Animal Welfare or Greenhouse Gas emissions? Consumers' preferences for hens' eggs in Spain

Rahmani D.[1], Kallas Z.*[1], Pappa M.[2], Gil J.M.[1]

[1]The Center for Agro-food Economy and Development (CREDA-UPC-IRTA), Parc Mediterrani de la Tecnologia Edifici ESAB C/Esteve Terrades, 8 08860 Castelldefels Barcelona, Spain. zein Kallas@upc.edu

[2]Department of Agricultural Economics at Agricultural University of Athens, Greece

Introduction & Goals

Consumers' awareness about the impacts of **CONVENTIONAL** farming on human **HEALTH**, **SAFETY**, animal **WELFARE** and the **ENVIRONMENT** is gaining relevance in their food choices. As a result, consumers are becoming increasingly interested in **ORGANIC** farming systems and those respectful with animal welfare. Consumers of organic food can be classified into the environmentalists, healthy eaters, food phobics, welfare enthusiasts, humanists and hedonists [Buller & Roe 2014].

The main **OBJECTIVE** of this study is to assess consumers' **WILLINGNESS TO PAY (WTP)** for fresh hens' eggs under **DIFFERENT PRODUCTION SYSTEMS** (caged, barn, free range and organic)

Material and Methods

A **LABELLED CHOICE DESIGN** was applied following the design used in Lusk & Schroeder (2004), in which **DIFFERENT PRODUCTS** were described in choice sets and only the **PRICES VARIED** among the scenarios.

In total, three attributes were considered, including two **ENVIRONMENTAL** attributes (reduction of carbon emissions and water use during **EGG PRODUCTION**) and **PRICE**.

The different egg **PRODUCTION SYSTEMS** (enriched caged, barn, free-range and organic) were **DISPLAYED** as the labels or **NAMES** of the **ALTERNATIVES**. An optimal and efficient experimental design was then applied. Data were collected from Qualtrics© Panel conducted in April 2019 among **1045 EGG CONSUMERS** over 18 years old in Spain

An example of a choice set.

	Eggs from hens raised in cages	Eggs from hens reared in barn	Free-range eggs	Organic eggs	None of the options
Price for half a dozen (€/6 eggs)	€0.85	€1.65	€2.00	€2.90	I would not buy any of the four options.
Reduction of greenhouse gas emissions (%)	10%	30%	0%	20%	
Reduction of water use (%)	10%	30%	20%	0%	

We estimated a **RANDOM PARAMETER LOGIT (RPL)**

- Controlling for **INDIVIDUAL-SPECIFIC CHARACTERISTICS0**: sex, age , monthly household income.
- Controlling for **PRO-ENVIRONMENTAL** attitudes (Environmentalist), and **PRO-ANIMAL** Welfare attitudes (Animalist).

Results

FREE-RANGE eggs were the preferred eggs, followed by barn, caged and organic eggs.

Regarding the attributes of **GHG EMISSIONS** and **WATER USE** reduction, we observed that all coefficients were statistically significant, with the exception of the parameters associated with the **SMALLEST (10%) REDUCTION** in GHG emissions and water use.

The results also showed that there was **NO** statistically significant **DIFFERENCE** in preferences for the different type of eggs by **SEX**. Participants who belonged to households with a monthly total **INCOME** of less than €1500 were less likely to select barn, free-range or organic eggs.

Participants with **PRO-ENVIRONMENTAL** attitudes (Environmentalist) were more **LIKELY** to choose barn, free-range or organic eggs. However, **NON-SIGNIFICANT** difference were found in the preferences according to **ANIMAL WELFARE** attitudes.

The results identified a **CLEAR LACK OF UNDERSTANDING** of the information regarding the types of eggs by consumers. We also observed that consumers attributed more **IMPORTANCE** to the **GHG** than **WATER** use.

Random parameter logit (RPL) model.

Random parameters in utility functions		
	Coeff.	Pr > [z]
GHG reduction 10%	0.19	0.14
GHG reduction 20%	0.29	0.00
GHG reduction 30%	0.38	0.00
Water reduction 10%	0.10	0.37
Water reduction 20%	0.23	0.00
Water reduction 30%	0.35	0.00
ASC—Caged	1.95	0.00
ASC—Barn	3.66	0.00
ASC—Free Range	7.46	0.00
ASC—Organic	0.13	0.88
Non-random parameters in utility functions		
	Coeff.	Pr > [z]
Price—Caged	−1.47	0.00
Price—Barn	−0.74	0.00
Price—Free Range	−2.38	0.00
Price—Organic	−0.23	0.48
Standard deviations of random parameters		
S.D. GHG reduction 10%	0.53	0.32
S.D. GHG reduction 20%	0.36	0.00
S.D. GHG reduction 30%	0.48	0.00
S.D. Water reduction 10%	0.21	0.88
S.D. Water reduction 20%	1.45	0.07
S.D. Water reduction 30%	0.20	0.00
S.D. Caged	3.72	0.00
S.D. Barn	2.16	0.00
S.D. Free Range	3.73	0.00
S.D. Organic	4.23	0.00
Wald Chi^2 (24)	11,442.33	0.00
McFadden Pseudo R-squared	**0.4252**	

Conclusion

The results showed **HETEROGENEOUS PREFERENCES** for the different types of eggs, with higher WTP for the production systems ensuring higher animal welfare.
There were **POSITIVE MARGINAL WTPS** for reductions in **GHG** emissions and water use, but only for significant reductions (20% or 30%) with respect to the current situation.
Our findings may **GUIDE** producers and **POLICY MAKERS** in the development of more **ENVIRONMENTALLY SUSTAINABLE** egg production systems and their **PRICING** strategies

References

Lusk, J.L.; Schroeder, T. C. (2004) Are choice experiments incentive compatible? A test with quality differentiated beef steaks. American Journal of Agricultural Economics, 86, 467–482

Buller, H.; Roe, E. Modifying and commodifying farm animal welfare: The economisation of layer chickens. J. Rural Stud. 2014, 33, 141–149..