

# PEOPLE'S WILLINGNESS TO PAY FOR FARM ANIMAL WELFARE

R M Bennett

Department of Agricultural Economics and Management, The University of Reading,  
Reading RG6 2AR, UK

## Abstract

*Animal Welfare* 1996, 5: 3-11

*There has been increasing policy debate about farm animal welfare over the last 5–10 years in a number of countries, particularly concerning the need for government intervention, for example by means of legislation. Assessment of farm animal welfare policy requires some evaluation of the associated relative costs and benefits involved. When considering the benefits, it is desirable not only to collate scientific evidence about the effects of policy on the welfare of animals but, also on the extent to which citizens in society want such a policy and the benefits that they perceive to result from it. This paper describes an exploratory survey which tests the application of a technique, contingent valuation, to estimate, in money terms, the benefits that people perceive to be associated with specific measures to improve farm animal welfare through eliciting their willingness to pay for welfare legislation (a case-study relating to the banning of battery cages in egg production is used). The study shows that the methodology could provide very useful information to policy makers and others interested in public perceptions and concerns about animal welfare, and public support for animal welfare policies.*

**Keywords:** *animal welfare, contingent valuation, public perceptions, welfare legislation, willingness-to-pay*

## Introduction

There has been increasing policy debate about farm animal welfare both in the United Kingdom (UK) and the European Union (EU) over the last 5–10 years. This has particularly concerned the need or otherwise for appropriate intervention by governments, largely in the form of legislation.

Concern about farm animal welfare was explicitly incorporated into European Community agricultural policy by amendments to EC Regulations 797/85, 1096/88, 1350/78, 389/82 and 1696/71 in 1989 which stated the need to preserve, protect and improve the natural environment and animal welfare particularly by preventing undesirable intensive farming (European Commission & European Parliament 1989). In terms of EU agricultural policy, farm animal welfare issues are linked to environmental ones, particularly to the aids to extensification under the Common Agricultural Policy which are seen as a way of supporting farmers and, at the same time, helping to reduce surplus agricultural production in the Union and achieve environmental aims. Under the Treaty on European Union of 1992 there is a Declaration on the Protection of Animals which is binding on all EU Member States and which states that 'when drafting and implementing Community legislation on the common agricultural policy, transport, the internal market and research, to pay full regard to the

welfare requirements of animals' (Council of the European Communities & Commission of the European Communities 1992).

Arguably, the UK has played a key role in promoting the cause of animal welfare in Community policies. This role continues to be strengthened by the scientific advice from such expert bodies as the Farm Animal Welfare Council as well as effective lobbying by animal welfare interest groups. Legislative activity concerning farm animal welfare (FAW) in the Union certainly seems to have increased (for example, see Eurogroup for Animal Welfare 1992). However, concerns about FAW may vary considerably throughout the Union, with evidence to suggest that northern European countries, if not more concerned about FAW, are more predisposed to FAW legislation than those of southern Europe. In other 'high income' countries, such as the USA, policy debate about FAW appears to be growing. This is perhaps following the European experience of 5–10 years ago (Halverson 1991).

Alongside this growing debate animal scientists and others have been exploring and developing methods for measuring animal welfare, and for assessing whether the welfare attributes of one system might be better than another. Despite the difficulties (see Mason & Mendl 1993; Sandoe & Simonsen 1992) this has provided a much needed scientific input into the policy debate. More recently, economists have also turned their attention to animal welfare issues (eg Bennett 1994, 1995; Blackorby & Donaldson 1992; McInerney 1993).

In determining policy it is necessary to make some assessment of the benefits (advantages) and costs (disadvantages) associated with any policy proposal. Like other areas of policy, assessment of farm animal welfare policy must include consideration of political, ethical and economic aspects as well as technical (eg animal science) ones. As Sandoe and Simonsen (1992) point out, an interdisciplinary inquiry is needed.

Science may be able to determine what constitutes better or worse welfare for animals from a biological point of view, but it is a collective decision of society that determines what is considered to be 'good' or 'bad' animal welfare from an ethical perspective, ie what is considered to be acceptable or unacceptable in relation to livestock production practices and uses of animals. Like society's definition of poverty, society's expectations about animal welfare will change over time and the boundaries of what people consider to be unacceptable uses of animals will expand. Of course the perceptions, opinions and beliefs of citizens in society about animal welfare will, and should be, influenced by scientific evidence. Such evidence should perhaps have more influence on the general public than it does, although given the nature of scientific debate and the apparent demand by the general public to be presented with unequivocal scientific information, this is a difficult challenge.

When assessing farm animal welfare policy, the 'costs' of policy will include assessments of possible financial effects on livestock producers, impacts on international trade and consumer prices etc, as well as any costs to government and the taxpayer. On the 'benefit' side it is necessary not only to collate scientific evidence about the effects of policy on the welfare of animals, but also on the extent to which individual citizens in society want such a policy and the benefits that they perceive to result from it. This is a reflection of what society considers to be good or bad, acceptable or unacceptable uses of farm animals (ie social preferences based, in part, on people's moral values). Ideally, such an assessment of the benefits that citizens perceive to accrue from FAW policy should be evaluated in money

terms – a common denominator for comparing benefits to the costs of a policy. But how can this be done?

Environmental policy has faced an identical problem, ie how can a value be placed on an environmental 'good' for which there is no market price and which has no measurably tangible benefits (such as a unique landscape, habitat or species which may be under threat)? One method has been to try to measure the value that people place on such goods by means of surveys, which directly elicit from individuals how much they would be willing to pay to ensure a particular environmental improvement. This approach is known as 'contingent valuation' about which there is a vast amount of literature (see Mitchell & Carson 1989 for a comprehensive introduction to the approach and Carson *et al* 1993 for a bibliography of studies and papers). The technique has become widely accepted as supplying useful information to policy makers particularly about the value that citizens place on the provision of 'public goods' (goods which the public generally benefit from such as improved air quality), and hence the value that they give to legislation intended to supply those public goods.

This paper describes an exploratory research project which aimed to apply contingent valuation (CV) methods, to measure the value that people place on specific farm animal welfare legislation, designed to improve animal welfare (and hence to obtain a proxy valuation of the animal welfare benefits that people perceive to be associated with that legislation), in terms of their 'willingness to pay'.

## Methods

A sample of some 140 students at the University of California, Davis was chosen to explore the CV method applied to animal welfare. An initial questionnaire was administered to the sample to identify farm animal welfare issues that people were particularly concerned about (if any). Following this initial survey, two livestock production practices were selected for the main CV survey. These were (1) veal production using 'crates' and restricted diets (2) egg production using battery cages.

The main CV questionnaire was then designed to elicit people's 'willingness to pay' (WTP) for changes in the two chosen livestock production systems intended to improve animals' welfare. The design phase involved pretesting several versions of the questionnaire. The final questionnaire asked for four main types of information.

- 1 The extent to which respondents were 'concerned' about farm animal welfare issues in general and about specific livestock production practices.
- 2 The livestock product consumption patterns of respondents.
- 3 The elicitation of respondents' willingness to pay to see federal (ie national) legislation in the US to ensure that (1) veal was only produced in the US under conditions where calves were given adequate housing and nutrition and (2) the use of battery cages in egg production is banned in the US by the year 2000.
- 4 Personal information about respondents such as their age, income etc.

This paper concentrates on the findings relating to cage egg production.

The WTP part of the questionnaire involved presenting a hypothetical scenario to respondents, giving information about the production system involved and asking respondents whether or not they would be willing to support the legislation. Respondents were then asked

their WTP to support the legislation by means of (1) an increase on 1994 Federal taxes for everyone in the US or, alternatively, (2) an increase in the price of eggs.

The nature and precise wording of the hypothetical scenario have an important influence on WTP responses. Respondents should be presented with a scenario that (1) contains adequate unbiased factual information about the issue, (2) is realistic to them (ie the scenario is accepted as a plausible situation) and (3) is clear and very specific about what the respondent is being asked to value and the method of payment. Equally important is the means by which WTP is elicited.

The extract below is taken from the study CV questionnaire and shows the hypothetical scenario, and the methods of payment that were presented to respondents together with the means by which their WTP was elicited (money amounts are given below as examples only).

'Most egg production in the US involves housing hens indoors in wire-meshed cages. Cage sizes vary but usually hold up to six hens with up to six tiers of cages in a building. Because of the degree of confinement, birds commonly have difficulty in moving such as stretching their wings, cannot make a nest or display certain other "natural" behaviours. Hens remain in these cages for up to 18 months before they are slaughtered.'

Imagine that the Government is developing legislation to ban the use of battery cages for egg production in the US by the year 2000. From that date, no egg producer will legally be allowed to use battery cages to produce eggs. The Government realizes that this will involve costs and that people in the US will ultimately have to pay in some way. The Government intends to establish an Egg Production Fund which could only legally be used to ensure that farmers complied with the legislation (including, where appropriate, helping producers to change to new production methods).

- (1) Would you support legislation which ensured that hens could no longer be kept in battery cages in the US? Please circle one only.
- YES                      NO                      NO OPINION
- (2) Would you be willing to pay 40 cents extra per dozen as a general increase on the price of eggs so that battery egg production could be banned in the US from the year 2000?
- YES                      NO                      NO OPINION
- 3) If YES to (2), would you be willing to pay 80 cents?                      YES      NO  
If NO to (2), would you be willing to pay 20 cents?                      YES      NO
- 4) Instead of an increase in the price of eggs, would you be willing to pay an increase of \$5 on 1994 Federal taxes required of each person in the US to support this legislation?  
(Taxes in subsequent years would not be affected). Please circle one only.
- YES                      NO                      NO OPINION
- 5) If YES to 4), would you be willing to pay \$10 ?                      YES      NO  
If NO to 4), would you be willing to pay \$2 ?                      YES      NO

A double-bounded dichotomous choice method (Kanninen 1993) was used to elicit willingness to pay responses. This involved asking people whether they would be willing to

pay a specified amount and then, depending on their response, asking them if they would be willing to pay a greater (if they answered 'yes' to the first question) or lesser (if they had answered 'no' to the first question) amount. A range of different amounts for the WTP questions was used. The double-bounded method is statistically more efficient to the single dichotomous choice format. Respondents were given a 'no opinion' response option if they declined to answer the WTP questions. In addition, they were asked to give reasons for their WTP responses using an open-ended format. Such follow-up questions are essential for CV studies to help gauge whether respondents have given thought to their responses, and to identify 'protest' responses (eg those expressing a zero WTP because they object to some aspect of the scenario – such as payment through taxation).

Respondents completed the questionnaire under supervision during class time. Responses were coded and analysed using SAS and LIMDEP (an econometric analysis package).

## Results

### *Concerns about (farm) animal welfare*

Eighty-one per cent of respondents stated that they were concerned that farm animals may be mistreated or suffer in the process of producing food and other agricultural products (22% were 'very concerned'). Around 50 per cent of respondents avoided purchasing particular products because of their concerns about animal welfare, whilst 21 per cent purchased particular animal products because they thought that the animals involved received better welfare (free-range poultry and eggs were most cited).

Table 1 shows how acceptable or unacceptable respondents considered specific aspects of livestock production systems to be. It would appear that respondents felt that veal production using 'crates' and the transport of animals without food or water for extended periods (ie 24 hours) were the most unacceptable aspects of the five systems presented to them.

**Table 1** The acceptability of particular livestock production systems.

System	Rating of acceptability* (% of respondents)				
	1	2	3	4	Don't know
Veal production with calves kept in confined 'crates'	64	23	4	4	4
Battery egg production where hens are kept in small wire cages	29	43	15	7	7
Pig production where sows are kept in 'crates' for 4–8 weeks each year	31	38	14	9	9
Transport of farm animals with no food or water for 12 hours	34	42	15	7	3
Transport of farm animals with no food or water for 24 hours	74	15	5	4	2

\* 1 = very unacceptable, 2 = somewhat unacceptable, 3 = relatively acceptable, 4 = completely acceptable.

Respondents were also asked to rate their concern about farm animal welfare generally, amongst a list of issues including those relating to other aspects of animal welfare and to the environment. On a scale of zero (no concern) to ten (extreme concern), farm animal welfare scored a mean of 6.2, compared to 6.2 for the use of animals for experimentation and 7.9 (the highest mean score with 45% being 9 or 10 scores) for cruelty to pets and three environmental issues which had mean scores of around 6.9 each.

### *Egg legislation and WTP*

Seventy-two per cent of respondents stated that they would support legislation which ensured that hens could no longer be kept in battery cages in the US (16% would not and 12% had no opinion). Table 2 contains a summary of people's responses to WTP questions. Over 80 per cent of respondents expressed a positive WTP for the legislation in terms of a specified increase in the price of eggs (nearly 20% responded 'no' to WTP questions – either because they had a zero WTP or because the amounts they were asked to respond to were too high). The mean WTP was \$0.35 (\$0.43 excluding those with no stated WTP) increase in price per dozen eggs to support the legislation. The range of amounts that people were asked if they would be willing to pay was \$0.10–\$0.80 extra per dozen eggs.

**Table 2** Summary of responses to WTP amounts.

Payment method	Response to WTP questions (% of respondents) <sup>1</sup>			
	NO NO	NO YES	YES NO	YES YES
Payment through egg prices	20	19	13	49
Payment through taxes	42	21	11	26

<sup>1</sup> Refers to whether responses to WTP amounts were Yes or NO to the first amount and then Yes or No to the second amount.

For the tax payment, 58 per cent of respondents expressed a positive WTP for the legislation through an increase in 1994 taxes (42% responded 'no' to WTP questions). The mean WTP was \$5.11 (\$8.83 excluding those with no stated WTP). The range of amounts that people were asked whether they would be willing to pay was \$1–\$40.

The majority (some 83%) of respondents provided some statement of reasoning for their responses. Over half of these expressed some objection to the hypothetical scenario presented to them, with nearly all of those with a zero WTP expressing some objection. Only 9 per cent (of all objections) expressed a specific objection to the use of legislation, but 33 per cent objected specifically to payment through taxation (with many respondents preferring payment through the price of eggs).

### *Explanatory factors of WTP responses*

Probit analyses<sup>1</sup> of possible determinants of people's WTP responses were carried out.

<sup>1</sup> Probit analysis is a type of regression analysis using an estimating model in which the dependent variable can be dichotomous in nature, taking a 1 or 0 value (see Gujarati 1995 for a full description of the probit model).

Whether people said yes or no to WTP by increases in the price of eggs depended upon (1) the degree to which people thought battery egg production to be unacceptable, (2) the amount they spend on eggs, (3) whether the respondents were female and (4) whether respondents had any stated objections to the scenario (these were found to be statistically significant explanatory variables at the 5% level). In addition, a statement containing extra information about the banning of battery cages in other countries (given to half the sample only) was also found to be a significant explanatory variable.

For WTP according to increases in taxes, significant explanatory variables included the WTP amount that people were asked to pay, the presence of the additional information statement, stated objections to the scenario and reasoning given for WTP responses.

### Discussion

The aim of the exploratory survey outlined in this paper was to assess whether the method of contingent valuation can be applied to help gauge public opinion and assess the perceived benefits of animal welfare policies. In particular, it aimed to explore how the technique might best be applied and whether useful results can be obtained.

In applying the CV technique, recommended guidelines from the literature for best CV practice were followed (eg Arrow *et al* 1993). However, the survey and questionnaire design were experimental and would not be wholly appropriate for a full CV study applied to the general population. Thus, the student sample was not a random sample of citizens and could in no way be considered representative of the population in general (Arrow *et al* 1993 point out that 'convenience' samples for preliminary testing are acceptable). Results from the survey should be used only to assess the application of the CV methodology, and not to imply anything about citizens more generally either in terms of people's concerns about animal welfare or their willingness to pay for measures intended to improve animal welfare.

Results suggest that respondents gave reasoned responses to questions. In particular there was evidence to show that respondents had thought through their responses to WTP questions and that individuals' responses were consistent (for example, the more people expressed concern about farm animal welfare the more likely they were to be willing to pay to improve it). Certainly it would appear that the CV technique can be applied to animal welfare issues and that its application is worthy of further exploration.

The key question, common to all CV studies, is: are people's stated WTP an accurate reflection of their true WTP (ie what they would actually be willing to pay if they had to)? This is a difficult question to answer, and further surveys would be useful which test for various sources of bias in WTP estimates. Possible sources of bias are well documented and can be tested for with appropriate 'follow-up' questions to respondents and avoided by means of additional information and/or questions in the CV survey. One aspect of bias which may be particularly relevant in relation to animal welfare issues is that of 'whole-part bias' (Mitchell & Carson 1989). This is where respondents give a WTP for a larger class of goods than they are being asked about. For example, when asked their WTP to ban battery cages they may respond with a higher WTP which reflects their concern about animal welfare more generally (although people may also behave like this in reality – for example, they may donate an amount to a specific animal welfare cause as a general expression of their concern about animal welfare).

Despite the difficulties, CV provides a means of measuring people's expressed concerns and wants in relation to animal welfare which can be aggregated in money terms. It therefore provides a means by which the benefits of animal welfare legislation, as perceived by people in society (including consumers, non-consumers of the good in question, producers etc), can be measured, which arguably no other method can accomplish (for example, information on price premia for 'animal welfare friendly' products fail to take account of the preferences of non-consumers, such as vegetarians). In particular, it is perhaps the only means by which the public benefits of animal welfare legislation can be assessed (Bennett 1995), and it is these aspects that policy makers need to address. Although there are problems in applying the CV methodology, they are generally recognized and there are established methods for tackling them.

With these problems in mind, primary estimates of WTP must be treated with considerable caution. Even in carefully designed and well-conducted CV studies with all necessary follow-up questions and tests for bias, estimates of WTP are likely to be more useful for comparative purposes (eg between animal welfare issues) rather than in any way taken as definitive estimates of the societal benefits associated with animal welfare policy. Policy makers and animal scientists may rightly point out that people's perceptions about specific animal welfare issues may be misinformed. Thus it must be stressed that the CV technique measures people's expressed preferences at a particular time – even if those preferences are ill-informed. However, with a better understanding of the preferences and perceptions of people in society, government and others concerned with animal welfare can better inform the public about animal welfare issues.

### **Conclusions**

The exploratory survey described in this paper has demonstrated that the CV method of estimating people's preferences in society can be applied to animal welfare issues, as a means of estimating (in money terms) the perceived benefits of animal welfare legislation and the extent that people would be prepared to pay for it, for example through prices or taxation. However, CV surveys must be carefully designed and well conducted and the results must be interpreted with caution.

### ***Animal welfare implications***

The results of such surveys have a number of potential uses. First they can better inform policy makers and others about the concerns that people have about animal welfare and help gauge public support for particular initiatives, such as legislation, to improve animal well-being. Secondly, they can help to identify areas where information to the public on animal welfare issues is particularly needed (for example, where groups such as the UK Farm Animal Welfare Council feel that there is public misconception about a particular issue). Thirdly, appropriately aggregated estimates of people's willingness to pay for animal welfare measures, may be used to help assess whether or not the public benefits of such measures outweigh the costs to society (in terms of higher costs to producers, higher consumer prices and effects on international trade and competitiveness) before a policy is implemented.



### Acknowledgements

The author thanks Doug Larson, Lynette Hart, Ed Price, Stan Dundon and others at the University of California, Davis for their useful advice and practical help, and The University of Reading and the AFRC Wain Fund for financial support.

### References

- Arrow K, Solow R, Portney P R, Leamer E E, Radner R and Schuman H 1993 *Report of the US National Oceanic and Atmospheric Administration Panel on Contingent Valuation*. January 11. Resources for the Future: Washington DC, USA
- Bennett R M (ed) 1994 *Valuing Farm Animal Welfare*. Proceedings of a workshop held at the University of Reading, September 1993. Occasional Paper No 3, Department of Agricultural Economics and Management, University of Reading, UK
- Bennett R M 1995 The value of farm animal welfare in society. *Journal of Agricultural Economics* 46 (1): 46-60
- Blackorby C and Donaldson D 1992 Pigs and guinea pigs: a note on the ethics of animal exploitation. *The Economic Journal* 102: 1345-1369
- Carson R T, Carson N, Alberini A, Flores N and Wright J 1993 *A Bibliography of Contingent Valuation Studies and Papers*. Natural Resource Damage Assessment Inc: La Jolla, USA
- Council of the European Communities and Commission of the European Communities 1992 *Treaty on European Union*. Office for Official Publications of the European Communities: Luxembourg
- Eurogroup for Animal Welfare 1992 *Summary of Legislation Relative to Animal Welfare at the Levels of the European Community and the Council of Europe*. 4th revision. Eurogroup for Animal Welfare: Brussels, Belgium
- European Commission and European Parliament 1989 *Texts Adopted by the European Parliament 25-27.10.89*. Office for Official Publications of the European Communities: Luxembourg
- Gujarati D N 1995 *Basic Econometrics, 3rd edition*. McGraw-Hill Inc: New York, USA
- Halverson M 1991 *Farm Animal Welfare: Crisis or Opportunity for Agriculture?* Staff Paper P91-1, Department of Agricultural and Applied Economics, Institute of Agriculture, Forestry and Home Economics, University of Minnesota, USA
- Kanninen B J 1993 Optimal experimental design for double-bounded dichotomous choice contingent valuation. *Land Economics* 69 (2): 138-146
- Mason G and Mendl M 1993 Why is there no simple way of measuring animal welfare? *Animal Welfare* 2: 301-319
- McInerney J P 1994<sup>2</sup> Animal welfare: an economic perspective. In: Bennett R M (ed) *Valuing Farm Animal Welfare*. Occasional Paper No 3 pp 9-15. Department of Agricultural Economics and Management, University of Reading, UK
- Mitchell R C and Carson R T 1989 *Using Surveys to Value Public Goods. The Contingent Valuation Method*. Resources for the Future: Washington DC, USA
- Sandoe P and Simonsen H B 1992 Assessing animal welfare: where does science end and philosophy begin. *Animal Welfare* 1: 257-267

---

<sup>2</sup> Paper first presented at the Agricultural Economics Society Conference, Oxford 1993.