Too poor to choose? Analyzing food agency in food insecure households in rural Burundi

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Abstract

Despite recent attention, the concept of food agency has been largely overlooked in academics as a food security dimension. In this study, we define lack of food agency as the inability to make food choices and the consumption of non-preferred and undesirable foods, and examine its relation to other food insecurity domains and household characteristics. Our analysis is based on data collected from 486 households in the impoverished regions of northern Burundi. Specifically, we use the responses to two questions of the Household Food Insecurity Access Score scale that examine the consumption behavior of non-preferred and undesirable foods. The results highlight a worrying lack of food agency in this area of research, as more than 80% of households admitted to consuming such foods. Our study also shows that only households with additional off-farm income are able to avoid non-preferred foods. This study serves to highlight the critical issue of food agency, particularly among low-income consumers in the Global South, and underscores the widespread nature of this problem.

1. Introduction

The high level - and even rise since COVID-19 pandemic in food and nutrition insecurity of low-income consumers in the Global South is of particular concern (FAO et al., 2022). Low-income consumers often experience constraints in physical and economic access to food, a key component of food security (FAO et al., 2022; HLPE, 2020; Clapp et al., 2022). As a result, they consume fewer calories (Van den Broeck et al., 2021) and have less varied diets (Obayelu & Osho, 2020), consisting of readily available, inexpensive calories (Erokhin et al., 2021). While these foods can be filling, they may not necessarily meet individual food preferences or bring enjoyment to the table.

The evidence on food choices and preferences of low-income consumers in the Global South is sparse, in particular in vulnerable rural low-income populations. Various studies have considered drivers of poor diets and food insecurity in low-income households in the Global South, but aspects of food choices and preferences of low-income households have received less attention. Karanja et al. (2022) reviewed studies on food choice in low- and middle-income countries. Of the 110 studies analyzed, most focused on middle-income countries - notably South Africa, China, Malaysia, Indonesia, India, Brazil, Turkey, and Iran. However, only a few studies specifically considered low-income consumers. Although affordability of food was one of the dimensions of the food environment in the Karanja *et al*. study, only two studies were found that associate food choice with affordability in low-income countries, which are Farris et al. (2020) on Madagascar and Thakwalakwa et al. (2020) on Malawi.

Despite the apparent lack of available empirical research on food choices and preferences, food agency of low-income consumers has gained prominence in food security discussions. A 2020 report by the High-Level Panel on Food Security introduced the food agency dimension to

food security by referring to the decision-making capacity of individuals and groups concerning their food systems (HLPE, 2020). More precisely, Clapp et al. (2022) refer to food agency as "the capacity of individuals and groups to exercise, voice and make the decision about their food systems". Hence, food agency emphasizes the importance of autonomy and freedom of choice and aligns with the broader debates about food sovereignty. While food sovereignty encompasses decision-making at a broader societal level and involves a stronger political agenda (Weiler et al., 2015), food agency - for us - refers to the daily conscious and self-determined choices individuals and households make about their food.

The knowledge on food agency as a dimension of food insecurity is scant, which raises numerous questions. One of these is how low-income consumers are affected by a lack of food agency and, as a result, have no other choice than to consume non-preferred or undesirable foods. In addition, it remains unclear how consumption of non -preferred or undesirable foods relates to other areas of food insecurity and whether income actually plays a role in the prevalence of consumption of non -preferred foods as we would expect. Or, put another way, are low-income consumers too poor to choose? This study contributes to the knowledge on food agency and diet diversity in food-insecure low-income households in the Global South. Our study focusses on farm households in rural Burundi, one of the world's poorest countries where many of the households are presumingly facing problems to access the food they enjoy and hence lack food agency.

2. Methodology

2.1 Case study area: Burundi

The study was conducted in the provinces of Ngozi and Muyinga in the north of Burundi. A large part of Burundi's population lives in rural areas where families widely rely on agriculture for their

livelihoods. The estimated prevalence of chronic malnutrition in these areas is alarmingly high, with estimates that 63% and 59% of the population in Ngozi and Muyinga are affected, respectively (ISTEEBU, 2019). Various challenges, such as high population pressure, land degradation and limited access to resources and information, have resulted in low agricultural productivity, food insecurity and malnutrition for many households (Niragira et al., 2022; Batungwanayo et al., 2023; Gaiser et al., 2023). Several studies conducted in Burundi indicate that poverty and resource scarcity are major obstacles to achieving food security (Desiere et al., 2015; Niragira et al., 2015). The poorest households in Burundi have low dietary diversity (Devereux et al., 2019), with many lacking access to fruits and animal foods (Niragira et al., 2015).

2.2 Data

This study uses data collected from farm households in April 2020, which coincides with the pre-harvest period of the main cropping season ("season B"). A multi-stage sampling approach was used for data collection. First, 15 administrative areas were selected from all administrative areas in the two provinces to be part of the study area. Within each administrative area, 10 villages were randomly selected. In each village, four households per village were randomly selected (Sauerwald et al., 2012). After cleaning the data, the responses of a total of 486 households remained, which could be used for the present analysis. The data was collected through interviews conducted by trained enumerators in Kirundi. At the beginning of each interview, a statement of informed consent was read to the respondents. It explained who the enumerators and authors were, why the data was being collected, and how the data would be anonymized, stored and analyzed. The respondents were told they could ask questions and suspend the interview at any time. Only if they

agreed to these terms, the interview took place. The survey collected information on household composition, assets, food consumption, and agricultural production records.

The Household Food Insecurity Access Score (HFIAS) is a widely used and validated tool for measuring food insecurity (Coates et al., 2007). It consists of nine questions that each probe a different domain of food security (Piazza et al., 2002). Respondents were asked to recall these experiences for the week prior to the interview. Questions 2 and 4 of the HFIAS questionnaire inquire about the consumption of non-preferred and undesirable foods. Question 2 asks, "Were you or any household member not able to eat the kinds of foods you preferred because of lack of resources?" and Question 4 asks, "Did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources?". We introduce the term "non-preferred food choices" to refer to households whose members had to consume foods they did not prefer due to a lack of resources, as indicated by a positive response to question 2. Similarly, a positive response to question 4 was used to refer to "undesirable food choices". We consider households to have greater food agency when they report not having to consume non-preferred or undesirable foods over the last month.

It is worth noting that food preference is generally considered an important factor in the food choices people make along with other socioeconomic, cultural, and environmental mediating factors (Monterrosa et al., 2020). Food choice refers to the foods that a person selects, prepares, and consumes (Karanja et al., 2022) while food preference refers to a person likes and dislikes, which are subjective and personal and related to their sensory experiences when consuming certain foods. The term "non-preferred food" consumption has been used in the literature to refer to the refusal of picky eaters to eat certain foods (Piazza et al., 2002). Moreover, the term "non-preferred food" is often used in the context of food waste, whereas here, we refer to food that people do not

want to eat because they may not have the opportunity to eat other food. In turn, the understanding of the term "food agency" as defined by HLPE (2020) and Clapp et al. (2022) different from how some scolars in consumer studies use 'agency' to explain autonomy in shopping, cooking, and dining practices of e.g. adolescents (see eg. Green et al. (2021)).

Although interrelated, food preferences and choices are distinct from diet composition and dietary diversity. Dietary diversity refers to the range of foods in a person's diet and the nutrient composition of the foods consumed (Hoddinott et al., 2002; Leroy et al., 2015; Moursi et al., 2008). In this paper, we capture the dietary patterns of households by recording which amongst ten food groups the respondent or any household member consumed in the month of the preceding year the households considered to be the worst. The question was not asked to households who said they did not experience any food shortages in the last year, reason why 34 (7.00%) of the 486 households are not included in Table 3.

2.3 Analytical approach

The data were analyzed using both descriptive statistics and multivariate probit models. Multivariate probit models are used to identify potential associations between the occurrence of non-preferred food and undesirable food consumption (i.e. the dependent variables in the model) and the household, farm and livelihood characteristics of the household that are our independent variables. Multivariate probit models are used to estimate probit models of binary dependent variables are suspected to be correlated (Chib & Greenberg, 1998). The models were run in R using the mvprobit codes.

As household characteristics we consider the household size, age, gender and literacy level of the head of the household. We characterize the farm activities by the farm size, the farm

production in kilocalories, and its diversity in terms of livestock counts and the simpson diversity index (see also Sibhatu & Qaim (2018); Simpson (1949)). The livestock count is calculated as the total number of livestock units while the Simpson index is based on the size of land on which every crop is grown relative to the total size of cultivated land (Jones et al. 2014)[1], Finally, livelihood outcomes are expressed by the sources of income, the on- and off-farm income levels and an asset count which is computed as the sum of the household's possession of a phone, radio, electricity, or means of transportation.

3. Results

3.1 Sample characteristics

Many of the respondents are engaged in farming as their main occupation (Table 1), which is the main source of living for 88% of the respondents (Table 2). Income levels are generally very low and respondents have few assets. About half of the households owns a telephone and/or a radio, one third report owning a means of transport, and only 17 % have access to electricity. In addition, 24% of household heads are illiterate, most of them are male, and the average household size is between 5 and 6. Households cultivate small plots of land (Table 1) where they grow various crops and keep a limited number of livestock.

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[1]The index is defined as $S = 1 - \sum s_j^2$ with s_j the percentage share of the total farm land dedicated to crop j. The index is bound between 0 and 1, with values closer to 0 indicating dominance of one crop and values closer to 1 indicating a more equal distribution across all crops.

3.2 Non-preferred and undesirable food consumption

Data shows that the overwhelming majority of farm household respondents in our sample reported consuming non-preferred and undesirable foods in the month prior to the survey; 81% and 82% of the responts reported to resort to foods they did not prefer or were undesirable, respectively.

A comparison of households that face consumption of non-preferred and undesirable foods with those that do not (Table 1) suggests that the latter are comparatively better off. The mean income levels, livestock and asset counts of households that did not report consumption of non-preferred and undesirable foods are significantly higher. Meanwhile, Table 2 indicates that households headed by illiterate individuals, those with farming as their primary occupation, and female-headed households report higher consumption of non-preferred and undesirable foods. Households that face the consumption of non-preferred and undesirable foods seem to have less access to a phone, electricity, a radio or a means of transport.

Table 1. Household and farm characteristics by consumption of non-preferred and undesirable foods during the last month

	Consumption of non-preferred foods			Consumption of undesirable foods		
	No	Yes	t-stat	No	Yes	t-stat
	(n=95)	(n=391)		(n=90)	(n=396)	
	Mean	Mean		Mean	Mean	
	(std. dev.)	(std. dev.)		(std. dev.)	(std. dev.)	
Household size	6.18	5.44	2.668***	6.43	5.39	4.118***
(continuous)	(2.50)	(2.10)		(2.56)	(2.07)	
Household age	51.29	50.50	0.592	51.58	50.45	0.823
(continuous)	(11.59)	(12.05)		(11.67)	(12.02)	
Farm size (ha)	0.28	0.27	0.159	0.18	0.29	-2.049**
	(0.77)	(0.61)		(0.39)	(0.69)	
Count assets (1-4)	2.41	1.36	7.767***	2.54	1.34	8.353***
	(1.34)	(1.15)		(1.26)	(1.15)	

Crop diversity (species count, continuous)	5.14 (1.92)	4.86 (1.75)	1.284	4.97 (1.79)	4.90 (1.79)	0.312
Crop diversity (simpson index)	0.64 (0.13)	0.63 (0.15)	0.635	0.63 (0.12)	0.63 (0.15)	0.198
Livestock (TLU, continuous)	1.06 (1.20)	0.51 (0.53)	6.754***	1.10 (1.21)	0.51 (0.54)	6.980***
On farm income (FBU)	1,691,377 (4,666,654)	319,963 (416,124)	5.736***	1,731,038 (4,779,803)	328,265 (452,102)	5.748***
Off -farm income (FBU)	899,524 (1,178,759)	231,483 (322,283)	9.822***	954,533 (1,187,722)	227,416 (321,803)	10.618***
Total household income (FBU)	2,590,901 (5,412,748)	551,447 (664,236)	7.251***	2,728,255 (5591211)	557,081 (682428)	7.437***

Note: *** refers to P<0.01; ** refers to P<0.05. Comparisons are based on a two-sided independent t-test

Table 2. Crosstabulation of categorical variables by non-preferred and undesirable foods during the last month (n=486)

			Consumption of non-preferred foods			Consumption of undesirable foods		
			No (%)	Yes (%)	Pearson Chi-square	No (%)	Yes (%)	Pearson Chi-square
Province	Muyinga	186	19	81	0.007	17	83	0.345
	Ngozi	300	20	80		19	81	
Gender	Female	47	15	85	0.717	11	89	2.141
	Males	339	20	80		19	81	
Illiterate	No	368	22	78	4.630**	21	79	4.573**
	Yes	118	13	87		12	88	
Farm main occupation	No	34	29	71	2.262	27	73	1.532
	Yes	452	19	81		18	82	
Phone	No	233	12	88	16.138***	9	91	24.437***

	Yes	253	26	74		19	82	
Electricity	No	404	14	86	53.603***	13	87	55.140***
	Yes	82	49	51		48	52	
Radio	No	249	15	85	5.965***	13	87	10.868***
	Yes	237	24	76		24	76	
Means transport	No	299	10	90	44.725***	9	91	49.691***
	Yes	187	35	65		34	66	

Note: *** refers to P<0.01; ** refers to P<0.05, A Chi-square test was used to compare groups

3.2 Dietary patterns and food agency

Diets of the respondent households during the worst months of the year consisted of a combination of roots, tubers, legumes and leafy vegetables (Table 3). A larger share of household that were able to avoid non-preferred or undesirable foods said to consume Vitamin A rich crops and meat compared to those that lack food agency. Nuts and seeds, eggs and dairy are not widely consumed in the study area. Consumption of nuts and seeds is even less frequent in households that report consumption of non-preferred or undesirable foods. Similar results are found for dairy products, meats and eggs. Hence, the dietary patterns of the households with food agency that can avoid non-preferred and undesirable foods in our sample is more diverse in terms of food groups compared to the households lacking food agency.

Table 3. Crosstabulation of food groups consumed by households with and without food agency in the worst month of the year (n=452)

	Consumption of non-preferred foods			Consumption of undesirable foods		
	No	Yes	Chi	No	Yes	Chi
	(%)	(%)	squared	(%)	(%)	squared

Grains and Tubers	Never	11	0	3	2.291	3	2	1.068
	< 3 times a month	27	5	6		4	6	
	< 3 times a week	214	49	47		52	46	
	> 3 times a week	200	46	44		40	45	
Legumes[1]	Never	42	4	10	15.760***	3	10	16.326***
	< 3 times a month	58	1	15		3	15	
	< 3 times a week	222	55	48		49	49	
	> 3 times a week	130	39	27		45	26	
Nuts and seeds	Never	304	53	70	15.692***	55	69	8.401**
	< 3 times a month	53	11	12		13	11	
	< 3 times a week	76	32	14		28	15	
	> 3 times a week	19	4	4		3	4	
Leafy vegetables[2]	Never	8	0	2	6.491*	0	2	4.861
	< 3 times a month	16	0	4		0	4	
	< 3 times a week	120	34	25		31	26	
	> 3 times a week	308	66	69		69	68	
Vitamin A crops[3]	Never	254	32	61	21.209***	39	59	10.97**
	< 3 times a month	48	19	9		18	9	
	< 3 times a week	113	38	22		34	23	
	> 3 times a week	37	11	8		9	8	
Other vegetables[4]	Never	89	5	22	15.169***	6	22	12.659***
	< 3 times a month	54	8	13		7	13	
	< 3 times a week	191	50	41		54	40	
	> 3 times a week	118	36	24		33	25	
Fruits	Never	68	5	17	6.800*	7	16	5.364
	< 3 times a month	64	16	14		10	15	
	< 3 times a week	188	49	40		46	41	
	> 3 times a week	132	30	29		36	28	
Eggs	Never	415	74	95	41.239***	72	95	42.715***
	< 3 times a month	26	15	4		19	3	
	< 3 times a week	11	11	1		9	1	

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	> 3 times a week	0	0	0		0	0	
Dairy	Never	409	77	93	20.759***	79	92	13.861***
	< 3 times a month	20	9	3		7	4	
	< 3 times a week	9	7	1		6	1	
	> 3 times a week	14	7	2		7	2	
Meat	Never	257	39	60	18.326***	36	61	23.916***
	< 3 times a month	98	23	21		27	21	
	< 3 times a week	83	30	16		27	17	
	> 3 times a week	14	8	2		10	2	

Note: *** refers to $P<0.01$; ** refers to $P<0.05$. [1] beans, peas, other legume seeds; [2] amaranth, cabbage, spinach, sukuma, kale, bean-leaves, umusoma; [3] orange maize, orange sweet potato, pumpkin, ripe papaya, ripe mango, carrot; [4] eggplant, onion, tomato, cumcumber, beet, lengalenga.

3.3 Comparison with other household food security domains

In Table 4, we compare responses to the question non-preferred and undesirable food consumption to the other food security domains. Almost all households lacking food agency (thus saying to have consumed non-preferred or undesirable foods) struggle with the other food access domains measured by the HFIAS questions. Additionally, only a few respondents provided affirmative answers to any other domain of the HFIAS while saying they did not consume non-preferred and undesirable foods. Households facing food insecurity are more likely to consume non-preferred or undesirable foods.

Table 4. Comparison of the consumption of non-preferred and undesirable foods versus other food security domains

	Yes	Q2. Non-preferred foods		Q4. Undesirable foods	
	n and % between brackets				
If yes to:		No (%)	Yes (%)	No (%)	Yes (%)
Q1. Worry that there is not enough food	278 (57)	3	97	3	97
Q2. Non-preferred foods	392 (81)	0	100	5	95
Q3. Limited variety	381 (78)	5	95	4	96
Q4. Undesirable foods	398 (82)	6	94	0	100
Q5. Smaller meals	335 (69)	4	96	2	98
Q6. Fewer meals	296 (62)	4	96	3	97
Q7. No food	112 (23)	3	97	1	99
Q8. Go to sleep hungry	114 (24)	5	95	2	98
Q9. Pass a whole day or night without food	47 (10)	4	96	2	98

3.4 Multivariate probit models

Table 5 gives the findings of the multivariate probit analysis, which aims to identify factors associated with the occurrence of non-preferred and undesirable food consumption by the household. We give the results of two models: one with only household income as an independent variable, and the other with additional household and farm characteristics included.

The results are consistent with the descriptive analyses, indicating that higher off-farm income and owning more assets are associated with a decreased likelihood of consuming non-

preferred and undesirable foods. Additionally, households with livestock ownership, which is a valuable asset in the region and source of food and fertilizer, are less likely to consume non-preferred and undesirable foods. The multivariate probit models also suggest that the consumption of non-preferred food and undesirable food is correlated.

Table 5. Estimates of coefficients and standard errors from multivariate probit models on the consumption of non-preferred and undesirable foods

Consumption of	Non-preferred foods (1=yes)		Undesirable foods (1=yes)	
	Model 1	Model 2	Model 1	Model 2
	Coefficient	Coefficient	Coefficient	Coefficient
	(std. error.)	(std. error.)	(std. error.)	(std. error)
Intercept	5.681***	4.713***	6.377***	3.859**
	(0.615)	(1.408)	(0.643)	(1.576)
Ln on-farm income (continuous)	-0.124**	-0.044	-0.071	-0.066
	(0.062)	(0.091)	(0.067)	(0.097)
Ln off-farm income (continuous)	-0.270***	-0.185**	-0.378***	-0.261***
	(0.073)	(0.086)	(0.079)	(0.097)
Province (1: Muyinga, 2: Ngozi)		0.089		0.100
		(0.159)		(0.176)
Age (continuous)		-0.007		-0.009
		(0.006)		(0.006)
Gender (1: Male, 2: Female)		-0.258		-0.158
		(0.252)		(0.302)
Household size (categorical)		0.015		-0.013
		(0.040)		(0.041)
Illiterate (1: Yes)		0.122		0.077

			(0.197)		(0.220)
Count assets (categorical)			-0.241***		-0.288***
			(0.076)		(0.082)
Livestock (TLU, continuous)			-0.304**		-0.282*
			(0.139)		(0.149)
Simpson Index [0;1]			0.992		0.188
			(0.667)		(0.758)
Farm size (ha)			-0.111		0.013
			(0.091)		(0.146)
Ln total kcal (continuous)			-0.044		0.099
			(0.091)		(0.131)
R 1-2	0.881***	0.873***			
	(0.033)	(0.041)			
Log likelihood	-336.122	-314.342			

Note: *** refers to P<0.01; ** refers to P<0.05; * refers to P<0.1

4. Discussion and Conclusion

The existing literature on food preferences and choices among food-insecure and low-income households in the Global South remains scant, despite the growing attention given to food agency. Using data from rural Burundi, we show that a significant number of respondents consumed foods they do not prefer or find undesirable, suggesting a potential lack of enjoyment in their food consumption, with repercussions on dietary diversity and food security. These households seem to exhibit a lack of food agency, a concern that we believe warrants attention from both academics and professionals.

In our sample population, income levels and overall livelihood standards significantly influence the consumption of non-preferred and undesirable foods. Especially lower-income

households and those with limited assets reported to consume foods they would otherwise avoid if they had the choice. This behavior is closely tied to the financial constraints and restricted economic access to food within the households in our study area.

A particularity of our sample is the importance of subsistence farm production in the respondent's households. Most of the produce of the respondents consists of staple foods like beans, cassava, sweet potatoes, and some maize. There is generally a limited supply of non-staple vegetables, fruits are scarcely available, and animal-sourced foods are extremely rare (Desiere et al., 2015). Cereals and tubers are consistently and widely consumed across households, likely due to their cost-effectiveness and higher caloric content relative to nutrients. It is therefore, probable that low-income households prioritize these foods for sustenance, albeit reluctantly. For many of the respondents, the income levels are inadequate for purchasing preferred foods from the market. Only few households that report some off-farm income can afford the foods they truly prefer.

Understanding the dynamics of food agency holds importance in assessing food security. Households facing other food insecurity domains in the HFIAS often consume foods they would typically avoid if they could afford doing so. In our survey, only a few households reported issues in other aspects of food insecurity but not to their food choices. Therefore, if they encounter any form of food insecurity, it is likely to impact their ability to exercise food agency. Consequently, consuming foods they would rather not eat is an initial coping strategy when facing hunger and food insecurity.

Our research emphasizes the crucial need to integrate considerations of food preferences and choices into the development of effective food interventions. This calls for policymakers and researchers to adopt a more tailored, context-specific approach to address food security challenges. However, tackling the issue of limited food choices is a complex endeavor that demands

substantial livelihood improvements. Achieving this goal requires a fundamental transformation of the food system, ensuring that healthy and nutritious diets are both affordable and accessible to all individuals. It is also essential to recognize that food preferences and choices can evolve over time, impacting food decisions in various ways. Therefore, offering a diverse array of food options enhances the likelihood of meeting individuals' evolving food preferences and choices. Equally so, the research underscores the critical necessity of integrating food preferences and choices into developing effective food interventions.

This study has several obvious shortcomings to be tackled in future research. First, the measurement of consumption of non-preferred and non-desirable foods may be refined in at least two ways; (a) reducing the recall period to seven days or 24hours prior to the survey can increase reliability of the measurement, and (b) while the way the questions 2 and 4 are asked in the HFIAS questionnaire are rather straightforward, follow-up questions are needed to detail which foods are non-preferred or non-desirable. Second, our focus in the analysis was on the association of non-preferred food choices with income. Yet, households may be limited in their food choices by other reasons such as cultural habits or health problems. Bad harvests and seasonality may limit the food available on the market at the time of the survey and food price inflation may impact the households' purchasing power. These important drivers of food choice were not analyzed in this paper. Finally, the data used in this analysis are from one area and may reflect a specific reality caused by a thin food environment. Cross-national comparisons may shed light on the consistency of the lack of food agency across food environments.

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