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Development and validation of sustainable diet questionnaire for Indian adults

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Abstract
The present study aimed to develop a valid and reliable Sustainable Diet Questionnaire (SUSDQ) to measure the attitude and perceptions of Indian adults. A comprehensive literature review was conducted to develop the initial version of the questionnaire. An online cross-sectional survey was conducted among Indian adults aged 18 years and above based on a convenience sampling technique. Seventy-four subjects were recruited for face validation, test-retest, and internal consistency reliability. Nine experts were nominated for content validation. The construct, discriminant, and predictive validity assessment sample size were 1844. The questionnaire measured knowledge, attitude, concerns, motives, practices, opinions, barriers, and drivers. Respondents were asked to rate the items based on importance, relevance, and clarity. Item impact score, face & content validity index, Cronbach's alpha, and Cohen's kappa were calculated. Construct validity was evaluated through exploratory factor analysis (EFA). Discriminant and predictive validity were assessed using Pearson's correlations and multivariate linear regression. The significance level was fixed at a P-value < 0.05. EFA highlighted a 19-item, 17-factor model. The SUSDQ demonstrated good internal consistency and discriminant and predictive validity. The study developed a valid and reliable multidimensional questionnaire, which researchers can use to understand the attitude and perceptions of Indian adults about sustainable diets.

Keywords: Sustainable diet questionnaire, validity, reliability, exploratory factor analysis, ecological attitude

Introduction
With only seven years left to attain the Sustainable Development Goal of *Sustainable Consumption and Production*, sustainability concerns are rising for the current food systems. "Sustainable consumption and production are about doing more and better with less" (United Nations, 2022) [1]. Sustainable consumption and production require shifts in behavior to minor carbon-intensive modes. Individual food choices and dietary preferences are hot spots in changing demand and supply-side dynamics of food systems. Changing dietary habits, reducing over-consumption, and avoiding food waste can contribute significantly to nutrition security and reduce the environmental footprint of the food system (Mbow *et al*., 2019) [2]. Sustainable diets can address environmental and health concerns regarding food production and consumption (Springmann *et al*., 2018) [3]. Healthy food choices by households and individuals can ensure the success of any effort to promote sustainable diets (UNSCN, 2019) [4]. Shifting notions of normal and culturally acceptable eating methods are complex (Bailey *et al*., 2014) [5]. Answering three questions, what, how, and why people eat the way they do, will provide a greater understanding of how people make food choices which will gear up the transition towards sustainable diets. The third question, "why do people eat the way they do?" depends on the underlying logic, personal priorities, and an individual's value system that drives decision-making processes (Blake *et al*., 2021) [6].

A complex interaction between personal, social, cultural, and environmental factors influences our food choices. Knowledge, perception, attitude, belief, values, and emotions are potent determinants of food choices (Contento, 2011) [7]. Environmental knowledge influences attitude towards environmentally sustainable products. Environmental knowledge and awareness are low in the Indian population, while willingness to conserve and protect the environment and seek related information is higher (Jain and Kaur, 2004, 2006) [8, 9]. A recent multi-country study found that half of the Indian respondents were highly concerned about sustainability, along with the highest proportion of consumers with no concern regarding sustainability compared to other countries (Sánchez-Bravo *et al*., 2020) [10].

An exploratory study revealed that taste, healthiness, price, convenience, and subjective norms motivate sustainable food consumption intentions among Indian consumers (von Meyer-Höfer *et al.*, 2015) [11]. Another multinational survey revealed that more than 80% of surveyed Indians consider the role of human activities in climate change. Half of the Indians view climate change as an essential motivating factor while choosing meat and dairy, with a greater willingness to modify their consumption behavior (Bailey *et al.*, 2014) [5].

Consumption of healthy and sustainable diets presents significant opportunities to reduce greenhouse gas emissions from food systems and improve health outcomes (Mbow *et al.*, 2019) [2]. The importance of an individual's attitude and perception has been shown in the context of sustainable food consumption (Van Loo *et al.*, 2017; García-González *et al.*, 2020; Tepper *et al.*, 2020; Rejman *et al.*, 2019) [12–15], and sustainability motives are also associated with healthy dietary patterns (Allès *et al.*, 2017) [16]. Various studies have shown the relation of diets with attitude and perception (Boustani and Guiné 2020; Paquette, 2005) [17, 18], and some highlighted a positive association between the consumption of healthy diets rich in fruits and vegetables and food-related attitudes (Aggarwal *et al.*, 2014) [19]. India houses the second largest population on earth, which influences the sustainability of the global food system. The food system's contribution to the country's greenhouse gas emissions cannot be ignored (MoEFCC, 2021; Ramaswami *et al.*, 2017) [20, 21]. Sustainable diets are a new emerging concept currently not focused on Indian food consumption policies (Brown *et al.*, 2021) [22] nor Indian diets. As a vital component of the demand side, the consumer can make the Indian food system sustainable. Exploration of the attitude and perception of Indian consumers represents a strong leverage point to promote the transition towards sustainable diets. This generates the need for a valid and reliable instrument to ascertain the attitudes and perceptions influencing sustainable diet consumption among Indians.

There is a paucity of a validated multidimensional questionnaires in the Indian context to assess attitudes and perceptions concerning sustainable diets. Such a questionnaire is essential for better understanding consumers' insights concerning sustainable diets. We sought to address these crucial gaps in the literature mentioned above. The current paper aims to 1) develop a Sustainable Diet Questionnaire (SUSDQ) to measure the attitude and perception of Indian adults concerning sustainable diets, 2) assess the validity and reliability of the questionnaire, and 3) identify underlying constructs of the questionnaire.

Materials and methods
The study was conducted in two phases. In the first phase, questionnaire development is carried out, and in the second phase, the reliability and validity of the questionnaire are assessed (Fig 1).

Phase 1. SUSDQ Development
A comprehensive literature review was conducted to search publications on sustainable diets and attitudes & perceptions. Publications were retrieved from Web of Science, ScienceDirect, and Google Scholar using the following search terms: "sustainable food consumption," "sustainable food/diet/dietary behavior," "sustainable food/diet/dietary choices," and "sustainable food purchase/motives," "green food purchase/choice/behavior/consumption." Besides this,

additional literature was identified from the reference list of the retrieved articles using a snowballing technique. Eighty-nine documents were reviewed during the literature search; 68 proformas were available and extracted from the studies. Measures and questionnaires used in the articles were compiled, and items were segregated into several dimensions. The initial pool of items included multiple questions under the following dimensions: knowledge, attitude, practices, motives, behavior, willingness, barriers, food involvement, drivers, intention, self-identity, perceived ability, social norm, and subjective knowledge related to sustainable diets.

Questionnaire: The first section of the questionnaire measured sociodemographic characteristics *viz* age, gender, marital status, religion, education, occupation, monthly per capita income, and residential zone. The composition of the Zonal Council by the Ministry of Home Affairs, Government of India (2022) [23], was used for classifying respondents into a residential zone.

From the initial pool of items, 17 dimensions were identified, measuring attitude and perception related to sustainable diets, as shown in Table 1. Next, items and subitems most relevant to represent the identified dimensions were extracted and assembled in usable and testable format to develop the initial version of SUSDQ with 24 items and 219 subitems. The scoring of items was based on 5-point & 7-point Likert scales and one item with a 5-point semantic differential scale.

Phase 2. Assessment of Reliability and Validity of SUSDQ
1st evaluation: face validity: We want to develop an easily understandable questionnaire for 12th pass individuals. For this purpose, a survey was conducted among a convenience sample of 74 Community Science degree program (2nd year) students in March 2021, based on the accessibility factor. A minimum of ten raters are recommended for face validation (Yusoff, 2019) [24]. Before the questionnaire was self-administered, participants were briefed about the study objective and instructed to evaluate the questionnaire items for clarity and importance. While rating questionnaire items, participants were encouraged to ask questions for clarification. Any question and response options that were misunderstood by at least one of the respondents were marked for modification.

The importance and clarity of items & subitems were evaluated by item impact score (IIS) and face validity index (FVI), respectively. A 5- and 4-point Likert scale was used to assess importance and clarity, as shown in Table 2. IIS for each item/subitem was calculated using the following formula: IIS = Frequency × Importance. "Frequency" is the number of participants who rated item 4 or 5 divided by the total number of participants, and "Importance" is the average of importance score given by the participants. FVI was computed as the number of participants providing a rating of 3 or 4 for each item divided by the total number of participants. Standard conventions were used to interpret IIS and FVI (Table 2).

2nd evaluation: content validity: Content validation of SUSDQ was conducted after face validation in April 2021. The recommended number of experts to review an instrument varies from three to ten individuals. A minimum of five experts are suggested for content validation to have sufficient control over the chance agreement (Lynn, 1986) [25]. Nine experts were nominated to determine content validity based

on their expertise in extension, social science, and community nutrition. Experts were asked to assess the relevance and clarity of questions and response options. A 4-point Likert scale was used to judge the relevance of each item, while a 3-point Likert scale was used for clarity (Table 2). Experts were requested to provide suggestions in the comment section to improve instrument relevance and comprehension. All the written comments of experts were considered for the qualitative assessment of content validity. Experts were given a maximum period of two weeks to evaluate the questionnaire.

The content validity index (CVI) was computed based on item relevance and clarity as Item-CVI (I-CVI). I-CVI is computed as the number of experts providing a rating of 3 or 4 on the relevance scale and a rating of 3 on the clarity scale for each item/subitem divided by the total number of experts (Rodrigues *et al*., 2017) [26]. To rule out inflated CVI values due to chance agreement (Wynd *et al*., 2003) [27], modified kappa (k^*) was calculated using the following formula: (I-CVI- p_c)/ (1- p_c), where p_c = [N!/A!(N-A)!] $\times$ 0.5^N (Polit *et al*., 2007) [28]. In this formula, p_c = probability of chance occurrence; N = number of experts; A = number of experts agreeing on a rating of 3 or 4 on the relevance scale and a rating of 3 on the clarity scale. The acceptable cut-offs of the above indexes are shown in Table 2.

3rd evaluation: construct validity: The construct validity of SUSDQ was evaluated through exploratory factor analysis (EFA). The recommended sample size for factor analysis is 5-10 subjects per item (Knapp and Brown, 1995) [29]. Therefore, 1844 Indian adults aged 18 or older with a minimum of 12 years of education were recruited for the study using the convenience sampling technique. An online cross-sectional survey was conducted in June and July 2021 using SurveyMonkey (SurveyMonkey.com, San Mateo, CA).

Sample adequacy for EFA was determined using Kaiser-Meyer-Olkin (KMO) test with a minimum acceptable value of 0.8 (Dixon, 2013) [30]. The suitability of factor analysis was determined using Bartlett's test of sphericity by testing whether the correlations among SUSDQ items were strong enough so that the items could be clustered. The significant result of Bartlett's test indicates that items correlate well and are suitable for factor analysis (Dixon, 2013) [30]. The normality of data was checked using the Shapiro-Wilk test. Factors were extracted using the principal axis factoring method considering the data's ordinal and nonnormal nature (Knekta *et al*., 2019) [31]. Oblique rotation was used since factors were expected to correlate (Tabachnick and Fidell, 2013) [32]. Retention of factors was based on two criteria. First was a parallel analysis comparing the eigenvalues of each factor obtained from sample data with eigenvalues obtained from completely random data (Fabrigar and Wegener, 2012) [33]. The second criterion was the meaningfulness of factors, which focuses on the interpretability of the extracted factors (Sautron *et al*., 2015) [34]. The minimum factor loading for keeping an item in the allocated factor was 0.3. Items with cross-loadings of 0.3 or above on more than one factor were eliminated (Costello and Osborne, 2005) [35].

4th evaluation: reliability assessment: Cronbach's alpha coefficient with a minimum acceptable value of $\geq$ 0.7 was calculated to assess internal consistency reliability (Bland and Altman, 1997) [36]. The repeatability of SUSDQ was assessed through test-retest reliability. The questionnaire finalized by

EFA was self-administered on the same sample (n = 74) used for face validation who filled out the questionnaire twice at two weeks intervals.

Median scores were computed for each item based on test and retest responses and analyzed for the significant difference by Wilcoxon signed-rank test. The coefficient of Cronbach's alpha was calculated for both the test and retest. Percent agreement was calculated for each item/subitem as the number of agreement scores divided by the total number of scores between studies (McHugh, 2012) [37]. Accounting for agreement occurring by chance, test-retest reliability was further evaluated using Cohen's kappa coefficient (κ) for nominal variables and Cohen's weighted kappa (κ_w) for ordinal variables (Vanbelle, 2016) [38]. Kappa coefficients were interpreted based on standard conventions, as shown in Table 2.

5th evaluation: discriminant and predictive validity
SUSDQ factors identified during EFA were correlated with sustainable food practices to measure discriminant validity. Predictive validity was assessed with multivariate linear regression. SUSDQ factors were entered as the dependent variable in the regression model. Sustainable food practices were set as the independent variable.
Jamovi version 2.2, Sydney, Australia, 2021, was used to perform all statistical analyses. The significance level was fixed at a *P* value < 0.05.

Ethical statement
University Ethics Committee for Human Research of Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, approved this study (Approval No. CHS/Ethical Comm/319). Written or electronic informed consent was obtained from all the respondents indicating their willingness to participate.

Results
Sample Characteristics
The mean age of the participants recruited for face validation and test-retest reliability (n = 74) was 20 (SD = 1.2) years, ranging from 18 to 26. The sample had 15 (20%) male and 59 (78%) female participants. The mean age of the participants recruited for the assessment of construct, discriminant, and predictive validity (n = 1844) was 31 (SD = 10.5) years, with an age range of 16 to 77 years. Among them, 50.3% were females, and 49.7% were males. Table 3 shows the demographic characteristics of the respondents. Seven out of nine experts completed the evaluation form for content validation. The only reason for non-completion was lack of time. The experts were from various disciplines such as Communication & Extension, Foods & Nutrition, Psychology, English Language, and Environmental Science. Five out of seven experts were Ph.D. while two experts were M.Sc. All the experts were from academia; two of them were retired professors & former Deans of agriculture universities. Three experts were professors and associate professors, while the other two were research scholars of the agricultural university.

Qualitative Assessment of Face and Content Validity
SUSDQ underwent several modifications following qualitative face and content validation to make well-articulated and easily answerable items. The phrasing of the questions and response options was revised, examples were

quoted for better interpretation, and an interrogative sentence format was used.

Quantitative Assessment of Face Validity
The IIS and FVI calculations for the importance and clarity of each item/subitem are in the Supplementary file: Table 1. IIS for items ranged from 0.51 to 3.54. The IIS for all the subitems was above 1.50. The majority of the items were marked as important, except for five questions on "Food purchase responsibility," "Understanding of sustainable diets," "Similarity between sustainable and healthy diets," "Judgement," and "Willingness" with an IIS of less than 1.50. FVIs for items ranged from 0.55 to 1.00, while for subitems ranged from 0.86 to 1.00. Twelve items and all the subitems were reported as clear and understandable with an FVI value of > 0.80, while ten items were marked as unclear and subsequently revised.

Quantitative Assessment of Content Validity
I-CVI (based on relevance): The I-CVI calculations based on the relevancy and clarity of each item/subitem are in the Supplementary file: Table 2. About 92% (22) of items were relevant, with an I-CVI value > 0.79. For subitems, CVI ranged from 0.14 to 1.00, with 75% (162) of subitems indicated as relevant. Two items and forty-two subitems with I-CVI between 0.70 to 0.79 were revised. The majority of items were considered relevant, except two subitems of "Knowledge about aspects of sustainable diets," two subitems of "Environment-friendly rating," four subitems measuring "Attitude," three subitems of "Motives," and one subitem measuring "Food involvement." The modified kappa values ($k*$) for items and subitems ranged from 0.17 to 1.05. Excellent agreement among experts with $k*$ values of > 0.75 was obtained for 22 items and 174 subitems, while two items and 42 subitems reported poor agreement with $k* < 0.40$.

I-CVI (based on clarity): The I-CVIs ranged from 0.57 to 1.00, and 67% of the items were clear. For subitems, CVI ranged from 0.14 to 1.00, with 43% (93) of subitems indicated as clear. Eight items (33%) and 123 subitems (57%) with I-CVI values less than 0.79 were marked as unclear and revised and rephrased for better clarity & comprehension. $k* > 0.75$ were reported for 19 items and 134 subitems, while two items and 82 subitems reported $k* < 0.40$.

Construct Validity and Reliability
The construct validity of SUSDQ was assessed via EFA. The calculated KMO index of 0.9 and significant results of Bartlett's test of sphericity ($\chi^2 = 101951$; df = 22791; $P < 0.001$) indicated sample adequacy and suitability of factor analysis. EFA identified 17 underlying constructs of the questionnaire, which explained 38.3% of the total variance, with eigenvalues ranging from 2.7 to 9.1 (Table 4). The 17 factors of the questionnaire were related to knowledge of concepts & features of sustainable diets, environment-friendly actions, opinions & barriers towards sustainable diets, motives for food choice, food-related concerns, drivers & intentions, sustainable food practices, environmental attitudes, perception of food sustainability, and eating habits. Most of the constructs had good reliability, with Cronbach's alpha coefficient ranging from 0.6 to 0.9. The factor loadings for all items of SUSDQ are displayed in the Supplementary file: Table 3.

Test-Retest Reliability
No significant difference was observed in median test and retest scores for most items/subitems. In comparison, median test-retest scores of 32% of the subitems were significantly different at $P < 0.05$. The internal consistency of items in both the test and retest were above 0.7. Table 4 in the Supplementary file displays the questionnaire's test-retest reliability results.

Agreement between test and retest scores: Cohen's kappa.
The percent agreement between test and retest scores of items ranged from 20.3 to 90.5%. The questionnaire had κ values ranging from −0.06 to 0.77. Substantial agreement was found for the item that evaluated "Diet type" (κ 0.77) and moderate agreement for the one subitem that evaluated "Practices" (κ 0.42). Twenty-eight (17%) items indicated fair agreement with κ values ranging from 0.21 to 0.32. Most of the items (78%) showed slight agreement with κ values ranging from 0.01 to 0.20. Poor agreement was found for seven items (4%); one subitem each that evaluated "Knowledge about aspects of sustainable diets" (κ −0.01), "Barriers" (κ −0.06), "Anti-ecological Attitude" (κ −0.06), "Price, Familiarity, & Sensory Motives" (κ −0.02), and three subitems that evaluated "Practices" (κ −0.02 to −0.01).

Table 5 shows the number of items/subitems deleted during different validity evaluation steps. The final version of SUSDQ had 19 items and 172 subitems within 17 dimensions (see Supplementary file: Appendix A).

Discriminant and Predictive Validity
The factor of sustainable food practices as measured by SUSDQ was correlated with identified factors of the questionnaire to measure discriminant validity (Table 6). Sustainable food practices were positively correlated with knowledge about aspects of sustainable diets, effectiveness rating, opinion, food choice motives, concerns, drivers & intention, food sustainability perception, pro-ecological attitude, and knowledge of sustainability concepts. A negative correlation between sustainable food practices and barriers and eating out practices was observed. A low to moderate correlation was observed between sustainable food practices and factors of SUSDQ, showing evidence of discriminant validity.

To assess the predictive validity of the SUSDQ, multivariate linear regression was conducted (Table 7). Higher scores on factor-effectiveness rating, food sustainability concerns, drivers & intention, knowledge about sustainability concepts, food choice motives of health, natural content, mood, ecological welfare, religion, price, familiarity, and sensory appeal were associated with a higher frequency of sustainable food practices. Conversely, engagement in sustainable food practices was reduced among those facing increased barriers in making climate-friendly food choices, those with anti-ecological attitudes, and with higher eating out frequency.

Readability Grade Levels
Readability levels were calculated for the finalized version of the questionnaire. The Flesch-Kincaid Grade Level and SMOG Index were calculated electronically (Automatic Readability Checker, 2022) [39], which rates how easily sentences in the tool can be read and understood. The Flesch-Kincaid Grade level was 6.2, indicating that the questionnaire can be easily read and comprehensible to 10- to 11-year-olds. The SMOG Index was 6.7 demonstrating a fifth and sixth-

grade reading level.

Ecological & Religious Motives
The responses obtained on factor 9, "Ecological & Religious Motives," showed that environment-friendly packaging was most important in the food choices of the respondent, followed by environment-friendly production (Fig 2). Respondents also recognized the importance of animal rights in their food choices. It is also observed that religious motives were less important in the food choices of the respondents.

Discussion
This study developed and provided validity and reliability of the Sustainable Diet Questionnaire to assess attitudes and perceptions of sustainable food consumption. The initially developed questionnaire consisting of 24 items & 219 subitems was reduced to 19 items & 172 subitems with 17 underlying constructs, which can be completed in 25 minutes; hence, it is an almost simple tool for administration. The questionnaire showed acceptable validity and reliability. To our knowledge, no literature is available in the Indian context developing a questionnaire to assess attitudes and perceptions concerning sustainable diets built on hierarchical validation and reliability analysis. The current study developed a reliable multidimensional questionnaire. The assessment of attitudes and perceptions influencing the choice for consumption of a sustainable diet will be valuable to encourage diet change towards sustainability.

Face Validity: Importance and Clarity
Face validity provided important insights regarding the target population's interpretation and response to the items. Only 3% and 5% of the items were marked unimportant and unclear, indicating the importance and clarity of the items included in the questionnaire. About 96% of participants found questionnaire items clear and comprehensible. The item on "Food purchase responsibility" was marked unimportant and unclear as young respondents generally do not share the responsibility of food acquisition in their household. The item "Understanding of sustainable diets" and the "Similarity between sustainable & healthy diets" was indicated as unimportant and unclear. The respondents might not have had exposure to the sustainability domain concerning diets and their distinction from healthy diets. Healthy diets encompass the concept of nutrient adequacy and its balance, while sustainable diets comprise the multiple domains of environment, biodiversity, nutrition, health, social, cultural, and equity. Acquaintance with facets of sustainable diets is required to distinguish between diets that are healthy for both people and the planet. Two items assessing "Judgement" and "Willingness" were also reported as unimportant and unclear. This rating is because the concept of climate-friendly foods is unclear to the participants. They might not know which criteria to apply and how to judge climate-friendly foods, as no labeling standards specific to food are available in India. Willingness to purchase food with the attribute of being climate-friendly is quite distant from attributes such as price, taste, convenience, and health, which are more important in influencing purchase decisions. Besides, organic foods are mainly advertised as healthy and free from fertilizers; foods healthy for people and the planet are not advertised in the current Indian market. So, the judgment and willingness in the context of climate-friendly foods are difficult to ascertain. Four items under the "Knowledge" dimension were unclear as

participants were unaware of the sectoral contribution to climate change, including agriculture and livestock, and the planetary impact of various food items.

Content Validity: Relevance and Clarity
A comprehensive literature review covered the complete range of attributes related to sustainable diets. Items of SUSDQ reflected multiple domains of sustainable diets such as environment, health, nutrition, culture, social, economic, ethical, food quality, and safety.

The decision to assess the two attributes of items and subitems helped in the development process of the questionnaire. The experts analyzed the relevance of content and clarity of wording. Most of the items (92%) and subitems (75%) in the questionnaire were relevant, with excellent agreement among experts. More than half of the items (67%) and 43% of the subitems were clear. Questions were revised and rephrased based on CVI scores and expert comments to increase their clarity and relevance. "Attitude" and "Food involvement" were reported as non-relevant and unclear. The "Attitude" dimension was derived from New Ecological Paradigm Scale (Dunlap et al., 2000) [40]. None of the items in the scale reflects the food domain but encompasses the broader perspective of nature and the environment. The items of the "Food involvement" dimension were adapted from the Food Involvement Scale, reflecting the perceived importance of food for an individual. The domains of sustainable diets and any relation with sustainability construct were not represented. The experts might have judged the above dimensions in relation to sustainable diets, and agreement on relevance and clarity was not reached. Nevertheless, to assess an individual's perception of a sustainable diet, it is crucial to measure one's involvement with food because it influences food choices related to general dietary healthfulness (Bell and Marshall, 2003) [41].

Construct Validity: Exploratory Factor Analysis
Factor analysis resulted in a 17-factor model, which explained 38.3% of the total variance. In behavioral research, it is satisfactory to consider a solution that accounts for less than 60% of the total variance (Joseph F Hair et al., 2019) [42]. Knowledge of sustainable diet's aspects and sustainability concepts was identified as the first and seventeenth dimensions of the questionnaire. Knowledge (nutrition and food-related) significantly influences food choices (Chen and Antonelli, 2020) [43]. Knowledge of the nutritional value of food and its environmental footprint is one of the desirable food skills nowadays. People acquire knowledge and develop perceptions about food. Perceptions, attitudes, beliefs, and meanings play a central role in food-related behaviors (Contento, 2011) [7]. Features of sustainable diets ascertained by an individual were reflected by "Opinion," which can become a starting point of any behavioral intervention. Assessment of "Barriers" to climate-friendly food choices, which stem from unconstructive individual thinking, low personal knowledge, resources & skills, fixed food habits & routines, and unsupportive contextual factors (Mäkiniemi and Vainio, 2014) [44], can become a critical area to leverage actions to encourage the adoption of sustainable diets. Sustainable diets are environment-friendly, natural, healthy, convenient, affordable, and culturally acceptable (FAO, 2012) [45]. The above attributes were captured by four factors related to food choice motives "Health, Natural, & Mood," "Price, Familiarity, & Sensory," "Convenience," and "Ecological

welfare & Religion." Furthermore, the relevance of food system sustainability issues was reflected by "Concerns," which might help assess the transformation of concerns into sustainable food behavior. Finally, "Drivers & Intention" to encourage dietary change toward sustainability can guide policy formulation and build a supportive environment.

"Practices" measured the frequency of self-reported sustainable food practices. Two items of this dimension were based on the Food Involvement Scale, which reflects two factors, cooking and food acquisition (Bell and Marshall, 2003) [41]. Involvement is how an object or idea is centrally related to an individual's value system (Van Loo et al., 2017) [12]. Food involvement is an essential mediator for a wide range of food choice behavior (Bell and Marshall, 2003) [41], including sustainability. Finally, items on "Pro- and Anti-ecological Attitude" measured general environmental attitude, shaped by the relative importance that a person places on himself/herself, humankind, and the whole planet.

"Perception of food sustainability" is influenced by sensory, social, and cultural factors (Contento, 2011) [7]. Consumer sustainability perception builds attitudes, which affect behavior and determines sustainable consumption patterns (Sánchez-Bravo et al., 2020) [10]. Thus, exploring people's perceptions of sustainability is crucial to understanding how and why they buy and eat food products. "Eating out practice" assessed the consumption of outside foods, which are highly processed and made from refined cereals, high in calories, trans fat, salt, and sugar, with poor nutritional value. Sustainable healthy diets are "based on a great variety of unprocessed or minimally processed foods, balanced across food groups while restricting highly processed food and drink products" (FAO and WHO, 2019) [46]. The frequency of eating out reflects meal patterns and the healthfulness of once dietary habits, which is one of the essential dimensions of sustainable diets.

There is a paucity of articles in the literature specifically conducted to develop a questionnaire to assess the attitude and perception of Indian adults concerning sustainable diets. An online survey conducted in six countries, including India, used a questionnaire organized into 13 food categories to analyze multiple aspects of the sustainability of different food categories (Sánchez-Bravo et al., 2020) [10]. A multinational online survey was conducted in 12 countries, including India, to assess the relationship between meat/dairy consumption and climate change. The survey questionnaire tested consumers' understanding of the sectoral contribution to climate change, motivations to increase or decrease meat or dairy consumption, willingness to alter behavior, and attitude towards information sources (Wellesley et al., 2015) [47]. A web-based exploratory study conducted in China and India used a questionnaire to assess buying motives, subjective norms, perceived consumer effectiveness, perceived barriers, and intention toward sustainable food consumption (von Meyer-Höfer et al., 2015) [11]. An online multi-country study was conducted to assess consumer expectations regarding sustainable foods in six countries, including India (Sidali et al., 2016) [48]. The study questionnaire included environmental, ethical, health, traditional food quality, and terroir attribute to measure sustainable food products' characteristics. In addition, the role of intrinsic values on food consumption behavior was assessed in the USA and India (Werner et al., 2020) [49]. The online questionnaire with 41 items captured food choice behavior, dietary behavior, pro-environmental behavior, spirituality, and mindfulness.

Reliability
All the dimensions showed good internal consistency. Two factors, "Perception of food sustainability" and "Knowledge about sustainability concepts," reported alpha values less than 0.7 but above 0.6. Available literature suggests Cronbach's alpha coefficient of 0.6 to 0.7 indicates an acceptable level of reliability (Ursachi et al., 2015; Joe F. Hair et al., 2011) [50, 51]. Internal consistency of two factors, motives, and concerns, were comparable with their sources of adaptation (Lindeman and Väänänen, 2000; Steptoe et al., 1995; Grunert et al., 2014) [52–54].

There was no significant difference between median test and retest scores for most items, indicating stability between the scores. A statistical test of the association is inappropriate for assessing reliability (Sainani, 2017) [55]. Therefore, the reliability statistics, Cohen's kappa, was used to measure agreement between test-retest scores. Overall test-retest reliability results showed slight to substantial agreement for most items. All administrations are subject to measurement errors (Kline, 2000) [56], which resulted in a poor agreement for a few items in the questionnaire. The present study's findings suggest that the items are valid and reliable for measuring attitudes and perceptions toward sustainable diets among Indian adults.

Discriminant and Predictive Validity
Discriminant validity showed a low to moderate correlation, implying that sustainable food practices and dimensions of SUSDQ are conceptually similar but distinct concepts (Joseph F Hair et al., 2019; Netemeyer et al., 2003) [42, 57], and reveals that the sustainable food practices correlate with related vested sustainability constructs. Knowledge about aspects of sustainable diets and sustainability concepts was positively correlated with sustainable food practices. Similar results were obtained by other researchers who found a positive association between knowledge of the environmental impact of food and environment friendly food purchasing behavior (Hartmann et al., 2021) [58].

The practical relevance of the SUSDQ dimensions was shown by their predictive validity on sustainable food practices. Individuals giving importance to health, natural content, and ecological welfare in food choices were likelier to engage in sustainable food practices. In line with the results of the present study, other researchers found a positive relation between ecological welfare food choice motives and sustainable food consumption (Verain et al., 2021) [59].

The Usefulness of the SUSDQ
Analysis of responses on "Ecological & Religious Motives" highlighted that environment is more important in respondents' food choices than animal welfare standards and religious concerns. Various studies also emphasized the importance of ethical and environmental concerns in organic food choices and vegetarianism among Indian consumers (Nandi et al., 2016; Ruby et al., 2013) [60, 61]. The above motives can be transformed into real choices for sustainable foods among Indian consumers by incorporating environmental sustainability in current food policies and Indian dietary guidelines. Similarly, the developed questionnaire can assess various attributes related to sustainable diets.

Limitations of the Study
A convenience sampling technique was used in the present

study. Thus, the results are limited in the extent to be generalized. The range and level of ability of the sample of college students were similar to the target population, *i.e.,* a minimum of 12 years of education. Second, the construct validity was assessed using an online survey, which might disproportionally exclude the population segments with no access to the internet and reduce the generalizability of conclusions. Due to the second wave of the COVID-19 pandemic, we conducted the survey online. In 2021, over 61% of Indians had access to the internet. In urban areas, internet subscribers per 100 population were 105 (TRAI, 2021) [62], which enabled the broader reach of the survey.

Strength of the Study
The research reported in the paper is the first study to develop

and validate a questionnaire exclusively for Indian adults to measure attitudes and perceptions about sustainable diets. The strength of the study is that rigorous instrument development practices were employed. Study domains were objectively defined, a large pool of items was generated by a comprehensive literature review, and an exhaustive set of items and subitems were selected to represent the dimensions adequately. The questionnaire was validated following the validity hierarchy moving from face validity, content validity, construct validity, discriminant and predictive validity. Content validity was assessed at both item and dimension levels. Test-retest reliability and internal consistency were assessed on the final version of the questionnaire.
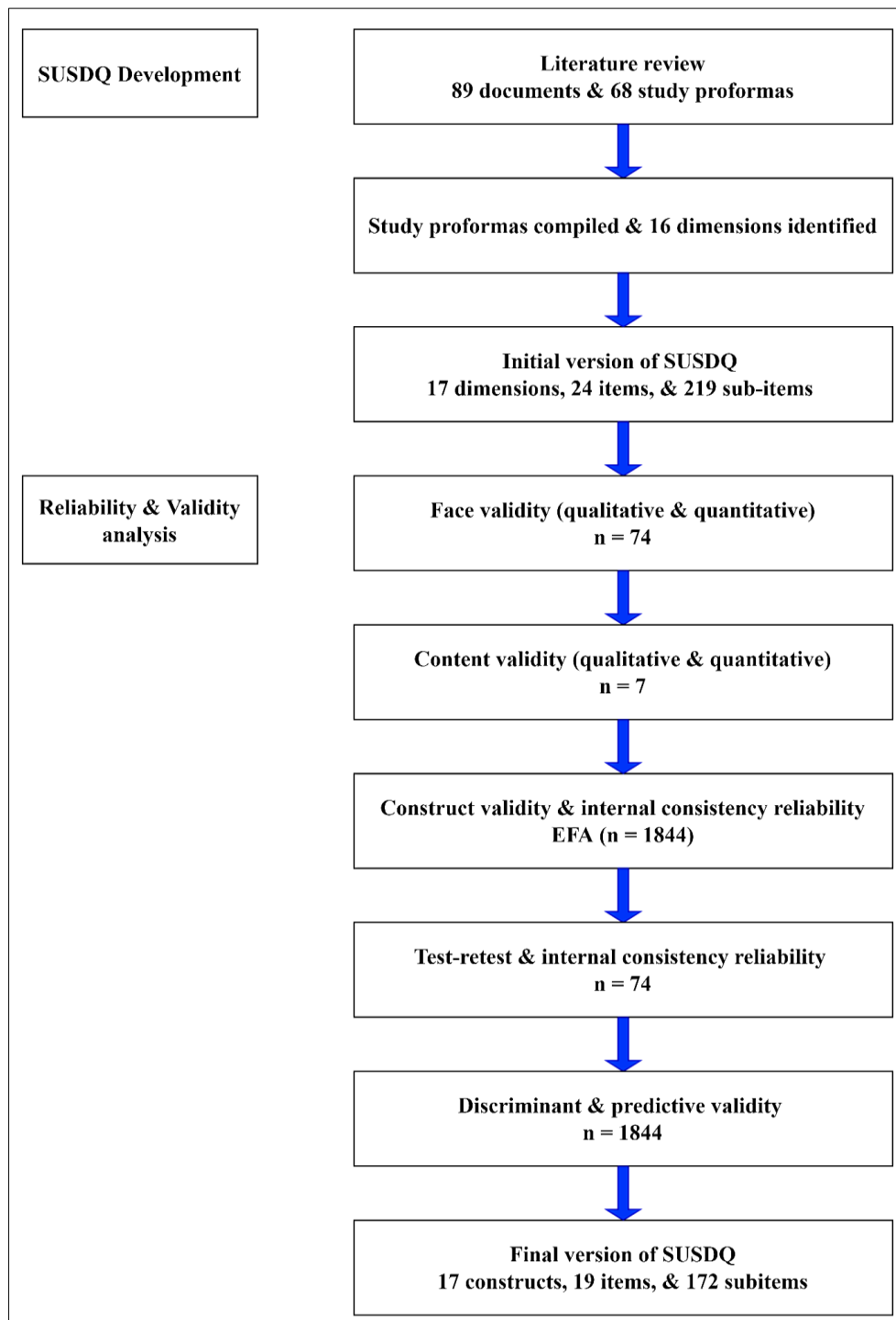

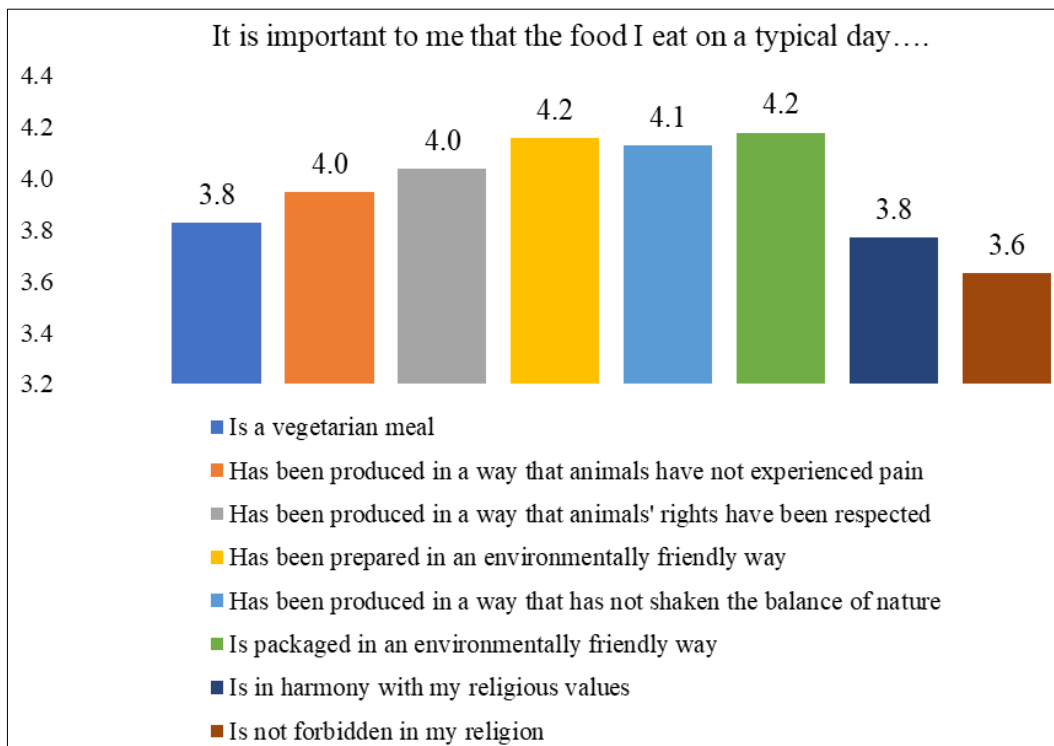**Fig 1:** Methodological steps in the development of SUSDQ. EFA: exploratory factor analysis

Fig 2: Mean score on items of "Ecological & Religious Motives" (n = 1844)

Table 1: Dimensions of Sustainable Diet Questionnaire with Sources of Adaptation

SN	Dimensions
1.	"Diet type" based on five food groups
2.	"Food purchase responsibility"
3.	"Knowledge"
I	Knowledge about climate change (Vanhonacker et al., 2013) [63]
ii	Knowledge about sustainability concepts (García-González et al., 2020) [13]
Iii	Knowledge about aspects of sustainable diets (García-González et al., 2020) [13]
iv	Similarity between healthy and sustainable diets (García-González et al., 2020) [13]
v	Impact of food groups on planet's sustainability (García-González et al., 2020) [13]
vi	Water use in food production (García-González et al., 2020) [13]
vii	Understanding of sustainable diet (Rejman et al., 2019) [15]
4.	"Environment-friendly rating" of climate-friendly actions
5.	"Attitude" towards environment (New Ecological Paradigm scale) (Dunlap et al., 2000) [40]
6.	"Concerns" about the sustainability of the food system (Grunert et al., 2014) [54]
7.	"Motives" for food choice (Steptoe et al., 1995; Lindeman and Väänänen, 2000) [53,52]
8.	"Practices" related to food sustainability
9.	"Meals at the workplace" (2 items)
10.	"Eating out practice"
11.	"Food involvement" (Food Involvement Scale) (Bell and Marshall, 2003) [41]
12.	"Opinion" about sustainable diets
13.	"Judgment" (perceived ability to judge food sustainability)
14.	"Willingness" to pay for climate-friendly foods
15.	"Barriers" to adopting sustainable diets (DEFRA, 2011) [64]
16.	"Drivers" to change current diet towards sustainability (Rejman et al., 2019; Szczebyło et al., 2020) [15,65]
17.	"Intention" to make climate-friendly food choices in the future

Table 2: Table for Interpretation of Various Indexes Used in the Study

Index	Scale	Cut-off	Interpretation
Item impact score (Dehghan Nayeri et al., 2019) [66]	1 = unimportant, 2 = slightly important, 3 = relatively important, 4 = important, 5 = very important	≥ 1.50	Important
		< 1.50	Not important
Face validity index (Yusoff, 2019) [24]	1 = not clear & understandable, 2 = somewhat clear & understandable, 3 = clear & understandable, 4 = very clear & understandable	≥ 0.80	Clear
		< 0.80	Not clear
Content validity index (relevance) (Rodrigues et al., 2017) [26]	1 = not relevant, 2 = somewhat relevant, 3= quite relevant, 4 = very relevant	> 0.79	Relevant
		0.70-0.79	Revised
		< 0.70	Not relevant
Content validity index (clarity) (Rodrigues et	1 = not clear, 2 = item needs some revision, 3 =	> 0.79	Clear

al., 2017) [26]	very clear	< 0.79	Not clear
Modified kappa index (k^*) (Fleiss *et al*., 2003) [67]	Agreement	> 0.75	Excellent
		0.60-0.74	Good
		0.40-0.59	Fair
		< 0.40	Poor
Cohen's kappa (κ) (Landis and Koch, 1977) [68]	Agreement	< 0.0	Poor
		0.0-0.20	Slight
		0.21-0.40	Fair
		0.41-0.60	Moderate
		0.61-0.80	Substantial
		0.81-1.00	Almost perfect

Table 3: Demographic Characteristics of Respondents Recruited for Evaluating the Validity and Reliability of the Questionnaire

Variable	Category	Respondents recruited for face validity and test-retest reliability		Respondents recruited for construct, discriminant, & predictive validation	
		Frequency n = 74	%	Frequency n = 1844	%
Age (years)	18-24	73	98.7	520	28.2
	25-34	1	1.4	842	45.7
	35-44	-	-	244	13.2
	45-54	-	-	143	7.8
	55-64	-	-	78	4.2
	65-80	-	-	17	0.9
Gender	Male	15	20.3	917	49.7
	Female	59	79.7	927	50.3
Marital status	Single	74	100.0	1162	63.0
	Married	-	-	656	35.6
	Widower/ Widowed	-	-	4	0.2
	Divorced	-	-	14	0.8
	Separated	-	-	8	0.4
Religion	Hindu	71	96.0	1619	87.8
	Muslim	3	4.1	76	4.1
	Christian	-	-	50	2.7
	Sikh	-	-	67	3.6
	Buddhist	-	-	13	0.7
	Jain	-	-	9	0.3
	Others	-	-	10	0.5
Education	Intermediate	74	100.0	202	11.0
	Diploma	-	-	56	3.0
	Graduate	-	-	575	31.2
	Postgraduate	-	-	728	39.5
	Doctorate	-	-	283	15.4
Occupation	Unemployed	-	-	84	4.6
	Homemaker	-	-	79	4.3
	Student	74	100.0	785	42.6
	Employee (govt. sector, teaching, private company, NGO)	-	-	560	30.4
	Business/Self-employed	-	-	308	16.7
	Retired	-	-	28	1.5
Monthly per capita income (Indian Rupees)	Prefer not to answer	-	-	43	2.3
	< 1,000	-	-	17	0.9
	1,000-10,000	38	51.4	580	31.5
	10,001-20,000	21	28.4	628	34.1
	20,001-30,000	7	9.5	201	10.9
	30,001-40,000	4	5.4	121	6.6
	40,001-50,000	-	-	72	3.9
	> 50,000	4	5.4	182	9.9
Residential zone	Northern	3	4.1	379	20.6
	Central	64	86.5	895	48.5
	Eastern	6	8.1	129	7.0
	Western	-	-	271	14.7
	Southern	1	1.4	170	9.2

Table 4: Derived Factors of Sustainable Diet Questionnaire Based on Exploratory Factor Analysis (n = 1844)

Sr. No	Factor	Cronbach's α	Factor mean score ± SD	Variance (%)	Eigenvalue
1.	Knowledge about aspects of sustainable diets	0.9	4.2 ± 0.7	4.2	9.1
2.	Effectiveness rating	0.9	4.4 ± 0.4	4.0	8.6
3.	Opinion	0.9	4.1 ± 0.6	3.2	6.8
4.	Barriers	0.9	2.7 ± 0.7	2.8	6.0
5.	Motives for food choice- Health, Natural, & Mood	0.9	4.2 ± 0.7	3.1	6.7
6.	Meals at the workplace	0.8	0.5 ± 0.4	1.9	4.1
7.	Concerns	0.9	4.2 ± 0.7	2.3	4.9
8.	Drivers & Intention	0.8	4.1 ± 0.6	2.1	4.5
9.	Ecological & Religious Motives	0.9	4.0 ± 0.8	2.1	4.5
10.	Practice	0.8	4.0 ± 0.5	2.0	4.3
11.	Anti-ecological Attitude	0.7	3.2 ± 0.9	1.7	3.6
12.	Price, Familiarity, & Sensory Motives	0.9	3.8 ± 0.7	1.7	3.7
13.	Perception of food sustainability	0.7	1.9 ± 0.5	1.5	3.2
14.	Convenience Motives	0.8	3.5 ± 0.9	1.5	3.2
15	Eating out practice	0.8	4.3 ± 0.7	1.4	3.0
16.	Pro-ecological Attitude	0.7	4.5 ± 0.5	1.4	3.0
17.	Knowledge about sustainability concepts	0.6	2.8 ± 0.3	1.3	2.7

Note: SD (standard deviation)

Table 5: Items and Subitems of the Questionnaire Deleted in Different Steps of Validity Evaluation

	Items		Subitems	
Evaluation steps	Deleted	Retained	Deleted	Retained
Face validity	None	24	None	219
Content validity	2	22	None	219
Construct validity	3	19	47	172

Table 6: Correlations Between Sustainable Food Practices and SUSDQ Factors: Discriminant Validity (n = 1844)

	Factors	Practice
F1	Knowledge about aspects of sustainable diets	0.3***
F2	Effectiveness rating	0.4***
F3	Opinion	0.2***
F4	Barriers	-0.3***
F5	Motives for food choice- Health, Natural, & Mood	0.4***
F7	Concerns	0.4***
F8	Drivers & Intention	0.4***
F9	Ecological & Religious Motives	0.4***
F12	Price, Familiarity, & Sensory Motives	0.3***
F13	Perception of food sustainability	0.1**
F14	Convenience Motives	0.1***
F15	Eating out practice	-0.2***
F16	Pro-ecological Attitude	0.3***
F17	Knowledge about sustainability concepts	0.2***

Note: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$; Pearson correlation coefficient

Table 7: Regression Model Showing Significant Predictive Factors of the Sustainable Food Practices (n = 1844)

		Practice	
		$R^2 = 0.36$, Adjusted $R^2 = 0.36$ [F $_{(10, 1833)}$ = 105, $P < 0.001$]	
	Predictor	Estimate	P value
	Intercept	1.8	< 0.001
F2	Effectiveness rating	0.2	< 0.001
F4	Barriers	-0.2	< 0.001
F5	Motives for food choice- Health, Natural, & Mood	0.1	< 0.001
F7	Concerns	0.1	< 0.001
F8	Drivers & Intention	0.1	< 0.001
F9	Ecological & Religious Motives	0.1	< 0.001
F11	Anti-ecological Attitude	-0.04	0.002
F12	Price, Familiarity, & Sensory Motives	0.1	0.005
F15	Eating out practice	-0.1	< 0.001
F17	Knowledge about sustainability concepts	0.1	0.004

Note: Linear regression

Conclusions

Evaluating consumers' knowledge, attitude, perception, opinion, concerns, and what prevents them from making climate-friendly food choices is of primary importance for improving the sustainability of food systems. The Sustainable Diet Questionnaire had acceptable validity and reliability. The

questionnaire offers the advantage of a better understanding of attitude & perception and characterizing those consumers particularly concerned about sustainability. The questionnaire can be used to investigate factors influencing sustainable food choices among Indian consumers and to study associations with individual characteristics such as socio-economic, diet, and lifestyle factors. Information gathered can be used by policymakers, communication, and the marketing industry to develop promotional materials or marketing programs to guide and support the transition toward sustainable diets. Population segments most concerned about sustainability can be identified using the developed questionnaire and can be used as the target group for behavioral interventions. Future studies in translating the questionnaire into Indian languages and validation in large and diverse samples of Indian and Asian populations can be undertaken.

Acknowledgement

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Appendix A

Table 1: The final version of the Sustainable Diet Questionnaire (SUSDQ)

Q1 Do you eat the following food items? Select all that apply.
1. Wheat, rice, fruits, and vegetables
2. Milk, Paneer or Cheese, Curd
3. Eggs
4. Chicken or Meat or Beef or Pork
5. Fish and Seafood

Due to climate change, monsoon and weather patterns are disturbed, Himalayan glaciers are melting, and sea levels are rising.
Q2 What, according to you, do the following sectors contribute most towards climate change and related disturbance?

Sector	Does not contribute at all (1)	Contributes less (2)	Contributes slightly (3)	Contributes Moderately (4)	Contributes very much (5)	Don't know (0)
1. Industry						
2. Transport (cars, trucks, motor vehicles)						
3. Energy (production of petrol, diesel, coal)						
4. Livestock (raising cow, buffalo, goat, hen, pig)						

Q3 Do you know the meaning of the following concepts?			
Concepts	Yes (3)	No (1)	I have heard the term but don't know what it means (2)
1. Carbon footprint			
2. Sustainable diets			
3. Environmental impact			
4. Biodiversity			
5. Locally grown food			
6. Greenhouse gas emissions			

Q4 What, according to you, are the important features of a sustainable diet?					
Aspects	Not Important at All (1)	Of Little Importance (2)	Moderately Important (3)	Important (4)	Very Important (5)	Don't know (0)
1. Biodiversity						
2. Organic						
3. Fresh						
4. Variety						
5. Food quality						
6. Rich in vegetables						
7. Typical from own culture						

8. Locally grown					
9. Seasonal					
10. Readily available at a reasonable price					
11. Less food waste					
12. Easy to follow					
13. Safe and hygienic					
14. High nutritional value					
15. Minimally processed					
16. Free from synthetic fertilizers and pesticides					
17. Free from any genetic modification					
18. No artificial additives					
19. Healthy					
20. Fair price for farmers					
21. High animal welfare standards					
22. No child labor involved					

Do you know that foods that we eat and drink also impact our climate?
Q5 What do you think about the following foods having any impact on our climate.

	Positive Impact (less damage) (1)	Negative Impact (more damage) (2)	I Don't Know (0)
1. Vegetable foods			
2. Chicken and meat			
3. Fish and Seafood			
4. Milk and dairy			
5. Eggs			

Q6 Do you agree with the following statements about water and its use in agriculture and food production?

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree(5)
1. More water is used while producing animal foods (milk/egg/chicken/fish)					

Q7 Do you agree that the following actions can save our environment?	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
1. Less use of a car and motor vehicles					
2. Saving water					
3. Restrict burning of crop residue in fields					
4. Eating chicken/meat less frequently					
5. Saving electricity					
6. Rainwater harvesting					
7. Installing solar panels in homes					
8. Using public transport such as bus, auto, taxi					
9. Buying energy-efficient electrical appliances (LED bulb, Fridge, TV, AC)					
10. Planting trees					
11. Reduce polythene bag use					
12. Recycling/Reusing newspaper or polythene bags					
13. Adopting a vegetarian diet					
14. Re-using glass & plastic containers/bottles					
15. Purchasing products with Eco-mark (labeled as environment-friendly)					
16. Purchasing organic, seasonal, or locally-grown food					
17. Buying products with less plastic packaging					
18. Farmers caring more about the environment (e.g., using less water, fewer pesticides)					
19. Purchasing fuel-efficient vehicles					
20. Reducing food waste					
21. Using peels of fruits/vegetables as manure for the garden					
22. Take part in a protest for climate conservation					
23. Adding taxes to products that are not environment-friendly					
24. Lower prices for climate-friendly products					

Q8 Do you agree with the following statements.	Strongly disagree (1)	Mildly disagree (2)	Unsure (3)	Mildly agree (4)	Strongly agree (5)
1. When human interferes with nature, it often produces disastrous consequences					
2. Human mind will ensure that we do NOT make the earth					

unliveable					
3. Humans are severely hurting the environment					
4. Earth has plenty of natural resources if we just learn how to develop them					
5. Plants and animals have as much right as humans to live on this planet					
6. The balance of nature is strong enough to cope with the impacts of modern industrial nations					
7. The so-called 'climate change' has been dramatically overstated					
8. Humans were meant to rule over the rest of nature					
9. Humans will eventually learn how to control nature					

Q9 Are you worried about the following issues?	Not at all worried (1)	Little worried (2)	Slightly worried (3)	Moderately Worried (4)	Extremely worried (5)
1. Excessive use of fertilizers in agriculture					
2. The amount of food that is wasted					
3. Damage to the environment caused by the use of land and water for food production					
4. Using too much of the world's natural resources for food production					
5. Plastic packaging (wrappers) used for food products that are not biodegradable					
6. Emission of carbon dioxide during food production					
7. Quality of food products available in market					
8. Maintenance of safe & hygienic conditions in food plants by manufacturers					
9. The amount of petrol/diesel used when transporting food products					
10. The amount of LPG/fuel used when cooking food products					

Q10 How important are the following features in your food choices?					
It is important to me that the food I eat on a typical day……	Not at all important (1)	A little important (2)	Moderately important (3)	Important (4)	Very important (5)
1. Is easy to prepare					
2. Can be cooked very simply					
3. Takes no time to prepare					
4. Can be bought in shops close to where I live or work					
5. Is readily available in shops and supermarkets					
6. Keeps me healthy					
7. Is nutritious					
8. Contains no additives					
9. Contains natural ingredients					
10. Contains no artificial ingredients					
11. Helps me to relieve stress					
12. Helps me to cope with life					
13. Helps me relax					
14. Keeps me awake/alert					
15. Lifts my mood					
16. Makes me feel good					
17. Is good value for money					
18. Smells nice					
19. Looks nice					
20. Feels pleasant to eat					
21. Tastes good					
22. Is what I usually eat					
23. Is familiar					
24. Is like the food I ate when I was a child					
25. Has been produced in a way that animals have not experienced pain					
26. Has been produced in a way that animals' rights have been respected					
27. Has been prepared in an environmentally friendly way					
28. Has been produced in a way that has not shaken the balance of nature					
29. Is packaged in an environmentally friendly way					

| 30. Is in harmony with my religious values | | | | | |
| 31. Is not forbidden in my religion | | | | | |

Q11 How often do you…	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
1. Buy locally grown food					
2. Buy seasonal fruits and vegetables					
3. Avoid food products from distant countries					
4. Use peels of fruits/vegetables as manure for the garden					
5. Eat plant-based meat substitutes (such as paneer, soya, beans, mushrooms, nuts)					
6. Donate/ share extra food					
7. Have a look into the kitchen/ fridge before going grocery shopping					
8. Carry your shopping bag					
9. Consume food before it spoils					
10. Avoid food products with excessive packaging					
11. Look for nutritional information in a food packet					
12. Reduce salt and sugar intake					
13. Reduce food waste					

Q12 Do your workplace/ company/ college/ university provides you food?
1. Yes
2. No

Q13 If Yes, which of the following meals do you eat in your workplace/ company/ hostel mess? (select all that apply)
1. Breakfast
2. Lunch
3. Dinner
4. Evening tea
5. None of the above

Q14 How many meals per week do you eat out (in restaurants, cafes, etc.) or order food online?	Never (5)	One or two times (4)	Three or four times (3)	Five or six times (2)	Seven times or more (1)
Breakfast					
Lunch					
Dinner					
Snacks					

Q15 Do you think the following statements apply to you?	Strongly disagree (1)	Moderately disagree (2)	Slightly disagree (3)	Neither agree nor disagree (4)	Slightly agree (5)	Moderately agree (6)	Strongly agree (7)
1. I enjoy cooking for others and myself							
2. I do all or most of my food shopping on my own							

Q16 Please rate sustainable diets from 1 to 5 between the parameters given below. In my opinion, a sustainable diet is……						
1. Bad	1	2	3	4	5	Good
2. Unhealthy	1	2	3	4	5	Healthy
3. Expensive	1	2	3	4	5	Affordable
4. Harmful	1	2	3	4	5	Beneficial
5. Distasteful	1	2	3	4	5	Tasty
6. Unrealistic	1	2	3	4	5	Reaslistic
7. Unacceptable	1	2	3	4	5	Acceptable
8. Difficult to prepare	1	2	3	4	5	Easy to prepare
9. Not nutritious	1	2	3	4	5	Nutritious
10. Unfavorable	1	2	3	4	5	Favorable
11. Not filling	1	2	3	4	5	Filling
12. Animal based	1	2	3	4	5	Plant-based
13. Not natural	1	2	3	4	5	Natural
14. Not traditional	1	2	3	4	5	Traditional

Q17 Please select the following reasons that prevent you from making climate-friendly food choices.	Not at all (1)	A little (2)	Neutral (3)	Quite Agree (4)	Totally agree (5)
1. I have not heard of sustainable foods					
2. Not available where I shop					
3. Lack of clear labeling					
4. I do not know where to buy such products					
5. Too expensive					
6. Less important than other issues such as price, taste					

	Least important (1)	Lesser important (2)	Neutral (3)	Important (4)	Most important (5)
7. Lack of cooking skills					
8. Lack of time					
9. Doesn't taste good					
10. I do not have confidence in what is promised by these products					
11. For me, it is hard to change my consumption and shopping routines					
12. I forget when I am shopping					
13. I don't know what fruit and vegetables are in season					
14. Country of origin information is not mentioned in the food package					
15. It is difficult to check the origin/seasonality of products					
16. They are not healthy					
Q18 Which of the following will encourage/help you change your current diet and make it more climate-friendly?	Least important (1)	Lesser important (2)	Neutral (3)	Important (4)	Most important (5)
1. Lower food prices					
2. Need to improve health					
3. Knowledge about the environmental impact of food products					
4. A belief that I protect the environment in that way					
5. Educational campaigns					
6. Producers' advertisements					
7. Getting information on food products produced in a sustainable way					
Q19 Will you like to make climate-friendly food choices in the future? 1. Extremely unlikely/ 2. Unlikely/ 3. Don't know/ 4. Likely/ 5. Extremely likely					