

1 SHOULD ANIMAL WELFARE REGULATIONS BE MORE RESTRICTIVE? A CASE STUDY 2 IN EIGHT EUROPEAN UNION COUNTRIES

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10 **Simple Summary:** Intensive animal production systems are compromising current animal welfare
11 standards. European societies' growing concerns regarding how animals are raised have resulted in
12 continuous European Union (EU) policy reforms that have banned certain intensive farming methods. We
13 investigated whether EU respondents, differentiated by their roles as citizens and consumers, believe that
14 the current regulations on animal welfare should be more restrictive. Data were collected using a survey
15 approach implemented in eight European countries (Spain, the United Kingdom, Poland, Greece,
16 Lithuania, Romania, Italy, and Sweden) with a sample of 3860 respondents with approximately 240
17 respondents organized by group and country. The results show that women citizens are more concerned
18 with animal welfare and are prone to accept more restrictive regulations. Respondents from Northern
19 European countries (Poland and Sweden) are willing to accept regulations that are more restrictive than
20 the current minimum standards than respondents from southern countries (Spain and Italy). Our results
21 suggest that increasing knowledge of animal welfare is related to effective information campaigns that
22 use the Internet to endorse the current animal welfare legislation.

23 **Keywords:** animal welfare, citizens, consumers, EU

24 **1. Introduction**

25 The growing demand for meat products associated with the increasing human population [Ballard et al.
26 (2015)] and income growth [Fukase et al. (2016)] has led to an increasing level of animal production [
27 Rollin (2005)] and intensive production practices. Consumers are demanding products with high welfare
28 standards for animals, and animal welfare is thus becoming a prominent and politically sensitive issue
29 that has received attention from the European authorities [(Kallas et al. 2016)]. Perceptions and attitudes
30 can differ depending on what people think in their different roles as citizens and how they behave as
31 consumers [Te Velde et al. (2002)]. Consumers express values and interests related to the process of
32 purchasing, preparing, and consuming, while citizens are associated with the organization of society and
33 political issues that may not be influenced by purchasing behavior [Korzen et al. (2010)]. In this context,
34 the main objective is twofold: (1) to analyze whether consumers and citizens believe that the current
35 European regulations regarding animal welfare should be more restrictive, and (2) to analyze the
36 determinant factors affecting this decision by analyzing respondents' understanding of animal welfare-
37 related issues, their subjective and objective knowledge levels, the credibility they assign to the different
38 information sources, their perceptions towards the current level of animal welfare standards, their
39 concerns regarding animal welfare of specific animal species, and their socio-economic characteristics.

40 **2. Methodology**

41 **2.1. Data collection and sample size**

42 Respondents were randomly selected and interviewed in person. A quota sampling approach was selected
43 stratified by sex, age, residence and regions in each country. An additional stratifying criterion was
44 applied to the respondent profiles to ensure an even representation of consumers and citizens.

45 **2.2. Respondents' opinions regarding whether animal welfare regulations should be more restrictive?**

46 To analyze factors affecting respondents' opinions regarding whether or not animal welfare regulations
47 should be more restrictive, a binomial logistic regression was selected as the best fitting model to describe
48 the relationship between this binary dependent variable and a set of independent variables. In our case, the
49 response variable (Y) has a value of 1 if a respondent answers "yes" for more restrictive animal welfare
50 regulations and has a value of 0 if a respondent answers "no" for more restrictive animal welfare regulations.

51 In this case, the logit of this probability (P_i) of answering "Yes" for more restrictive animal welfare
52 regulations is expressed as a function:

$$53 \ln \left(\frac{P_i}{1-P_i} \right) = X_i' \beta \quad (1)$$

54 where $X_i' = (1, X_{1i}, X_{2i}, \dots, X_{ki})$ represents the (k) independent variables of respondent \vec{z} and
 55 $\beta' = (\beta_0, \beta_1, \beta_2, \dots, \beta_k)$ is the vector of the coefficients to be estimated through the regression:

56 **▪ Definition of animal welfare**

57 An open question was introduced on animal welfare meaning. Data was analyzed using conventional
 58 qualitative content analysis, which provides insight into the interpretation of the meaning of the term from
 59 the content of the data by identifying specific categories that refer to different concepts of animal welfare.

60 **▪ Perceived subjective and objective knowledge level regarding animal welfare**

61 The study of knowledge level was differentiated between what respondents believe they know (subjective
 62 knowledge level) and what they objectively know (objective knowledge level). Thus, respondents were
 63 asked to respond about their perceived knowledge level (subjective) via an 11-point Likert-type scale
 64 ranging from 0 (participants do not have any knowledge) to 10 (participants have absolute knowledge).

65 **▪ Credibility of information sources regarding animal welfare**

66 Respondents were asked about their opinions regarding the credibility of the different information sources
 67 (n) using an 11-point Likert-type scale ranging from 0 (not credible at all) to 10 (totally credible).

68 **▪ Perception of current level of animal welfare regulations**

69 Respondents were asked about their perceptions about the current level of animal welfare (p) using an
 70 11-point Likert-type scale ranging from 0 (very low) to 10 (very high).

71
 72 **3. Results and discussions**

73 *Table 1. Logit model to analyze factor affecting the agreement with more restrictive regulations*

	B	Sig.	Exp(B)
Type of questionnaire (q)	0.29	0.000	1.33
Sweden (r)	0.20	0.063	1.23
Poland (r)	0.24	0.030	1.27
Subjective information level (l)	0.10	0.001	1.10
Concerns for laying hens / broilers for meat (o)	0.07	0.000	1.07
Credibility of internet media (factor) (n)	0.06	0.081	1.06
Concerns for pigs animal welfare (o)	0.03	0.036	1.03
Spain (r)	-0.34	0.002	0.71
Italy (r)	-0.18	0.090	0.83
Gender (j)	-0.12	0.090	0.88
Perceived current animal welfare level (p)	-0.09	0.000	0.92
Animal use for fur, work, sport and cosmetics (k)	-0.04	0.000	0.96
Correct classification		62.1%	
Hosmer and Lmeshow test (sig.=0.12)			

74 Citizens showed a higher likelihood of accepting more restrictive regulations than consumers.
 75 Respondents from Poland and Sweden were prone to supporting more restrictive regulations.
 76 Respondents who exhibited high subjective information levels were more concerned with the welfare of
 77 laying hens, broilers, and pigs, and were more likely to agree with adopting more restrictive animal
 78 welfare legislation. Respondents who attributed higher credibility to Internet information showed a higher
 79 likelihood of accepting more restrictive regulations. Respondents from Spain and Italy were less likely to
 80 accept more restrictive regulations. These results highlight the Spanish opinion regarding animal welfare
 81 legislation. Compared with those from other European countries, respondents from Northern European

82 countries showed the greatest concern for animal welfare in farm production systems. Respondents who
83 perceived that the current animal welfare level in their country is high and who agree with using animals
84 for fur and cosmetic production, work, and sports were less likely to accept more restrictive regulations.
85 Finally, men exhibited less interest in adopting more restrictive animal welfare regulations. Women
86 generally demonstrate more affection toward animals and exhibit a greater preference for more restrictive
87 animal welfare standards [Lagerkvist et al. (2011)].

88 **4. Conclusions**

89 We identified factors affecting consumer and citizen opinions regarding whether animal welfare
90 regulations should be more restrictive in eight EU countries. Our model showed two clearly
91 differentiated behaviors: respondents in Southern EU countries (Italy and Spain) exhibited
92 significant reluctance to the implementation of more restrictive regulations and those in Northern
93 EU countries (Poland and Sweden) exhibited the opposite opinions. Our results highlight the need
94 for Mediterranean countries to increase animal welfare knowledge to justify the need for
95 increasingly restrictive EU regulations. Thus, information campaigns using the Internet as a credible
96 media source to promote current animal welfare standards can be used to affect public opinion. This
97 study highlights the importance of Internet websites in affecting respondents' opinions and thus their
98 knowledge, because such sites often play a relevant role in forming the decision to adopting more
99 restrictive regulations. Results should be handled carefully due to the hypothetical nature of our
100 survey.

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