature to suggest that overall welfare is better on organic dairy farms, although minor differences in disease prevalence between organic and non-organic farms have been reported (SAC 2007; Valle *et al* 2007).

The majority of respondents felt that the Government has the most power to make a difference to animal welfare (presumably through regulation and legislation). A large number of participants also thought that consumers had power as they were able to control the market by exercising demand for particular products. Some respondents felt farmers have the most influence as the people who are directly responsible for the animals' needs on a daily basis. Others felt that supermarkets have the most power as consumers can only really have a choice of what is sold within the supermarket, with the supermarket able to control what consumers are able to buy. Thus, supermarkets can affect the market in both directions; to the consumer and to the farmer as they control both demand for products and prices paid to producers.

Dairy welfare

Most participants felt that it was 'unacceptable' to keep dairy cows tethered or inside permanently and 'acceptable' to keep cows outdoors in summer and indoors in winter. Many of the respondents did not realise that outdoors in summer and indoors in winter is the normal husbandry method in the UK. Although this husbandry method is most common, due to increased pressure on dairy production, there are some producers moving towards completely indoor systems which represent higher intensity production. Therefore, dairy farming may be developing in opposition to consumers' welfare opinions. Outdoors, all year, caused the most thought, with qualifying statements such as 'maybe' if they were either an 'appropriate breed' or, 'if they had shelter' or, 'depending on the climate in which the animals lived'. No husbandry system is perfect and many factors are farm-specific. Veterinarians have a potentially

significant role to play in improving welfare directly, on-farm and conveying the advantages and disadvantages of different husbandry systems into food-labelling schemes that accurately inform consumers.

Life expectancy

Most participants thought that dairy cows lived around ten years. The average number of lactations for a UK dairy cow is four (Whitaker *et al* 2004) and therefore the average lifespan is around five-to-seven years. There was a wide range of estimates of age indicating that, similar to other studies (María 2006), respondents do not have much understanding of dairy farming; this is despite, in the current study, the apparent high response rate of farm experience. Asking about age is a good, non-leading way of getting an impression for understanding of dairy systems, although it does not cover all aspects of dairy farming.

Value of milk

At the time of the study, two pints of milk in the major supermarkets cost 66 pence, so most people were approximately correct with the mode response being 60 pence, although, again, there was a wide range in estimates. Respondents often stated that milk is an essential part of their diet and would purchase it whatever the cost (inelastic demand). As in previous studies (María 2006), the majority of respondents felt that they would be willing to pay more if improved animal welfare could be guaranteed, with around a third of respondents stating preparedness to pay 30% more for milk if welfare was guaranteed. Results may have been affected by the ‘citizens versus consumers’ effect. The conflict within consumers as to their views on animal welfare has been reported (Harper & Henson 2001; Velde *et al* 2002; Schröder & McEachern 2004; María 2006); as citizens they may wish to improve societal standards but as consumers at point of purchase, acknowledgement of a connection with a live animal is avoided. Korthals (2001) suggests that the concept of ‘consumer sovereignty’ be used to get past the citizen vs consumer effect. Consumer sovereignty is defined as the right of the individual to get information on food products and make their own choice on purchase, although for this to be effective wider public debate of food production is required.

Nevertheless, measurement of the ‘willingness to pay’ for improved farm animal welfare has been suggested to be a useful estimate of the value of legislation to enforce higher welfare standards (Bennett 1996), although the question as to whether this is a true measure of consumer preferences and relative values or merely a measure of attitudes on an arbitrary monetary scale remains (Bennett & Blaney 2002). Recent work by Napolitano *et al* (2008) demonstrated by means of use of a Vickrey Auction, that information about animal welfare can be a determinant of consumer willingness to pay for dairy-derived products (yoghurt). However, they emphasised that eating quality is also a determinant; this is more difficult to achieve with respect to milk as it is more of a ‘generic’ product and it is more difficult to add value to it (recent milk marketing has been towards longer shelf-life products). Additionally, both Lange *et al* (1999)

and Dransfield *et al* (2005) found that consumers’ food purchasing behaviour can be influenced by labelling, even under price constraint, with a tendency to move their rating of a food towards the labelling expectation when compared to a blind tasting alone. Hence, labelling can have profound effects on willingness to pay, even with price constraints.

There is also the problem of ‘guaranteeing good welfare’ which is difficult because of the difficulties posed by standardising cost effective approaches to ‘measure’ welfare in the commercial market place (Jahn *et al* 2005). Milk labelling would have to demonstrate that it was from an improved welfare farm and with the apparent lack of knowledge about different logos shown in the current study this would create another problem in providing consumers with information. Additionally, higher-priced goods would be expected to be sensitive to national and global economic variables and must clearly demonstrate their intrinsic worth to ensure continued consumer support. Nevertheless, if there is a willingness to pay more, which can be translated to the producer, farmers could not use the argument sometimes put forward (Velde *et al* 2002) that better welfare cannot be achieved until higher prices are paid.

The majority of participants thought that the price paid to the farmer was around 20p for two pints of milk, which at the time of the study, was the approximate amount farmers received for one litre (approximately two pints) of milk. Participants seemed to be well aware that the farmer had a fairly low profit margin which may be due to substantial media coverage of this topic (BBC 2007).

Animal welfare implications

In summary, this study has addressed a number of the gaps in the body of knowledge concerning consumer perceptions in the UK about dairy production. Although 50% of consumers perceive welfare to be good on dairy farms, most people do not feel well informed about animal welfare and would like more information. Consumer food purchasing choices are complex and do not always relate in a reasoned way to the presentation of information. However, consumer spending power can bring about significant changes in animal husbandry systems. In order for society (which is now largely removed from food and farming as a means of employment) to understand the complex issues regarding animal husbandry, welfare education is required at various levels. Education by meaningful food labelling should be a part of this multifaceted approach. Providing understandable welfare information to consumers is a challenge that should be addressed in order to allow freedom of choice of product. Education of consumers via labelling is currently flawed as few people understand product-labelling logos relating to production systems and only 25% intentionally buy products with these logos on them. Additionally, consumers do not trust the media or supermarkets, two of the most likely sources of their information on food production and welfare but do trust farmers and veterinarians. Veterinarians are able to both improve and audit welfare on-farm and are therefore an important, respected link in the dairy food chain. Consumers state willingness to pay more

for milk if good animal welfare could be guaranteed; there is potential for feedback of increased income to farmers meeting welfare-assured production systems. The challenge is therefore to improve consumer education and provide clearer labelling leading to habitual product-choice behaviour. This goal requires disciplinary (producers, retailers, psychologists and veterinarians) research into meaningful, understandable dairy welfare indices and, crucially, how to explain these attributes across a range of consumer demographics.

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Appendix I

Date..... Gender Male Female

Area..... **Dairy Production Questionnaire**

Socio-demographics

- 1) Which of these categories do you fit into? Under 20
 20s
 30s
 40s
 50s
 60 and over
- 2) Do you mind if I ask about your ethnicity? Yes No
- 3) What is your ethnic background? (open Q) British Scottish English Irish Welsh
 Black Chinese Asian Mixed Ethnic Background
 Any Other Ethnic Background
- 4) What is the first part of your post code?
- 5) What is your highest level of education (read list) High school University degree
 College University higher degree
- 6) What is your occupation?
- 7) How many children under the age of 16 do you have at home?
 None
- 8) How would you rate (with 1 being very poor and 4 being excellent) overall animal welfare on dairy farms?
 1 2 3 4 5 Don't know
- 9) Do you buy dairy products? Yes No
- 10) Who do you buy dairy products for? Your Household Work Other
- 11) What main factors would determine your choice of milk if you had a full range of products to choose from?

- 12) Which shops do you normally buy most of your food in? Asda Tesco Morrison's Co-op
 Marks & Spencer Sainsbury's Somerfield Local shops
 Other.....
- 13a) Do you consume dairy products yourself Yes No
- 13b) If not, why not? Fat content Allergy Vegan Other.....
- 14) How often do you consume dairy products? Every day Several times a week
 Once a week Less than once a week
- 15) Do you buy organic milk? Yes No
- 16) Do you buy other organic foods.....Yes No
- 17) What characteristics do you associate with organic farming?

Labelling

18) Do you recognise this logo? (Red Tractor) Yes No

19) What do you think it means?
.....

20) Do you recognise this logo? (Soil Association) Yes No

21) What do you think it means?
.....

22) Do you recognise this logo? (Freedom Foods) Yes No

23) What do you think it means?
.....

24) Do you recognise this logo? (OMSCo) Yes No

25) What do you think it means?
.....

26a) Do you intentionally buy products with any of these logos? Yes No

26b) If yes, which ones?

Red Tractor Soil Association Freedom Foods OMSCo

26c) If not, why not?

Don't know what they mean Don't care Too expensive

Other.....

27) Do you feel that you are well informed about how your food is produced?

Yes No Some food

28) Would you like to know more about how your food is produced? Yes No

29) How reliable would you consider information on animal welfare provided by the following?

a) Defra/Government Yes No Don't know

b) Dairies, eg Wiseman Yes No Don't know

c) Supermarkets Yes No Don't know

d) Friends Yes No Don't know

e) Farmers Yes No Don't know

f) Media Yes No Don't know

g) Veterinarians Yes No Don't know

Welfare in General

30a) Do concerns about animal welfare currently stop you from buying specific food products?

Yes No

30b) If so, which ones?
.....

31) Some people believe animals have emotions do you agree?

Agree Disagree Don't know

32) Some people believe animals feel pain, do you agree?

Agree Disagree Don't know

33) What do you associate with good animal welfare?
.....
.....

34) Do you believe organic dairy cows have better, the same, or worse standards of welfare than other cows?

Better Same Worse Don't know

35) Who has the power to make the biggest difference to animal welfare?

Animal charities Veterinarians Government

Farmers Consumers Supermarkets

Dairy Welfare

36) Have you ever?

- Lived on a dairy farm Worked on a dairy farm
Visited a dairy farm Never been to a dairy farm

37) Do you think the following methods of keeping cows are acceptable in terms of animal welfare?

- Acceptable Not acceptable Maybe
- Indoors permanently
Tethered
Outdoors during the summer/indoors in the winter
Outdoors all year round

38) What is the average life expectancy of a dairy cow in years?years

39) How much do you think 2 pints of milk currently costs in the major supermarkets.....pence

40) How much would you be willing to pay for milk if good animal welfare could be guaranteed? For example, if 2 pints of milk currently cost 66 pence, how much would you be willing to pay in total?

- No more Up to 80p
Up to 70p Up to 80p
Up to 75p More than 85p

41) How much of what you pay for 2 pints of milk do you think goes to the farmer? (in pence).....
