Extended Abstract
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Paper/Poster Title	Examining Preferences for Great British High Fibre White Wheat Bread: Evidence from Wheat Supply Chain Stakeholders

Abstract prepared for presentation at the 98th Annual Conference of The Agricultural Economics Society will be held at The University of Edinburgh, UK, 18th - 20th March 2024.

Abstract *200 words max*

Sustainable transformation of food systems requires collaborative efforts among relevant stakeholders in the food supply chain. Thus, this study examines stakeholders' preferences for high fibre white wheat bread, taking into account the economic, environmental and social (public health) concerns. With representative samples of stakeholders along the wheat supply chain (WSC) in the UK, data were collected on individual risk attitudes, as well as preferences and perceptions of decision-makers in the wheat supply chain. Additionally, discrete choice experiment (DCE) was conducted to achieve the main objective of the study. The results of the conditional logit model indicate improvements in economic, environmental and social (public health) sustainability dimensions are positively associated with the satisfaction (utility) of high fibre wheat bread but negatively associated with increasing price of 800g white loaf. Additionally, stakeholders are willing to pay 49p, 55p, and £3.94 for the improvement of economic, environmental and social (public health) benefits respectively, while the average price they are willing to pay for high fibre 800g loaf stands at 95p. It is recommended that the transformation of the wheat economy should focus on the development and sustainability of high fibre white wheat bread.

Keywords	high fibre, public health, sustainability, sustainable development, wheat supply chain (WSC), white wheat bread
JEL Code	D Microeconomics: D1, D6, D9 see: www.aeaweb.org/jel/guide/jel.php?class=Q)

Introduction *100 – 250 words*

Sustainable agricultural development requires interdisciplinary research and policy analysis of the entire food systems. Wheat is the most important grain crop in history; provides healthy food for humans, feeds for animals and contributes greatly to the global economy [1, 2]. Its health benefits include richness in fibre. High fibre wheat bread offers great opportunity in addressing food-related health challenges. With an estimated less than 10% of UK adult currently consuming around 30g of government recommended fibre per day, increasing the fibre contents of white wheat bread seems promising in addressing public health concerns. Since the sustainability of the high fibre white wheat bread is important for the UK economic development, policy issues should centre around answers to questions like how the contribution of agriculture (wheat) can be sustainably increased and public concerns and what should be done to address them. Consumption of low fibre raises red alert for heart related diseases like type-2 diabetes and stroke. With an estimated 12 million loaves of white wheat bread sold daily in the UK, increasing the fibre content in 800g white wheat bread will have positive health impacts. Thus, processes leading to the consumption of wheat products must be adjusted and all stakeholders should be considered in the research design as well as policy formulation and implementation. This study bridges the research gap by analysing the data collected from wheat supply chain stakeholders to understand preferences and sustainability issues in WSC for efficient food system transformation.

Methodology *100 – 250 words*

The data used for this study was collected through individual interviews (in person and online). The survey instrument was pre-tested twice at the University of Reading with the relevant stakeholders within WSC. Respondents' risk attitudes were tested on an 11-point Likert scale (0-10). We implement Discrete choice experiment (DCE) shown in **Table 1**. Additionally, we collected data on socio-demographic variables, perceptions about sustainability dimensions in relation to high fibre wheat and preferences for high fibre wheat attributes from 69 individual stakeholders who are key decision makers in the WSC. The data were analysed using both descriptive and conditional logit model.

Table 1: Attributes' Description and Attribute Levels

Attributes	Attributes description	Attributes Levels		
Economics (GDP)	Economic benefit, by increasing the contribution of agriculture (wheat) to GDP	High (H) (2.0%)	Medium (M) (1.0%)	Low (L) (0.51%)
Environment (EPI) 	Environmental impact associated with food production, in line with the environmental performance index (EPI) which reflect the health impact, climate change impacts, water resources, habitat diversity, and ecosystem vitality	High (H) (97.7)	Medium (M) (87.7)	Low (L) (77.70)
Nutrition (fibre content of bread) 	Nutritional benefit of the hi-fi wheat (increased fibre contents) which will promote good health. This value represents the average fibre content of 800g of white bread	High (H) (30g)	Medium (M) (25g)	Low (L) (19g)
Price (£)	Cost of 800g loaf of white bread	£1.00	£0.95	£0.90

Note: The EPI is an index that reflects the environmental performance of 180 countries

Results

100 – 250 words

Figure 1 shows the attitudes of WSC stakeholders to general risk taking, as well as risks in relation to environmental, economic and social sustainability dimensions of high fibre bread. **Figure 2** shows respondent preferences for sustainability dimensions, revealing respondents' preferences for economic, public health, environment and social concerns respectively. Lastly, respondents were asked to rank wheat attributes as shown in **Figure 3.** Grain colour and taste topped the preference list for wheat attributes.

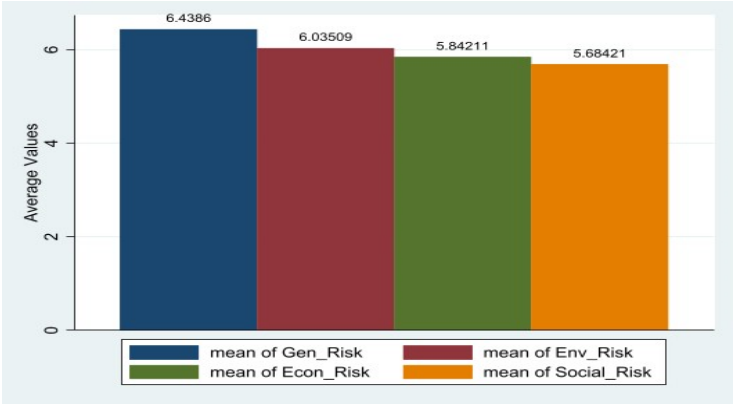

Figure 1: Average Risk Attitudes in relation to High Fibre White Wheat Bread (Measured on 11 Point-Scale (0-10)

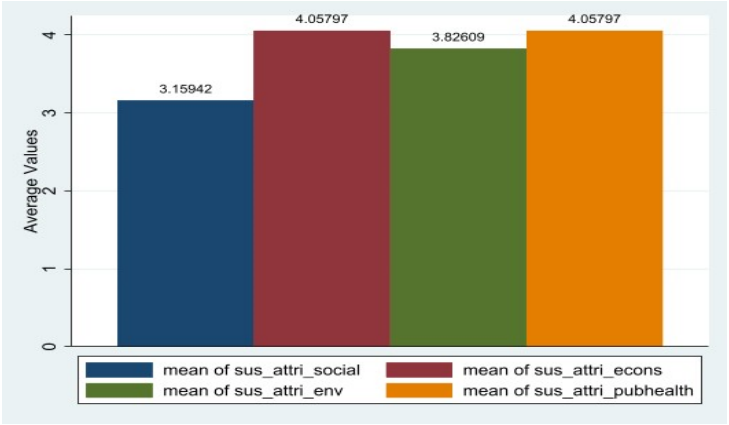

Figure 2: Perceived Sustainability Dimensions (Measured on 5 Point-Scale (1-5) from Not at all Important to Extremely Important

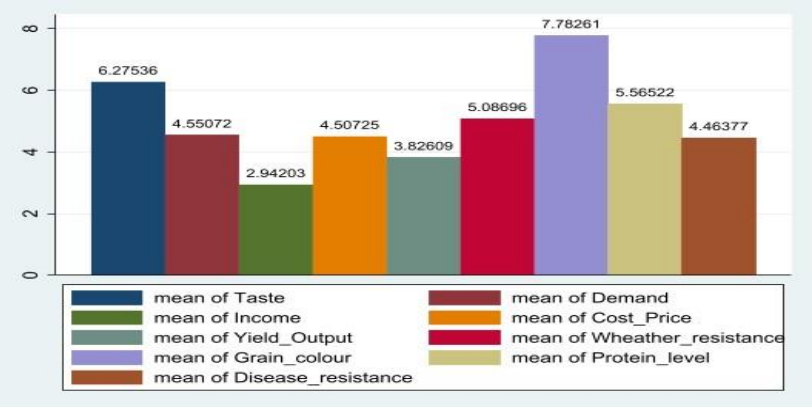

Figure 3: Preferences for High Fibre Wheat Attributes (Each Attribute individually ranked between 1-9)

Discussion and Conclusion

100 – 250 words

Most stakeholders are risk-loving with an average risk attitude of 6.44, 6.04, 5.84 and 5.68, respectively for the general, environmental, economic and social risks suggesting respondents are willing to take risks to ensure the sustainability of high fibre white wheat bread. Additionally, respondents prioritise public health and economics over other sustainability attributes (environment and social) with an average scores of 4.06, 4.06, 3.83 and 3.16, respectively.

Grain colour (7.78) and taste (6.28) topped the rankings in the wheat attributes while income (2.94) and yield/output (3.83) are least rank suggesting more preference for the wheat grain colour, but less concerned about the economic variable like income. High preferences are also reported for chemical components of wheat like protein level (5.57) which directly relates to health, environmental variable like weather resistance (5.09) that affect production and demand (4.55).

Stakeholders' satisfaction is associated with reduction in price but improvement in economic, environmental and nutrition sustainability dimensions with a relative willingness to pay of 49p, 55p and £3.94, respectively for economic, environment and nutrition as it relates to high fibre white wheat bread.

Sustainability of WSC should top the policy agenda in management while prioritising healthy food outcomes. Specific attention should also be given to attributes of wheat including grain colour, weather resistance, protein content and taste in an effort to ensuring availability of high fibre white wheat bread. Consumers will pay 95p or more (up to £1.31) for 800g white wheat bread if it is enriched with high fibre which may positively impact sustainable economic development.

References:

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2. Gustafson, P., Raskina, O., Ma, X., & Nevo, E. (2009). Wheat evolution, domestication, and improvement. *Wheat Science and Trade*, 3-30.