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# Fish Purchasing Behavior and Implications for Promoting Sustainable Consumption: A Malaysian Case

Ee Von GOH<sup>1</sup>, Susan AZAM-ALI<sup>2</sup>, Fiona MCCULLOUGH<sup>3</sup>

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## Abstract

**Purpose:** Motivated by the fact that Malaysians fish consumption patterns and preferences have raised sustainability concerns, this study aims to understand the key entry points to promote sustainable consumption and increased uptake of sustainably sourced fish among Malaysian consumers. This is achieved by exploring the individual determinants of Malaysian consumers' fish purchasing behaviors and their subjective and objective knowledge of fish. **Research design, data, and methodology:** A survey was conducted using interview-led questionnaire on 250 consumers in selected Malaysian populations recruited via street-intercept random sampling. **Results:** Findings confirmed the homogeneous societal culture of fish consumption amongst Malaysians. Females and consumers with advanced degree are found to be potentially effective primary targets of sustainable consumption interventions. Future interventions should consider the solutions to the low health and sustainability literacies among Malaysian consumers, and limited availability, accessibility, and affordability of sustainable options in Malaysia. **Conclusion:** The study findings provide new insights for the multisectoral stakeholders in the region working on promoting sustainable fish consumption and sustainable fisheries in general.

**Keywords :** Sustainable Diet, Environmental Sustainability, Food Systems, Food Policy, Fish Consumption

**JEL Classification Code:** D10, Q01, Q18, Q22

## 1. Introduction

Malaysia is a maritime nation with about 4,800 km of coastline and claims an exclusive economic zone (EEZ) of 334,671 km<sup>2</sup> with 200 nautical miles from its shores (Abdullah, 1993). Fisheries have long been a tradition and lifeline of Malaysians, for both food and livelihood. Based on data from published food balance sheets and dietary recall studies, Malaysia has, at 45 to 55kg per year, one of

the highest per capita fish supply and consumption in the world, more than double the global average of 20.5kg (Ahmad et al., 2016; FAO, 2020; Goh et al., 2020; Goh et al., 2021). It has been shown that Malaysian fish consumption patterns and preferences are unsustainable, as evidenced by the high import bills to satisfy local needs after having increased local fishing effort (Goh et al., 2021). Such consumption patterns may not be sustained in the long term;

1 First and Corresponding Author. Research Fellow. School of Biosciences, Faculty of Science and Engineering, University of Nottingham Malaysia. Email: [eevon.goh@nottingham.edu.my](mailto:eevon.goh@nottingham.edu.my)

2 Second Author. Assistant Professor. School of Biosciences, Faculty of Science and Engineering, University of Nottingham Malaysia. Email: [susan.azamali@nottingham.edu.my](mailto:susan.azamali@nottingham.edu.my)

3 Third Author. Associate Professor. School of Biosciences, Faculty of Science, University of Nottingham, United Kingdom. Email: [fiona.mccullough@nottingham.ac.uk](mailto:fiona.mccullough@nottingham.ac.uk)

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hence, a consumer-focused approach to influence sustainable consumption is necessary.

In line with the growing interest in sustainable healthy diets, research has focused on devising intervention strategies to target both production and consumption (Vermeir et al., 2020). Consumers are recognized as the key to driving sustainable production and play a central role in sustainable development (Yildirim, 2022). Since the root of sustainability problems is highly associated with human consumption, it is suggested that consumers, as the end users, can contribute a significant impact in sustainable development through their choices and behaviors as the purchasers and main end-users (Yildirim, 2022). Hence, interventions are required to help consumers improve on sustainability literacy and ultimately adopt sustainable consumption habits and behaviors. For effective interventions, one of the crucial first steps is to understand both how buying decisions are made and how products are consumed.

Numerous studies have been conducted in the West to study fish purchase behaviors (Leek et al., 2000; Verbeke and Vackier, 2005; Verbeke et al., 2007; Pieniak et al., 2010; Carlucci et al., 2015; Smith et al., 2017). In recent years, there is an increasing number carried out in the Asia Pacific to assess various aspects of fish marketing and demand, such as those in Indonesia (Arsil & Yanto, 2019), India (Sajeev, 2020), Japan (Kitano et al., 2020) and China (Chen & Wang, 2021; Zhang et al., 2021), but such knowledge is lacking in Malaysia. To date, there is only one study conducted by Ahmed et al. (2011) that assesses demographic and attitudinal characteristics that can affect the purchase decisions of marine fish among Malaysian consumers.

To address the information gap, the major goal of our study is to understand the individual determinants of Malaysian consumers' fish purchasing behaviors and their subjective and objective knowledge of fish. This information is essential to help identify entry points to promote sustainable consumption by empowering the individual as an agent of change. The results provide valuable insights for further research, future public debate, and policy making, given the importance of sustainable exploitation of fisheries resources. This paper would be beneficial for many stakeholders in the region working on sustainable diet and food system and sustainable production and consumption.

## 2. Methods

### 2.1. Study Sample

This study was conducted in selected areas in the Klang Valley, or also known as the Greater Kuala Lumpur. It is the

most densely populated region in Malaysia that is centered in the metropolitan Kuala Lumpur and includes its adjoining cities and towns in the state of Selangor. Samples of the urban population were collected in Kuala Lumpur and of the coastal population were collected in Kuala Selangor, a coastal town about 60 km from central Kuala Lumpur. The samples of rural population were recruited in Hulu Selangor, a rural district about 50 km from central Kuala Lumpur.

All participants were selected based on a purposive sampling technique. The inclusion criteria of the subjects were (1) Malaysian citizen; (2) 18 to 60 years of age; (3) individuals with no known illnesses; and (4) individuals able to give informed consent. All participants, regardless of gender, must have been the main person responsible for food purchasing within their household. Exclusion criteria were adults who have recently changed their dietary pattern and those practicing a special diet e.g., vegetarianism.

### 2.2. Study Design

The survey data were collected by interview-led questionnaires over a five-month period i.e., October 2015 to February 2016. Subjects were randomly recruited via street-intercept at selected areas (i.e., shopping streets, supermarkets, and wet markets) within Klang Valley and Selangor. Subjects were approached for screening and were informed about the study. A verbal consent was sought before the interview.

### 2.3. Development of Questionnaire

The questionnaire was split into six main sections, covering frequency of fish consumption, factors that determine consumption behavior, motivation to consume fish, barriers to fish consumption, perceptions of farmed and wild fish, and general consumer knowledge about fish. The findings regarding consumer perception of farmed and wild fish are reported in a separate paper (in preparation).

#### *i. Frequency of total fish consumption*

Fish consumption behavior was a self-reported measure. Participants were asked how often they eat fish, both at home and out of the home. The responses were summated to create one final variable, namely, total fish consumption. The frequency scale had 6 points, which were "seldom/never", "2-5 times every 6 months", "1-3 times a month", "1-2 times a week", "3-5 times a week", and "more than 5 times a week". Further, with the same scale, the participants were asked to report how frequently they consume each of the farmed species as listed. Participants reporting consumption of more than 3 times a week were categorized as 'heavy users'. Those who consumed fish less than twice a week but at least once a month were

categorized as ‘moderate users’, whereas only those who consumed less than once a month were ‘light users’.

*ii. Fish consumption behavior - determinants at point of purchase*

Nine items used to assess influences of determinants at the point of purchase were freshness, price, nutritional value, familiarity, cooking plan, sustainability, information of product origin, level of contaminants, and presence of “muddy” smell. A 4-point Likert scale was used, ranging from “no influence” to “extreme influence”. A neutral response category was excluded, which forced participants to think and decide on the proposed statements and their responses.

*iii. Fish consumption behavior - motives to eat fish*

Nine items used to assess the motives that drive fish purchase and consumption were personal liking, family member’s liking, advice of health professionals, cheap price, family habit, desire for a varied diet, easiness to prepare, and customs and traditions. A 4-point Likert scale was used ranging from “no influence” to “extreme influence”. A neutral response category was excluded, which forced participants to think and decide on the proposed statements and their responses.

*iv. Barriers to consumption*

There were 13 items to assess the barriers to fish purchase and consumption. Most of the barriers were the opposite statements of motives, i.e., personal disliking, family member’s disliking, perceived unhealthiness of some fish, advice of health professional to reduce consumption of certain fish, and expensive price. Other barriers included were the lack of experience in judging freshness, cleaning and cooking of fish, unpleasant smell when cooking, lower satiety compared to meat, abundance of bone, inconsistent supply of fresh produce, and limited choices. A 4-point Likert scale was used, ranging from “no influence” to “extreme influence”. A neutral response category was excluded, which forced participants to think and decide on the proposed statements.

*v. Consumer perception of farmed versus wild fish*

Participants were asked if they had any special preference for wild or farmed fish and whether they have knowingly purchased farmed fish before. Perceptions of farmed versus wild fish on 12 attributes were assessed. The attributes were freshness, quality, smell, taste, texture, availability throughout the year, price stability throughout the year, state of being “premium”, value for money, health benefits, contaminant content, and lastly, sustainability. Participants were required to answer whether fish of which wild or farmed origin was superior in each of the attributes. Two

other response categories, i.e., “no difference” and “don’t know”, were included to better segregate the participants’ standpoints and avoid forced choice bias.

*vi. Consumer knowledge about fish*

Objective and subjective knowledge about fish were assessed with 9 items. Subjective knowledge about fish was measured by three items: (1) "My friends consider me as an expert on fish"; (2) "I have a lot of knowledge of how to prepare fish for dinner"; and (3) "I have a lot of knowledge on how to evaluate the quality of fish". Next, consumer's level of objective knowledge about fish origins and health benefits was measured with 6 statements that are either true or false. It was assumed that those statements should be common knowledge among at least half of the population. Of the 6 statements, three were designed to assess the depth of understanding of fish and its fatty acid content. One of the statements was false: "Fish is the largest contributor of saturated fat in our diet when compared to meat and poultry." and two statements were true: "Fish is a source of omega-3 fatty acids" and "The general nutritional difference between cold water and warm water fish is their fatty acid composition". For all of the 9 statements, a binary scale "true"/"false" was used. A "don't know" response category was included in the options, which avoid forcing participants to make wild guesses.

## 2.4. Statistical Analysis

Data were analyzed using SPSS 22.0 (SPSS Inc., Chicago, IL, USA). Mean scores and standard deviations on 4-point scales are presented in table format (Table 3 – 5). Non-parametric bivariate analyses through correlation and comparison of mean scores, i.e., Wilcoxon–Mann–Whitney test and analysis of variance F-tests with Dunnett T-3 post hoc comparison of mean scores, were used to detect differences in frequency and determinants of consumption between different sociodemographic and behavioral consumer groups.

Cronbach’s coefficient alpha was used to test the reliability of the multiple items that used 4-point Likert scale. From the analysis, the standardized item (alpha) for these variables ranged from 0.859 to 0.882. The alpha scores for each factor were satisfactory as the Nunnally’s (1978) guideline of a minimum alpha value of 0.5 for explanatory research was met.

## 3. Results

### 3.1. Sample Characteristics

In total, 310 questionnaires were collected. Of these, 76%

(n=250) were classified as 'complete' and 24% (n=60) were classified as 'incomplete or unreliable'. The majority of the questionnaires that were classified as 'incomplete or unreliable' (n=54) were excluded from the dataset because part of the responses given were self-contradictory and, therefore, not credible. Of those included in the analysis (n=250), 188 were women (75.2%) and 62 were men (24.8%). This gender distribution reflected the criterion that each respondent was the main person responsible for food purchasing within the household. The sample covered a wide range of consumers in terms of sociodemographic characteristics, such as age, income, and educational background (Table 1).

**Table 1:** Consumers' Characteristics (% , n=250)

Characteristics	Proportion % (n=250)
Gender	
Male	24.8
Female	75.2
Age (years)	
18 – 29	14.0
30 – 39	22.4
40 – 49	27.6
50 – 59	22.8
60 – 69	11.2
≥70	1.2
Geographical Location	
Urban	50.4
Coastal	24.8
Rural	24.8
Ethnicity	
Malay	57.6
Chinese	29.2
Indian	13.2
Highest Level of Education	
Completed Primary Education	16.0
Completed Secondary Education	36.4
Certificate/Diploma	29.6
Bachelor's Degree	10.8
Postgraduate Degree	6.0
Monthly Median Per Capita Income	
RM 500 or below	20.8
RM 501 – RM 1000	28.0
RM 1001 – RM 2000	28.0
RM 2001 – RM 3000	10.4
RM 3000 and above	3.2

The age group distribution of participants was approximately normal, with the majority in the age range of 30-60. Half (50.4%) of the participants resided in the urban

area while their counterpart was equally distributed in rural (24.8%) and coastal (24.8%) areas (Table 1). The majority (82.8%) completed a minimum of 12 years of formal education (Table 1). The monthly median per capita income demonstrated a fairly left-skewed distribution, indicating that there were more people of low income than high income.

### 3.2. Frequency of Total Fish Consumption

Total fish consumption frequency is the summative frequencies of total fish consumption and farmed fish consumption, at home and out of home (Table 2). The majority of participants (61.2%) consumed fish more than 3 times a week ('heavy users') and geographical location appeared to significantly influence the frequency of fish consumption, with highest consumption levels in rural and coastal regions as compared to urban areas. No significant difference was found across other socio-demographic factors.

**Table 2:** Prevalence of different types of fish consumers across different geographical locations

Types of fish consumers	Geographical Location (%)		
	Urban	Coastal	Rural
Heavy users	41.3	80.6	82.3
Moderate users	47.6	19.4	17.7
Light user	11.1	0.0	0.0

### 3.2. Potential Factors and Barriers Influencing Decision to Buy Fish

Perception of fish as healthy food was rated as the most important factor that encouraged the purchase of fish (Table 3). Individual and family preferences were also influential (Table 3). Lack of persistency of fresh produce supply was rated as the most important barrier against the purchase of fish (Table 4). Difficulty to judge freshness and expensive price tags were also similarly demotivating factors (Table 4).

Gender, geographical location, and ethnicity all appear to influence individual motivation to buy fish. Males generally scored higher overall than females for the motivating factors; they also scored lower than females overall for the demotivating factors. Likewise, the urban and Chinese consumers scored lower for motivating factors and higher for demotivating factors. It is worth noting that a vast majority of the Chinese participants reside in urban area ( $p < 0.05$ ). Neither the motivating nor demotivating scores appear to influence frequency of fish consumption.

**Table 3:** Mean ( $\pm$  standard deviation) Likert-scale scores of motivating factors for fish purchase

I buy fish and/or fish because . . .	Total (n=250) Mean $\pm$ SD
It is a healthy food	2.96 $\pm$ 1.01
I like to eat	2.81 $\pm$ 1.08
Some of my family members like to eat	2.80 $\pm$ 1.03
We are used to eating it regularly	2.77 $\pm$ 1.10
I'd like to have a variety in my diet	2.76 $\pm$ 1.04
It is easy to prepare	2.76 $\pm$ 1.08
It is a must-have during family meal or gathering	2.60 $\pm$ 1.15
Health professionals advised to eat more	2.36 $\pm$ 1.10
It is cheap	2.20 $\pm$ 1.08

Note: The extent of influence of each factor was indicated using a scale of 0 (no influence), 1 (slight influence), 2 (moderate influence), and 3 (extreme influence).

**Table 4:** Mean ( $\pm$  standard deviation) Likert-scale scores of demotivating factors for fish purchase

I do not buy fish and/or fish because . . .	Total (n=250) Mean $\pm$ SD
The supply of fresh produce is not persistent	2.24 $\pm$ 1.03
It is difficult to judge the freshness	2.23 $\pm$ 1.00
It is expensive	2.21 $\pm$ 1.03
Some fish and/or fish are not healthy	2.05 $\pm$ 1.05
The choices are limited	2.04 $\pm$ 1.00
Health professionals advised to eat less of some fish and/or fish	1.98 $\pm$ 1.06
Some of my family members do not like to eat	1.88 $\pm$ 1.05
The smell when cooking is unpleasant	1.86 $\pm$ 1.05
It is difficult to clean	1.85 $\pm$ 0.98
It is difficult to remove bones from fish	1.83 $\pm$ 1.00
I do not like to eat	1.79 $\pm$ 1.01
It is difficult to cook	1.73 $\pm$ 0.96
Unlike other meat, fish and/or fish is not filling after eating	1.59 $\pm$ 0.87

Note: The extent of influence of each factor was indicated using a scale of 0 (no influence), 1 (slight influence), 2 (moderate influence), and 3 (extreme influence).

### 3.4. Determinants of Point of Purchase

Generally, participants regarded freshness, judged by visual and olfactory appeals, as the most influential factor in

determining which type of fish to buy. Participants also tended to choose fish that they are familiar with. Product origin and sustainability were the least important factors to consider at the point of purchase (Table 5).

**Table 5:** Mean ( $\pm$  standard deviation) Likert-scale scores of determinant factors at point of purchase

How much do these factors influence your decision on choosing which type of fish/fish to buy?	Total (n=250) Mean $\pm$ SD
Looks and smell fresh	3.32 $\pm$ 0.94
Is the type I am familiar with	3.08 $\pm$ 0.93
Has no muddy smell	2.99 $\pm$ 1.09
Is affordably priced	2.98 $\pm$ 0.98
Has higher nutritional value	2.96 $\pm$ 0.96
Is what I have pre-planned to cook	2.85 $\pm$ 1.00
Is free of chemical and heavy metals	2.53 $\pm$ 1.17
Has product origin information	2.30 $\pm$ 1.11
Is sustainably produced	2.07 $\pm$ 1.06

Note: The extent of influence of each factor was indicated using a scale of 0 (no influence), 1 (slight influence), 2 (moderate influence), and 3 (extreme influence).

A few of the determinants at point of purchase are significantly influenced by some socio-demographic factors. Females scored higher than males for concerns on chemical and heavy metals. Participants with postgraduate degree also scored higher for "Is free of chemical and heavy metals" than those without tertiary education. The older age groups (>50 years old) scored lowest for "Is affordably priced", and the score decreased as age increased. The urban and the Chinese scored lower for overall determinants at the point of purchase, reflecting their lower scores for motivating factors.

### 3.5 Objective and Subjective Knowledge about Fish

The question that garnered the highest percentage of correct responses (71.5%) was the one that assessed objective knowledge of fish as a source of omega-3 fatty acids (Table 6). When asked about their subjective knowledge of fish, about 75% of total participants claimed that they did not know a lot about the harvesting of fish (Table 6), which indirectly explains the ranking of sustainability and origin of fish as least important factors to consider at point of purchase. More than half (53.6%) thought that they did not know a lot about how to evaluate the quality of fish (Table 6). A significantly higher prevalence of coastal participants reported that their friends and/or family think they know a lot about fish (75.4%) and that they know a lot about how to evaluate the quality of fish (68.9%). In contrast, among those who claimed that they were

regarded by their friends and family as somebody who knew a lot about fish (n=123), 71.5% answered 'yes' to the question "Fish is the source of dietary fibre"; 64.2% didn't know that the general nutritional difference between cold water and warm water fish is their fatty acid composition; and 64.2% mistook fish as the "largest contributor of saturated fat in our diet when compared to meat and poultry".

**Table 6:** Prevalence of different responses towards multiple statements assessing objective knowledge

Statements (Correct Response)	Responses (n=250)		
	True %	False %	Not Sure %
Fish is a source of dietary fibre. (False)	57.1	22.7	20.2
Mackerel and tuna are freshwater fish. (False)	15.1	60.4	24.5
The general nutritional difference between cold water and warm water fish is their fatty acid composition. (True)	27.9	8.1	64.0
Fish is the largest contributor of saturated fat in our diet when compared to meat and poultry. (False)	32.7	36.3	31.0
Salmon is a cold-water fish. (True)	52.4	12.2	35.4
Fish is a source of omega-3 fatty acids. (True)	71.5	4.1	24.4

#### 4. Discussion

Fish is consumed frequently by the population under study. Total consumption does not appear to be influenced by socio-demographic factors nor motivating and demotivating scores – only geographical location appears to significantly influence the frequency of fish consumption. These findings reflect the homogeneous societal culture of fish consumption amongst Malaysians, despite the multi-ethnic and multicultural demographic of the population. It is understandable that Malaysia is a maritime nation; hence, fish is deeply ingrained in the local diet and culture for that apparent reason. Other studies have also shown high frequency of fish consumption among Malaysians (Norimah et al., 2008; Ahmad et al., 2016; Kasim et al., 2018) and that those living close to the sea generally consume more fish due to greater availability and accessibility (Goh et al., 2021).

Malaysian consumers' motivations to buy fish as driven

by perception as healthy food and demotivated by freshness issues are in line with studies reported by Pieniak et al. (2008), Brunsø et al. (2009), and Mesnildrey et al. (2010). The inherent characteristics and nature of fish and seafood can help to explain the fact that freshness and familiarity with the varieties are regarded as the most important deciding factors at point of purchase. Fish and seafood require extra care and attention during the cooking process to avoid overcooking because their muscles are much softer and the connective tissue is weaker than their terrestrial counterparts and such characteristics differ from one species to another (Listrat et al., 2016; Zhang et al., 2017). Since there are many more varieties of fish and seafood than meats or poultry, it is more challenging to generalize about basic cooking techniques. Hence, it is important for the consumer to become familiar with the individual characteristics of the varieties they decide to purchase so that the appropriate methods and cooking times can be chosen to maximize effectiveness and enjoyment. The higher perishability of fish and shellfish as compared to their terrestrial counterparts also demands the freshest selection for the best cooking, eating, and nutritional qualities (Mayer & Ward, 1991).

The results of this study suggest that interventions that aim to promote sustainable fish consumption may be more engaging and effective if they are targeted at females, since the majority of people responsible for fish purchasing within the household are females. This finding is in line with other studies that have acknowledged that although more men have increased their involvement in food purchasing and food preparation, most food purchasing research continues to focus on women because they are primarily responsible for household food purchasing and preparation and are regarded as the "nutritional gatekeepers" of the family (Flagg et al., 2014; Crane et al., 2019). Compared with women, men, on average, have lower knowledge about nutrition and give less consideration to nutrition (Crane et al., 2019). Our results also point to the greater health consciousness among females and consumers with advanced degree. They are found to be more concerned about the presence of chemical and heavy metals in fish. In fact, Rezai et al. (2013) have found that consumers who live in urban areas and with higher education levels and income were more likely to be aware of and have a positive perception towards green food consumption.

It is of no surprise that consumers are least concerned by, and less likely to consider, product sustainability at the point of purchase. This may be due to the low sustainability literacy of the general population of Malaysia (Joseph et al., 2013). Nonetheless, Latip et al. (2020) have demonstrated that perceived green trust does not have an effect on Malaysian consumer purchase intention. While there are green stores in Malaysia that promote environmentally friendly products and services, the majority of Malaysians

buy environmentally friendly food for food safety and health reasons instead of environmental concerns (Khan et al., 2015). To ensure the long-term environmental sustainability, the fishery industry as well as the broader food industry in Malaysia must learn more about the apparent disconnection between green products and environmental impacts among consumers.

The consumers in this study appear to have generally poor objective knowledge of fish, with the exception of fish as a source of omega-3. This indicates the successful advertising and marketing of omega-3 products by the ever-growing fish-oil-based food supplement industry (Grand View Research, 2019) and generally low health literacy levels among Malaysians. In fact, the National Health and Morbidity Survey 2015 (NHMS 2015) has found only 6.6% of Malaysian adults had adequate health literacy (Jaafar et al., 2021). Consumers with strong subjective knowledge will have more positive attitudes and behaviors towards an object that they feel they know a great deal about. As discussed earlier, fish is highly intertwined to Malaysian diet and culture, owing to Malaysia being a maritime nation. Hence, it is not unusual for consumers, particularly those living in coastal regions, to have stronger subjective knowledge, since subjective knowledge usually includes those ideas which are influenced by personal feelings (Xin & Seo, 2019).

Future interventions to promote sustainable fish consumption should acknowledge the challenges in modifying dietary habit, particularly one that is deeply intertwined with the geography, culture, and heritage (O'Riordan & Stoll-Kleemann, 2015). The low health and sustainability literacies among Malaysians will add to this challenge. Local study has proven the positively significant effects of eco-literacy and environmental concern upon attitudes towards environmental-friendly products and the willingness to pay for environmental-friendly products (Al Mamun et al., 2018). Future interventions may focus on improving sustainability literacy, as well as learning from the successful marketing campaign of fish oil omega-3 when devising effective campaigns to promote sustainable fish consumption. Royne et al. (2011) have suggested that the attitude-behavior gap is possibly the result of individuals not being able to relate to the personal benefits, including the health advantages of engaging in sustainable behaviors. Thus, to translate health and sustainability literacy and intention to practice sustainable consumption habits into actual purchase behavior, future interventions should also bolster consumer knowledge on the interlinkage of environment and health and instill the belief that their actions can positively affect the environment, their own health, as well as their own well-being (Royne et al., 2011).

At present, there is limited availability and knowledge of sustainable options in Malaysia. The main means would be

via global eco-labelling (i.e., Marine Stewardship Council (MSC) Certification); however, MSC certified products are not widely available or accessible and usually attract a price premium. As such, the food environment in Malaysia is not conducive for environmentally sustainable food consumption by the wider circle of consumers because sustainable options only appeal to a narrow niche of consumers who are financially able to engage in sustainable consumption. Economic barriers, such as higher prices and barriers resulting from market imperfections (e.g., limited access to products, lack of information) (Gorynska-Goldmann, 2019), could limit the freedom to make sustainable choices among less affluent groups. In fact, the majority of consumers in this study are price sensitive, the exception being the older age group and retirees who may have more financial freedom and, thus, are less concerned about the price. The less affluent consumers may have different purchase motives altogether, as well as limited access to outlets that offer a wide variety of affordably priced sustainable options (Mirsch and Dimitri, 2012).

## 5. Conclusion and Recommendations

The current study provides a glimpse into the motivating factors and determinants of fish purchase as well as objective and subjective knowledge of fish among a selected sample of Malaysian consumers. It appears that Malaysians have a strong fish consumption culture that would not be easily influenced by or responsive to the introduction of sustainable consumption principles. It is opined that these results are suggestive of the need to improve health and sustainability literacies among consumers, with women being the prime target as agents of change. Knowledge on how to get less affluent and price sensitive consumer groups on board is lacking but is a key condition for scaling up sustainable food consumption. A starting point would be to establish local sustainability certification programs by appropriate government agencies for qualified fisheries to get certified at nominal cost. The resulting food label can serve as the easy-to-use interface to promote sustainable consumption.

Although a conscious effort was made to ensure the survey included a cross-section of the population (by utilizing three distinctly different locations –urban, rural, and coastal towns and participants from all three major ethnic groups), it is acknowledged that this may not be representative of the entire Malaysian population. To provide a more generalized view of the Malaysian population at large, the study could be replicated in different States and with larger samples.

## Ethical Approval

This study was approved by the University of Nottingham Ethics Committee (application number: GEV120116)

## Statement of Informed Consent

The authors ensured that the participants were well-informed, prior to taking part in the study, of the aim and objectives of the research as well as the scope of their involvement and the use of any subsequent data arising from their participation. The voluntary nature of participation and the option to withdraw from the study at any point in time were stated clearly. Potential participants were also assured of the confidentiality and anonymity of their responses. All participants gave a verbal consent stating their acceptance to take part in the survey.

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