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تمایل به پرداخت هزینه برای ایمنی مواد غذایی در افغانستان: مطالعه‌ای بر مصرف‌کنندگان شهری

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چکیده

ایمنی و کیفیت غذا برای رفاه کلی جهان از اهمیت بالایی برخوردار است، اما در افغانستان اطلاعات بسیار کمی وجود دارد و به عنوان یک ناامنی غذایی یک نگرانی جدی به شمار می‌آید. افغانستان با ناپایداری سیاسی، مشکلات اقتصادی و مسائل زیست‌محیطی مواجه است که منجر به کمبود غذا شده است. کشاورزی به عنوان منبع اقتصادی اصلی برای بیش از ۶۰٪ از جمعیت افغانستان عمل می‌کند. تضمین ایمنی غذا برای تثبیت معیشت و بازسازی ارتباط میان افراد آسیب‌دیده و منابع غذایی آنان ضروری است. بنابراین، این مطالعه به منظور تعیین ترجیحات و تمایل مصرف‌کنندگان به پرداخت هزینه‌ی بیش‌تر برای ویژگی‌های ایمنی «پیازها» بالای ۴۱۰ نفر در شهر کابل انجام شده است. در این تحقیق از آزمایش انتخاب گسسته (DCE) استفاده شد و نتایج نشان داد که مصرف‌کنندگان تمایل دارند برای پیازهایی که ویژگی‌های ایمنی غذایی برتر دارند، قیمت بالاتری پرداخت کنند. علاوه بر این، مطالعه نشان داد است که درآمد، سطح تحصیلات و سن از دیگر عواملی هستند که می‌توانند بر تمایل افراد به پرداخت هزینه بیش‌تر برای ویژگی‌های ایمنی پیازها تأثیر بگذارند. این یافته‌ها بر اهمیت رعایت مقررات ایمنی برای سبزی‌جات تازه تأکید می‌کند، زیرا مصرف‌کنندگان، تمایل دارند برای پیازهایی که دارای کیفیت بالاتر و مطابق با استانداردهای ایمنی غذایی هستند، قیمت بیش‌تری پرداخت کنند.

کلیدواژه‌ها: پیازها، ترجیحات مصرف‌کنندگان، آزمایشات انتخاب گسسته، ویژگی‌های ایمنی غذایی، تمایل به پرداخت

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Willingness to Pay for Food Safety in Afghanistan: Evidence from Urban Consumers

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Abstract

While food safety and quality are of utmost importance for the overall welfare of the world, very little is known about Afghanistan where food insecurity is a significant concern. Afghanistan is confronted with political instability, economic adversity, and environmental issues, resulting in a lack of food. Agriculture serves as the primary economic resource for more than 60% of the Afghan populace. Ensuring the safety of food is crucial for stabilizing livelihoods and re-establishing the connection between afflicted individuals and their sources of food. Hence, this study aims to ascertain the preferences and willingness of consumers to pay for the safety attributes of onions. The study was carried out in Kabul, with 410 respondents successfully completing the questionnaires. The study utilized the discrete choice experiment (DCE), and the results indicated that consumers have shown a willingness to pay a higher price for onions that have superior food safety attributes. In addition, the study found that income, education level, and age are other factors that can influence people's willingness to pay for safety attributes of onions. These findings emphasize the significance of adhering to safety regulations for fresh vegetables, as consumers are willing to pay a higher price for onions that possess superior quality and meet food safety standards.

Keywords: *onions, consumer's preferences, discrete choice experiments, food safety attributes, willingness to pay*

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INTRODUCTION

Food safety is a critical determinant of public health and economic development, yet it remains an underexplored area in Afghanistan. Food safety and quality significantly influence consumers' purchasing decisions, as highlighted in global studies, with growing attention to food safety attributes such as organic certification, Good Agricultural Practices (GAP), and quality assurance labels. However, Afghanistan faces unique challenges, including political instability, environmental adversity, and economic constraints, which have exacerbated food insecurity and hindered the adoption of food safety standards (Afghanistan: Food Insecurity and Malnutrition Threaten 'An Entire Generation,' 2022; Essar et al., 2022; Rahmat et al., 2023).

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Afghanistan's agricultural sector is the backbone of its economy, providing livelihoods for over 60% of its population. Despite its rich agricultural heritage, the sector struggles with inadequate storage facilities, limited modern farming methods, and low awareness of food safety protocols (Poole et al., 2022; Rahimi & Artukoğlu, 2023). These challenges impact the availability and quality of safe food, raising concerns about consumer access to nutritious and uncontaminated produce. The problem is further compounded by limited empirical research on consumer preferences and behaviours toward food safety attributes in Afghanistan, particularly for vegetables like onions, a staple in the Afghan diet (Afghanistan Food Security and Nutrition Plan, 2018).

Despite the critical nature of food safety and quality, a gap exists in examining Afghan consumers' preferences concerning these aspects, particularly in vegetable consumption. This gap is concerning given the pivotal role of vegetables in the Afghan diet and nutritional security (Afghanistan Food Security and Nutrition Plan, 2018). Focusing on onions, the primary horticultural crop in Afghanistan, this study aims to explore Afghan consumer preferences for vegetable safety, along with their willingness to pay for safety attributes associated with onions. By understanding these preferences, valuable insights can be gained into consumer decision-making regarding vegetable consumption, informing strategies to enhance food safety and quality in Afghanistan's agricultural realm.

Furthermore, the outcomes of this study hold significant implications for policymakers, farmers, and business entities within the agricultural sector. Policymakers can refine their decision-making processes by leveraging insights into consumer preferences, while farmers and businesses can utilize this data to align with consumer demand, bolster market competitiveness, and enhance food safety and quality standards.

LITERATURE REVIEW: The growing importance of food safety in consumer decision-making has been widely documented. Studies in developed and developing countries alike emphasize consumers' willingness to pay (WTP) a premium for products with enhanced safety attributes, such as organic labelling, certified quality, and traceability. For instance, research in China and India revealed a strong preference for certified produce, while studies in Ghana and Vietnam showed a similar inclination toward organic and GAP-certified

vegetables (Birol et al., 2015; Wang and Huo, 2016; Nam, Qiao, and Ahn, 2021). These findings highlight the universal value consumers place on food safety, albeit with regional variations driven by socioeconomic factors.

The role of sociodemographic factors in shaping food safety preferences has also been explored extensively. Education, income, and age have emerged as significant determinants, with higher levels of education and income correlating with a greater willingness to pay for safety attributes. For instance, studies in Pakistan and Nigeria found that younger, educated consumers exhibited heightened awareness of food safety concerns, while older consumers prioritized food safety due to health-conscious behaviours (Wongprawmas and Canavari, 2017; Rani et al., 2018; Lusk et al., 2018; Liu et al., 2019; Ogundijo, Tas, and Onarinde, 2022). However, these findings underscore the need for context-specific analyses to understand the unique preferences of different consumer groups.

Methodologically, discrete choice experiments (DCE) have been the preferred tool for evaluating consumer preferences for non-market attributes, including food safety. The approach offers a robust framework for simulating real-world purchasing decisions by presenting respondents with hypothetical choice sets that vary in attribute levels (Obayelu, 2014; Nandi et al., 2017; Britwum and Yiannaka, 2019; Constantinides et al., 2021; Hong et al., 2021). This method has been employed in various studies to assess marginal WTP for food safety attributes, highlighting its applicability in diverse contexts.

Multiple studies have demonstrated that consumers place a greater value on attributes related to food safety as opposed to those associated with the product itself (Lim et al., 2013; Alimi and Workneh, 2016; Wang and Huo, 2016; Byrd, Widmar, and Wilcox, 2018; Cho and Choi, 2019; Verdú et al., 2021; Yang and Fang, 2021). For instance, research conducted in China and India has indicated that consumers place greater importance on certified fruits(Birol et al., 2015; Wang and Huo, 2016; Nam, Qiao, and Ahn, 2021).

Additionally, a separate study conducted in Ghana revealed that consumers exhibited a willingness to allocate a higher monetary value towards food products, specifically chicken meat that was deemed to possess enhanced safety attributes (Ragasa et al., 2019). Numerous studies have also shown that consumers are willing to bear additional costs in exchange for enhanced food safety measures (Lee et al., 2011; Wu et al., 2015, 2016; Thiene et al., 2018; Britwum & Yiannaka, 2019; Liu et al., 2020; Niewczas-Dobrowolska, 2022;). Besides safety attributes, freshness has been identified as one of the essential factors to weigh in on purchase decisions among consumers (Nguyen et al., 2015; Lin, 2021). This trend is mirrored in Pakistan, where consumers' purchasing decisions were positively associated with the appearance and freshness of vegetables (Rani et al., 2018), which can be considered as quality attributes.

Multiple studies have employed quantitative analysis methods to examine the correlation between sociodemographic characteristics and consumers' preferences for food products, alongside their willingness to spend on such products (Wongprawmas and Canavari, 2017;

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Lusk et al., 2018; Liu et al., 2019; Ogundijo, Tas, and Onarinde, 2022). The findings revealed that education level, income, and age significantly influence their willingness to pay. The Discrete Choice Experiments (DCE) have emerged as the preferred method for consumer valuation of non-market items and food features (Sckokai et al., 2014; Obayelu, Arowolo, and Poji, 2018; Meixner and Katt, 2020; Mariel et al. 2021).

Theoretical Framework

For many years, Discrete Choice Experiments (DCEs) have served as a valuable marketing tool for assessing consumer preferences related to various product attributes. Respondents are prompted to select a single alternative from a set of choices presented using the stated preference method. The foundation of DCE is rooted in two prominent theories, namely Lancaster's theory of characteristics and the Random Utility Theory (RUT) (Lancaster, 1966). According to the Lancaster theory, the utility of a product can be classified into the advantages derived from its attributes, which, in turn, influence consumers' decision-making process. DCE can be used to replicate real-world purchase scenarios, offering researchers the means to combine product attributes (Bahrampour et al., 2020; Lusk, Roosen, and Fox, 2003; Tonsor et al., 2009). The participants must compromise among attributes in the choice set (James and Burton, 2003; Street and Viney, 2019). The present study employed the DCE approach to ascertain the marginal willingness to pay for onion safety attributes. These attributes include the visual appearance, the type of production system of the onions, the type of market in which onions are sold, and Good Agricultural Practices (GAP) certification. The participants were instructed to choose the option that they found most desired. Using the random utility model as an assessment, an individual selecting alternative m is represented by:

$$U_{nm} = X_{nm}\beta + \varepsilon_{nm} \quad (1)$$

Where $X_{nm}\beta$ is the deterministic or observable portion of utility, whereas the error term ε_{nm} denotes the stochastic part of the model. The vector,X_{nm}, comprises safety attributes and β is a vector of parameters intended for estimation within the model. The possibility that an individual *n* selects m_{th} alternative from the choice set K_n is:

$$P(m) = P(X_{nm}\beta + \varepsilon_{nm}) \geq \left(X_{nj}\beta + \varepsilon_{nj}\right); \text{ for all } j \in K_n \quad (2)$$

In this study, the choice set K_n comprises different safety attribute levels, such as onion visual appearance, production method, the type of market, and GAP certification levels. The error term, ε_{nj}, is presumed to follow an independent and identically distributed pattern. Conditional logit model (CL) was employed to estimate Equation (1). The interaction terms were utilized to determine whether the willingness to pay for onion safety attributes varied according to the respondents' sociodemographic profiles (age, education, and income).

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Safety Attributes of Onion and Levels

The selection of onion safety attributes and their levels constitutes the fundamental step in this study. These attribute levels are integral to constructing alternative sets of hypothetical options. Each attribute is associated with distinct levels, and the interplay between these levels potentially influences individual preferences that drive the choice decision (Lancsar and Louviere, 2008). According to Hanley et al., (2001), Mangham et al., (2009), Steiner et al., (2016), Obadha et al., (2019) and (Poder et al., 2019), the process of choosing suitable attributes and levels for DCE can be accomplished through expert interviews, literature reviews, focus group discussions (FGD) and the combination of FGD and literature reviews.

29 respondents participated in the FGD. The FGD was performed to ascertain the pertinent safety attributes of onions that consumers prefer. The safety attributes and levels used in the FGD were derived from comprehensive literature reviews (Armghan Khalid et al., 2022; Ceschi et al., 2018; Costanigro et al., 2011; Durham et al., 2012; Izani Abdul Hadi et al., 2010; Mascarello et al., 2015; Wongprawmas & Canavari, 2017). The participants were tasked with prioritizing the key safety attributes associated with onions. The findings from FGD have identified the onion's visual appearance, the production system used to produce onion, the marketing channel through which the onions are distributed, GAP certification, and product pricing as critical safety attributes consumers desire. The physical shape of an onion is represented by its appearance. The production system of onions can be classified into organic or inorganic (conventional). The term "market type" pertains to where onions are acquired, such as a supermarket or wet market; "GAP certification" pertains to the certification of good agricultural practices in Afghanistan. All five (5) attributes identified as desirable by consumers during the FGD were incorporated into this research. Table 1 describes the attributes and corresponding levels considered in this study.

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Table 1 Selected safety attributes and the corresponding levels for onion

Attribute	Level
Appearance	Wholesome
	Slightly damaged
Production System	Organic
	Conventional
Type of Market	Supermarket
	Wet market
GAP Certification	Certified
	Not Certified
	40
Price (AFN per kilogram)	32
	25
	15

Data collection and choice sets

The research was carried out throughout the Kabul city region, involving 490 respondents employing a choice experiment. The participants were asked about the kind of onion they would consider purchasing. This was accomplished by presenting orthogonally constructed choice sets, each consisting of a range of onion options distinguished by distinct levels of food safety attributes. These safety attributes include onion's appearance, production system types, market type, GAP certification, and price-related attributes. Using the MktEx procedure in SAS version 9.4 (SAS Institute Inc, 2015), 16 choice sets were constructed as an efficient design to ensure methodical variety. Table 2 illustrates an exemplary choice set utilized in the study.

Table 2 Choice set example

Q. Options A and B represent two different descriptions for onion. Please indicate (X) the option (A, B, or C) that aligns with the onion you would be most inclined to purchase. Please select ONE option only.

OPTION	A	B	C
Appearance	Wholesome	Slightly damaged	Neither A nor B is preferred.
Production System	Organic	Conventional	
Type of Market	Supermarket	Wet market	
GAP Certification	Certified	Not Certified	
Price	AFN40	AFN15	
Option			

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Model specifications and estimation procedures

This study explored two models: Model 1 and Model 2. The first model was developed to ascertain consumers' valuation of onion safety attributes, whereas the second aimed to ascertain the sociodemographic characteristics that could potentially impact consumers' willingness to pay for onion food safety attributes.

Model 1

The specification for Model 1 is as follows:

$$U_{nm} = \beta_{0n} + \beta_{1n}AP + \beta_{2n}PS + \beta_{3n}TM + \beta_{4n}GAP + \beta_{5n}PRICE_m \quad (3)$$

Where

U_{nm} = the utility for n_{th} individual, where m corresponds to options A, B, C

β_{0n} = an alternative-specific constant (ASC) that denotes the ‘‘neither” choice

AP = a dummy variable representing onion appearance

PS = a dummy variable representing the type of production system for onions

TM = a dummy variable representing the point of purchase of onions

GAP = a dummy variable that represents the GAP certification for onion

$PRICE$ = refers to the price of onions (AFN/kg).

Model 1 was estimated using a conditional logit, and the following equation (4) was used to assess the marginal willingness to pay:

$$WTP = -\beta k / \beta p \quad (4)$$

where,

WTP = marginal willingness to pay,

βk = coefficient to be estimated for k attribute,

βp = coefficient to be estimated for the Price attribute.

The Krinsky-Robb parametric bootstrapping technique in STATA15 generated 95% confidence intervals for willingness to pay. A total of 1000 measurements were obtained randomly from the estimations using multivariate distributions and variance-covariance matrices (StataCorp, 2017).

Model 2

To explore the influence of socio-demographic characteristics on individuals' willingness to pay for onion food safety attributes, dummy variables were created for age, education, and income to allow the categorization of the participants into distinct groups. For instance, a value of 1 is assigned to the variable "*Age2029*" if a respondent's age falls within the range of 20 and 29; otherwise, it is assigned a value of 0. This was also done for *Age3039*, *Age4049*, and *Age5059*. For education variables (primary, secondary, and tertiary), a value of 1 is assigned to *Edu_Primary* if a respondent graduated with a primary level of education; 0 for otherwise. The three dummy variables for household monthly income are Low, Median, and High. As such, Inc_*Low* = 1 if it is under AFN10000 and 0 otherwise; *Inc_Med* = 1 if the income falls within the range of AFN10001 and AFN20000, otherwise 0; and *Inc_High* = 1 if it exceeds AFN20000 and 0 otherwise. The interaction terms were then generated involving the dummy and independent variables, as specified in the model (Equation 3). The categorization approach provides a clear framework for analysing the relationship between socio-demographic factors and willingness to pay for food safety attributes associated with onions.

RESULTS AND DISCUSSION

Table 3 presents the descriptions of the respondents. The age distribution of the respondents comprised a large proportion (42.6 %) within the 20-29 age range, followed by those aged 30 to 39 (16.9%), 40 to 49 (19.8%), and those aged 50 to 59 (20.7%). The gender composition comprised significant male participation, accounting for two-thirds (66.7%), while the remaining 33.3% are female. In terms of racial demographics, the majority of respondents (62.2%) identify as Tajik, followed by Pashtoon (21.8%), Hazara (14.3%), and

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Uzbek (1.6%). Marital status comprised over half of the respondents are married. The respondents' educational backgrounds were categorized into three groups: primary education, secondary education, and higher education. More than half of the respondents (67.6%) had completed tertiary education; 27.3% had attained a secondary school education, while 5.1% had attained primary school education. Regarding the occupational distribution, almost half (44.3%) were employed in the private sector. The mean monthly household income was AFN12000, with the majority of respondents (45.6%) reporting earning AFN10000, followed by AFN10001 to AFN20000 (37.1%) and more than AFN20000 (17.3%). The majority of respondents (45.9%) reported a household size of four to six members, followed by one to three (37.3 %), seven to nine (13.8%), and ten to twelve (2.8%).

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Table 3 Summary of respondents' socio-demographic background

Demographic profiles	Categories	Frequency	Percentage	Mean
Group of Age (years old)	20-29	209	42.6	
	30-39	83	16.9	
	40-49	97	19.8	30.25
	50-59	101	20.7	
Gender	Female	163	33.3	
	Male	327	66.7	
Ethnic	Tajik	305	62.2	
	Pashtoon	107	21.8	
	Hazara	70	14.3	
	Uzbek	8	1.6	
Marital status	Single	240	49.0	
	Married	249	51.0	
Education	Primary	25	5.1	
	Secondary	134	27.3	
	Tertiary	331	67.6	
Employment	Government sector	96	19.6	
	Private sector	217	44.3	
	Full-time student	83	16.9	
	Unemployed/	23	4.7	
	Looking for a job	71	14.5	
Income	Low (<=AFN10000)	223	45.6	
		182	37.1	12000
	Medium (AFN10001-AFN20000)	85	17.3	

	High (>AFN20000)			
Household number	1-3	183	37.3	
	4-6	225	45.9	4.28
	7-9	68	13.8	
	10-12	14	2.8	

Estimation results from conditional logit

Table 4 presents the analysis outcome of the conditional logit regression. All coefficients were statistically significant at 1%, with the predicted signs for all studied variables. Given that the ASC in this study was statistically significant and negative, respondents were more inclined to choose either option (A or B), which presented improvements in the food safety attributes of onions.

The positive signs of the coefficients indicated that consumers preferred onions that had a wholesome appearance over onions that did not. According to the conditional logit estimates, consumer preferences leaned towards several factors. These included a preference for organic onions (as opposed to inorganic onions), onions purchased from supermarkets (as opposed to wet markets), and a clear preference for onions with GAP certification as opposed to non-certified onions. The coefficient of price, however, was negative, suggesting that with increasing prices, the utility of the product diminished. On the other hand, the wholesome onion had the highest coefficient at 0.4966. This highlighted the significance of appearance as a crucial safety attribute strongly emphasized by consumers. Following this, onions were certified with GAP (0.4576), organic onions (0.3257), and onions sold at the supermarket (0.1048).

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Table 4 Conditional Logit Estimates

Variable	Coefficient
Alternative Specific Constant	-2.8601*** (0.0690)
Appearance (Wholesome)	0.4966*** (0.0379)
GAP Certification (Certified)	0.4576*** (0.0272)
Production system (Organic)	0.3257*** (0.0308)
Type of Market (Super Market)	0.1048*** (0.0308)
Price	-0.1086*** (0.002903)

Number of Observation = 23529

Log-likelihood = - 5533

AIC (Akaike information criterion) = 10837

Mc Fadden R^2= 0.3716

Note: In parentheses are standard errors. At the 1% level, all estimates are statistically significant.

Marginal willingness-to-pay for food safety attributes of onion

Table 5 displays the marginal willingness to pay (MWTP) for onion food safety attributes. According to the research, consumers preferred wholesome onions over those that appeared slightly damaged, with some indicating their willingness to pay an additional AFN4.57 for onions with a wholesome appearance. Similarly, consumers expressed willingness to pay an additional AFN4.21 for onions with GAP certification relative to non-certified onions. This strongly suggested the importance of certification as one of the essential attributes of food safety standards. The findings also showed that the MWTP for organic onions is AFN2.99 relative to the inorganic onions. Most importantly, organic vegetables were considered the safest, so consumers were putting more value on organic vegetables rather than inorganic ones. Compared to onions sold in the fresh market or wet market, consumers were also willing to pay an additional AFN0.96 for onions sold at supermarkets.

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Table 5 Marginal willingness to pay (MWTP) for food safety attributes of onion

Attribute Levels	MWTP	Standard Error[3]
Wholesome Appearance	4.57	0.3545
GAP Certification (Certified)	4.21	0.2500
Production system (Organic)	2.99	0.2959
Type of Market (Super Market)	0.96	0.2857

Table 6 presents the MWTP for the onion's safety attributes for Model 2. According to the study, individuals aged 40 to 49 demonstrated a greater willingness to pay an additional AFN5.13 for wholesome onions than their counterparts between the ages of 20 and 29. Similarly, individuals aged 50 to 59 demonstrated a willingness to pay AFN5.04 more for a wholesome onion than those who are between the ages of 20 and 29. Compared to individuals aged 20 to 29, those aged 30 to 39 demonstrated a willingness to pay AFN4.42 more for an organic onion. These results suggested that younger consumers exhibited a lower level of concern over food safety than older adults. The propensity of elderly consumers to prioritise clean aesthetics and organic vegetables suggests their preference towards these types can be attributed to their experience as they considered these types of vegetables as safer, leading them to demonstrate a willingness to pay a premium price to get them.

[3] The corresponding standard errors were estimated using a parametric bootstrap procedure in STATA15, following the Krinksy-Robb method.

Additionally, the findings reveal that consumers with secondary and tertiary education backgrounds are willing to pay an additional AFN3.22 and AFN3 for onions sold at supermarkets compared to those with only primary education. Consumers possessing high levels of education tend to exhibit an increased level of awareness, leading to a greater emphasis on food safety. They believe that the authorities have inspected and regulated vegetables sold at the supermarkets; hence, they are willing to pay more for vegetables sold at supermarkets rather than other conventional markets. Additionally, it was discovered that consumers between the ages of 30 and 39 were prepared to pay AFN1.03 more for onions that were GAP-certified than consumers between the ages of 20 and 29. Similar findings were also noted for consumers with secondary and tertiary education backgrounds who were willing to pay an additional AFN3.30 and AFN3.65, respectively, for onions certified with GAP relative to those with primary education backgrounds. In households with higher incomes, consumers demonstrated a willingness to pay an additional AFN2.74 for onions certified with GAP compared to those with lower incomes. Overall, the findings implied that older consumers possessing a higher education background and high incomes considered certified vegetables safe and ready to pay more. That is because certified vegetables are often regulated for safety and supervised by the authorities.

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Table 6 Marginal willingness to pay for interaction terms for onion

Variables	WTP	Standard Error[4]
Appearance wholesome x Age4049	AFN5.13	0.2882
Appearance wholesome x Age5059	AFN5.04	0.3801
Production system organic x Age3039	AFN4.42	0.2321
Type of market supermarket x Education Secondary	AFN3.22	0.2831
Type of market supermarket x Education Tertiary	AFN3.00	0.2933
GAP certification certified x Age3039	AFN1.03	0.2780
GAP certification certified x Education Secondary	AFN3.30	0.3035
GAP certification certified x Education Tertiary	AFN3.65	0.3341
GAP certification certified x Income High	AFN2.74	0.2627

This study seeks to ascertain consumer preferences and assess the perceived value of food safety attributes associated with onions. The findings distinctly highlight consumers' willingness to spend more money on onions that have improved food safety attributes. The research highlights the tendency of Afghan consumers to be willing to pay extra for wholesome onions instead of those with minor damage. This could be rooted in the

[4] Using STATA 15 software, the corresponding standard errors are calculated using the Krinsky-Robb parametric bootstrap approach.

perception that products exhibiting superior visual appeal possess a higher level of safety than their aesthetically inferior products. This finding aligns with those reported by Yue et al., (2017) and Bou-Mitri et al., (2021), where consumers demonstrated a greater willingness to spend more for vegetables and fruits with greater visual qualities.

Consumers who exhibited a greater willingness to spend a higher price for organic onions than conventionally grown can be attributed to the perception that organic vegetables are often considered safer, as they are free from chemicals. These findings align consistently with previous studies (Wongprawmas and Canavari, 2017; Bhattarai, 2019; Ha, Shakur, and Pham Do, 2019; Mengistie, 2020; Akinwehinmi, Amos, and Ogundari, 2021;), where consumers were willing to pay more for organic vegetables. In the same vein, certified onions tend to appeal more than those without certification as it signifies that the produce has undergone meticulous inspections to ensure superior quality control standards. The certification provides consumers with the impression of superior quality onions. Recent studies also support these findings (Khan et al., 2018; Amfo, Donkoh, and Ansah, 2019), demonstrating a greater willingness among consumers to pay for certified vegetables.

Consumers predominantly preferred to acquire onions from supermarkets and, hence, a willingness to pay more than those sold at the fresh markets or wet markets. This observable tendency shows that consumers view vegetables sold in supermarkets as safer than those sold in fresh or wet markets. The prevailing view can be primarily ascribed to the extensive pre-washing, hygienic conditions, and superior packaging methods employed for vegetables in supermarkets, distinguishing them from their equivalents found in fresh or wet markets. This finding is in line with previous studies (Boccaletti and Nardella, 2000; Hoang and Nakyasu, 2006; Salam, Afrin, and Saha, 2020; Parveen et al., 2023), where consumers exhibited a preference for purchasing vegetables from supermarkets than traditional markets.

The findings of the present study are coherent with prior research, demonstrating the variation in consumers' willingness to pay for food safety attributes associated with onions. This variation depends on demographic factors, including age, income, and level of education. Notably, the study found that older consumers (aged 30 to 59) were more likely to prioritise food safety attributes than their younger counterparts (between 20 and 29). This gap may be attributable to the growing emphasis on sustaining a healthy diet as individual's age. This observation aligns with the findings of (Muhammad et al., (2015) and (Katt and Meixner, 2020), where elderly consumers demonstrated a willingness to pay a higher price for organic vegetables. A plausible explanation for this pattern is that maturing consumers tend to prioritise their well-being, a perspective that becomes more pronounced with age, differing from the mindset of younger individuals.

Besides, the findings underscore that consumers possessing higher education backgrounds, specifically tertiary qualifications, and earning higher incomes manifest a stronger disposition to afford monetary endorsement of the safety attributes associated with

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onions. This finding corroborates with recent studies (Zhang et al., 2018; Khan et al., 2018; Yang and Fang, 2021), which suggests that individuals with higher levels of education and higher incomes demonstrate a greater willingness to pay a premium for safe vegetables. As individuals experience an increase in wealth and educational attainment, their level of health consciousness tends to rise, resulting in a corresponding increase in their willingness to pay for such attributes.

CONCLUSION AND RECOMMENDATION

This study employed discrete choice experiments to ascertain consumer preferences and gauge their willingness to pay for various food safety attributes associated with onions within the Kabul city region. The survey included a total of 490 respondents. The findings demonstrate that consumers are willing to allocate a greater monetary value to food safety attributes associated with onions. Among these attributes, visual appearance emerges as the most important, followed by the production system used to produce onions, GAP certification, and market type (the point of sale for the onions). The findings also demonstrate the interplay of demographic factors—age, education, and income level—in shaping consumers' readiness to pay for safety features associated with onions. Compared to younger consumers (those below 30), mature consumers (aged 30 and above) exhibit a greater awareness of food safety attributes. This connection can be attributed to the fact that individuals with tertiary education are equipped with a more sophisticated understanding of the potential risks associated with food consumption, and their high income affords them the capacity to pay more for food safety attributes that align with their safety-conscious preferences.

Based on these findings, it is prudent to recommend that the Afghan government provide steadfast support to enhance food safety standards, especially given the increasing demand for safer products. The results demonstrate that consumers are increasingly willing to spend more money on products with improved safety attributes. As a result, the industry and farming community must adapt and react fast to these evolving dynamics to ensure their relevance and competitive edge in the dynamic market landscape. The adeptness of supply chain players in navigating these changes holds the promise of business opportunities for them. The study findings serve as a compass for Afghanistan's agri-food business in identifying and understanding critical factors impacting consumers' willingness to pay. This will empower the industry to respond actively to react to consumer demand and preference shifts, thereby promoting a proactive stance. Conflict of interest: The authors declare no conflict of interest

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