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Development of knowledge test to assess agricultural practices and nutritional knowledge among FIG (Farmer Interest Group) members of the Farming System for Nutrition (FSN)

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Abstract

The knowledge test was developed to assess the understanding of farming system for nutrition among members of Farmer Interest Group (FIG) which is crucial for enhancing agricultural practices and promoting better health outcomes. In total, 50 items were primarily constructed with the objective of endorsing rational understanding as opposed to root memorization in order to differentiate the well-informed members of the FIG regarding Farming System for Nutrition from those exhibiting inadequate knowledge. The data retrieved from the sample respondents underwent rigorous item analysis, which encompassed evaluations of both the item difficulty index and the item discrimination index. The final set-up of the knowledge test in the current study includes items with difficulty indexes ranging from 20 to 96.66 and discrimination indexes ranging from 0 to 0.65. Split-Half method was employed to check the reliability of knowledge test being developed and it was found to be 0.629. 3 FIG on farming system for nutrition from 3 villages were purposefully selected for the study. Results indicated that 61.70% of FIG members had low-level knowledge, while 38.30% exhibited high-level knowledge, highlighting the need for targeted educational interventions within farming communities.

Keywords: Knowledge test, Farmer Interest Group (FIG), Farming System for Nutrition (FSN).

1. Introduction

Malnutrition is a widespread issue that affects millions of people. It is observed that more than 2 billion people suffer from lack of vitamins and minerals, and more than 200 million children are stunted or wasted (MSSRF, 2017) [9]. Malnutrition cannot be solved solely by increasing food production; it also requires prioritizing nutrition and ensuring that the poorest have access to diverse, nutritious food sources. M.S. Swaminathan believes that a nutrition-focused farming system can address nutritional deficiencies. This involves selecting crops, animals, and fish based on their nutritional value (Nagarajan, 2014) [10]. Agriculture serves as the backbone of nutrition security, with farming practices directly influencing dietary diversity and health outcomes, particularly in resource-constrained settings (Ruel *et al*., 2018) [11]. Increase in agricultural production have the potential to improve nutrition by increasing earnings, particularly in nations like India where the sector employs 58% of the workforce and contributes 14% of GDP. There is a complicated, distant, and frequently weak link between agricultural output, consumption habits, and nutritional outcomes rather than a direct one. In order to enhance absorption and bioavailability, the strategy calls for integration with supporting non-farm factors like sanitation and hygiene. It also emphasizes the differences in human nutritional needs between genders and age groups (Das *et al*., 2014) [1].

One of the best methods to deal with the numerous issues facing agriculture is to organize the farming community, particularly small and marginal farmers, into Farmer Interest Groups. Farmer Interest Groups are platforms for local innovation in sustainable agriculture and for enhancing decision-making abilities (Khhada, *et al*. (2021) [6]. Das, in his paper, focused on the importance of nutritional

awareness at levels of household, community and institution and it can be done with more effectiveness when the farmers are collective or in a group (Das *et al*, 2014 ; Khadda *et al*., 2021) [1, 6]. Nutrition-focused evaluations may overlook the agricultural context that shapes food availability and access. This disconnect limits the ability to design targeted training programs or measure the efficacy of interventions aimed at bridging farming and nutrition outcomes (FAO, 2017) [3]. The concept of Farming System for Nutrition (FSN) emphasizes the importance of incorporating nutrition considerations into agricultural practices. By evaluating the knowledge of Farmer Interest Group (FIG) members, we can identify gaps and provide targeted training to improve their capacity to implement nutrition-sensitive interventions. This, in turn, can lead to more effective and sustainable agricultural practices that support both food security and nutritional well-being. To address this gap, this study focuses on developing a standardized Knowledge Test tailored to evaluate FIG members' understanding of integrated farming-nutrition concepts. The development of a knowledge test to measure the understanding of farming systems for nutrition among FIG members is crucial for enhancing agricultural practices that contribute to better nutrition outcomes. This test aims to assess the knowledge level of FIG members on integrating nutrition sensitive approaches into farming systems, which is essential for improving dietary diversity and addressing malnutrition.

2. Materials and Methods

Item Assortment: The content of knowledge test was composed of questions called items. Items were generated from various sources such as journals, magazines, books, subject matter specialists in food and nutrition and the investigator's own experiences. The questions were designed to test the knowledge level of the FIG members about Farming system for Nutrition.

Preliminary medley of items: The criteria for selection of the items were based on the following: (i) It should encourage critical thinking rather than rote memorization; and (ii) It should distinguish the knowledgeable FIG members from the unknowledgeable ones and have an appropriate difficulty value. Based on these two criteria, 50 items (30 on Nutrition and 20 on Farming System), all of which were in dichotomous form, were principally gathered for the design of the knowledge test. Thus, a schedule consisting of these 50 items was developed in order to administer it to the FIG members and eliminate the extraneous items during item analysis.

3. Results and Discussion

3.1 Preliminary Administration of Test

Items were pretested in the villages of Thadnongniaw, Kdonghulu and Liarkhla of Bhoirymbong block under Ribhoi District of Meghalaya state and were administered randomly to 60 farmers who were not part of the FIG of FSN. Score was given as '1' for right and '0' for wrong answer for each of the 50 items. The total correct response was the knowledge obtained by an individual farmer. The farmers were then distributed into 6 groups (G1 to G6) each consisting of 10 farmers. The farmers in each group were arranged in descending order according to the scores obtained by them. The four extreme groups with high and low scores were taken into consideration for calculation of item difficulty and item discrimination indices.

3.2 Item Analysis

As stated by Guilford, an item analysis of a test provides two kinds of information: item discrimination and item difficulty [#]. The index of item difficulty exposed how challenging an item was whereas the index of discrimination quantified the extent to which an item discriminates to well informed individuals from the ill-informed ones.

3.3 Item Difficulty Index (Pi)

The proportion of FIG members who provided accurate answers to a certain item was used to determine that item's difficulty index. The formula used to define this was:

$$P_i = n_i/N_i \times 100$$

Where,
P_i = Difficulty index in percentage of the ith item.
n_i = Number of FIG members giving correct response to the ith item.
N_i = Total number of rubber growers to whom ith item was administered.

3.4 Item Discrimination Index

The method was formulated by Mehta [#] using $E^{1/3}$ method to find out the Item Discrimination Index which is given below:

$$E^{1/3} = \frac{(S1 + S2) - (S5 + S6)}{N/3}$$

Where, S1, S2, S5 and S6 were the frequencies if correct answers in groups G1, G2, G5 and G6 respectively.
N = Total number of respondents in the sample of item analysis, here it was 60.

3.5 Selection of Items for Test

In the final configuration of the knowledge exam, two standards; item difficulty index and item discrimination index were computed for a large number of items. The final set-up of the knowledge test in the current study includes items with difficulty indexes ranging from 20 to 96.66 and discrimination indexes ranging from 0 to 0.65. All 50 items' item difficulty index and item discrimination index were calculated, and 16 things that met both criteria were chosen for the final knowledge test configuration, as shown in Table 1. Knowledge test for kiwi farmers included 15 item statements as stated by Koyu, *et al.* 2019 [4] and Singh *et al* 2023 [5] in his study also included 17 item statements for rubber grower's knowledge test. Marabiang *et al.* 2021 [7], in his study created knowledge test scale to measure the knowledge level of the village councillors about MGNREGA in Meghalaya and as a result, 20 knowledge items were included out of 48 item statements.

Table 1: Difficulty Index (DI) and Discrimination Index (Disc. Index) for knowledge test items

Item No.	Statements	DI	Disc. Index	S= Selected item and R= Rejected item
A.	**Knowledge on Nutrition**			
1.	Are you aware of balanced diet?	68.33	0.1	R
2.	Are you aware of vitamins and minerals?	68.33	0.45	S
3.	Dal/ any other pulses are source of protein	53.33	0.65	S
4.	Leafy vegetables are to be washed before chopping them	96.66	-0.05	R
5.	The nutrient content of food increases if heated again	38.33	-0.05	R
6.	Millet rice is more nutritious than hand pounded rice	48.33	-0.05	R
7.	Cooking is to be done in low flame	25	-0.1	R
8.	Soda is to be used for cooking as it decreases the nutrient content of the food	61.66	0.3	S
9.	Vitamin helps in body building and repairing	33.33	0.2	R
10.	The rich source of vitamin and minerals are green leafy vegetables	70	0.5	S
11.	All fruits aren't an energy giving fruit	45	0.1	R
12.	The lid is to be used while cooking to avoid loss of nutrient in it	26.66	-0.1	R
13.	Diet adequate with all the essential nutrients are termed as balanced diet	75	0.2	R
14.	Balance diet include food materials from all food groups	65	0.4	S
15.	Knowledge on nutritive value of different food materials will help in making balanced diet	56.66	0.1	R
16.	Vegetables and fruits provide bulk to the diet	38.33	0.1	R
17.	Pasteurized milk is good food consumption	66.66	0.35	S
18.	Animal foods provide better quality protein	66.66	0.25	R
19.	Pressure-cooking is advisable to prevent nutrient loss	33.33	0.25	R
20.	Fried foods are better than steamed foods	33.33	0.1	R
21.	Bleeding gums is due to the deficiency of vitamin C	33.33	0.3	S
22.	Deficiency of calcium and vitamin D will not reduce bone strength	65	0.35	S
23.	Drinking 2 liters (8 glasses) of water every day maintains good hygiene	96.66	-0.1	R
24.	Processed foods provide the same nutritional benefits as fresh foods	25	0.25	R
25.	Vitamin A is essential for blood clotting	30	0	R
26.	Using jaggery in the diet reduces iron deficiency	51.66	0.25	R
27.	Only expensive food can prevent and cure malnutrition and diseases (-)	33.33	-0.05	R
28.	Nutritious diet help in faster recovery from diseases	85	0.1	R
29.	People can get contamination through food and water	60	0.3	S
30.	Attending nutrition related education activities is beneficial	95	0	R
B.	**Knowledge on Farming system**			
31.	Farming system refers to ordered combination of crops grown, livestock produced, husbandry methods and cultural practices	96.66	0.1	**R**
32.	Large-scale industrial farming is always more profitable than small- scale farming system	41.66	-0.05	**R**
33.	Organic farming system is one where chemical and pesticides are not used	61.66	0.4	**S**
34.	In intensive cultivation, more labour and capital are used in the same piece of land.	33.33	0.1	**R**
35.	Shifting cultivation is an indigenous farming system where the land under natural vegetation is cleared by slash and burn method	56.66	0.45	**S**
36.	Fertilizers should be applied in excess to ensure optimal crop health	63.33	0.4	**S**
37.	Intercropping refers to growing two or more, generally dissimilar crops simultaneously on the same piece of land	20	0	**R**
38.	Organic farming always results in lower yields compared to conventional farming methods	30	0	**R**
39.	Diversified farming systems, such as agroecology, can provide farmers with better resilience too climate change and market fluctuations	95	-0.1	**R**
40.	Monoculture farming, where only one crop is grown over large areas, is always more sustainable than mixed cropping	61.66	0.4	**S**
41.	Small-scale farming systems play a crucial role in food security and livelihood in many developing countries	43.33	0.1	**R**
42.	Crop rotation is a common farming practice in farming systems to improve soil fertility and reduce pest and disease pressure	40	0.4	**S**
43.	Farmers often change what they grow in a field from year to year to keep the soil healthy and prevent pest and diseases	35	-0.05	**R**
44.	Some farmers use natural ways to control pest and diseases like using beneficial insects and plant varieties	26.66	-0.1	**R**
45.	Farmers face challenges like unpredictable weather, market fluctuations and changing consumer demands which they adapt	61.66	0.35	S
46.	Agro-forestry combines trees or woody plants with crops or wind protection and habitat for wildlife	26.66	0.15	R
47.	Farmers often work with scientists and researchers to learn new methods and improve their farming practices	53.33	0.15	R
48.	Farming systems vary across different region and are influenced by climate, soil condition, and available resources	56.66	0.3	S
49.	No-tillage farming system minimizes the soil disturbances and help improve soil health and water retention	26.66	-0.1	R
50.	Irrigation systems always improve crop yields regardless of water availability or soil conditions	95	0	R

3.6 Reliability
The coefficient of correlation between the two set of scores was calculated and found to be 0.629. Therefore, it can be concluded that the correlation is statistically significant at 0.05 significance level. This indicated that the knowledge test's internal consistency was relatively high.

3.7 Content Validity of Knowledge Test
During the final selection of items, meticulous care was taken to ensure the inclusion of all relevant behavioral aspects pertaining to the respondents' knowledge of nutrition and farming systems. The items were sourced from various experts, and it was assumed that the scores obtained from administering this test accurately measured the respondents' knowledge as intended.

3.8 Knowledge level of the respondents
From table 2, it is noticed that from FIG 1, 21.28% was found to have low level of knowledge and remaining 10.64% had high level of knowledge. From FIG 2, 21.28% was also found to have low level knowledge whereas, 14.89% was found to have high level Knowledge. Lastly from FIG 3, 19.14% had low level knowledge while 12.77% had high level knowledge. Therefore, from the overall FIG members of the 3 villages, 61.70% of the respondents have low level knowledge whereas, 38.30% have high level knowledge pertaining to Farming System for Nutrition.

Table 2: FIG wise distribution of respondents according to the knowledge level about Farming System for Nutrition

Knowledge level	FIG 1 (n= 15)	FIG 2 (n=17)	FIG 3 (n=15)	Overall (N=47)
Low knowledge level (5.68)	10 (21.28%)	10 (21.28%)	9 (19.14%)	29 (61.70%)
High knowledge level (8.68)	5 (10.64%)	7 (14.89%)	6 (12.77%)	18 (38.30%)

4. Conclusion
The formulation of knowledge assessments pertaining to nutrition-sensitive farming systems is of paramount importance as it facilitates the adoption of practices that enhance nutritional well-being, thereby contributing to improved food and nutritional security and dietary diversity in the fight against malnutrition. The research findings indicated a persistently low level of understanding regarding nutrition among farmers, which may be correlated with the ongoing prevalence of malnutrition within a substantial segment of the population, thereby underscoring the imperative for a farming system that prioritizes nutritional considerations. By identifying these limitations in the comprehension of the links between sustainable agricultural approaches and nutrition, such assessments facilitate the delivery of tailored training and the strategic allocation of resources, ultimately contributing to greater agricultural productivity.

5. References

1. Das PK, Bhavani RV, Swaminathan MS. A farming system model to leverage agriculture for nutritional outcomes. Agric Res. 2014;3(3):193-203.
2. Guilford JP. New standards for test evaluation. Educ Psychol Meas. 1946;6(4):427-38. DOI: 10.1177/001316444600600401.
3. Food and Agriculture Organization (FAO). Nutrition-sensitive agriculture and food systems in practice: Options for intervention. FAO; 2017. Available from: https://www.researchgate.net/publication/354582085_Nutrition-sensitive_agriculture_and_food_systems_in_practice_options_for_intervention. Accessed on 16th February, 2025.
4. Koyu B, Singh RJ, Devarani L, Singh R, Hemchandra L. Developing an intellectual learning scale to test knowledge level of kiwi growers of Arunachal Pradesh on package of practices of kiwi. Curr J Appl Sci Technol. 2019;32(6):1-6.
5. Singh SS, Singh RJ, Devarani L, Hemchandra L, Singh R, Choudhury A. Construction of a knowledge test to assess rubber growers' knowledge of rubber plantation development and extension schemes in North East India. Int J Environ Clim Change. 2023;13(1):42-7.
6. Khadda BS, Kumar KL, Rai AK, Khajuria S, Patel YG, Varia SK, *et al*. Farmer interest groups: an effective pathway for enhancing agricultural production, productivity, and profitability. J Agric Ecol. 2021;11:58-68.
7. Marbaniang EK, Chauhan JK, Devarani L, Singh RJ, Singh R, Hemochandra L. Knowledge test scale to measure the knowledge level of village councillors about MGNREGA in Meghalaya. Indian Res J Ext Educ. 2021;21(4):56-62.
8. Mehta P. A study of communication of agricultural information and the extent of distortion occurring from district to village level workers in selected IADP districts. Ph.D. Thesis, University of Udaipur, Rajasthan, India; 1958.
9. MSSRF. Farming system for nutrition. M.S. Swaminathan Research Foundation; 2017. Available from: http://59.160.153.188/library/sites/default/files/Farming%20System%20for%20Nutrition.pdf. Accessed on 22nd February, 2025.
10. Nagarajan S, Bhavani RV, Swaminathan MS. Operationalizing the concept of farming system for nutrition through the promotion of nutrition-sensitive agriculture. Curr Sci. 2014;107(60):959-64.
11. Ruel MT, Quisumbing AR, Balagamwala M. Nutrition-sensitive agriculture: What have we learned so far? Glob Food Sec. 2018;17:128-153.