

Article

Who Wants Chicken? Uncovering Consumer Preferences for Produce of Alternative Chicken Product Methods

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Abstract: As ethical and environmental concerns regarding current poultry production systems arise, consumers look for alternatives. This study assesses consumers' preferences for chicken meat of dual-purpose breeds (DPBs), regionally produced feedstuff, and specific breeds, along with attitudes and social norms that explain these preferences. We conducted an online survey ($n = 934$) including a discrete choice experiment and elements of the theory of planned behavior. Results show that after price, product and feedstuff origin are preferred by consumers, followed by breeding form and specific breed. Utilities for each attribute and level were calculated and consumer segments were created using latent class analysis. Three different consumer groups were identified: (1) price-sensitive consumers, (2) price-sensitive and origin-oriented consumers, and (3) origin-oriented consumers. We conclude that although consumers are interested in meat from DPBs, this attribute alone is not enough to influence the purchase decision, and geographical origin seems to be of crucial importance. However, by highlighting important attributes (i.e., animal welfare, regional/local production), DPB products could be introduced to the market. The consumption of these alternative products has economic implications, such as not relying on imports and promoting local production/consumption, along with social implications as refraining from killing day-old chicks.

Keywords: Bresse Gauloise; choice experiment; dual-purpose breeds; faba beans; Kollbecksmoor; theory of planned behavior; Vorwerkkuhn; White Rock



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1. Introduction

Massive animal production methods started gaining popularity after World War II as these systems included specialized indoor environments and automation instead of manual labor. These methods increased the production of poultry meat worldwide, surpassing beef production [1]. In more recent years poultry production, and therefore consumption, has also increased worldwide. In the last 10 years, meat consumption in Germany has slightly decreased from approximately 61.6 kg per person to 59.5 kg [2]. However, poultry consumption in Germany has increased in from 17 kg (2006) to 20.9 kg (2017) per capita [3]. This increase in consumption has resulted in a production increase from 801,000 tons in 2000 to 1,537,000 tons in 2017 [3].

This fast increase in production and consumption has led to breeding of specialized chicken breeds to achieve a higher performance [4]. However, within these production schemes other animal welfare-related issues arose, such as the killing of day-old male chicks of the laying breeds. The killing of these male chicks is commonly practiced in the commercial production of eggs, in organic and conventional farming, since the males are not profitable [5]. In Germany, around 45 million male chicks are killed every year due to their non-profitability [6]. Consumers' complaints and requests to stop the killing of day-old chicks have led to the German government's decision to prohibit this practice starting January 2022 [7]. Consumers' increasing concern in this issue has led to the development of various alternatives to this practice. Among the different alternatives are: (1) in-ovo gender determination, i.e., looking into the egg to see the gender, (2) breeding of the brother, i.e.,

continue with specialized breeds but rear the male chicks of the laying breeds, and (3) the use of dual-purpose breeds [6]. This study focuses on the latter.

1.1. Dual-Purpose Breeds: Consumer Perspectives on an Alternative to Killing Day-Old Male Chicks

Dual-purpose breeds (DPBs) are chicken breeds that can be used for both laying eggs and producing meat; i.e., female chickens (hens) lay eggs and male chickens (cockerels) are fattened to produce meat [8]. DPBs are not able to compete with specialized fattening (meat-type) and laying breeds—DPB hens lay fewer eggs and DPB males produce less meat than specialized breeds, even if reared for a longer period of time. The main challenge is that these lower laying and fattening performances mean an increase in costs related to production, particularly with feed and housing, which should lead to higher product prices [9]. At the same time, DPBs could produce better meat quality with regard to sensory profile, while also meeting consumer expectations on animal welfare. As consumers are searching for higher animal welfare standards, they might be willing to pay a higher price [4,10,11]. Hence, the DPB may be a very valuable transitory product line for sustainable food systems.

The importance of dual-purpose breeds does not rely solely on the ethical aspects of avoiding the culling of day-old chicks. The current specialized methods have created a loss of genetic variability of poultry; hence, by fostering DPBs, especially traditional breeds, breeders are contributing to the conservation of poultry genetic resources [12,13]. In Germany, traditional breeds such as Vorwerkkuhn (VH), a traditional breed from Germany, and Bresse Gauloise (BG), a traditional breed from France, have been used as DPB chickens by small-scale farmers. Additionally, commercial laying lines like White Rock (WR) could be bred with a dual-purpose traditional breed, in order to produce a DPB with a higher laying performance, such as Kollbecksmoor (KM) [14].

The impression that alternative poultry production systems provide healthier, tastier, and more environmentally friendly and more animal friendly products has led to consumers valuing these alternative systems and increasing their demand when compared to conventionally produced meat [15–17]. This shows that consumers are increasingly more interested in having more information about the products they purchase and consume. Additionally, Apostolidis and McLeay [18] show that some consumers who are not price driven are willing to pay more for sustainable-related attributes in meat products and consume less meat. Nonetheless, it is still unknown whether these consumers would be willing to pay a higher price for DPBs when other product attributes are compromised (e.g., product origin, feed origin) or whether consumers prefer the place of origin (of either production or feedstuff) versus attributes related to animal welfare, particularly DPBs. Additionally, the preference for a specific chicken breed has not been previously tested.

1.2. Faba Beans: An Alternative to Soy Imports for Protein Feedstuff

A further problem in the current poultry industry is that poultry farming requires a high amount of protein-rich feedstuff. When looking at the overall poultry farming system, feedstuff production accounts for a higher environmental impact than rearing the animals [19]. Soybeans are extensively used as a protein source in poultry diet formulations [20]. The problem with soybeans is that the European Union's (EU) yield is not enough to cover the needs of its own poultry industry and there is a need to import soybean products from other countries [21,22]. These large imports cause problems in EU agriculture, mainly instability due to price volatility of soybeans on the global market [23] and EU consumers' concerns with genetic modified soy crops and deforestation of the Americas [22,24].

An alternative to soybean products is other protein crops like beans and peas, which are traditional European crops and suit the natural production surroundings well. Local agricultural industries could benefit from these crops by having a greater independency in their production and they could also benefit from these crops' environmental benefits like nitrogen fixation [23]. Faba beans (*Vicia faba* L.) are one of the oldest and most widely

cultivated legumes [25]. They contain approximately 30% protein, which is complemented by a rich amino acid composition [25,26], making faba beans a good poultry feed protein source [26]. The use of faba beans in poultry diet has been challenged by anti-nutritional factors in the beans [20,27]. However, recent research has shown that there is no adverse effect in the chickens' health or in the carcass quality parameters when animals are fed with a faba bean-based diet compared to a soy-based diet [28]. Additionally, a recent study showed that meat quality parameters and sensory properties of chicken meat (of the abovementioned breeds) do not suffer a negative effect from a faba bean-based diet [29].

1.3. Study Aim and Research Questions

Food choice is a complex process that is influenced by different factors, e.g., situation, available information, previous experiences, personal preferences, lifestyle, and knowledge about the products [30,31]. Additionally, other aspects like attitudes regarding animal welfare issues and agricultural systems, and access to product information also determine purchase criteria of agricultural products [32,33]. Nowadays, consumers are confronted with abundant sustainability-related choices, such as fair trade products, organic products, animal products produced under animal-friendly conditions, and regional products. This abundance of sustainable products can confuse consumers since an overload of information is delivered to them in different ways and for different, specific topics [34]. Often labeling is used to communicate specific characteristics of products, particularly credence attributes (attributes that cannot be evaluated by a consumer—e.g., animal-friendly); it is important to communicate particularly relevant information on the packaging so consumers use this information for decision making [35]. In this regard, one can distinguish different labeling strategies ranging from a binary to multilevel label—each containing a different level of abstract information [36]. Especially when it comes to the aspect of extrinsic food quality, it is the question of which information to communicate best, in order to reach the consumer successfully.

It is not known which altered product characteristics of alternative systems have the highest potential or which may be of interest to consumers. Thus, the objective of this study is to better understand which of the studied attributes (i.e., breed type, breeding form, product origin, feedstuff origin) are preferred by consumers. Additionally, this study aims to understand consumers' basic attitudes, beliefs, and motivations towards DPBs. Therefore, the following research questions were investigated:

RQ1: What is consumers' preference for dual-purpose breeds, regionally and German produced feed, and specific breeds over other attributes when buying chicken meat?

RQ2: How can these preferences be explained?

Our study aims to contribute to the missing literature regarding a socially accepted poultry production system, which takes into account the killing of day-old chicks, the use of dual-purpose breeds, the use of traditional breeds, and feeding chickens regional faba beans rather than soy imports.

The following section presents the concept of a discrete choice experiment (DCE) along with the different attributes and levels used in this study, as well as the theory of planned behavior (TPB) and the elements of it that were used to collect data. Section 3 then presents the main results of the study, including results from the latent class analysis used to create consumer segments based on their utilities for each attribute. Additionally, we further describe each class using the different elements of the TPB and sociodemographic information. In Section 4, we then discuss our findings with existing literature and present the major limitation for this study. Finally, in Section 5, we present our main conclusions and ideas for future research in this topic.

2. Materials and Methods

2.1. Conceptual Framework

The present study combines two methodological approaches. First, a DCE was conducted to detect participants' preferences regarding the different attributes they value the

most when purchasing chicken meat. Then, in order to better describe the motivations behind these preferences, elements of the TPB were used and adapted since this method can trace attitudes, norms, and perceived behavioral control about a specific behavior [37]; in this case, a choice of purchase.

2.1.1. Discrete Choice Experiment

Thus far, chicken meat from DPBs is rarely found in the market, therefore there is little to no purchase data available. In order to simulate this market data, a DCE was implemented. In these experiments, respondents make choices from two or more alternatives with different varying attributes, allowing the elicitation of preferences and values for specific products that do not exist yet [38]. This also allows calculating consumers' willingness to pay (WTP) based on individuals' decision making [39].

The Lancasterian consumer theory assumes that different products have multiple characteristics which raise the utility of each product, and that each product will possess several characteristics which are shared by other products [40]. Thus, stating that consumers derive utility not from a product itself but from the combination of product attributes and levels. To measure these preferences or utilities, DCEs are applied. A DCE is a technique used to research consumer preferences by simulating a purchase situation in supermarkets, where different products are offered, and the consumer may choose any or none. These DCEs have been applied in a wide range of contexts, such as evaluating the impact of country-of-origin labeling and traceability in consumers' preferences [39] or evaluating preferences for animal-friendly foods [41]. These studies indicate that DCEs can be successfully implemented for calculating such preferences. In addition to the elicited preferences, data can be used to classify consumers based on latent or unobserved characteristics into segments via latent class analysis (LCA) [42].

For this study, we used five different attributes with four levels each. The attributes and levels selected for this study were those of interest to the authors and are mainly related to the animal from which the product comes from rather than to extrinsic characteristics (e.g., weight, color, fat). The attributes and levels used are the following:

1. *Breeding form*: The levels of this attribute were chosen to test consumers' preference for (1) dual-purpose breeds, (2) breeding of the brother—rearing brothers of laying hens despite their low fattening performance, (3) organic products, which consumers usually associate with higher animal welfare standards and show a higher WTP for these [43–46], and (4) no information, which resembles the current market situation where basic information regarding the husbandry system (barn raised, free range, organic) is provided.
2. *Breed*: The levels chosen for this attribute were four dual-purpose breeds currently used in Germany; (1) Bresse Gauloise (BG), a French native DPB commonly used due to its good laying and fattening performance, (2) Vorwerkhuhn (VH), a German native DPB used mainly to preserve the genotype [14], (3) White Rock (WR), a commercial laying line with potential to be used as a DPB, and (4) Kollbecksmoor (KM), a crossbreed of VH and WR used due to its good laying and fattening performance. The name of each breed was presented along with a picture of the corresponding breed in order to increase consumers' exposure to each breed's appearance.
3. *Price*: The levels of this attribute were based on current market prices in Germany for breast fillets; the lowest level corresponds to the lowest market price, while the highest level to the highest market price. The levels in between are 9.64 EUR apart from the previous and following levels.
4. *Product origin*: The levels in this attribute were chosen to test consumers' preference for a regional product over (1) national (German) product, (2) product from the EU, since it is where Germany imports mostly from [3], and (3) product from outside the EU.
5. *Feed origin*: The levels in this attribute were chosen to test consumers' preference for regional faba beans over (1) German faba beans, (2) Brazilian soy, since it is the

most common protein feedstuff [47,48] and the country where most imports to the EU come from [48], and (3) no information, which resembles the current market situation where no information regarding the feedstuff is provided.

The levels of the attribute “breeding form” are not mutually exclusive, i.e., they can be found combined with one another in the market (e.g., DPB or brother of laying hen reared organically). For this study, it was decided to test the preference for each of these levels individually. The objective was to better calculate the utilities of the specific wording “organic”, “breeding of the brother”, and “dual-purpose breed” and not a combination of these.

In order to make this experiment more realistic, we decided to prohibit eight combinations of attributes that could not possibly be found in the market. The lowest price level did not appear with organic or DPB levels since the cost production of these products does not allow such a price. Similarly, the lowest price level did not appear with BG since the current market price of this breed is comparable to organic (highest price). Non-EU product origin did not appear with regional nor German faba beans; moreover, it also did not appear with the highest price level. Finally, regional product origin and regional faba beans as feedstuff do not appear with the lowest price label since literature suggests that consumers are willing to pay more for regional products [49,50]. Table 1 provides an overview of the different attributes, levels, and prohibitions included in the design.

Table 1. Attributes, levels, and prohibitions included in the design of the choice sets.

Attributes	Levels	Prohibitions
Breeding form	Organic	5.98 EUR/kg
	Breeding of the brother	
	Dual-purpose breed	5.98 EUR/kg
	No information	
Breed	Bresse Gauloise	5.98 EUR/kg
	Vorwerkhuhn	
	White Rock	
	Kollbecksmoor	Regional product
Price	5.98 EUR/kg	
	15.62 EUR/kg	
	25.26 EUR/kg	
	34.90 EUR/kg	Non-EU product origin
Product origin	Regional	
	Germany	
	EU	
Feed origin	Non-EU	Regional faba beans, German faba beans
	Regional faba beans	5.98 EUR/kg
	German faba beans	
	No information	

Source: authors' own.

The description of the CE reads as follows—participants were asked to imagine they want to buy chicken breast fillets. Next, they were presented with ten different choice sets. Each choice set had three options from which to choose plus a non-purchase option. The non-purchase option could be chosen if none of the other options met participants' preferences or WTP for their preference. Figure 1 shows an exemplary choice set. In this study, since the products are not in the market, each option was labeled as “Option 1”, “Option 2”, “Option 3”, or “Option 4”.

Which of these products would you purchase?

Chicken breast fillet with the following characteristics:

Option 1	Option 2	Option 3	Option 4
<p>Breeding form Dual-purpose chicken</p> <p>Breed</p>  <p>Vorwerk</p> <p>Price 25.26€/kg</p> <p>Product origin Non-EU</p> <p>Feed origin Brazilian soy</p> <p>Select</p>	<p>Breeding form Dual-purpose chicken</p> <p>Breed</p>  <p>White Rock</p> <p>Price 15.62€/kg</p> <p>Product origin EU</p> <p>Feed origin Regional field beans</p> <p>Select</p>	<p>Breeding form No information</p> <p>Breed</p>  <p>Bresse Gauloise</p> <p>Price 25.26€/kg</p> <p>Product origin Regional</p> <p>Feed origin No information</p> <p>Select</p>	<p>I would not purchase any of these products</p> <p>Select</p>

Figure 1. Example of a choice set (translated from German).

This experiment was prepared with Sawtooth Software (Version 9.5.3) as a balanced, fully randomized choice design.

2.1.2. Theory of Planned Behavior

Since food choice is a complex process, purchase behavior is not only affected by sociodemographic characteristics, or the product's price or attributes, but also by psychological characteristics of buyers, such as attitudes and beliefs [51]. Therefore, to measure these psychological characteristics, we employed elements of the TPB.

Based on the TPB, consumers' intention to behave in a certain way (e.g., purchase a product) is determined by their attitudes, social norms, and perceived behavioral control. These predicting intentions refer to the following: (1) "attitudes" (A) refers to the favorable or unfavorable attitude towards the behavior in question, (2) "subjective norms" (SN) refers to the social pressure consumers perceive to perform or not this behavior, (3) "perceived behavioral control" (PBC) refers to the perception consumers have of it being easy or hard to perform the behavior [37]. This theory has been widely used in different scenarios, such

as predicting consumers' willingness to buy meat from a mobile slaughter unit [52], and to predict consumers' intention to purchase organic food [53]. Such studies show that the TPB can be successfully applied to predict food consumption behavior. Therefore, in this study, it is assumed that consumers who have a positive attitude towards buying DPB chicken meat, are influenced by their family, friends, and society approving DPBs, and believe they are able to buy DPB chicken meat should have a stronger intention to buy the product.

Although the TPB has been widely used and has received empirical support, other research, e.g., [54,55] has used the value belief norm (VBN) theory which links factors to predict pro-environmental behavior [56]. Nonetheless, the aim of this study is not solely guided by an environmentally friendly preference, but by several dimensions of sustainability (e.g., purchase of local products, animal welfare, and diversity of genotype—biodiversity). Therefore, for the purpose of this study, the elements of the TPB were extended with moral elements of the VBN theory to consider other attributes that would help better understand consumers' purchase intention of DPB products. Other studies, e.g., [52,57–59] have also combined both theories to better explain specific behaviors. Hoeksma et al. [52] tested the VBN theory versus the TPB and the extended TPB (combination of TPB with VBN) to predict consumers' willingness to buy meat that was not available in the market yet; they found that the combination of both theories explained a higher percentage of variance in the models than the theories by themselves. From the VBN theory, personal norms (PN) were included since these reflect people's sense of obligation to act in a certain way. Since the topic of DPB is related to animal welfare concerns, personal norms on animal welfare (PNAW) were added. Additionally, since the topic of regional/German faba beans as feedstuff is also a research point, personal norms to address consumption of regional products (PNR) were included.

Items related to the attitude towards DPB, SN, PBC, PNAW, and PNR were measured using a 7-point Likert-scale, from 1 "totally agree" to 7 "totally disagree". Statements were adapted from [53,60–62]. Table A1 (Appendix A) shows the statements used to evaluate each predictor of the extended TPB. All statements were randomized to prevent systematic order effects.

2.2. Survey Design

A sample of 1100 participants was recruited via a professional online panel (Respondi AG) in July and August 2018 in Germany. The sample was selected by a quota sampling procedure with gender, age, education, and income, to achieve representativeness of the German population. Additionally, participants were asked in which state of Germany they currently lived in. In this study, all participants gave written informed consent to take part in the study before the survey started. This study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the University of Goettingen.

First, participants were screened to select only those who consume chicken meat. Additional questions related to participants' consuming and buying patterns were asked: consuming frequency of chicken meat and eggs, and buying frequency of chicken meat, eggs, regional products, organic products, and animal products with animal welfare labels. Next, to ensure all participants had the same basic knowledge about the topic and could make an informed decision, all participants were shown a text with information about the current poultry farming system, dual-purpose breeds, and the current poultry feed situation (see Table A2, Appendix A). Participants were then asked if they were aware of these specific issues: killing of one-day-old male chicks and soy import for animal feedstuff. The DCE was next; here, participants were presented with 10 choice sets consisting of 3 products plus the option "I would not purchase any of these products", as shown in Figure 1. Finally, elements of the extended TPB were used to measure the relationship between respondents' attitudes and purchase behavior.

2.3. Data Analysis

A total of 977 participants completed the survey. After data cleaning (participants who needed less than half of the average response time or more than twice the average response time were removed) the total sample was reduced to 934 participants. All descriptive statistics were calculated using IBM SPSS, Version 26.

The analyses of the DCE were calculated using Sawtooth Software Lighthouse Studio (Version 9.5.3). First, the hierarchical Bayes multinomial logit model was used to estimate attribute preferences and part-worth utilities, utility values for each level of every attribute of a product of each level, for each respondent [42].

Next, in order to narrow down the statement batteries of the extended TPB to the core of each concept, a confirmatory factor analysis (CFA) set on five factors was performed. The requested five factors account for each of the extended TPB predictors (see Table A1, Appendix A). The principle components analysis method was used for the extraction of the factors with an orthogonal (varimax) rotation. To optimize each factor, variables with loadings <0.4 were suppressed [63] from the final item list of each factor in order to better display principal elements for each factor. The quality was tested using the Kaiser–Meyer–Olkin (KMO) test and the Bartlett’s test for sphericity. To measure the internal reliability of each factor, Cronbach’s alpha ($C\alpha$) was calculated. These analyses were calculated using IBM SPSS (Version 26).

Since consumer heterogeneity was found in responses of the extended TPB as well as utilities for some attributes of the DCE, we decided to further segment consumers into groups based on their responses in the DCE. Therefore, a latent class analysis was performed to determine different segments of consumers. In an LCA, each participant gets a utility for each attribute in the choice experiment; however, this utility is determined by the latent, or unobservable, class membership [42]. This analysis was calculated using Sawtooth Software Lighthouse Studio (Version 9.5.3).

Finally, each factor was used to further characterize each consumer segment along with sociodemographic data and purchase frequencies of chicken meat, organic products, regional products, and products with an animal welfare label. To analyze the differences of the describing variables between groups, an ANOVA with post-hoc tests Tukey for variance homogeneity and Games–Howell for variance heterogeneity was calculated using IBM SPSS (Version 26).

3. Results

The sociodemographic characteristics of the sample are described in Table 2. Gender, age, and income fairly represent the German population, while education is slightly under- or overrepresented in certain categories. Nearly half (53%) of the participants lived in northern Germany (Berlin, Brandenburg, Bremen, Hamburg, Lower Saxony, Mecklenburg-West Pomerania, North Rhine-Westphalia, Saxony-Anhalt, and Schleswig-Holstein), while 46% lived in the southern states (Baden-Württemberg, Bavaria, Hesse, Rhineland-Palatinate, Saarland, Saxony, and Thuringia).

Most participants (56%) consume chicken meat at least once a week, while 50% of participants purchase chicken meat with the same frequency. Chicken meat is mostly purchased in supermarkets (46.4%) and discounters (36.7%), while only 2% is directly from the farmer.

After participants read the provided information regarding the current poultry farming situation, they were asked if they were aware of the killing of one-day chicks, to which 85.4% responded “yes”, 12.4% “no”, and 2.1% “I do not know”. Respondents were also asked if they were aware of the imports of protein feed for animals, 26.1% responded “yes”, 66.4% “no”, and 7.5% “I do not know”.

Table 2. Sociodemographic characteristics of the sample (n = 934) and the German population.

	Sample (%)	Population (%)		Sample (%)	Population (%)
Gender			Education		
Female	50.9	50.7	No education	0.5	4.0
Male	49.1	49.3	Lower secondary education	34.3	31.4
Age			High school diploma	30.8	29.4
18–24 years old	8.8	9.1	Technical college	15.3	13.7
25–39 years old	20.8	22.6	University degree	19.1	17.1
40–64 years old	43.5	43.1	Income (net/month)		
65 or more years old	27.0	25.2	Less than 1300 EUR	25.1	26.3
			1300–2599 EUR	39.3	39.6
			2600–4999 EUR	28.1	27.1
			5000 EUR or more	7.6	6.5

Source: authors' own data for sample, German population based on data from the Federal statistical office [64].

3.1. Discrete Choice Experiment

3.1.1. Hierarchical Bayes

Aside from the part-worth utilities, the average importance of the hierarchical Bayes estimates for each attribute was calculated. These averages showed a general overview of how each attribute influenced the overall utility of a product. The presented average importance of attributes and utilities of levels are only valid for this specific combination of attributes.

Results indicated that after price (38.63%), the attributes “feed origin” and “product origin” had the highest importance, with 21.11% and 20.19%, respectively. The breeding form only accounted for 13.47% of the preference, while the breed had the lowest preference (6.58%).

3.1.2. Latent Class Analysis

In an LCA, it is important to decide the number of groups, or classes, needed for further analysis or interpretation. The optimal number of classes is usually determined by the Akaike information criterion (AIC), consistent AIC (CAIC), and Bayesian information criterion (BIC) [65]. By looking at the higher decrease in AIC, CAIC, and BIC in three groups and by interpreting the group sizes and characteristics of the different class solutions, we selected three classes. Table 3 shows the model fit criteria.

Table 3. Criteria for number of groups in latent class analysis.

Groups	Log-Likelihood	AIC	CAIC	BIC	Chi-Square
2	−9242.67	18,551.35	18,820.04	18,787.04	7410.62
3	−8749.21	17,598.42	18,005.52	17,955.52	8397.55
4	−8440.82	17,015.64	17,561.16	17,494.16	9014.33
5	−8268.78	16,705.56	17,389.50	17,305.50	9358.40

AIC: Akaike information criterion; CAIC: consistent AIC; BIC: Bayesian information criterion. *Italics*: Selected number of groups and its criteria. Source: authors' own calculations.

The attribute importance reveals which attributes are more important to consumer classes (from hereon also referred to as segments) while the part-worth utilities show the preference of each level for each particular attribute. Higher values represent a higher importance or preference of each attribute or level. Table 4 shows the attribute importance and part-worth utilities for each attribute and level in detail.

Table 4. Attribute importance and part-worth utilities for each class.

	Class 1	Class 2	Class 3
Size (%)	22.8	20.0	57.2
Attribute importance (%)			
Breeding form ***	5.10	5.09	17.09
Breed ***	2.57	2.44	4.16
Price ***	70.27	62.13	18.76
Product origin ***	11.30	20.52	27.63
Feed origin ***	10.73	9.76	32.33
Part-worth utilities			
Breeding form			
Dual-purpose breed	9.44	−5.80	31.16
Breeding of the brother	10.06	10.95	26.38
Organic	−4.38	9.52	−3.30
No information	−15.13	−14.68	−54.28
Breed			
Vorwerkhuhn	−6.40	−7.50	0.17
White Rock	6.36	2.60	8.12
Bresse Gauloise	3.78	4.77	4.44
Kollbecksmoor	−3.73	0.11	−12.73
Price			
5.98 EUR/kg	171.41	181.68	−0.21
15.62 EUR/kg	68.11	28.45	43.67
25.26 EUR/kg	−58.60	−80.85	6.99
34.90 EUR/kg	−180.92	−129.29	−50.45
Product origin			
Regional	16.29	36.37	55.93
Germany	17.67	30.83	49.48
European Union	3.93	−1.68	−23.19
Non-EU	−37.90	−65.52	−82.22
Feed origin			
Regional field beans	21.71	12.94	72.00
German field beans	21.39	19.22	71.58
Brazilian soy	−32.40	−2.19	−89.43
No information	−10.70	−29.97	−54.15
None	−143.76	120.14	−104.11

*** $p \leq 0.001$. Source: authors' own calculations.

The first class accounted for 22.8% ($n = 213$) of the sample. This group of participants gave the highest importance to price (70.27%), particularly to the lowest level (5.98 EUR/kg), followed by product (11.30%) and feed origin (10.73%), particularly regional and German origin. Breeding form and breed accounted for less than 6% of attribute importance each. Breeding of the brother and DPB had the highest utilities in this attribute. Bresse Gauloise was the breed with the highest utilities from the attribute breeds. The second group consisted of 20% ($n = 184$) of participants and also gave the highest importance to price (62.13%), particularly the lowest level. However, this group allocated around 30% of importance to origin (product and feed, 20.52% and 9.76%, respectively), particularly regional and German. Breeding form and breed only accounted for less than 8% importance for this group. Breeding of the brother and organic showed the highest utilities for this class when referring to breeding type. The third, and largest, class consisted of 57.2% ($n = 537$) participants. Contrary to the other groups, this group allocated a higher importance to feed (32.33%) and product origin (27.63%), specifically regional and German. Price showed an importance of 18.76%, and contrary to the other groups, the highest utilities were on the second and third levels (15.62 EUR/kg and 25.26 EUR/kg). For this group, breeding form was more important (17.09%); here, DPB and breeding of the brother

showed the highest utilities. Similar to the other groups, the attribute importance of the attribute “breed” accounts for less than 5%.

3.2. Extended Theory of Planned Behavior

The five factors obtained by the CFA accounted for 77.27% of explained variance and the KMO value was 0.906, which is generally seen as a very good value [63,66]. The internal reliability of each factor was tested with $C\alpha$, and the values obtained ranged from 0.689 to 0.909.

Table 5 shows each obtained factor in detail along with individual loadings, means, and standard deviations for each item. Factor 1 ($C\alpha$: 0.882) resulted in six items related to the participants’ attitude towards DPB. The highest loadings were those of items related to the general idea of purchasing the products; however, when talking about the confidence of the purchase the loading decreased. Factor 2 ($C\alpha$: 0.870) resulted in six items related to personal norms on animal welfare. While most items were directly related to animal welfare, elements of PBC and PNR were also found. Factor 3 ($C\alpha$: 0.909) consisted of four items related to social norms that influence participants’ attitude towards purchasing DPB. All items showed similar loadings. Factor 4 ($C\alpha$: 0.855) resulted in four statements related to personal moral norms on regional products influencing consumers’ purchase. The loadings obtained were similar for three items, while the statement related to guilt from purchasing products from different regions or countries obtained a lower loading. Finally, Factor 5 ($C\alpha$: 0.689) resulted in three items related to participants’ perceived behavioral control, specifically to participants’ knowledge or ability to purchase these products.

Table 5. Factors obtained of extended theory of planned behavior statements ($n = 934$).

Wording	Factor Loading	Mean SD
<i>Factor 1: “Attitude towards DPB” ($C\alpha$: 0.882)</i>		
It is a good idea to buy products from DPB (eggs and meat).	0.911	2.02 1.21
The purchase of products from DPB (meat and eggs) is good.	0.887	2.11 1.19
The purchase of products from DPB (eggs and meat) is interesting for me.	0.870	2.29 1.34
It is important for me to buy products from DPB (eggs and meat).	0.680	2.80 1.39
I am confident that I will buy chicken meat and eggs from DPB.	0.615	2.77 1.47
I see myself in a position to buy chicken meat and eggs from DPB in the future.	0.428	2.99 1.61
<i>Factor 2: “Personal norms on animal welfare” ($C\alpha$: 0.870)</i>		
I feel morally obliged to consider animal welfare in my daily behavior.	0.811	2.65 1.50
I feel guilty buying meat and eggs where the day-old chicks were killed.	0.807	3.59 2.00
People should do everything to improve animal welfare.	0.719	2.00 1.25
I feel a moral obligation to buy DPB products (meat and eggs) regardless of what others do.	0.682	3.09 1.69
I am ready to invest more time and money in purchasing chicken meat and eggs from DPB.	0.522	3.22 1.75
I feel guilty if I buy chicken meat and eggs from other countries or regions.	0.509	4.03 1.91
<i>Factor 3: “Subjective norms” ($C\alpha$: 0.909)</i>		
People who are important to me want me to buy products from DPB (eggs and meat).	0.892	4.24 1.70
People who are important to me think that I should buy products from DPB (eggs and meat).	0.884	4.08 1.67
People whose opinions I value would prefer that I buy chicken and eggs from DPB.	0.873	3.81 1.72
The positive opinion of my friends influences me to buy products from DPB (meat and eggs).	0.763	4.25 1.74

Table 5. Cont.

Wording	Factor Loading	Mean SD
<i>Factor 4: "Personal norms on regional products" (Cα: 0.855)</i>		
People should do everything possible to increase the consumption of regional products.	0.810	2.22 1.29
I feel obliged to consider regional consumption in my daily behavior.	0.803	2.69 1.60
I feel a moral obligation to buy products from this region, regardless of what others do.	0.788	2.93 1.76
I feel guilty if I buy chicken meat and eggs from other countries or regions.	0.521	4.03 1.91
<i>Factor 5 "Perceived behavioral control" (Cα: 0.689)</i>		
I know where I can buy chicken meat and eggs from DPB.	0.840	5.11 1.95
Products from DPB (meat and eggs) are available in the shops where I usually go shopping.	0.840	4.39 1.74
I see myself in a position to buy chicken meat and eggs from DPB in the future.	0.522	2.99 1.61

C α : Cronbach's alpha, DPB: dual-purpose breed. Explained variance: 77.27%; KMO: 0.906; Bartlett's test: Chi-square: 13,498.96, sig.: 0.000. Likert-scale: 1 "I fully agree" to 7 "I fully disagree". Source: authors' own calculations.

3.3. Characterization of Classes

To further describe each obtained class, sociodemographic data, purchase frequencies (organic products, regional products, and products labeled with animal welfare, purchase place) and the extended theory of planned behavior were used. Table 6 shows the results of consumer segmentation with respect to the abovementioned (significant) describing variables.

Segment 1: Price-conscious consumers (23%). Consumers in this group were mostly men (60%) with a monthly net income of up to 2599 EUR (67%). Participants in this group mostly purchase their chicken meat at discounter stores. The attribute they valued most was price, and within the price the lowest level (5.98 EUR/kg) obtained the highest utilities. In this group, product and feed origin had a similar importance (11%), especially the regional and German levels. Breeding form and animal breed were not highly important (5% and 2%, respectively); however, the levels of breeding of the brother and dual-purpose breed were preferred in this group. This group also shows a more positive attitude towards DPBs (attitude towards the behavior—ATB), which can also be observed in the utilities of DPB, and a higher PBC versus Segment 2.

Segment 2: Price-sensitive and origin-oriented consumers (20%). This group consisted of a similar percentage of male and female participants. Most consumers (55%) were between 40 and 64 years old and most (73%) had a monthly net income of up to 2599 EUR. Participants in this group purchase chicken meat mostly in supermarkets and discounters. The most important attribute for this consumer segment was also price (62%), specifically the lowest level. However, contrary to Segment 1, this group places more importance (almost twice as much, i.e., 20%) on the product origin, particularly in regional origin. The importance of the breeding form and animal breed for this group were also very small (5% and 2%, respectively); however, the breeding of the brother and organic were preferred, rather than dual-purpose breed (as opposed to Segment 1). The lower preference for DPB can also be observed in the attitude towards DPB (ATB), where Segment 1 reported a more positive attitude towards dual-purpose breeds. Results also showed that subjective norms had a significantly lower impact in this group than in Segments 1 and 3.

Segment 3: Origin-oriented consumers (57%). Women make up the majority (56%) of this group, and 39.5% of participants reported a monthly net income of at least 2600 EUR. Similar to Group 2, participants in this group purchase chicken meat mostly in supermarkets and discounters. Nonetheless, 21.9% members of this segment purchase chicken meat from either a butcher, directly from the farmer, in organic shops, or at the farmer's market, while only 7.4% in Group 1 and 5.4% in Group 2 do so. Contrary to the other two segments, this group valued feed and product origin (regional and German) more than other attributes such as price. This

was also reflected in the group's reported purchase frequency of regional products and on their personal norms regarding regional products. For consumers in this group, price and breeding type obtained almost the same importance. Participants were willing to pay more for their products (15.62 EUR/kg and 25.26 EUR/kg), which can be related to 40% of participants earning at least 2600 EUR (net) per month. As opposed to Segments 1 and 2, the utilities of consumers in this group were higher for dual-purpose breeds. This was also observed in the describing variables where the attitude towards dual-purpose breeds (ATB) and personal norms on animal welfare (PNAW) were more positive in Segment 3 when compared to the other groups. Similarly, Group 3 reported purchasing products with an "animal welfare" label with a higher frequency than the other two groups. A similar difference was observed in the PBC, where Class 3 felt a higher control to purchase DPB products when compared to the other two classes.

Table 6. Description of each class based on significant describing variables.

	Class 1	Class 2	Class 3
Size (%)	22.8	20.0	57.2
Describing variables: Sociodemographic (%)			
Gender ***			
Female	40.4	48.4	55.9
Male	59.6	51.6	44.1
Age *			
18–24 years old	8.5	6.0	9.9
25–39 years old	27.2	10.3	21.8
40–64 years old	38.0	55.4	41.5
65 or more years old	26.3	28.3	26.8
Net income per month **			
Less than 1300 EUR	30.5	27.7	22.0
1300–2599 EUR	36.2	45.1	38.5
2600–4999 EUR	23.9	23.9	31.1
5000 EUR or more	9.4	3.3	8.4
Describing variables: Purchase frequencies ¹ (μ σ)			
Organic products ***	3.46 ^a 1.00	3.61 ^a 0.97	2.85 ^b 1.05
Regional products ***	2.41 ^a 0.76	2.38 ^a 0.89	2.00 ^b 0.78
Products with "animal welfare" label ***	3.06 ^a 0.91	3.23 ^a 0.94	2.66 ^b 0.93
Describing variables: Place of purchase (%)			
Discounter	57.3	42.4	26.6
Supermarket	35.2	47.8	50.3
Butcher	2.3	2.2	8.6
Directly from the farmer	0.9	0.5	3.2
Organic shop	1.9	0	4.3
Farmer's market	2.3	2.7	5.8
Other	0	4.3	1.3
Describing variables: Factors ² (μ σ)			
ATB ***	2.57 ^a 0.93	3.01 ^b 1.22	2.28 ^c 1.04
PNAW ***	3.70 ^a 1.26	3.72 ^a 1.32	2.63 ^b 1.15
SN ***	4.13 ^a 1.49	4.60 ^b 1.46	3.90 ^a 1.50
PNR ***	3.56 ^a 1.41	3.47 ^a 1.48	2.55 ^b 1.18
PBC ***	4.29 ^a 1.23	4.70 ^b 1.32	3.92 ^c 1.42

¹ Scale: 1 "Very often" to 5 "Never", ² Scale (for items in each factor): 1 "I fully agree" to 7 "I fully disagree". * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$. ^{a,b,c} values with different superscript letters are statistically significant different ($\alpha = 0.05$) according to Games–Howell or Tukey. ATB: attitude towards the behavior, PNAW: personal norms on animal welfare, SN: subjective norms, PNR: personal norms on regional products, PBC: perceived behavioral control. Source: authors' own calculations.

4. Discussion

Our results showed that 85% of the participants were aware of the killing of day-old chicks. This high awareness has also been confirmed in previous studies with European consumers [4,10,67]. As this practice will be forbidden in Germany starting January 2022, current animal friendly alternatives such as using dual-purpose chicken breeds and how to market these products need to be researched extensively.

4.1. Consumers' Preference for Each Attribute

In this study, the importance of each attribute is only valid with the particular combination of attributes and levels used here. Results of the present study show that, in the whole sample, price was the most important attribute considered when purchasing chicken meat. Price has been shown to play a major role in a consumer's purchase decision [68,69]. After price, feed origin and product origin had an important weight when purchasing chicken meat, particularly when the feed or product origin was regional or German. Studies have shown that consumers prefer and are usually willing to pay more for local products [49,70–72]. Schnettler et al. [73] show that consumers prefer and have a higher WTP for beef products of local origin than non-local origin. However, Rahbauer et al. [74] show that the elasticity in German consumers' WTP for meat products varies depending on the type of meat—beef shows a higher elasticity, while poultry and pork show a lower elasticity, suggesting consumers would still purchase chicken meat if prices increase slightly. Additionally, Feldmann and Hamm [49] find that consumers' preference and WTP for local products depends on the type of product—higher for plant products than for animal products. Similarly, Becker et al. [75] show that the country of origin is more important for beef than for pork and chicken.

The type of breeding only accounted for a small percentage of importance when purchasing chicken meat. Finally, the type of breed played a minor role in consumers' preferences when purchasing meat. This could be attributed to consumers' lack of familiarity with different chicken breeds [76]. Additionally, the "meat-paradox" (i.e., liking meat but disliking killing an animal for food) could have an important effect in this attitude, since research has shown that consumers do not like to associate any living animal to food, especially meat [77,78].

4.2. Preferences of Each Consumer Segment

While the theory of planned behavior is usually employed to predict consumers' intention to carry out a certain action, in this case we used it to explain what motivates consumers to carry out the specific action. It is suggested that consumers which have a positive ATB, SN, and PBC have a stronger intention to purchase a product; however, this decision making process takes into account additional product attributes (e.g., price, quality) that can hinder this intention. Therefore, by combining the motivations behind a purchase and actual product attributes, we can better understand what our target group values most. As we see from these results, the TPB would not have been enough to describe the purchasing motivations behind the purchase of our specific products. Although this theory helps understand how society influences consumers' decisions and how the attitudes towards a specific behavior in question influence the purchasing decision, this theory lacked the elements of animal welfare and regional products that this particular research question needed. Therefore, the use of an extended TPB seems like a suitable option to understand motivations and/or values beyond the usually employed.

Although, for the sample as a whole, price was the most important attribute, and this differed between consumer segments. Price was the attribute with the highest importance for two consumer segments, while (feed and product) origin was the most important attribute for the third segment. Our results confirm that although the price of a product usually plays a major role in a consumer's purchase decision [68], consumers' willingness to pay might be affected when involving credence attributes such as animal welfare [79–81] and place of origin [73].

The origin of either the product or feedstuff was a valued attribute for all consumer segments in this study. This has also been tested in other studies [41,82] where local or regional food is preferred to other attributes. In our study, while Class 1 preferred German product and feed origin, Classes 2 and 3 preferred regional over German origin. This was also reflected in each segment's personal norms on regional products (PNR) and on their claimed purchase behavior of regional products. These results showed a slight difference between the behavior of Class 1 and 2, but a clear difference between Class 3 and the other two classes. Consumers' preference for local foods has been related to positive attitudes towards environmental, social, and quality motives [49,70]. This was also reflected in this study, where "origin-oriented consumers" (Class 3) also shows a more positive result towards animal welfare (PNAW), has a more positive attitude towards dual-purpose breeds (ATB), and consumes organic products and products with "animal welfare" labels more frequently than the rest.

The role of the breeding form in the purchase of chicken meat was less important than origin of the product or feed. "Price-sensitive and product origin-oriented consumers" (Class 2) preferred the breeding of the broiler and organic over DPB. The ATB of this consumer segment also reflected this preference, as this segment has the less positive attitude towards DPB. Although "price-conscious consumers" (Class 1) showed a positive attitude towards dual-purpose breeds (ATB) and the utilities for this breeding form were the second highest, other product attributes (such as price) had a higher weight on their purchase decision. This supports related research [4,10], which indicates that although consumers are interested in DPB, attributes like price influence their final decision. On the other hand, Class 3 showed a higher preference towards dual-purpose breeds versus Segments 1 and 2. This engagement with DPB was also seen in the factors obtained from the TPB, where Class 3 had the most positive attitude towards DPB, the highest personal norms on animal welfare, and their stated purchase frequency of animal products with an "animal welfare" label. Since consumers have evaluated the breeding of dual-purpose chickens as an "animal-friendly" practice [4], our study showed that there was a group of consumers willing to pay a higher price for chicken meat where animals were raised under animal-friendly standards. Even though, in general, consumers' attitude towards DPB is positive, many consumers are not willing to pay more for meat and eggs from this production system [4,67], while others would also have to consider other product attributes when purchasing these products [4,10,67].

Other elements of the extended TPB also show significant differences between groups. Subjective norms (SN) have a lower influence in Class 2 when compared to Classes 1 and 3. This could also contribute to the lower preference of DPB, more negative ATB, and in general a lower purchase frequency of animal products with an "animal welfare" label. Additionally, perceived behavioral control (PBC) also shows differences between groups, which can also influence the overall preference for DPB. Class 3 showed a higher utility for DPB, which is also reflected in their PBC; this can also be associated to the place of purchase of chicken meat as about 25% of participants in this group usually purchase their chicken meat in "non-typical" (i.e., supermarket or discounter) venues.

Segments for potential consumers of dual-purpose chicken breeds have also been created by Busse et al. [67]. However, the approach used in that study involved conditions for a potential purchase of these products; among the conditions included were knowledge of the product, regular availability, price, regional origin, and taste. That particular study showed that various aspects contribute to determining purchase criteria, such as access to information and trust in the given information. However, although their most promising cluster stated a higher willingness to pay for DPB products, it is still unknown how much more they would pay and which compromises or under which conditions this price would be paid. Our study did that by showing that although consumers might be willing to pay a premium price for certain attributes such as animal welfare conditions, other attributes are equally or more important. In our case, the most promising consumer class gives a higher importance to the origin of the product and feed than to other attributes.

The overall low preference for DPB products could be associated to the fact that this topic (dual-purpose chicken breeds) is unknown to most European consumers [10,67,83]. Therefore, for this particular alternative production system (dual-purpose breeds fed with German field beans), it is necessary to communicate what dual-purpose breeds are and to specifically market the regional origin of the feedstuff, along with the sustainability and ethical advantages of this product when compared to conventional chicken meat. A proper communication of the advantages of these products could justify a higher price and more consumer engagement in these topics. By increasing communication of these particular products, consumers would be more aware of their decisions and the impact these have on sustainability issues like animal welfare (e.g., killing of day-old chicks), sustainability (e.g., supporting local economy, conserving biodiversity through the use of traditional chicken breeds), and environmental issues (e.g., avoiding imports of protein feedstuff for animals).

The major limitation of the present study is that since this product is still not available in a mainstream market, consumers had to make their choices assuming the product was available without having prior experience. Although potential consumers of DPBs show a higher engagement towards DPBs, and a higher engagement to animal welfare and regional origin, important aspects such as organoleptic properties and availability can heavily influence the final behavior. This study is also limited by the use of a method that indirectly measures consumers' WTP. As participants do not have to actually pay for the products they are selecting, there are no actual financial consequences for their decisions. This lack of financial consequences creates a hypothetical willingness to pay [84].

5. Conclusions

In order to create a successful marketing strategy for alternative production methods for poultry, it is necessary to understand which product characteristics consumers value the most. From this study it can be concluded that, after price, consumers value most the information about the origin of the product and origin of the animal feedstuff. Three classes were obtained from the latent class analysis based on their preferences for certain attributes: (1) price-conscious consumers (where price is the most important attribute), (2) price-sensitive and origin-oriented consumers (where price and origin are of importance), and (3) origin-oriented consumers (where origin importance is the highest). We conclude that the target consumer for meat of DPB fed with German field beans is Class 3 "origin-oriented consumers". Although consumers in this segment are interested in the idea of dual-purpose breeds, this attribute alone is not enough to influence their purchase behavior. Since animal welfare standards and region of origin are important to them, an approach to promote dual-purpose breeds could highlight these particular attributes rather than the specifics of the breeding.

The results of this study support the idea of using alternative production methods in the poultry industry. This is of particular relevance to this industry since the killing of day-old chicks will be prohibited in Germany starting 2022 and alternatives have to be implemented. Moreover, these results are also relevant to breeders of DPBs and growers of faba beans in Germany as consumers showed interest in these products.

Further research should test how to integrate and communicate different concepts related to these accepted attributes in chicken meat. Additionally, future studies could research organoleptic acceptance (sensory testing) with consumers along with an experimental auction, where consumers actually have to purchase the product, as this could show a real WTP and preference for these products when including experience and credence attributes.

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Appendix A

Table A1. Statements used to measure the extended TPB (translated from German).

Predictors		Wording
ATB [53]	1	The purchase of products from DPB (eggs and meat) is interesting for me.
	2	It is a good idea to buy products from DPB (eggs and meat).
	3	It is important for me to buy products from DPB (eggs and meat).
	4	The purchase of products from DPB (meat and eggs) is good.
SN [53,60,62]	1	People who are important to me think that I should buy products from DPB (eggs and meat).
	2	People who are important to me want me to buy products from DPB (eggs and meat).
	3	People whose opinions I value would prefer that I buy chicken and eggs from DPB.
	4	The positive opinion of my friends influences me to buy products from DPB (meat and eggs).
PBC [62]	1	I know where I can buy chicken and eggs from DPB.
	2	I am confident that I will buy chicken meat and eggs from DPB.
	3	I see myself in a position to buy chicken meat and eggs from DPB in the future.
	4	I am ready to invest more time and money in purchasing chicken meat and eggs from DPB.
PNAW [61]	5	Products from DPB (meat and eggs) are available in the shops where I usually go shopping.
	1	People should do everything to improve animal welfare.
	2	I feel a moral obligation to buy DPB products (meat and eggs) regardless of what others do.
	3	I feel guilty buying meat and eggs where the day-old chicks were killed.
PNR [61]	4	I feel morally obliged to consider animal welfare in my daily behavior.
	1	People should do everything possible to increase the consumption of regional products.
	2	I feel a moral obligation to buy products from this region, regardless of what others do.
	3	I feel guilty if I buy chicken and eggs from other countries or regions.
	4	I feel obliged to consider regional consumption in my daily behavior.

ATB: attitude towards the behavior, SN: subjective norms, PBC: perceived behavioral control, PNAW: personal norms on animal welfare, PNR: personal norms on regional products; DPB: dual-purpose breeds. Source: adapted from [53,60–62].

Table A2. Information provided to participants prior to the choice experiment (translated from German).**Current poultry farming system**

“The intensive poultry husbandry of chickens is characterized by specialized laying breeds (egg production) and fattening breeds (meat production). For modern meat production, specialized fattening breeds are used, which reach a weight of 2.6 kg within 6 weeks and can then be slaughtered. Specialized laying breeds are used in egg production, which lay up to 330 eggs in a laying period of 56 weeks. These laying breeds are thin and do not produce much meat, even when fully grown. The problem with the laying breeds is that only the female animals can lay eggs. Since this breed produces little meat and the male chicks do not lay eggs, these (male chicks) are generally killed today on the first day of life. This practice is carried out today by almost all farmers in conventional farming and by the vast majority in organic farming.”

Dual-purpose breeds

“A possible solution to avoid the direct killing of male chicks is the use of “brother cocks”. These are the male siblings of the laying hens, which are reared as broilers. However, the use of brother cocks is regarded as a transitional solution until there are solid dual-purpose breeds, because these chickens are relatively expensive. A dual-purpose breed is a breed that can be used for both production systems (eggs and meat). This means that the female hens lay relatively many eggs, the male hens gain weight relatively well. Both are not as good as the specialized breeds, but they can do both, which also explains the name “dual-purpose breed”. Since these breeds are not only for egg production, chicks do not have to be killed and can be used for meat production. This prevents the male chicks from being killed directly and then new chickens from being bought for meat production only. At the moment it is possible to buy products from dual-purpose chickens. However, these products are not very common as they are only available in certain regions and shops.”

Current poultry feed situation

“Another current problem with chicken production is that many farmers in Germany produce only a small part of the feed for their animals themselves. In most cases, this is purchased from feed manufacturers. A supply bottleneck (i.e., less produced than used) exists throughout the EU, especially for protein feed (protein). For the protein supply of livestock in Germany, 27% of this feed component must be imported. Most of the imported raw protein is in the form of soybeans and soy extraction meal, which are mainly produced in the USA or South America (e.g., Brazil). In the public debate, some interest groups are calling for the import of protein feed to be reduced and for only domestic raw materials to be used. One reason for this is, for example, the criticism of genetically modified varieties. In order to solve this problem, farmers and scientists are looking for other protein sources with correspondingly available protein quantity and quality.”

References

- Fraser, D. Animal welfare and the intensification of animal production. In *Ethics of Intensification: Agricultural Development and Cultural Change*; Thompson, P.B., Ed.; FAO: Rome, Italy, 2008; Volume 16, pp. 167–189.
- Statista: Fleischkonsum pro Kopf in Deutschland in den Jahren 1991 bis 2019. Available online: <https://de.statista.com/statistik/daten/studie/36573/umfrage/pro-kopf-verbrauch-von-fleisch-in-deutschland-seit-2000/> (accessed on 5 October 2020).
- Bundesanstalt für Landwirtschaft und Ernährung. Bericht zur Markt- und Versorgungslage Fleisch 2018. Available online: https://www.ble.de/SharedDocs/Downloads/DE/BZL/Daten-Berichte/Fleisch/2018BerichtFleisch.pdf?__blob=publicationFile&v=4 (accessed on 5 October 2020).
- Leenstra, F.; Munnichs, G.; Beekman, V.; van den Heuvel-Vromans, E.; Aramyan, L.; Woelders, H. Killing day-old chicks? Public opinion regarding potential alternatives. *Anim. Welf.* **2011**, *20*, 37–45.
- Rautenschlein, S. Einsatz des Zweinutzungshuhns in Mast und Eierproduktion: Ansätze für ein integriertes Haltungskonzept. *RFL* **2016**, *68*, 276–278.
- Bundesministerium für Ernährung und Landwirtschaft: Tierwohl-Initiative. Available online: https://www.bmel.de/DE/Tier/Tierwohl/_texte/Tierwohl-Forschung-In-Ovo.html (accessed on 3 March 2020).
- Zeit Online. Kükenschreddern Wird ab 2022 Verboten. Available online: <https://www.zeit.de/politik/deutschland/2020-09/tierschutzgesetz-kuekenschreddern-eintagskueken-maennliche-kueken-julia-kloeckner> (accessed on 15 September 2020).
- Damme, K.; Urselmans, S.; Schmidt, E. Economics of dual-purpose breeds—A comparison of meat and egg production using dual purpose breeds versus conventional broiler and layer strains. *Lohmann Inf.* **2015**, *50*, 4–9.
- Diekmann, J.; Hermann, D.; Mußhoff, O. Wie hoch ist der Preis auf Kükentötungen zu verzichten? Bewertung des Zweinutzungshuhn- und Bruderhahnkonzepts als wirtschaftliche Alternative zu Mast- und Legehybriden. *Ber. Landwirtsch.* **2017**, *95*, 1–22.
- Brümmer, N.; Christoph-Schulz, I.; Rovers, A.K. Consumers’ perspective on dual-purpose chickens. *Proc. Syst. Dyn. Innov. Food Netw.* **2017**, 164–169. [[CrossRef](#)]

11. Lichovníková, M.; Jandásek, J.; Juzl, M.; Dracková, E. The meat quality of layer males from free range in comparison with fast growing chickens. *Czech J. Anim. Sci.* **2009**, *11*, 490–497. [[CrossRef](#)]
12. Spalona, A.; Ranvig, H.; Cywa-Benko, K.; Zanon, A.; Sabbioni, A.; Szalay, I.; Benková, J.; Baumgartner, J.; Szwaczkowski, T. Population size in conservation of local chicken breeds in chosen European countries. *Arch. Geflügelk.* **2007**, *2*, 49–55.
13. Padhi, M.K. Importance of indigenous breeds of chicken for rural economy and their improvements for higher production performance. *Scientifica* **2016**, *6*, 1–9. [[CrossRef](#)] [[PubMed](#)]
14. Weigend, S.; Stricker, K.; Röhrßen, F.G. Establishing a conservation flock for “Vorwerkhuhn” chicken breeds—A case study of in-situ conservation of local chicken breeds in Germany. *Anim. Genet. Resour. Inf.* **2009**, *44*, 87–88. [[CrossRef](#)]
15. Farmer, L.; Perry, G.; Lewis, P.; Nute, G.; Piggott, J.; Patterson, R. Responses of Two Genotypes of Chicken to the Diets and Stocking Densities of Conventional UK and Label Rouge Production Systems—II. Sensory Attributes. *Meat Sci.* **1997**, *45*, 77–93. [[CrossRef](#)]
16. Grashorn, M.; Serini, C. Quality of chicken meat from conventional and organic production. In Proceedings of the 12th European Poultry Conference, Verona, Italy, 10–14 September 2006; CABI Int.: Wallingford, UK, 2006.
17. Smith, D.; Northcutt, J.; Steinberg, E. Meat quality and sensory attributes of a conventional and a Label Rouge-type broiler strain obtained at retail. *Poult. Sci.* **2012**, *91*, 1489–1495. [[CrossRef](#)] [[PubMed](#)]
18. Apostolidis, C.; McLeay, F. Should we stop eating like this? Reducing meat consumption through substitution. *Food Policy* **2016**, *65*, 74–89. [[CrossRef](#)]
19. Boggia, A.; Paolotti, L.; Castellini, C. Environmental impact evaluation of conventional, organic and organic-plus poultry production systems using life cycle assessment. *World's Poult. Sci. J.* **2010**, *66*, 95–114. [[CrossRef](#)]
20. Nalle, C.; Ravindran, V.; Ravindran, G. Nutritional value of faba beans (*Vicia faba* L.) for broilers: Apparent metabolizable energy, ileal amino acid digestibility and production performance. *Anim. Feed Sci. Technol.* **2010**, *156*, 104–111. [[CrossRef](#)]
21. Deutscher Bauernverband (DBV). Erzeugung und Märkte. In *Situationsbericht 2016/17. Trends und Fakten zur Landwirtschaft*; Hemmerling, U., Pascher, P., Naß, S., Eds.; Deutscher Bauernverband: Berlin, Germany, 2016; pp. 148–193. ISBN 978-3-9812770-8-1.
22. De Visser, C.; Schreuder, R.; Stoddard, F. The EU's dependency on soya bean import for the animal feed industry and potential for EU produced alternatives. *OCL* **2014**, *24*, D407. [[CrossRef](#)]
23. Proskina, L.; Cerina, S. Faba beans and peas in poultry feed: Economic assessment. *J. Sci. Food Agric.* **2016**, *97*, 4391–4398. [[CrossRef](#)]
24. Profeta, A.; Hamm, U. Consumers' expectations and willingness-to-pay for local animal products produced with local feed. *Int. J. Food Sci. Technol.* **2019**, *54*, 651–659. [[CrossRef](#)]
25. Duc, G. Faba bean (*Vicia faba* L.). *Field Crop. Res.* **1997**, *53*, 99–109. [[CrossRef](#)]
26. Crépon, K.; Marget, P.; Peyronnet, C.; Carrouée, B.; Arese, P.; Duc, G. Nutritional value of faba bean (*Vicia faba* L.) seeds for feed and food. *Field Crop. Res.* **2010**, *115*, 329–339. [[CrossRef](#)]
27. Laudadio, V.; Ceci, E.; Tufarelli, V. Productive traits and meat fatty acid profile of broiler chickens fed diets containing micronized faba beans (*Vicia faba* L. var. minor) as the main protein source. *JAPR* **2011**, *20*, 12–20. [[CrossRef](#)]
28. Nolte, T.; Jansen, S.; Weigend, S.; Moerlein, D.; Halle, I.; Link, W.; Hummel, J.; Simianer, H.; Sharifi, A.R. Growth performance of local chicken breeds, a high-performance genotype and their crosses fed with regional faba beans to replace soy. *Animals* **2020**, *10*, 702. [[CrossRef](#)] [[PubMed](#)]
29. Escobedo del Bosque, C.I.; Altmann, B.A.; Ciulu, M.; Halle, I.; Jansen, S.; Nolte, T.; Weigend, S.; Mörlein, D. Meat quality parameters and sensory properties of one high-performing and two local chicken breeds fed with *Vicia faba*. *Foods* **2020**, *9*, 1052. [[CrossRef](#)]
30. Steptoe, A.; Pollard, J.; Wardle, J. Development of a measure of the motives underlying the selection of food: The food choice questionnaire. *Appetite* **1995**, *25*, 267–284. [[CrossRef](#)] [[PubMed](#)]
31. Brunso, K.; Scholderer, J.; Grunert, K.G. Closing the gap between values and behaviour—A means-end theory of lifestyle. *J. Bus. Res.* **2004**, *57*, 665–670. [[CrossRef](#)]
32. Toma, L.; Stott, A.W.; Revoredo-Giha, C.; Kupiec-Teahan, B. Consumers and animal welfare. A comparison between European Union countries. *Appetite* **2012**, *58*, 597–607. [[CrossRef](#)] [[PubMed](#)]
33. Heise, H.; Theuvsen, L. What do consumers think about farm animal welfare in modern agriculture? Attitudes and shopping behaviour. *Int. Food Agribus. Manag. Rev.* **2017**, *20*, 379–399. [[CrossRef](#)]
34. Grunert, K.; Hieke, S.; Wills, J. Sustainability labels on food products: Consumer motivation, understanding and use. *Food Policy* **2014**, *44*, 177–189. [[CrossRef](#)]
35. Fernqvist, F.; Ekelund, L. Credence and the effect on consumer liking of food—A review. *Food Qual. Prefer.* **2014**, *32*, 340–353. [[CrossRef](#)]
36. Weinrich, R.; Spiller, A. Developing food labelling strategies: Multi-level labelling. *J. Clean. Prod.* **2016**, *137*, 1138–1148. [[CrossRef](#)]
37. Ajzen, I. The theory of planned behavior. *Organ. Behav. Decision Process* **1991**, *50*, 179–211. [[CrossRef](#)]
38. Lancsar, E.; Louviere, J. Conducting Discrete Choice Experiments to Inform Healthcare Decision Making. *Pharmacoconomics* **2008**, *26*, 661–667. [[CrossRef](#)] [[PubMed](#)]
39. Loureiro, M.; Umberger, W. A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety, country-of-origin labelling and traceability. *Food Policy* **2007**, *32*, 496–514. [[CrossRef](#)]
40. Lancaster, K. A new approach to consumer theory. *J. Political Econ.* **1966**, *74*, 132–157. [[CrossRef](#)]

41. Nocella, G.; Boecker, A.; Hubbard, L.; Scarpa, R. Eliciting consumer preferences for certified animal-friendly foods: Can elements of the theory of planned behaviour improve choice experiment analysis? *Psychol. Mark.* **2012**, *29*, 850–868. [CrossRef]
42. Sawtooth. The CBC Latent Class Technical Paper 2019. Available online: <https://sawtoothsoftware.com/resources/technical-papers/latent-class-technical-paper> (accessed on 20 August 2020).
43. Napolitano, F.; Girolami, A.; Braghieri, A. Consumer liking and willingness to pay for high welfare animal-based products. *Trends Food Sci. Technol.* **2010**, *21*, 537–543. [CrossRef]
44. Olesen, I.; Alfines, F.; Røra, M.B.; Kolstad, K. Eliciting consumers' willingness to pay for organic and welfare-labelled salmon in a non-hypothetical choice experiment. *Livest. Sci.* **2010**, *127*, 218–226. [CrossRef]
45. Zanolli, R.; Scarpa, R.; Napolitano, F.; Piasentier, E.; Naspetti, S.; Bruschi, V. Organic label as an identifier of environmentally related quality: A consumer choice experiment on beef in Italy. *Renew. Agric. Food Syst.* **2013**, *28*, 70–79. [CrossRef]
46. Napolitano, F.; Braghieri, A.; Piasentier, E.; Favotto, S.; Naspetti, S.; Zanolli, R. Effect of information about organic production on beef liking and consumer willingness to pay. *Food Qual. Prefer.* **2010**, *21*, 207–212. [CrossRef]
47. Dei, H.K. Soybean as a Feed Ingredient for Livestock and Poultry. In *Recent Trends for Enhancing the Diversity and Quality of Soybean Products*; Krezhova, D., Ed.; InTech: Rijeka, Croatia, 2011; pp. 215–226. ISBN 978-953-307-533-4.
48. WWF. *The Growth of Soy: Impacts and Solutions*; WWF International: Gland, Switzerland, 2014; pp. 20–31. ISBN 978-2-940443-79-6.
49. Feldmann, C.; Hamm, U. Consumers' perceptions and preferences for local food: A review. *Food Qual. Prefer.* **2015**, *40*, 152–164. [CrossRef]
50. Hempel, C.; Hamm, U. How important is local food to organic-minded consumers? *Appetite* **2016**, *96*, 309–318. [CrossRef] [PubMed]
51. Dagevos, H. Consumers as four-faced creatures. Looking at food consumption from the perspective of contemporary consumers. *Appetite* **2005**, *45*, 32–39. [CrossRef]
52. Hoeksma, D.L.; Gerritzen, M.A.; Lokhorst, A.M.; Poortvliet, P.M. An extended theory of planned behaviour to predict consumers' willingness to buy mobile slaughter unit meat. *Meat Sci.* **2017**, *128*, 15–23. [CrossRef] [PubMed]
53. Yazdanpanah, M.; Forouzani, M. Application of the Theory of Planned Behaviour to predict Iranian students' intention to purchase organic food. *J. Clean. Prod.* **2015**, *107*, 342–352. [CrossRef]
54. Farr-Wharton, G.; Foth, M.; Hee-Jeong Choi, J. Identifying factors that promote consumer behaviour causing expired domestic food waste. *J. Consum. Behav.* **2014**, *13*, 393–402. [CrossRef]
55. Whitley, C.T.; Takahashi, B.; Zwickle, A.; Besley, J.C.; Lertpratchya, A.P. Sustainability behaviors among college students: An application of the VBN theory. *J. Environ. Educ. Res.* **2014**, *24*, 245–262. [CrossRef]
56. Stern, P.C.; Dietz, T.A.; Guagnano, C.A.; Kalof, L. A value-belief-norm theory of support for social movements: The case of environmentalism. *Hum. Ecol. Rev.* **1999**, *6*, 81–97.
57. Han, H. Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior. *Tour. Manag.* **2015**, *47*, 164–177. [CrossRef]
58. Al-Swidi, A.; Mohammed Rafiul Huque, S.; Haroon Hafeez, M.; Noor Mohd Shariff, M. The role of subjective norms in theory of planned behavior in the context of organic food consumption. *Br. Food J.* **2014**, *116*, 1561–1580. [CrossRef]
59. Aertsens, J.; Verbeke, W.; Mondelaers, K.; Van Huylenbroeck, G. Personal determinants of organic food consumption: A review. *Br. Food J.* **2009**, *111*, 1140–1167. [CrossRef]
60. Chen, M.-F.; Tung, P.-J. Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. *Int. J. Hosp. Manag.* **2014**, *36*, 221–230. [CrossRef]
61. Ibtissem, M.H. Application of value beliefs norms theory to the energy conservation behaviour. *J. Sustain. Dev.* **2010**, *3*, 129–139. [CrossRef]
62. Paul, J.; Modi, A.; Patel, J. Predicting green product consumption using the theory of planned behaviour and reasoned action. *J. Retail. Consum. Serv.* **2016**, *29*, 123–134. [CrossRef]
63. Brosius, F. *SPSS 21*; Mipt: Heidelberg, Germany, 2013; pp. 123–154. ISBN 978-3-8266-9454-7.
64. Destatis. *Statistisches Jahrbuch 2017. Deutschland und Internationales*. Wiesbaden, Germany: Statistisches Bundesamt. Available online: <https://www.destatis.de/DE/Presse/Pressekonferenzen/2017/Jahrbuch-2017/pm-jahrbuch.html> (accessed on 14 November 2019).
65. Nylund, K.L.; Asparouhov, T.; Muthén, B.O. Deciding on the number of classes in latent class analysis and growth mixture modelling: A Monte Carlo simulation study. *Struct. Equ. Model.* **2007**, *14*, 535–569. [CrossRef]
66. Field, A. *Discovering Statistics Using SPSS*, 3rd ed.; SAGE: London, UK, 2009; pp. 627–685. ISBN 978-1-84787-906-6.
67. Busse, M.; Kernecker, M.L.; Zscheischler, J.; Zoll, F.; Siebert, R. Ethical concerns in poultry production: A German consumer survey about dual purpose chickens. *J. Agric. Environ. Ethics* **2019**, *32*, 905–925. [CrossRef]
68. Lockshin, L.; Jarvis, W.; d'Hauteville, F.; Perrouy, J.-P. Using simulations from discrete choice experiments to measure consumer sensitivity to brand, region, price, and awards in wine choice. *Food Qual. Prefer.* **2006**, *17*, 166–178. [CrossRef]
69. Steenhuis, I.H.M.; Waterlander, W.E.; Mul, A. Consumer food choices: The role of price and pricing strategies. *Public Health Nutr.* **2011**, *14*, 2220–2226. [CrossRef]
70. Chamorro, A.; Rubio, S.; Miranda, F.J. The region-of-origin (ROO) effect on purchasing preferences: The case of multiregional designation of origin. *Br. Food J.* **2014**, *117*, 820–839. [CrossRef]

71. Risius, A.; Janssen, M.; Hamm, U. Consumer preference for suitable aquaculture products: Evidence from in-depth interviews, think aloud protocols and choice experiments. *Appetite* **2017**, *113*, 246–254. [[CrossRef](#)] [[PubMed](#)]
72. Risius, A.; Hamm, U.; Janssen, M. Target groups for fish from aquaculture: Consumer segmentation based on sustainability attributes and country of origin. *Aquaculture* **2019**, *499*, 341–347. [[CrossRef](#)]
73. Schnettler, B.; Ruiz, D.; Sepúlveda, O.; Sepúlveda, N. Importance of the country of origin in food consumption in a developing country. *Food Qual. Prefer.* **2008**, *19*, 372–382. [[CrossRef](#)]
74. Rahbauer, S.; Staudigel, M.; Roosen, J. Investigating German meat demand for consumer groups with different attitudes and sociodemographic characteristics. In Proceedings of the 30th International Conference of Agricultural Economists, Vancouver, BC, Canada, 28 July–2 August 2018. [[CrossRef](#)]
75. Becker, T.; Benner, E.; Glitsch, K. Consumer perception of fresh meat quality in Germany. *Br. Food J.* **2000**, *102*, 246–266. [[CrossRef](#)]
76. Escobedo del Bosque, C.I.; Busch, G.; Spiller, A.; Risius, A. My meat does not have feathers: Consumers' associations with pictures of different chicken breeds. *J. Agric. Environ. Ethics* **2020**. [[CrossRef](#)]
77. Bastian, B.; Loughnan, S. Resolving the meat-paradox: A motivational account of morally troublesome behavior and its maintenance. *Personal. Soc. Psychol. Rev.* **2017**, *21*, 278–299. [[CrossRef](#)]
78. Kunst, J.; Palcios Haugestad, C.A. The effects of dissociation of willingness to eat meat are moderated by exposure to unprocessed meat: A cross-cultural demonstration. *Appetite* **2018**, *120*, 356–366. [[CrossRef](#)]
79. Vanhonacker, F.; Verbeke, W.; Van Poucke, E.; Tuytens, F. Segmentation based on consumers' perceived importance and attribute toward farm animal welfare. *Int. J. Sociol. Food Agric.* **2007**, *15*, 84–100. Available online: <http://hdl.handle.net/1854/LU-408305> (accessed on 5 October 2020).
80. Mulder, M.; Zomer, S. Dutch consumers' willingness to pay for broiler welfare. *J. Appl. Anim. Behav. Sci.* **2017**, *20*, 137–154. [[CrossRef](#)]
81. Xu, L.; Yang, X.; Chen, X.; Chen, L.; Tsai, F.-S. Consumers' willingness to pay for food with information on animal welfare, lean meat essence detection, and traceability. *Int. J. Environ. Res. Public Health* **2019**, *16*, 3616. [[CrossRef](#)] [[PubMed](#)]
82. Gracia, A.; Barreiro-Hurlé, J.; López-Galán, B. Are local and organic claims complements or substitutes? A consumer preferences study for eggs. *J. Agric. Econ.* **2013**, *65*, 49–67. [[CrossRef](#)]
83. Gangnat, I.D.M.; Mueller, S.; Kreuzer, M.; Messikommer, R.E.; Siegrist, M.; Visschers, V.H.M. Swiss consumers' willingness to pay and attitudes regarding dual-purpose poultry and eggs. *Poult. Sci.* **2018**, *97*, 1089–1098. [[CrossRef](#)] [[PubMed](#)]
84. Schmidt, J.; Bijmolt, T.H.A. Accurately measuring willingness to pay for consumer goods: A meta-analysis of the hypothetical bias. *J. Acad. Mark. Sci.* **2020**, *48*, 499–518. [[CrossRef](#)]