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How Successful Is Origin Labeling in a Developing Country Context? Moroccan Consumers' Preferences toward Local Products

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Abstract: The Green Moroccan Plan (GMP) is a national long-term strategy launched by the Moroccan government to support the agricultural sector as the main driver of social and economic development. The GMP involves a labeling strategy based on geographical indications, aimed at protecting and promoting the marketing of locally produced food specialties and linking their specific qualities and reputations to their domestic production region. We evaluated the success of this policy by comparing consumers' attitudes and preferences toward a local product having a geographical indication label to one without. We conducted a survey of 500 consumers in main Moroccan cities. The potential consumer set for the local product was found to be segmented, indicating the potential for a domestic niche of environmentally aware consumers preferring organically and sustainably produced food. We applied the analytical hierarchy process to prioritize the attributes of the commodities of interest, which underscores the importance of the origin when choosing a local product without origin labeling; for the labeled product, intrinsic quality attributes are considered to be more important. These findings demonstrate the limited promotion of the established origin labeling in the domestic market. Hence, we recommend that the Moroccan government reinforce the labeling scheme with an organic label to increase the market potential of the environmentally aware consumers by ensuring sustainable production of local products.

Keywords: AHP; consumer attitudes; consumer preferences; environmentally friendly; food attributes; local product; origin labeling

1. Introduction

The agricultural sector plays a substantial role in the economic and social stability of Morocco. It is essential for ensuring sustainable economic development since it contributes almost 19% of the country's gross domestic product and substantially influences the macroeconomic balance [1]. Its vitality for ensuring food security for the Moroccan population of more than 30 million people reaffirms the crucial importance of this sector in the country's economy [2]. The sector also has an important social dimension, as 80% of the country's rural inhabitants, which account for almost half of the national population, depend on revenues from it, and it employs a significant proportion of the rural labor force.

Since 2008, the country has adopted the Green Morocco Plan (GMP; Plan Maroc Vert), which is an agricultural policy setting the framework for achieving the national strategic objective of unlocking the potential of agriculture for the economic development of the country. Consequently, a number of initiatives have been implemented. The process of labeling was launched with the establishment of Law No. 25-06 regulating the Distinctive Signs of Origin and Quality (SDOQ) labeling for food, agricultural, and fishery products.

In 2010, a quality labeling scheme was established as part of the GMP to strengthen the commercialization, valorization, and promotion of domestically produced agricultural and food products. This strategy aims at creating and promoting geographical indications (GI) which establish intellectual property rights for products whose qualities are linked to a specific area of production, e.g., in the form of protected geographical indication (PGI) or protected designation of origin (PDO) labels. It focuses mainly on a number of "terroir" products, which are food specialties whose production is linked to unique features such as the particular natural resources of the production region (e.g., involving the interaction of unique environmental contexts such as climate, soil, and geomorphology) or the human know-how (e.g., traditional and nature-inclusive low-intensity farming practices) [3,4]. The labeling scheme is considered one central framework for sustainable rural development given its capacity to create high added value in less-favored and remote areas such as the oases and mountainous areas that cover the country [5]. The goal envisaged by Moroccan policy makers is the reinforcement of the link between the specific production region and the name of the product so that quality attributes and reputation could be associated by consumers with its geographical origin, which is expected to boost consumer awareness and domestic consumption [6]. In particular, this policy aims at promoting the marketing of locally produced food specialties to help reduce poverty in such regions, which are often located far away from the densely populated Moroccan coastline. This policy intends to guide consumers toward food choices that lead to the promotion and recognition of traditional local food systems and the preservation of the nation's agricultural heritage. A further goal is to enable consumers to trust and distinguish quality products and origin through GI signs [7,8].

Such marketing support strategies are, however, only successful if the targeted consumers are aware of the label and trust it as a reliable and crucial indicator of product quality, ensuring the creation of the associated non-commodity benefits to the society as mentioned above. We achieved these insights by assessing relative preferences for the attributes of labeled specialty foods and comparing them to those of a non-labeled terroir commodity. If consumers assign the highest value to attributes other than the label for their purchase decision, then one can conclude that the label and, thus, its associated societal benefits in terms of sustainable farming and rural development do not play the most important role in consumers' attitudes toward such a commodity. In this sense, consumers are only partly aware of the benefits guaranteed by the label. Consumers' preferences of established origin labels measured by their relative importance is hence a decisive component determining the success of this aspect of the GMP.

The objectives of the Green Morocco Plan's origin labeling are to promote terroir products by guaranteeing their origin, product quality, and the previously mentioned non-commodity benefits associated with traditional production, which mostly occurs in remote and poor rural regions. Hence, there is a clear added value and additional benefit of GI labeling in comparison to only knowing the origin of the commodity. Therefore, a PGI label may boost quantities domestically marketed as a GI label may attract additional consumers in urban regions that switch to this particular commodity because they might deliberately wish to support the creation of such non-commodity benefits in disadvantaged parts of the country.

Several studies have analyzed preferences and attitudes of consumers in the Mediterranean region toward origin-labeled food. Recently, researchers examined consumers' preferences and drivers affecting the choice of quality-labeled food products considering PDO-labeled cheese in Italy and France [9]. The authors used a questionnaire for sampling 808 consumers and found that the motivations, the perceived ability to perform the behavior, and consumers' attitudes are significant predictors of the intention to purchase PDO-labeled cheese. The results showed the significant effect of subjective and moral norms in influencing the intention to purchase PDO-labeled cheese and suggested that the authorities should carefully target their interventions to stimulate the demand of PDO-labeled products. Other studies explored local foods such as Spanish extra virgin

olive oil and considered the effects of the country of origin (COO) and ethnocentrism as relevant factors in making a decision about product choice (e.g., the COO is considered an emotional dimension of purchasing behavior). The study suggested that understanding the role played by consumers' ethnocentrism in the evaluation of food products in accordance with their origin may yield useful information for local food producers [10]. Italian apples with PDO and PGI labels were compared to Italian apples without such labels [11] using chemical chemometrics and multielement composition analysis linked to soil and environment conditions. The authors found that the use of those techniques represents an interesting tool to enhance and protect the PDOs and PGIs of Italian products. Another study explored the representativeness of relevant stakeholders in the elaboration of GIs in France and Vietnam [12]. They recommended that the state needs to consult a wide range of stakeholders in the process of elaborating GIs, first the value-chain stakeholders, and second those outside the value chain, such as local authority representatives, traders, and consumers. Finally, Dokuzlu [13] demonstrated methods to implement GIs in domestic markets in developing countries, with a focus on Turkey. The author considers the establishment of an efficient control system and the promotion of GI-holding organizations necessary for developing countries with no sufficient experience in applying GIs. Many of these studies recommended how to implement and control GIs and analyze the perception of those quality signs by local consumers [14–16].

Only few studies focused on consumers' preferences and perceptions of GIs in the North African context. One study investigated quality cues to explore the importance of origin attributes in the choice of olive oil by consumers in Tunisia and France [17]. The results revealed the importance of origin cues in consumer choice: French consumers tended to choose olive oil based on the GI, whereas Tunisian consumers mainly used origin and sensory cues. Recently, Lambarraa-Lehnhardt et al. [18] examined Moroccan consumers' preferences regarding PGI-labeled oasis dates. To the best of our knowledge, no study has evaluated the market visibility of established origin labels by measuring consumers' preferences toward local products. Our findings add to the literature by providing an evaluation of consumer preferences and visibility of the PGI sign established by the GMP labeling scheme. In particular, we analyzed the attitudes and preferences of Moroccan consumers toward a labeled local product that carries a quality sign of origin and compared them to those toward an unlabeled local product. For this purpose, we considered the main attributes of both products including the PGI for the labeled local product and the origin for both local products.

To gain those insights, we chose clementines of Berkane, which have the biggest market value among all labeled domestic food products marketed in Morocco. This value amounts to more than EUR 55 million per year substantially exceeding the value of other traditional commodities such as carob or argan oil [7]. Given their high commercial value and traditional position in the domestic market, clementines of Berkane are positioned within the core of the development strategy of the GMP. This product received a PGI label as a distinctive sign of origin and quality in 2010. The label promotes and protects the PGI clementines of Berkane in domestic and international markets by guaranteeing origin and quality to consumers. The fruits may only be produced in seven localities in the Molouya region in Morocco's northeast and must meet distinctive qualitative criteria such as a minimum juice content of 40%. The PGI and origin attributes in the case of clementines can be considered substitutes to a limited extent although the established PGI label creates a number of benefits to society, which are fairly independent of the product origin.

For comparison, we chose the cherries produced in the region of Sefrou–Ifrane as a non-labeled local terroir benchmark commodity. As many producers of other traditional Moroccan terroir products, the producers of these cherries are also seeking to obtain a PGI label. This particular type of cherries is recognized as having a good reputation in the domestic market [19,20]. Despite most of the marketed quantities being produced in the Sefrou–Ifrane region, the product is barely promoted in the domestic market. We conducted a survey with 500 consumers in four of the largest cities of Morocco (Casablanca, Rabat, Fes,

and Meknes). The analytical hierarchy process (AHP) was used for estimating the relative importance of the consumers' most desired product attributes and their various levels.

The remainder of this paper is organized as follows: Section 2 describes the data and outlines the methods applied. Section 3 presents the results. Section 4 discusses the findings and concludes the paper.

2. Materials and Methods

2.1. Analytical Hierarchy Process (AHP)

Before implementing the AHP, we examined whether Moroccan consumers of local terroir food specialties can be segmented into distinct groups using SPSS. First, the attitudes items regarding the respondents' ratings of the characteristics and attributes of terroir products were extracted into a few factors using principal component analysis. The objective was to condense the information of the original variables into a small number of factors associated with the respondents' attitudes toward terroir products. The following criteria were used for extracting the factors: having an eigenvalue greater than 1, each one explaining at least 5% of the total variance of the items; the scree plot; statistical tests, e.g., KMO and Bartlett's; the total explained variance of the total components; and Cronbach's alpha to measure internal consistency. Second, a cluster analysis was performed to determine the number of homogenous groups contained in the data. For the analysis, we employed an agglomerative hierarchical technique. The existing segment clusters were then identified using the SPSS cluster technique based on the identified factor groupings [21–23].

Several methods can be used to analyze the preferences of consumers. In addition to the AHP, other stated-preference methods such as discrete choice experiments (DCEs) can be used. This latter approach is based on the creation of a hypothetical market for the product by simulating the stated purchasing preference, which is based on the trade-off between product attributes. One important attribute is the price, and consumers are asked which product they would purchase from a set of competitive products at different prices. In our analysis, we used the AHP as our objective in assessing consumers' preferences independently of the purchasing decision and comparing two different products based on nonmonetary attributes such as the origin. If an extensive survey is conducted, the AHP provides the advantage where asking the consumers for a pairwise comparison of attributes and levels is less difficult than comparing two or more complex choice sets as for DCEs, for example. Several studies benchmarked the AHP against other methods, demonstrating its ability to correctly analyze individuals' preferences and find similar rankings of attributes and levels [24,25].

The AHP is a multicriteria analysis that was originally developed in the 1970s by mathematician Thomas Saaty. It compares and chooses between options and predefined criteria by breaking down a complex problem into its main components. It helps decision-makers reach rational and optimized decisions by considering the options that suit their goals [26,27]. In the context of analyzing consumers' perceptions and preferences, the AHP can be used to convert preferences of many individuals into weight ratios, quantifying the average importance of the preference across the study population. Those weight ratios can be used to compare and rank decision alternatives and thus assist consumers in forming a choice regarding certain product attributes [28,29].

Before implementing the AHP, the decision hierarchy needs to be constructed. Thus, every product attribute and subattribute are organized following a hierarchical structure. If we consider the example of cherries, the fruit pulp attribute has two possible subattributes, also called levels: crisp-firm and juicy-soft. During the survey, consumers were asked to rate each attribute and subattribute of cherries on a scale of nine points (see Table 1 for an example) based on pairwise comparisons within a structured hierarchy [24]. These consumer valuations were then translated into a weight for each attribute and subattribute. The result was used to compare and rank the alternatives and to choose the most important attribute based on the highest score.

Table 1. Example of the AHP questions following the Saaty scale.

	Clementines						Cherries				
	High juice content			Low juice content			Dark red color			Large size	
9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9		9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9					
	PGI labeling			Origin			Fruit pulp			Origin	
9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9		9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9					
	Berkane origin			Other origin			Sefrou–Ifrane origin			Other origin	
9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9		9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9					
	Orange-reddish color			Light orange color			Size			Color	
9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9		9 8 7 6 5 4 3 2	1	2 3 4 5 6 7 8 9					

■ In your opinion, what is the most important element that determines your preference for clementines/cherries?
■ Indicate the degree of superiority of the preferred element. In case of equality of items, mark the option "1".

Source: Authors.

Following [30–32], the geometric mean was chosen to estimate the weights vector that represents the relative importance of each attribute obtained from the pairwise comparisons (for more details, see [24]). Thus, the weights assigned by each individual k (1, ..., K) to each attribute and level were obtained based on the following formula [33,34]:

$$w_{nk} = \sqrt[N,P]{\prod_{n=1}^{n=N,P} A_{npk}} \qquad \forall n,k. \tag{1}$$

where W denotes the relative weight of attribute A_{npk}, where $n = 1, ... , N$ is the number of attributes; and $p = 1, ... , P$ is the number of levels of that attribute. Following [35], the individual weights W_{nk} were aggregated across the respondents using the geometric mean to obtain synthesis of weights for each attribute and level:

$$w_n = \sqrt[K]{\prod_{k=1}^{k=K} w_{nk}} \qquad \forall n. \tag{2}$$

As the next step, the global weights of each of the levels and of each of the attributes were calculated by multiplying the weights of the aggregated levels (W_n for each level L_{np}) by their corresponding weight W_n of attribute A_n [36,37].

$$w_{G\_Ln.p} = w_{An} \times w_{Ln.p} \tag{3}$$

where $\sum W_{G\_Ln.p} = 1$ for all levels.

The ranking of the global weights allows providing ordered preferences based on priorities [38].

2.2. Data Collection

The data analyzed were obtained from face-to-face interviews with Moroccan consumers. The first version of the survey was pretested to optimize the question design. A total of 50 incomplete questionnaires were excluded from the survey. The final sample consisted of 500 consumers distributed across the major cities of Morocco: Casablanca, Rabat, Meknes, and Fes. Those cities are representative of the country and are commonly used for assessing consumer behavior [18]. Given the cultural aspects related to the North African context for conducting consumer surveys [17], the data were collected by directly approaching the respondents in supermarkets, traditional markets, or streets [9]. The participants were selected based on the consumption of local terroir foods using control questions at the beginning of the interview. The data were collected between December 2017 and May 2018 (the season for cherries is May–July, for clementines—September–December), representing a population defined as adults at least occasionally consuming terroir products (we used control questions regarding terroir products at the beginning of

the survey so that we could determine if the consumers correctly understood the concept and at least occasionally consumed the corresponding terroir products) and being at least partly responsible for their household's food purchases.

The survey collected information on the consumers' socioeconomic characteristics, their preferences, attitudes, and ratings using a nine-point Likert scale [18,24] and pairwise comparison between both local products, that is, the PGI of clementines of Berkane vs. the non-labeled cherries produced in the Sefrou–Ifrane region. The main sample characteristics are reported in Section 3. In general, half of the participants were women, with 40% of the respondents indicating that they had secondary education and 60% indicating that they had a household size of more than four members. More than half of the respondents had a monthly income of more than EUR 450 and 45% of them spent between EUR 100 and 200/month on food. For clementines, most of the respondents were willing to pay 0.6–0.8 EUR/kg given the actual market price of 0.8–0.9 EUR/kg. For cherries, most of the participants were willing to pay 1–3 EUR/kg given the actual market price of 4–5 EUR/kg. The finding that participants are willing to pay much less for cherries than the actual market price may be explained by the high market price of this fruit compared to others and to the low purchasing power of the respondents (72% of the participants spent less than 200 EUR/month on food).

To define the attributes and levels of the PGI commodity, we first identified and specified its most relevant attributes based on the description provided by the Moroccan Agricultural Ministry. To pretest our questionnaire, we conducted an exploratory survey for both products by interviewing various stakeholders (e.g., producers, consumers, traders, and sector experts). The results of this explanatory survey served to guide the design of the final version of the survey and determine the most important attributes of each local product [18,39]. To implement the AHP, we used the defined attributes and levels for each product following the identified hierarchical structure. The relative importance of attributes and levels was obtained from pairwise comparisons using a scale ranging from 1 to 9. An example of the AHP questions for both products is shown in Table 1.

Using the AHP questions, we performed binary comparisons and inserted their results into the matrices reflecting our hierarchy. Then, the corresponding weights for each attribute and level were calculated.

3. Results

3.1. Product Attributes and Levels

A factor analysis of the respondents' attitudes ratings (using a nine-point Likert scale [18,24]) of different terroir products characteristics was conducted. The factors were extracted using principal component analysis. The statistical test values showed that the data were suitable for factor analysis (Kaiser–Meyer–Olkin measure of sampling adequacy = 0.856; Bartlett's test of sphericity χ^2 = 3434.639; $p < 0.001$). The Cronbach's alpha score was larger than 0.7, suggesting adequate internal consistency. The criterion for selecting the optimal number of components was based on component eigenvalues larger than 1. The five factors extracted explained 55% of the total variance, which corresponds to the standard in social sciences [22].

The final component of the factor analysis is shown in Table 2. This approach summarized the 25 attitudes and perception questions asked in the survey into five components, which was especially useful for quantifying unobservable variables such as perceived product quality.

Table 2. Factor analysis results.

	Components				
	Positive Attitude toward Organic Products	**Perception of Geographical Indications as a Sustainable Label**	**Importance of Intrinsic Quality Attributes**	**Importance of Extrinsic Quality Attributes**	**Positive Attitude toward Terroir Products**
Contribution to rural development	0.701	–	–	–	–
Willing to pay a high price for organic products	0.656	–	–	–	–
Preference for organic products	0.646	–	–	–	–
Organic products are good for the environment	0.633	–	–	–	–
Terroir products need to be produced organically	0.617	–	–	–	–
Product with a geographical indication	–	0.783	–	–	–
Origin labels do not necessarily guarantee the origin of the product	–	−0.722	–	–	–
Origin labeling is sustainable	–	0.714	–	–	–
As a consumer, I spend time to look for healthy products	–	0.652	–	–	–
The methods of producing terroir food are environmentally sustainable	–	0.643	–	–	–
I buy products without artificial additives	–	0.633	–	–	–
Color	–	–	–	0.789	–
Juice content	–	–	0.824	–	–
Fruit pulp	–	–	0.789	–	–
Sugar content	–	–	0.715	–	–

Table 2. *Cont.*

	Components				
	Positive Attitude toward Organic Products	**Perception of Geographical Indications as a Sustainable Label**	**Importance of Intrinsic Quality Attributes**	**Importance of Extrinsic Quality Attributes**	**Positive Attitude toward Terroir Products**
Size	_	_	_	0.649	_
Presentation	_	_	_	0.595	_
Packaging	_	_	_	0.451	_
Terroir products have superior quality and the best taste	_	_	_	_	0.757
I trust terroir products	_	_	_	_	0.651
Local origin is important when buying products	_	_	_	_	0.522
Berkane origin	_	_	_	_	0.47
Nutritional quality	_	_	0.443	_	_
Sefrou–Ifrane origin	_	_	_	_	0.431
Exclusive purchase of seasonal fruits and vegetables	_	_	0.403	_	_

Source: Authors.

From Table 2, the following factors were deduced: the first factor in column two is called "Positive attitudes toward organic products" and consists of five variables that are all related to the high quality and the positive externalities of the commodity; the second factor summarizes six variables that are all linked to the perception of GI as a sustainability label; the third factor quantifies the importance of intrinsic quality attributes of the commodities explained by five variables, which is complemented by the fourth factor, measuring the importance of extrinsic quality attributes. The fifth factor quantifies positive attitudes toward local specialty terroir products.

The cluster analysis we conducted segmented the market of these locally produced food specialties into two main homogeneous groups. The first group, "consumers with environmentally friendly attitudes", represents 73% of respondents and is characterized by having an environmentally friendly attitude; the second group is the consumers indifferent to the positive environmental side effects of production. The substantial differences in the preferences between both groups are highlighted in Figure 1.

Figure 1. Preference portfolios of Moroccan consumer segments for local terroir products. Source: Authors.

The consumers with environmentally friendly attitudes had strong preferences for quality organic products and origin labeling which guarantees sustainable methods of production and preservation of the environment. They preferred products with high intrinsic and extrinsic quality. They considered local production of food specialties to be a guarantee of superior quality, local origin—an important attribute for their purchase

decisions. In contrast, the second consumer segment was much less demanding in terms of quality and all other attributes.

Table 3 characterizes both segments in terms of socioeconomic characteristics. The consumers with environmentally friendly attitudes were mostly men, often entrepreneurs or executives, with high education. The majority of them had an income level of more than EUR 450 per month. The consumers in this segment had an average age of 40 years and were willing to pay between EUR 0.8 and 1 for 500 g of clementines of Berkane and more than EUR 2 for 500 g of cherries produced in the Sefrou–Ifrane region. They bought terroir specialties mainly at supermarkets or farmer markets. Quality attributes such as organic, sustainable, and environmentally friendly production certified by GI labeling and the particular origin were the most important criteria for their purchasing decisions.

The majority of the indifferent consumers were unemployed women with a low education level. Their income was mostly less than EUR 150 per month. The members of this segment were indifferent to quality attributes. Most of them were willing to pay between EUR 0.6 and 0.8 for 500 g of clementines and less than EUR 1 for 500 g of cherries. Their main purchase location was farmers markets. This analysis of the market segmentation of terroir commodities shows the potential for developing a market for environmentally friendly consumers that sustain terroir commodities produced in a sustainable and organic way with a GI guaranteeing the origin and the production approach of the product.

Before presenting the AHP results, we outline the final set of the attributes used in the survey for each product. For clementines, we identified the following attributes: color being orange-reddish or light orange; origin of Berkane or other; labeling with and without PGI; and high, medium, or low juice content. For cherries, four main attributes were considered: size being small or large; color, dark red or yellow-orange; Sefrou–Ifrane or other origin; and crisp-firm or juicy-soft fruit pulp.

3.2. AHP Results

The AHP produced the ranking of the consumer preferences of their preferred attributes and their levels using the geometric mean criterion. The results of the aggregation of the weights of the attributes for both products across individual consumers are shown in Figure 2.

These results indicated that Moroccan consumers consider the origin attribute of cherries as the most important one when buying the product (assigned aggregate weight of 41%) even in the absence of a GI label, which would enforce this link. This finding confirms the importance that Moroccan consumers assign to this particular origin as a quality indicator of cherries.

For clementines, the juice content was found to be the most important attribute, with a weight of 34%. Surprisingly, the origin attribute ranked second. This implies that Moroccan consumers do not assign the most weight to the origin of clementines despite the established PGI label aiming to promote this commodity as a local product characterized by unique features linked to the Berkane production area. The results of locally and globally weighting the attributes' levels are shown in Table 5. The weights allowed the ranking of consumers' preferences locally and globally toward each specific attribute level. The local weight indicates the most important level of each attribute affecting consumers' choices (e.g., origin of production being Berkane or presence of a PGI label), whereas the global weight of the level ranks it in comparison to all levels of all attributes.

Table 4 summarizes all attributes and levels for both products.

Table 3. Characteristics of the consumer segments.

Variable	Details	Group Share (%)		Total Share (%)
		Consumers with Environmentally Friendly Attitudes	Indifferent Consumers	
Sex	Male	34	15	49
	Female	20	31	51
Occupation	Free occupation, entrepreneur	20.8	10	30.8
	Executive	18.4	1	18.5
	Worker	8	11.9	19.8
	Retired	0.7	1.5	2.2
	Housewife/jobless	7	21.7	28.7
Studies	No studies	1	13.7	14.7
	Primary school	5	7	12
	Secondary school	24.6	15.8	40.4
	University studies	26.5	6.4	32.9
Income (EUR)	<150	0.7	15.9	16.6
	150–300	4.5	14	18.5
	300–450	6.4	7.4	13.8
	450–600	10.2	9	19.2
	>600	23.5	8.4	31.9
Place of purchase of clementines	Hypermarket	26	0.1	26.1
	Farmers market	30	38	68
	Exhibitions, trade shows	4	0.8	4.8
	Directly from farmers	0.7	0.4	1.1
Place of purchase of cherries	Hypermarket	14.1	1.8	15.9
	Farmers market	17	39.1	56.1
	Exhibitions, trade shows	24	1	25
	Directly from farmers	2.1	0.9	3
WTP (this was asked in the form of an open question) for 1 kg clementines (EUR)	0.3–0.6	14.1	1.8	15.9
	0.6–0.8	17	39.1	56.1
	0.8–1	24	1	25
	≥1	2.1	0.9	3
WTP for 1 kg cherries (EUR)	≤1	1.4	28.5	29.9
	1–2	3,5	21.3	24.8
	2–3	23.1	1.7	24.8
	3–4	12	0	12.0
	>4	7.8	0	7.8

Source: Authors.

Based on the local weighting of clementines' level attributes, a high juice content (0.73) was found to be relatively important. This was followed by the origin, of which the labeling of the Berkane origin (0.77) and PGI (0.679) was evaluated as a mid-range priority. The origin of cherries was identified as the top priority, of which the Sefrou–Ifrane origin was relatively the most important level (0.82). For the fruit pulp and color attributes, which were evaluated as mid-range priorities, the levels of crisp-firm pulp (0.21) and dark red (0.168) were found to be relatively important. The attribute levels orange-reddish color for clementines and large size for cherries were evaluated as priorities of lower importance.

Table 4. Attributes and levels.

Clementines		Cherries	
Attribute	**Level**	**Attribute**	**Level**
Origin (A_1)	Berkane ($L_{1.1}$) Other ($L_{1.2}$)	Origin (A'_1)	Sefrou–Ifrane ($L'_{1.1}$) Other ($L'_{1.2}$)
Color (A_2)	Orange-reddish ($L_{2.1}$) Light orange ($L_{2.2}$)	Color (A'_2)	Dark red ($L'_{2.1}$) Yellow-orange ($L'_{2.2}$)
Labeling (A_3)	PGI ($L_{3.1}$) Without labeling ($L_{3.2}$)	Size (A'_3)	Large size ($L'_{3.1}$) Small size ($L'_{3.2}$)
Juice content (A_4)	High juice content ($L_{4.1}$) Medium juice content ($L_{4.2}$) Low juice content ($L_{4.3}$)	Fruit pulp (A'_4)	Crisp-firm pulp ($L'_{4.1}$) Juicy-soft pulp ($L'_{4.2}$)

Source: Authors. Note: $L_{n.p}$ denotes the level symbol, where $n = 1, \ldots, N$ is the number of the attribute and $p = 1, \ldots, P$ is the number of the level.
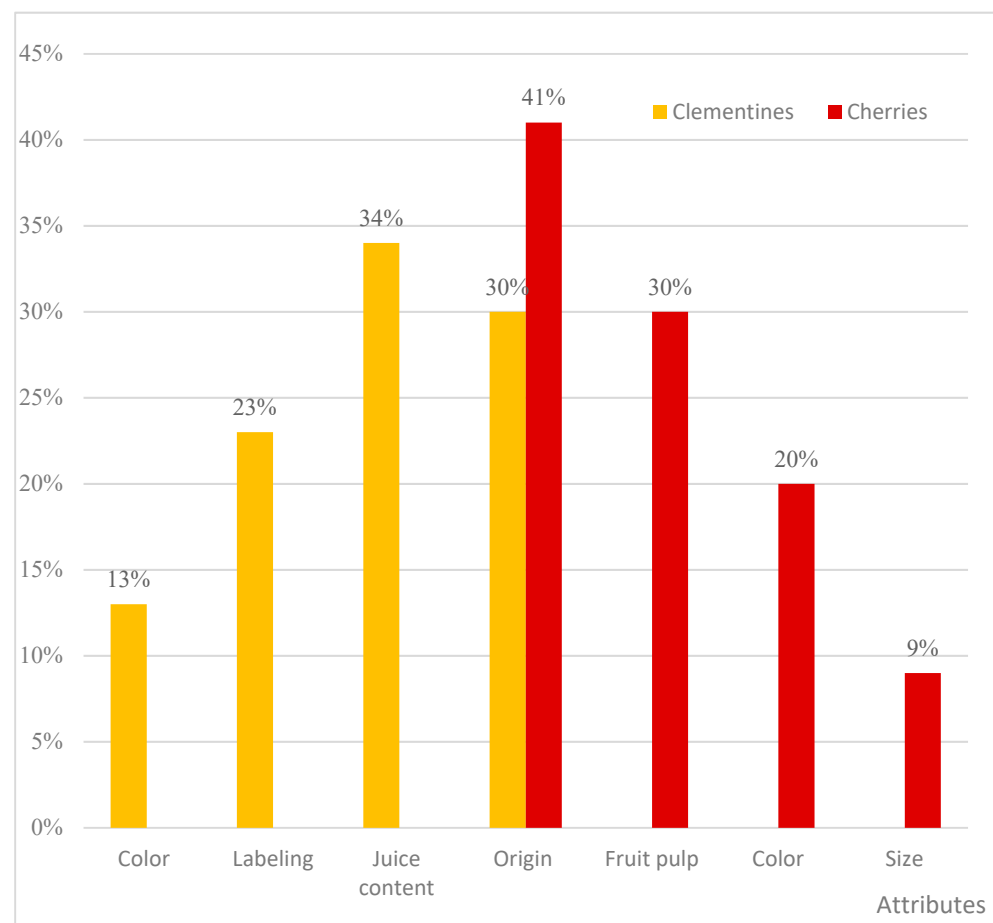

Figure 2. Aggregated weights of the attributes of cherries and clementines. Source: Authors.

Table 5. Hierarchical structure, relative importance, and priorities of product attributes.

Product	Attribute	Attribute Level	Local Weight	Ranking	Global Weight	Ranking
Clementines	Juice content (A_4)	High juice content ($L_{4.1}$)	0.734	1	0.247	1
		Medium juice content ($L_{4.2}$)	0.197	2	0.066	6
		Low juice content ($L_{4.3}$)	0.069	3	0.023	9
	Origin (A_1)	Berkane ($L_{1.1}$)	0.778	1	0.240	2
		Other ($L_{1.2}$)	0.221	2	0.068	5
	Labeling (A_3)	PGI ($L_{3.1}$)	0.679	1	0.155	3
		Without labeling ($L_{3.2}$)	0.320	2	0.073	4
	Color (A_2)	Orange-reddish ($L_{2.1}$)	0.773	1	0.096	4
		Light orange ($L_{2.2}$)	0.226	2	0.028	7
Cherries	Origin (A'_1)	Sefrou–Ifrane ($L'_{1.1}$)	0.821	1	0.339	1
		Other ($L'_{1.2}$)	0.158	2	0.065	6
	Fruit pulp (A'_4)	Crisp-firm pulp ($L'_{4.1}$)	0.735	1	0.219	2
		Juicy-soft pulp ($L'_{4.2}$)	0.265	2	0.030	7
	Color (A'_2)	Dark red ($L'_{2.1}$)	0.846	1	0.168	3
		Yellow-orange ($L'_{2.2}$)	0.153	2	0.079	4
	Size (A'_3)	Large size ($L'_{3.1}$)	0.793	1	0.071	5
		Small size ($L'_{3.2}$)	0.206	2	0.018	8

Source: Authors.

Global weights represent the total preference score or the total relative importance of each level considering the levels of all attributes of a commodity. For clementines, the globally most-preferred attribute level for Moroccan consumers (with a global weight of 25%) was high juice content, followed closely by the Berkane origin (24%), whereas PGI labeling ranked third. For the non-labeled terroir commodity, the Sefrou–Ifrane origin was globally the most important attribute level (34%), followed by a crisp-firm pulp (22%). The global weight comparison between both products showed that Moroccan consumers ranked first the Sefrou–Ifrane origin for cherries (even in the absence of the GI), but for clementines, the consumers prioritized high juice content over the Berkane origin and PGI labeling.

These results highlight that Moroccan consumers perceive the cherries of Sefrou–Ifrane as a locally produced food specialty with unique features related to its production region and the traditional know-how of the farmers there. These results also suggest the possibility of establishment of a GI label for the cherries produced in the region of Sefrou–Ifrane to protect and promote this local food specialty and explicitly link it to its place of origin. The prioritization of clementine attributes is contrasting as origin and the PGI label are not considered to be the most important ones. The origin and the PGI attributes can be considered substitutes for each other to some extent; however, the PGI of the GMP does not only certify origin, but also the creation of a number of non-commodity benefits to society from the production of this commodity. Hence, some substitution is possible, but

only to a limited extent as the PGI label certifies much more than origin (we thank an anonymous reviewer for pointing this out). This outcome questions the effectiveness of the product-of-origin labeling strategy of the GMP. Therefore, more effort is needed to effectively increase the visibility of the established PGI label and promote the linkage between origin-labeled local products and their regions of production.

4. Discussion and Conclusions

We analyzed the attitudes of Moroccan consumers toward the origin-labeling policy part of the GMP. We examined the preferences of Moroccan consumers for locally produced food specialties that benefit from a quality label of origin, the PGI clementines of Berkane, by comparing them to cherries of the Sefrou–Ifrane region, which represent a non-labeled terroir commodity. For this purpose, a primary dataset of 500 questionnaires was collected in Morocco's main cities.

The comparison of the results between both specialties showed that the local origin of cherries is the most important attribute considered in the purchasing decision. Thus, Moroccan consumers perceive them as a locally produced food specialty having unique features linked to the Sefrou–Ifrane origin, which may encourage establishment of a GI label for this product. For clementines, Moroccan consumers do not assign important weight to the established PGI label for clementines of Berkane or to the origin, Berkane, in comparison to other intrinsic characteristics. This implies that more effort is needed to promote the established PGI label in Morocco's domestic market.

The consumers purchasing terroir products consist of a subgroup of consumers with environmentally friendly attitudes whose members are aware of organic, sustainably, and environmentally friendly produced domestic food specialties. These consumers have higher education and salaries and show a substantially higher willingness to pay for labeled and non-labeled terroir products. This result may motivate policy makers to establish an explicitly green labeling strategy within the framework of the GMP for linking the production process of a labeled commodity to specific production practices that guarantee not only the origin of the product, but also maximization of positive externalities in the region of production. If the association of the PGI label with existing or additional non-commodity benefits associated with the commodity's production process is more widely based on the preferences of consumers, more individuals belonging to this segment may switch to purchasing this particular commodity because they not only might deliberately wish to support the creation of such non-commodity benefits in disadvantaged parts of the country, but they also have the purchasing power to afford them.

By emphasizing such positive side effects of production for regional development, environmental preservation, and the maintenance of the national food and farming heritage, more groups of young, urban consumers who have above-average purchasing power and appreciate the creation of such societal added value might become aware and interested in purchasing these specialty products due to their non-commodity benefits. This would improve the equity of income distribution across urban and rural regions, as more demand channels more income to less economically favored parts of the country.

These results also question the effectiveness of the product-of-origin labeling strategy of the GMP. Despite of the commitment of the Moroccan government to the Green Morocco Plan labeling strategy, more efforts are needed for promoting the quality sign of origin, raising the consumers' knowledge about purchasing locally produced and certified specialty foods, and reinforcing the consumers' associations with the local commodity for boosting purchasing decisions. The higher the esteem of consumers of the origin-labeled local product, the greater the benefits for domestic smallholder producers. The establishment of green origin labeling of local products would offer an additional income source for farmers located in less favored areas, help fight against climate change, preserve traditional ecosystems, and maintain biodiversity and landscape esthetics through environmentally friendly production. Consumers would also profit from such labeling as the commodity quality would be homogenized and they could be sure they have contributed to preserving

biodiversity and ecosystems in the production region, which helps to preserve the natural and cultural heritage of Morocco.

This study has a number of limitations from which future research topics can be deduced if sufficient human and financial resources are available. We chose to use the stated preference elicitation technique due to the flexibility of choosing product attributes compared to the revealed preference technique characterized by low attribute variation. Moreover, this technique permitted collection of the data from a controlled survey to avoid many of the problems that arise in the revealed preference data by controlling the observable attributes [40]. Techniques based on revealed preferences can add reliability to preference elicitation as they are based on actual choices instead of hypothetical questions. However, the revealed preferences data are susceptible to a number of modeling concerns such as endogeneity, which may result in biased parameter estimates [41]. They also require more research resources, which can be a severely limiting factor in many developing countries. Especially in mostly informal economies, such as the Moroccan one, in which consumers have minimal knowledge of revealed preference elicitation techniques, stated preference elicitation techniques can be a suitable tool for creating a basis for understanding existing preference structures. Future research might therefore apply alternative methods for ensuring incentive compatibility by correcting for the bias of hypothetical questions and providing alternative approximations of the WTP and its determinants such as DCEs, latent class analysis, or experimental auctions. Another limitation is that we only interviewed consumers living in the biggest cities. The preferences and attitudes of Moroccan consumers in rural areas and towns may differ, although economic activity, and thus the highest purchasing power levels, often tends to be agglomerated in the few largest cities of developing countries, so we recommend that future research extends the surveying to regions beyond urban centers. Lastly, the use of structured sampling approaches may also be considered to the extent they are feasible in an informal economy context to guarantee representativeness by the interviewees of the entire population [42].

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