COMMUNICATING THE BENEFITS OF AGROBIODIVERSITY ENHANCING PRODUCTS- INSIGHTS FROM A DISCRETE CHOICE EXPERIMENT

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Summary

Agrobiodiversity is declining at a threatening rate. *On-farm conservation* is one prominent strategy to safeguard heirloom varieties as a crucial component of agrobiodiversity. However, cultivating those varieties is currently not attractive for farmers. Hence, a value added strategy has to be established. In this paper, we examine how the added value of heirloom varieties can be communicated to consumers by testing different communication approaches in a discrete choice experiment. Results suggest that consumers are more interested in different aspects of diversity than whether a variety is 'old' or not. Hence, in communicating the benefits of heirloom varieties the fact that they strengthen diversity should be a key element.

Keywords

Agrobiodiversity, heirloom varieties, marketing, WTP, discrete choice experiment

1   Introduction

Agrobiodiversity is one crucial aspect for functioning ecosystems and food supply (Ficiciyan et al. 2018; Ebert 2014). An important component of agrobiodiversity are endangered varieties such as heirloom varieties. A prominent strategy to safeguard heirloom varieties is their cultivation and preservation in their natural environment (*on–farm conservation*). Cultivating heirloom varieties often requires an additional effort from farmers as these varieties have a lower yield and higher labour costs. Hence, an additional demand and added value have to be created for farmers. In this regard, a consumer–orientated communication approach is a critical issue (Padel et al. 2018). According to preliminary qualitative studies (focus group discussions and expert interviews), three different approaches to communicate the added value of those varieties seemed recommendable. The communication approaches can be expressed via different label designs:

The label "old variety" sets a focus on the age of a variety, the label "red list variety" on its endangerment status. The label "promoter of diversity" focuses less on the variety itself, but on more diverse agricultural systems and hence different varieties' (potential) contribution to a more diverse diet for consumers.

In this paper, we address the following questions: (1) Which communication approach for agrobiodiversity enhancing products such as heirloom varieties do consumers prefer? (2) Do consumers have an additional willingness to pay for those labelled vegetable varieties?

2   Empirical Methods

We conducted an online survey with 708 participants in Germany in 2019. The questionnaire consisted of five parts, one of which was a discrete choice experiment.

A discrete choice experiment is a method to analyse consumer preferences towards a certain product based on their preference towards specific attributes of that product (Hensher et al. 2015). It is based on Lancester's "A New Approach To Consumer Theory" stating that the

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utility of a product is derived from the sum of the utilities of the product attributes (Lancaster 1966) and Mc Fadden's Random Utility Theory stating that consumers seek to maximise their utility when buying a certain product (McFadden 1974).

In our discrete choice experiment, we looked at different product attributes of carrots. We chose the following attributes and attribute levels:

- price per kilogram (0.69 €, 1.29 €, 1.89 €, 2.59 €) based on market prices in different food outlets in 2019 (discounter, supermarkets, organic supermarkets and market stalls) and was set to increase by 60 ct. for each attribute level;
- packaging (plastic packaging, paper packaging, no packaging) based on current packaging in different food outlets;
- label representing the different communication approaches outlined in the introduction including a "no label" as status quo option.

We used a pivot design created with Ngene with 12 choice situations with three different choice cards and an additional "no choice" option. The design showed some restrictions: we used the lowest price of 0,69 € and "no label" exclusively in the status quo option which was included in every choice situation. The different labels and all packaging options were tested with the higher prices starting from 1,29 € to 2,59 €, varying in each choice situation.

The analysis of the choice experiment was conducted with STATA 16.

3   Results

The data set of n= 708 participants is representative for the German population in terms of gender, age and personal net income. There is a slight over-representation of academics.

We performed a mixed logit model with the (hypothetical) purchase as the dependant variable and the price, package and label as independent variables. We used dummy codings for the different attribute levels. The price was used as a fixed coefficient and the latter two as random coefficients (normally distributed). The attribute levels "plastic packaging" and "no label" were excluded from the model due to collinearity.

Table 1: Results from the Mixed Logit Model (depicting the results for the labels) [2]

purchase	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Mean						
old	0.532615	0.191926	2.78	0.006	0.156446	0.908783
red	0.866368	0.17955	4.83	0	0.514457	1.218279
var	2.877901	0.23443	12.28	0	2.418427	3.337376

Comparing the three coefficients it is shown that the option "promoter of diversity" (var) yields the highest utility for consumers. According to Mc Fadden's Random Utility Theory, consumers are most likely to buy varieties with this claim, followed by the claims "red list variety" (red) and "old variety" (old).

Secondly, we estimated the willingness to pay as the quotient of the attribute parameter estimates over the cost parameter estimates (Hensher et al. 2015).

Table 2: Willingness to Pay for different labels

	old	red	var
WTP	0.3952	0.6429	2.1356

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[2] model specification: pseudo R^2=0.30329522; Log likelihood = -5096.1086; significant standard deviations

The WTP for the different labels varies drastically. The label "promoter of diversity" revealed the highest WTP with 2.14 €. Those numbers should not be interpreted as actual market prices as we investigated a hypothetical purchase and other effects (e.g. substitution effects) were not included.

4 Recommendations

Results show that the label "promoter of diversity" yields the highest utility for consumers and derives the highest WTP among the labelled options. Therefore, when communicating the benefits of heirloom varieties to consumers, the aspect of promoting diversity should be in focus rather than the age of the variety or its endangerment status. The data suggests that agrobiodiversity enhancing products can generate premium prices at the point of sale when the communication approach focuses on the diversity aspect. By this generated added value, cultivating these varieties can be more attractive for farmers.

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