



Socio-cultural Factors Affecting Fresh Fish Consumption and Willingness to Consume Fish-based Products among Tribals: A Study in Wayanad, Kerala

Aparna Radhakrishnan^{1*}, Sajeev M.V.², A. K. Mohanty³, Suseela Mathew² and C. N. Ravishankar⁴

¹Kerala Agricultural University, Vellanikkara - 680 656

²ICAR-Central Institute of Fisheries Technology, Cochin - 682 029

³ICAR-Agricultural Technology Application Research Institute, Barapani - 793 103

⁴ICAR-Central Institute of Fisheries Education, Mumbai - 400 061

Abstract

Fish consumption is a crucial component of a balanced and nutritious diet. The study identified the willingness to consume fish-based products and the socio-cultural factors affecting fresh fish consumption among the major tribes of Wayanad district in Kerala, South India. Sardine was the most consumed and favourite fish of the tribes, followed by mackerel. Variables like age and frequency of fresh fish consumption were found influencing the willingness of tribes for consumption of specific fish-based food products like fish soup, fish pappads, fish noodles, fish balls, and fish cutlets. The regression model revealed that factors including age, social media exposure, organizational trust, consumer trust, attitude of consumer, subjective norms, perceived behaviour control, and perceived risks of consuming fish affect the frequency of fresh fish consumption. The study indicates that the tribes of Wayanad prefer fresh fish over fish-based products and dried fish. The tribes expressed a willingness to consume fish-based products if provided free of cost, with fish soup, fish pappads, and fish noodles being the most preferred among a given set of options. The research highlights the need for policy interventions and extension efforts to promote fresh fish consumption, especially among tribal communities, to alleviate malnutrition.

Keywords: Fish consumption, Kerala, socio-cultural factors, tribes

Received 30 September 2022; Revised 10 October 2023; Accepted 16 October 2023

*Email: aparna.r@kau.in

Introduction

Fish, in general, is accepted as vital for a balanced and healthy diet and is considered to be safe and nutritious. It is perceived as the primary source of proteins and many micronutrients, such as vitamins and minerals with low-fat content (Yaktine & Nesheim, 2007). Many studies have pointed out that consumers regard fish healthier than other non-vegetarian foods (Brunsø, 2003; Gross, 2003). According to Akpinar et al. (2009), the buying preference of consumers is primarily influenced by product variety, supply channel and price. Mugaonkar et al. (2011) found that most fish consumers (84.3 %) were species-specific while buying fish and the significant determinants of purchase were the quality and convenience. The health concern is also a vital consumer choice dimension (Roininen et al., 2001; Vannoppen et al., 2002) while taste was another aspect of buying preference (Grunert et al., 2000; Verbeke, 2006).

The inclusion of fish in Indian diet is favoured by its extensive availability from various marine and inland sources. India's fishery biodiversity supports the livelihoods of millions of people. Fish products are an excellent source of nutrition for the tribal communities who often live isolated from the mainstream population and markets. However, introduction or modification in the consumption pattern of communities like tribes is challenging as their food consumption behavior is very complex (Evans & Cox, 2006). Several factors influence the general food choice including health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity (Steptoe et al., 1995), impression management, ethical concern (Martins & Pliner, 1998) and ecological welfare, environmental

protection, political values and religion (Lindeman & Väänänen, 2000; Bonne et al., 2007). Freshness, price and attitude are the most critical determinants for food choices (Olsen, 2004; Petrovici et al., 2004; Tuu et al., 2008). It was frequently assumed that the major factor responsible for acceptance or rejection of fish was the consumer attitude towards the flavour and texture of the products involved (Leek et al., 2000). Salient beliefs reasonable in forming seafood/food consumption attitudes were taste/distaste (negative affect), quality/freshness (Olsen, 2004) and nutrition (Steptoe et al., 1995).

The role of fisheries and aquaculture in food security and nutrition is driven by many connections among environmental, development, policy and governance issues (HPL, 2014). Indian population derived just 2 % of their protein intake from fish as converted into levels of protein consumption (Needham & Smith, 2015). While the World Bank (Msangi et al., 2013) predicts per capita fish consumption of 6.6 kg/year for India in 2030, it still falls behind the ICMR recommendation of 12 kg/year. Compared to national figures, the state of Kerala predominantly reported a high average annual per capita fish consumption (NSSO, 2012) of nearly 30 kg (2.26 kg in rural and 2.21 kg in urban areas), with the tendency to include fish and seafood in daily diet being very common among Keralites (Sajeev et al., 2019). Even though there are many studies on the tribal food consumption pattern, only a few empirical studies have been reported on willingness to consume fish-based products and the socio-cultural factors that affect fresh fish consumption among the tribes of Wayanad (Sajeev et al., 2021). Hence, there was a felt need to understand willingness of tribes to consume fish-based products and the socio-cultural factors that affect fresh fish consumption in the context of alleviating malnutrition among the tribes of Wayanad, Kerala. The tribes exhibit a unique cultural pattern, tangled with certain specific traditions and beliefs, which acted as a limitation during this study.

Materials and Methods

The Wayanad district is home to the largest tribal population in Kerala with significant levels of malnutrition (Krishna & Sriyayanth, 2022). Around 54.6 % of children below five years and 15.5 % of pregnant women in Wayanad are anaemic, in addition to nearly 27.2 % underweight, 27.7 % stunted, and 10.7 % severely wasted children of less than five years old (NFHS, 2019).

The secondary data on tribal groups, tribal population and tribal colonies and number of households under each tribal group were collected from the District Collectorate, Wayanad. Wayanad has a total tribal population of 151,443 settled in 3,169 colonies containing 36,136 households distributed among different tribal communities. Stratified probability proportional sampling technique was used for the study purpose. Six different tribal communities with highest population were considered as six different strata or groups for the study. Probability proportional to population size was computed from each stratum to calculate the number of households to be selected from each stratum. The final sample size of 200 households was divided between 6 selected tribes - Paniya (88), Kurichyan (32), Kuruman (28), Kattunaykkan (26), Adiyar (16) and Vettakuruman (8).

A structured pre-tested interview schedule was used and household interviews were conducted during January-March, 2020. The Wilcoxon signed-rank test was used to segregate the respondents by their willingness to consume fish-based products. The ordered logit model was used to identify the determinants of frequency of fresh fish consumption (McCullagh, 1980). The variables used for the study were operationally defined for analysis (Table 1).

Results and Discussion

Investigations showed that 78 % of the respondents belonged to the age group of 26-50 years, 9 % and 13 % to below 26 and above 50 years respectively (Table 2). The majority of the respondents (78 %) were females. Males represented only 22 % of the respondents. About 84 % of the respondents had a family size ranging from 3-6 members, and most (51 %) had a primary level of education. Majority of the respondents were labourers (72 %) while about 14 % were unemployed. Around 84 % of the surveyed respondents resided inside tribal hamlets, while the rest were living in government-provided accommodation in a semi-urban area. It was found that spouses of 57 % of the respondents were labourers, while 42 % were homemakers.

The tribe-wise segregated data implied that the fish consumption frequency ranges from very frequent (daily) to moderately frequent (twice or thrice a week) to less frequent (weekly once). Adiyar and Kurumar tribes had the highest fish consumption frequency, while Kattunaykkan tribes had comparatively lesser frequency of fish consumption than

Table 1. Conceptualisation of the major variables

Variables (Xi)	Unit of account: Modalities of variables
Age	Number of completed living years
Gender	Male/Female
Family size	Total number of members in the family
Education level	Illiterate/Primary/Secondary/Graduate/Post Graduate
Occupation of respondents	The activity that generates >50% of the respondent's income (Farming/Fishing Labour/Fish-Vending/Self-employed/Private casual/ private salaried/ Govt. Service)
Place of residence	Place where one lives- Rural (tribal hamlets)/Semi-urban (Government provided accommodations)
Working status of spouse	Whether the spouse is a laborer, housewife, or does govt. job- Employee/Homemaker
TV (TV Watching behaviour)	Whether the respondent watches TV or not
Social Media (Social Media usage)	Whether the respondent uses social media or not and usage preferences. (YES/NO)
Income	Total monthly income earned by the family. (Rs.)
Organizational Trust (otrust)	Level of trust accorded by tribes on organizations and agencies involved in fisheries research, extension, food safety, health, fish marketing and retail
Consumer trust (ctrust)	Level of trust accorded by tribes on different fish retailers.
Fish consumption factor-1 (fishconsump1/Attitude)	Attitude towards the fish purchase and consumption measured on a five-point scale. Measure of a tribal person's feeling or opinion about purchase and consumption of fish, or a purchase and consumption behaviour that is caused by this feeling or opinion.
Fish consumption factor-2 (fishconsump2/Subjective Norms)	Subjective norms in the consumption of fish, measured on a five-point scale. Measure of a tribal person's beliefs about whether peers and people of importance to him/her think he or she should engage in the purchase and consumption of fish
Fish consumption factor-3 (fishconsump3/Perceived Behavioural Control)	Perceived behavioral control in purchase and consumption of fish measured on a five-point scale. Measure of a tribal person's expectancy that performance of the fish purchase and consumption behavior is within his/her control
Fish consumption factor-4 (fishconsump4/Perceived Risks)	Perceived risks of consuming fish. Measure of a tribal person's perception on functional, financial, performance, psychological, physical and social risk associated with fish purchase and consumption
Opinion of Consumers (opinion)	Opinion of tribes on the nutritional value and health benefits of consuming fish
Fish buying factors (fishbuying~c)	Based on the fish consumption behavior, other factors that contribute towards the purchase of fish as perceived by tribes

other tribes (Fig. 1). Kattunaykkans are more dependent on forests and forest products. They subsist on honey, roots, and barks of plants, and whatever small animals they trap or hunt down. They purchase fish only when they have disposable income, otherwise live on various forest produces collected by them. Kurichyans were found to be a well-off group among the surveyed tribes. Having better purchasing power, their diet had meat more times a week compared to other tribes.

Results from the study indicated that sardine was the most consumed fish by 98 % of the tribals, along with other fishes like mackerel, anchovy, tuna, sharks and squids. Sardine (87 %) followed by mackerel (48 %), mullet (8 %), shark (4.5 %), pomfret (3 %), crab (2 %) and anchovy (2 %) were rated as their most favourite fishes. Arrival of fish to the wholesale and retail markets of Wayanad are generally from the coastal landing centers of Kerala and other neighbouring states like Karnataka, Tamil

Table 2. Socio-demographic characteristics of respondents (n=200)

Variables	Category	Frequency	Percentage (%)
Age	≤ 25 years	18	9
	26-50 years	156	78
	≥ 51 years	26	13
Gender	Male	44	22
	Female	156	78
Family size	≤ 2	19	9.5
	3-6	168	84
	≥ 7	13	6.5
Education level	Illiterate	46	23
	Primary	102	51
	Secondary	46	23
	Graduate	6	3
Occupation	Farm labourer	21	10.5
	Labourer (other)	144	72
	Farmer	7	3.5
	Unemployed	28	14
Place of residence	Rural (Tribal hamlets)	167	83.5
	Semi-urban	33	16.5
	(Govt. provided accommodation)		
Working status of spouse	Labourer	114	57
	Homemaker	84	42
	Govt. job	2	1

Nadu and Andhra Pradesh. On an average, about 100 kg of marine and freshwater iced fish mostly sardine, mackerel and tilapia were transported daily to these areas (Shyam et al., 2020). Decision-making by consumers largely depends on their knowledge about the product. Consumer knowledge will influence how consumers collect and analyse the information and make buying decisions (Alba & Hutchinson, 1987). Pieniak et al. (2010 a, b) found that consumer knowledge is an essential determinant of fish purchase and consumption.

A team of scientists under the WorldFish funded ICAR-CIFT project in collaboration with KVK, Wayanad (KAU) aims to provide and popularise fish-based products among the tribes of Wayanad to alleviate malnutrition. Hence, the willingness of the tribes to consume ICAR-CIFT's fish-based products like fish soup, fish pappads, fish noodles, fish balls, and fish cutlets were enquired. Results showed that 54.5, 72.5, 56.5, 75 and 64.5 % of the total surveyed

tribes were willing to consume fish soup, fish pappad, fish noodle, fish ball and fish cutlet respectively (Fig. 2) provided these items are given free of cost. Even though they hadn't consumed fish ball earlier, they preferred eating the fish balls because of its resemblance to some of their traditional food items. Many of them revealed that they like eating noodles, and sometimes they add fish in noodles for taste. They hadn't consumed fish noodles but were willing to consume them. Tribes of Wayanad consume pappads and were also eager to consume fish pappads developed by the project team. The rest of the tribal respondents were either unwilling or undecided regarding consumption of fish-based products as they were mostly unimpressed or unaware about them.

When the respondents' characteristics were segregated by their willingness to consume fish-based products, it was found that there was a significant difference between willingness among different age

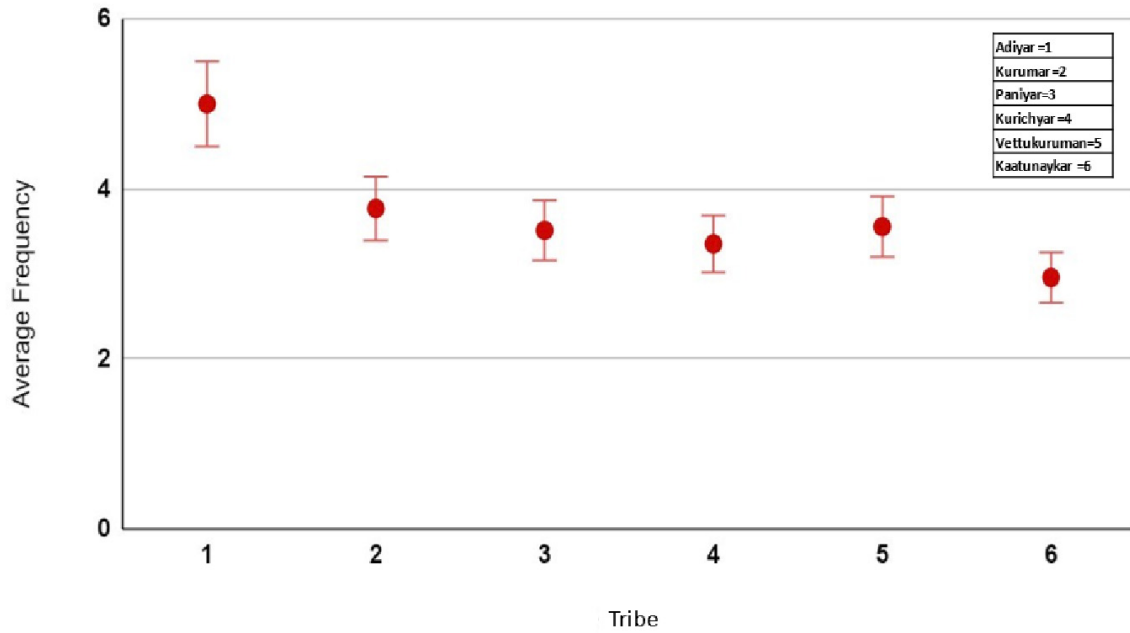


Fig. 1. Fish consumption frequency among different tribes (n=200)

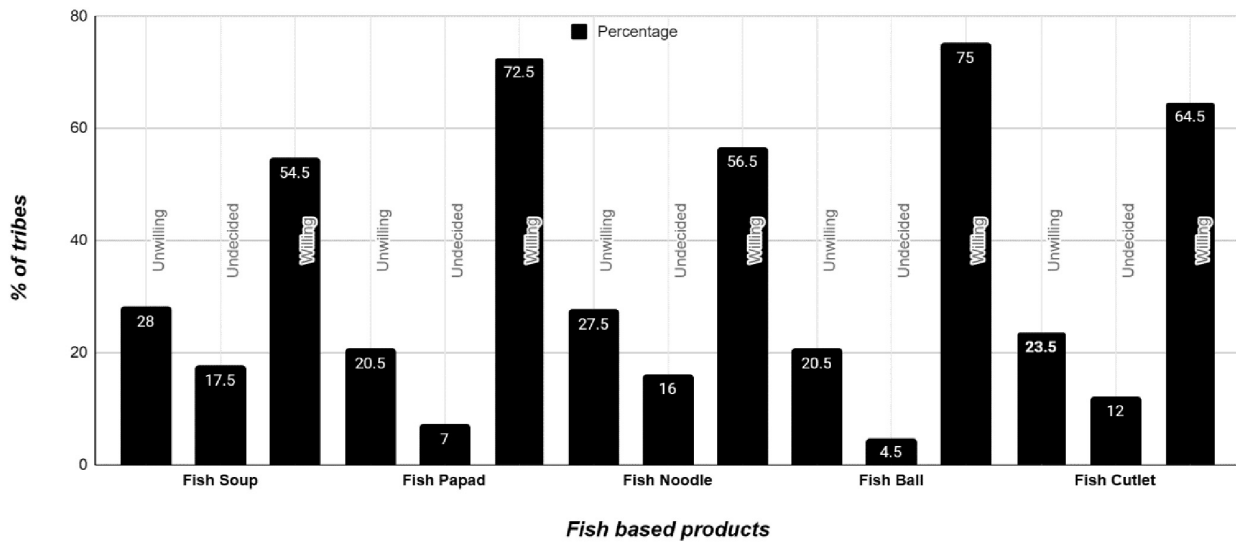


Fig. 2. Willingness to consume fish-based products by the respondents (n=200)

categories. The results revealed that the younger generation (below 20 years) prefer fresh fish to fish-based products (Table 3). The reason might be the lower exposure to fish-based products among tribal youth. On the contrary, the tribal individuals who were consuming fresh fish frequently also consume fish-based products.

The ordered logit regression results are presented in Table 4. The pseudo R² was statistically significant. Therefore, the model’s independent variables explain the variation of the dependent variable, the frequency of fish consumption, in three groups. Age, social media usage, organisational trust, consumer trust, perceived behavioral control and perceived

risks of consuming fish are the variables that are found to affect the frequency of fish consumption in tribal households. Old age, poor organisational trust, consumer trust on specific vendors and perceived risks of consuming fish are the variables found contributing to less frequent (weekly once) fish consumption among tribes. Social media usage, younger age, lower perceived behavioural control and less perception of risks from fish consumption were found leading to very frequent (daily) fish consumption among tribal households.

Age is a significant factor influencing the frequency of fish consumption of the tribes (Can et al., 2015). There is a significant positive relationship with age for the category that had less frequent fish consumption. As they get older, the tendency to be in the category of less frequent fish consumption increases. For the group that had more frequent fish consumption, there is a significant negative relationship with age. Both the results indicate that the younger tribal population prefer fresh fish in their diet. It is mentioned that people with lower income and in the younger age groups tend to consume more fish, even though many studies state fish consumption increases with age (Verbeke & Vackier, 2005; Supartini et al., 2018). The tribes younger than 25 years usually live in the hamlets but migrate to towns and cities for jobs as they turn older.

The use of social media has a positive impact on fresh fish consumption (Allison et al., 2023). However, compared to meat, fish is treated as food that has a lower chance of causing chronic diseases and health hazards (Verbeke & Vackier, 2005); but adulteration and fish cultured in an unhygienic environment could cause serious health problems. It is well identified in consumer research that consumer's risk perception may not only be a physical issue but also deal with other features such as social and financial consequences (McCarthy & Henson, 2005; Tsiros &

Heilman, 2005; Angulo & Gil, 2007; Yüksel & Yüksel, 2007). Social media was found to negatively affect dried fish consumption (Sajeev et al., 2022) due to circulation of several videos showing adulteration of dried fish with pesticides primarily for keeping birds and pests away during fish drying and storage (Sajeev et al., 2020).

Organisational trust was found contributing to fish consumption among Wayanad tribes. When the trust in the information sources increases, fish consumption also increases. The significant entities the tribe trusts for information are the state government, health inspector, food safety department, scientists/researchers, television, newspapers, radio, mobile apps, social media (Facebook, WhatsApp) and friends/colleagues. The tribal development department and other related State government departments are considered the most authentic information source by the tribes. The younger generation tends to trust mass media along with these sources. This explains the effect of organisational trust on fish consumption among tribes.

Consumer trust on retail fish vendors was identified as affecting tribal fish consumption. The primary vendors available for tribes under study were fish shops, mobile vendors, roadside vendors, fish farms and fish markets. The tribes preferred the fish shops and fish markets. When there is a high level of trust in a specific vendor, other fish vendors are viewed with lower trust, ultimately leading to a reduced consumer trust score. This results in a tendency to consume more fish by purchasing from a single trustworthy fish vending source. Studies on communication effectiveness and information processing have shown that negative messages or negative press related to food health issues can heavily influence consumers' food consumption decisions (Frewer et al., 1997; Burger et al., 2003). Mass-media information about adulteration and contamination

Table 3. Characteristics of the respondents segregated by their willingness to consume fish-based products using Wilcoxon signed-rank test

Willingness	Age	TV Watching Behaviour	Social Media Usage	Frequency of fish consumption
Willing	38.66 ± 12.18*	0.49 ± 0.5	0.22 ± 0.40	3.5 ± 0.86*
Unwilling	34.38 ± 11.78	0.64 ± 0.48	0.35 ± 0.48	3.38 ± 1.18

* Significant at 0.05 level

Values in the table represent Mean ± S.D

Table 4. Estimation of ordered logit model for factors contributing to frequency of fish consumption

Frequency of fish consumption	Coef.	Std. Err.	z	P> z	[95 % Conf.
Less Frequent (Once a week)					
TV (TV Watching behaviour)	1.014	0.656	1.54	0.12	-0.27
Social Media (Social Media usage)	-1.136	0.894	-1.27	0.20	-2.89
Age	0.052	0.024	2.18	0.03**	0.01
Organisational Trust (otrust)	-4.364	2.475	-1.76	0.08*	-9.25
Consumer Trust (ctrust)	6.972	3.680	1.89	0.06*	-0.24
Attitude	-1.179	1.842	-0.64	0.52	-4.79
Subjective Norms	-3.976	4.359	-0.91	0.36	-12.52
Opinion of Consumers (Opinion)	3.487	2.335	1.49	0.14	-1.09
Perceived Behavioural Control	4.411	4.634	0.95	0.34	-4.67
Perceived Risks	6.149	3.443	1.79	0.07*	-0.60
Constant (_cons)	-10.230	5.014	-2.04	0.04**	-20.06
Moderately Frequent (Twice or thrice a week)					
TV (TV Watching behaviour)	0.141	0.327	0.43	0.67	-0.50
Social Media (Social Media usage)	-0.079	0.385	-0.2	0.84	-0.83
Age	-0.017	0.014	-1.19	0.23	-0.04
Organisational Trust (otrust)	0.847	1.483	0.57	0.57	-2.06
Consumer Trust (ctrust)	1.009	1.949	0.52	0.60	-2.81
Attitude	-0.535	1.193	-0.45	0.65	-2.87
Subjective Norms	2.357	2.205	1.07	0.28	-1.96
Opinion of Consumers (Opinion)	0.615	1.099	0.56	0.58	-1.54
Perceived Behavioural Control	-3.782	2.378	-1.59	0.11	-8.44
Perceived Risks	-1.046	1.783	-0.59	0.56	-4.54
Constant (_cons)	0.107	1.484	0.07	0.94	-2.80
Very Frequent (Daily)					
TV (TV Watching behaviour)	-0.875	1.257	-0.7	0.49	-3.33
Social Media (Social Media usage)	2.184	1.286	1.7	0.09*	-0.34
Age	-0.119	0.048	-2.46	0.01**	-0.21
Organisational Trust (otrust)	4.480	5.326	0.84	0.4	-5.96
Consumer Trust (ctrust)	10.305	6.327	1.63	0.10	-2.09
Attitude	-4.525	3.289	-1.38	0.17	-10.97
Subjective Norms	3.843	5.947	0.65	0.52	-7.81
Opinion of Consumers (Opinion)	-2.565	2.747	-0.93	0.35	-7.95
Perceived Behavioural Control	-9.823	5.113	-1.92	0.05*	-19.84
Perceived Risks	-18.311	7.554	-2.42	0.02**	-33.12
Constant (_cons)	-0.733	4.20	-0.17	0.86	-8.96

Notes: ***, **, and * indicate the significance level of 1, 5, and 10 %, respectively

Source: Ordered logit model output. Model fitting information: Prob > chi² = 0.0133, Log likelihood = -212.73996
Pseudo R² = 0.119

of fish can impact consumer perception and attitude concerning the incorporation of fish in their diet. At the same time, it can interfere with communication on the health aspects of fish.

Perceived behavioral control was measured as a tribal person's expectancy that performance of the fish purchase and consumption behavior is within his/her control. As perceived behavioural control (fishconsump3) increases, the fish purchase and consumption among tribes decreases. The perceived behavioural control was measured based on the respondent thoughts like 'fish is costly', 'cleaning of fish takes time', 'fish takes lot of time to cook', 'fish don't give delicious dishes', 'we can't prepare many dishes out of fish', 'my control over eating fish is complete', 'if my family wants, they can eat fish any day', 'my religion/caste fully supports fish consumption' and 'my family and relatives fully support fish consumption'.

The findings also reveal that frequency of fish consumption decreases as their perceived risk on fish consumption (fishconsump4) increases. This risk was measured across five dimensions: functional risk, financial risk, performance risk, psychological risk, physical risk, and social risk. Tribes perceived risk from fish consumption primarily stemming from expectations regarding fish quality, concerns about financial losses, worries about the taste not meeting expectations; discomfort associated with the idea of buying fish; worries about potential long-term risks to oneself, family and others; and the fear of lower social status associated with fish. Additionally, a logistic model offers a more informative approach to explaining fish consumption preferences.

Effective interventions are needed for introducing fish in the diet plan of the malnourished and vulnerable communities. Researchers and policymakers continuously mention the association between fish consumption, willingness, and related socio-cultural factors. Understanding these connections are crucial for developing effective strategies to promote sustainable and healthy fish consumption habits. However, it is essential to conduct further comprehensive studies to estimate the impact of socio-economic and demographic factors on fish consumption. But region and community-specific studies are needed for any policy action.

There is a need to create awareness and make policy interventions promoting the consumption of fish

and fish-based products. Government-sponsored awareness campaigns may be made on a larger scale to change consumer behaviour and preference towards fish and fish-based products for better nutritional security. While bearing future food policy, a sustainable pattern of food consumption must be considered ensuring sufficient fish and fish products supply. A collective effort to create more local culture-based, self-reliant fish-based products in which sustainable food production, processing, distribution, and consumption are joined to augment economic, environmental, and social health is needed for the tribal regions. There is a need to reach out to rural and undernourished populations with a regular supply of nutritious fish-based food items through the public distribution system and build resilient marine food systems aligned with WHO principles of sustainable healthy diets for all.

Acknowledgement

This work was undertaken as part of the ongoing ICAR-CGIAR W3 collaboration in India between ICAR-Central Institute of Fisheries Technology, Cochin; ICAR-Krishi Vigyan Kendra, Wayanad and WorldFish, Malaysia. The support provided by Tribal Extension Office, Kalpetta, Wayanad is duly acknowledged.

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