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Staple Food Consumption Patterns of Arfak Tribe Farmer Households in Warmare District

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ABSTRACT

This research was conducted in Warmare District, with the aim of examining the staple food consumption patterns of Arfak Tribe farming households in Warmare District. This research uses a quantitative approach using survey methods. The method used to collect data in this research was 24 hour recall. The research population is Arfak tribe farming households who cultivate tubers and rice fields in the Warmare District, namely Kwau Village, Guentuy Village and Indisey VillageThe results of the research show that the average staple food consumption pattern in Kwau Village is the highest in the sweet potato food type, namely 1,595.54 grams per day, Guentuy Village and Indisey Village, on average, the type of food most consumed is grains (white rice). 1,486.37 grams per day and 1,451.83 grams per dayThe average expected food pattern score for tuber foods, namely sweet potatoes, taro and cassava, has reached the normative expected food pattern score, for the grains group, Kwau Village has not yet reached the expected and normative food pattern score, while for Guentuy Village and Indisey Village it has achieve normative expected food pattern scores.

INTRODUCTION

The level of food consumption can provide an overview of the health condition of the population in a region based on the nutritional status. In other words, to maintain a healthy body, a person needs to consume food containing essential nutrients such as carbohydrates, proteins, fats, and vitamins/minerals in adequate and balanced amounts (Karina et al., 2019). These nutrients are needed to provide energy, promote growth, maintain body tissues, and regulate bodily processes (Alristina et al., 2021). The 11th National Forum on Food and Nutrition (WNPG) established that the Recommended Dietary Allowance (RDA) for energy and protein per day for the Indonesian population is 2,100 kcal/capday for energy and 57 gramscapday for protein (National Food Agency, 2023).

The adequacy of energy and protein for each individual can be assessed by analyzing the frequency, type, and amount of food consumed daily, as reflected in food consumption patterns (Adha & Suseno, 2020). Furthermore, Elinur et al. (2020) stated that meeting food needs can be observed from household food consumption patterns. Food consumption patterns refer to the choices of food combinations and types of food consumed by households to meet basic needs and ensure sufficient and balanced nutrient intake.

The quality of food consumption in Indonesia indicates a diverse composition, as reflected by the 2022 Food Consumption Pattern Score (PPH), which reached 92.9, exceeding the target of 92.8 set in the National Medium-Term Development Plan (RPJMN) (National Food Agency, 2023). It was further explained that animal food consumption had reached the ideal composition; however, the consumption of tubers, legumes, vegetables, and fruits still needs to be increased. Additionally, the consumption of cereals and fats/oils has exceeded recommendations and needs to be reduced to achieve a more balanced nutrient composition.

The development of staple food consumption patterns (carbohydrate sources) in Indonesia is still dominated by cereals, particularly rice and wheat, while the consumption of tubers remains low. This is evidenced by the data on cereal consumption in 2020, which accounted for 56.6%, whereas tuber consumption was only 2.6% (National Food Agency, 2023). This shows that the staple food pattern of the Indonesian population tends to rely heavily on rice, despite the country's wide variety of local carbohydrate sources such as corn, cassava, sweet potatoes, sago, gembili, bananas, breadfruit, taro, and others (Rahajeng & Khotimah, 2020). Research by Satmalawati and Fola in Umanailo (2019) found a significant availability of tubers and bananas in Waimangit Village. However, these foods have not been fully utilized as staple foods but are consumed as supplementary foods. The community perceives that the complex preparation, nutritional content, and local food consumption habits in Waimangit Village are associated with households or individuals of lower economic status. Although the habit of consuming tubers and bananas has not disappeared entirely, they are still served during traditional events as local foods. Rasyid (2020) mentioned that local food in Biak Numfor Regency is used as an alternative food source to replace rice. Local food substitutes include tubers (sweet potatoes, cassava, gembili, and taro), sago, and millet. Sihombing (2021) stated that Indonesian food culture has been continuously changing. In the 1950s, Indonesians predominantly relied on local foods to meet their daily needs. The people of Papua and Maluku consumed tubers and sago, while those in East Nusa Tenggara relied on corn as a staple food. However, after Indonesia achieved rice self-sufficiency in 1984, the consumption of tubers, sago, and corn began to shift towards rice. It was further explained that the lack of attention from stakeholders, along with the declining infrastructure supporting local food production (tubers, corn, and bananas), has led to decreased local food production.

The daily recommended energy intake for Indonesians is 2,100 kcal/day, with 6% or approximately 126 kcal/day coming from tubers and 50% or about

1,050 kcal/day from cereals. However, the types and amounts of staple foods predominantly consumed by the Arfak people in Warmare District have not been thoroughly studied in previous research,
prompting the researcher to investigate the staple food consumption patterns of Arfak households in Warmare District.

Materials and Methods

This study was conducted in Warmare District, Manokwari Regency, from February to June 2024. A quantitative approach was used, employing a survey method. Data collection was performed using a 24-hour recall method.

The population in this study consisted of Arfak households in Warmare District who cultivate tubers and upland rice. The sample was selected in stages, beginning with the purposive sampling of villages. The criteria for village selection included: 1) the majority of the population are Arfak farmers cultivating tubers and upland rice; 2) accessibility to trading centers; and 3) interaction with more advanced farmers (transmigrant farmers). Based on these criteria, two villages were selected purposively, namely Kwau Village and Indise Village (Prafi Village). Kwau Village represents a village with difficult access to trading centers and transmigration locations, while Indise Village represents a village with easy access to trading centers (close proximity) and direct borders with transmigration areas. Guentuy Village was also included to represent a village cultivating upland rice.

Food consumption patterns will be analyzed by calculating energy sufficiency based on the Food Consumption Pattern Score (PPH) with the following formulas (Alfiati, 2018):

1. Konsumsi Aktual

$$\text{Actual Consumption} = \frac{Household\ Food\ Consumption}{Number\ of\ Household\ Members}$$

2. Actual Energy

$$Actual\ Energy = \frac{Actual\ Food\ Consumption}{Expected\ Consumption} x\ Conversion\ Factor$$

3. % Actual

$$\%\ Actual = \frac{Actual\ Food\ Consumption}{Total\ Actual\ Food\ Consumption} x\ 100\ \%$$

4. % AKE

$$\%\ AKE = \frac{Actual\ Energy}{2100} x\ 100\ \%$$

5. Weight is the determination of weight (Triguna Pangan
6. Actual Score

$$Actual\ Score = \%\ Actual\ x\ Weight$$

7. Energy Adequacy Score (AKE)

$$AKE\ Score = \%\ AKE\ x\ Weight$$

8. PPH Score = If the AKE score is > than the max score, then the max score is used in the PPH score table and vice versa.

The weight determination (Triguna Pangan) is as follows:

1. Energy source (carbohydrates) 33,33%

Grains (50%), tubers (6%), oils and fats (10%), oily fruits/seeds (3%), sugar (5%).
Weight= 33,3% / 74% = 0,5

2. Source of building blocks (protein)33,33%
   Animal foods (12%), nuts (5%)
   Weight = 33,33% / 17% = 2
3. Source of regulators (vitamins and minerals) 33,33%
   Vegetables and fruits (6%)
   Weight = 33,33% / 6% = 5
4. Others (0,1%)
   Spices and drinks (3%)
   Weight = 0,1% / 3% = 0,03

Table 1. Conversion Factors (Kcal)and Scores in the Food Consumption Pattern (PPH)

No.	Food Group	Conversion Factor (Gr)		Skor PPH
		Gr	Kkal	Ideal
1.	Grains	289	1050	25,0
2.	Tubers	105	126	2,5
3.	Animal Foods	157	252	24,0
4.	Oils and Fats	21	210	5,0
5.	Oil Fruits/Seeds	11	63	1,0
6.	Legumes	37	105	10,0
7.	Sugar	31	105	2,5
8.	Vegetables and Fruits	262	126	30,0
9.	Others	-	63	0,0
	Total	**913**	**2100**	**100**

Source: National Food Agency, 2021

RESULTS AND DISCUSSION

Food Consumption Patterns

Food consumption patterns describe the types of food consumed, the amount, and the frequency of consumption among specific communities. These patterns highlight the selection of food groups, determining the amount and frequency of meals. The food types, meal quantities, and frequency of meals among Arfak farmers' households in this study are shown in the following table:

Table 2. Types of Food and Average Daily Consumption per Arfak Farmer Household

Type of Food	Average Daily Consumption in Kwau Village (gr)	Average Daily Consumption in Guentuy Village (gr)	Average Daily Consumption in Indisey Village (gr)
White Rice	1.311,14	1.486,37	1.451,83
Sweet Potatoes	1.595,54	1.164.86	864,25
Taro	940,31	829,04	567,60
Cassava	1.575,54	1.334,48	1.327,20
Bananas	420,00	638,57	363,43

Source: Data Analysis 2024

This table shows the variety of food consumed by Arfak farmers in different villages. White rice and tubers like sweet potatoes, taro, and cassava dominate their diets, with significant variation in the quantity of each food type across the three villages.

Based on Table 2, it can be seen that tuber-based foods are more commonly consumed in Kwau Village, particularly sweet potatoes (1,595.54 grams), cassava (1,575.54 grams), and taro (940.31 grams). This is due to the fact that Kwau Village does not produce rice and has limited access to shopping centers and transmigration locations. As a result, farming households rely more on producing tubers to meet their staple food needs. Rice (white rice1,486.37 grams and banana consumption at 638.57 grams. Guentuy Village is one of the villages that cultivates upland rice to meet staple food needs, leading to high rice consumption. Additionally, Guentuy Village produces a lot of bananas, which are consumed as food and sold as a source of income to purchase non-food items. In contrast, rice, tuber, and banana consumption in Indisey Village falls between the levels in Kwau and Guentuy Villages. Indisey Village does not cultivate upland rice but has easy access to markets and transmigration locations, making it easier to obtain food to meet daily needs.

Table 3. Types of Food and Frequency of Meals per Day in Warmare District

Frequency of Meals per Day	Number of Respondents				
	White Rice	Sweet Potatoes	Taro	Cassava	Bananas
Kwau Village					
1 Time	9	9	5	3	6
2 Times	11	1	0	0	2
3 Times	8	1	1	1	0
Guentuy Village					
1 Time	5	3	2	0	7
2 Times	9	1	0	2	0
3 Times	16	0	0	0	0
Indisey Village					
1 Time	8	6	4	7	6
2 Times	14	1	1	1	3
3 Times	8	0	0	0	0

Source: Data Analysis 2024

Based on Table 3, it can be seen that the highest frequency of rice consumption is in Guentuy Village, with 16 respondents consuming rice 3 times a day, followed by Indisey Village with 14 respondents consuming rice 2 times a day, and Kwau Village with 9 respondents consuming rice once a day. The frequency of sweet potato, taro, and cassava consumption 3 times a day was recorded for 1 respondent in Kwau Village, while no respondents in Guentuy or Indisey Villages consumed tubers 3 times a day. Sweet potatoes were consumed 2 times a day by the same number of respondents (1) across all three villages. Taro was consumed 2 times a day by 1 respondent in Indisey Village, while no respondents in Kwau or Guentuy Villages reported this frequency. Cassava was consumed 2 times a day by 2 respondents in Guentuy Village, 1 respondent in Indisey Village, and none in Kwau Village. As for the frequency of 1-time-a-day

consumption, the highest number of respondents for sweet potatoes and taro was in Kwau Village, with 9 and 5 respondents, respectively, while cassava consumption was highest in Indisey Village, with 7 respondents. For bananas, no respondents in any of the villages consumed them 3 times a day. The highest number of respondents consuming bananas 2 times a day was in Indisey Village, , with 3 respondents followed by Kwau Village with 2 respondents, and none in Guentuy Village. Meanwhile, the highest number of respondents consuming bananas once a day was in Guentuy Village, with 7 respondents, while Kwau and Indisey Villages.

Analysis of Food Consumption Patterns

1. **Analysis of the Quantity of Food Consumption Patterns (AKE)**

   The quantity of food consumption among residents can be indicated by the volume of food consumption (grams/personday), energy consumption (kcalpersonday), and protein consumption (grams of protein/person/day) (National Food Agency, 2023). In this study, the quantity of food consumption for farming households was calculated based on energy consumption levels in kcal/personday, following the National Food and Nutrition Workshop (WNPG), which sets nutritional quality indicators to measure overall nutritional status. The recommended Energy Adequacy Rate according to WNPG XI in 2018 is 2,100 kcal/personday.

   Based on the results of the research in Warmare District, shown in the table below, the total energy consumption from staple foods for farming households in Kwau Village was 2,515.32 kcal/person/day, and in Guentuy Village, it was 2,373.17 kcalpersonday, both exceeding the recommended 2,100 kcalpersonday. In contrast, farming households in Indisey Village had a total energy consumption of 2,030.56 kcal/personday, which is below the recommended level. The average energy consumption is presented in Table 4 below.

Table 4. Average Energy Consumption of Farming Households of the Arfak Tribe in Warmare District

Kelompok Pangan	Energy Consumption (Kcal/Person/Day)		
	AKE Actual	AKE Normative	% AKE Actual
Kwau Village			
White Rice	1.206,84	1.050	47,84
Sweet Potatoes	338,20	126	13,92
Taro	313,19	126	11,45
Cassava	562,93	126	22,88
Bananas	94,16	126	3,91
Total	**2.515,32**	**1.554**	**100**
Guentuy Village			
White Rice	1.337,81	1.050	56,89
Sweet Potatoes	223,16	126	9,18
Taro	242,40	126	10,33
Cassava	442,95	126	18,52
Bananas	126,85	126	5,09
Total	**2.373,17**	**1.554**	**100**
Indisey Village			
White Rice	1.205,56	1.050	62,29

Sweet Potatoes	159,91	126	7,81
Taro	170,07	126	7,23
Cassava	421,33	126	19,16
Bananas	73,69	126	3,51
Total	**2.030,56**	**1.554**	**100**

Source: Data Analysis 2024

Table 4 shows that the average calorie source from the cereal food group (rice) is highest in Guentuy Village, at 1,337.81 kcal/person/day, followed by Indisey Village with 1,205.56 kcal/person/day and Kwau Village with 1,206.84 kcal/person/day. The average calorie source for the tuber food group, which includes sweet potatoes, taro, and cassava in Kwau, Guentuy, and Indisey Villages, indicates that tuber consumption is closer to the normative adequacy standard of 126 kcal/person/day. Banana consumption in Kwau and Indisey Villages is below the normative adequacy standard of 126 kcal/person/day, while in Guentuy Village, it is slightly above at 126.85 kcal/person/day.

Based on Table 4, it can be concluded that the average energy consumption of farming households in Warmare District for the cereal and tuber food groups exceeds the normative adequacy standard, which is 1,050 kcal/person/day for cereals and 126 kcal/person/day for tubers. This exceeds the recommendations set by the National Food and Nutrition Workshop (WNPG) XI in 2018 and established in the Minister of Health Regulation No. 28 of 2019 (National Food Agency, 2024). Although bananas are classified as vegetables and fruits, for the Arfak Tribe, they serve as a source of carbohydrate food. The table shows that energy consumption from bananas in Guentuy Village exceeds the normative adequacy standard of 126 kcal/personday, while in Kwau and Indisey Villages, it falls below this standard.

2. Analysis of the Quality of Food Consumption Patterns (PPH Score)

The Pattern of Expected Food (PPH) is one of the indicators used to assess the quality of food consumption. The PPH is a composition of diverse foods based on the proportion of energy balance from various food groups to determine nutritional needs, both in quantity and quality, considering food availability, acceptability, economics, culture, and religion. The PPH Score serves as an indicator of nutritional quality and food consumption diversity, which can be used for planning food consumption needs. The maximum PPH score is 100; the higher the PPH score, the more diverse and balanced the food consumption of the population or individual.

Table 5 shows that the actual PPH score in Warmare District is below the normative PPH score of 100. The actual PPH score is obtained by comparing the AKE score with the normative PPH score. If the AKE score is greater than the normative PPH score, the actual PPH score uses the normative PPH score. Conversely, if the AKE score is lower than the normative PPH score, the actual PPH score uses the AKE score. The average PPH score offarming households of the Arfak Tribe in Warmare District is presented in the following table:

Table 5. Average PPH Score of Arfak Tribe Farming Households in Warmare District

Food Group	%AKE Actual	%AKE Normative	Weight	AKE Score	Actual PPH Score	Normative PPH Score
Kwau Village						
White Rice	47,84	50	0,5	23,92	23,92	25
Sweet Potatoes	13,92	6	0,5	6,96	2,5	2,5
Taro	11,45	6	0,5	5,73	2,5	2,5
Cassava	22,88	6	0,5	11,44	2,5	2,5
Bananas	3,91	6	5,0	19,55	19,55	30
Total	**100**	**74**	**7**	**67,60**	**50,97**	**62,50**
Guentuy Village						
White Rice	56,89	50	0,5	28,45	25	25
Sweet Potatoes	9,18	6	0,5	4,59	2,5	2,5
Taro	10,33	6	0,5	5,17	2,5	2,5
Cassava	18,52	6	0,5	9,26	2,5	2,5
Bananas	5,09	6	5,0	25,45	25,45	30
Total	**100**	**74**	**7**	**71.91**	**57,95**	**62,50**
Indisey Village						
White Rice	62,29	50	0,5	31,15	25	25
Sweet Potatoes	7,81	6	0,5	3,91	2,5	2,5
Taro	7,23	6	0,5	3,62	2,5	2,5
Cassava	19,16	6	0,5	9,58	2,5	2,5
Bananas	3,51	6	5,0	17,55	17,55	30
Total	**100**	**74**	**7**	**65.80**	**50,05**	**62,50**

Source: *Data Analysis 2024*

Table 5 shows that the average PPH score for tuber-based foods (sweet potatoes, taro, and cassava) in Warmare District meets the normative PPH score. This indicates that local food consumption in Warmare District is relatively high. However, the PPH score for cereal-based foods in Kwau Village does not reach the normative PPH score. This is due to difficult access to shopping centers and the fact that the Arfak Tribe farming households in Kwau Village do not cultivate upland rice, making it hard to obtain rice-based foods.

In contrast, Guentuy and Indisey Villages achieve the normative score because Guentuy Village has Arfak Tribe farming households that cultivate upland rice, ensuring the availability of rice. Meanwhile, Indisey Village has easy access to shopping centers and transmigration locations, facilitating the acquisition of rice-based foods, even though the Arfak Tribe households there do not cultivate upland rice.

The total average PPH scores for staple foods among Arfak Tribe farming households in Warmare District are 50.97 for Kwau Village, 57.95 for Guentuy Village, and 50.05 for Indisey Village. These figures indicate that the actual PPH score for staple foods is below the normative PPH score.

CONCLUSION

1. **Daily Meal Frequency**: The frequency of meals per day among farming households in Warmare District shows that cereal-based foods are more commonly consumed by households in Guentuy and Indisey Villages, while tuber-based foods are more frequently consumed by households in Kwau Village. Banana consumption is highest among farming households in Indisey Village.
2. **Energy Consumption**: Energy consumption in Warmare District for cereal-based and tuber-based foods exceeds the normative adequacy standards of 1,050 kcal per capita per day for cereals and 126 kcal per capita per day for tubers. Banana consumption in Guentuy Village also exceeds the normative standard of 126 kcal per capita per day, while Kwau and Indisey Villages have not reached the energy adequacy standard, falling below 126 kcal per capita per day.
3. **PPH Scores**: The PPH scores for farming households in Warmare District are 50.97 for Kwau Village, 57.95 for Guentuy Village, and 50.05 for Indisey Village. These scores indicate that the PPH scores for farming households in Warmare District are below the normative score for staple foods, which is set at 65.

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