Health, Livelihoods, and Food Intake in Inland Southeast Tanzania:

From Questionnaire Interviews in Malolo Village, Lindi Region

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I. Introduction

1. Health and nutrition status in Tanzania

Zero hunger, good health, and well-being are important goals for the Sustainable Development Goals (SDGs), yet many people have not been able to fulfill these goals. In Tanzania, on the east coast of Africa, great improvement has been seen in Under-five Mortality Rates (U5MR) and Infant Mortality Rate (IMR) at 66.5 and 46.2 per 1,000 births respectively, almost reaching the Millennium Development Goal (MDG) of 64 and 38 per 1,000 births[1]. However, MDG to reduce hunger shows a mixed picture. The prevalence of underweight for children under-five is 13.4% was close to reaching the target of 12.5%. Global Acute Malnutrition (GAM) or wasting measured by weight-for-height was also at 3.8% as of 2004, further decreased to 3.5% in 2018. However, underweight increased to 14.6% and chronic malnutrition or stunting measured by height-for-age remains at 31.8% as of 2018[2].

Regional disparities are also prevalent in Tanzania. In the *2010 Tanzania Demographic Health Survey* (TDHS, Map 1), Dodoma (56%), Lindi (54%), and Iringa (52%) Regions have the highest percentage of stunting over 50%[3]. TFNC (Tanzania Food and Nutrition Centre) survey 2014 earmarked Kagera (51.9%), Njombe (51.5%), and Iringa (51.3%), as regions of stunting over 50%. Lindi Region was at 36.2%, slightly higher than the mainland average of 35.0%[4]. In 2018, the situation improved to 23.85% for Lindi Region, but leaving behind Njombe at 53.6%[5].

As for rate of acute malnutrition (GAM, wasting), Zanzibar (6.1%) and Singida (5.2%) have the highest; and Kilimanjaro (1.5%) and Mtwara (1.6%) have the lowest. Lindi Region is at 2.3%, lower than the national average of 3.5%[6].

For underweight, Rukwa (21.5%) and Kigoma (20.3%) Regions have the highest. Lindi has the lowest percentage of underweight at 7.4%[7].

As for U5MR, Kagera (93.9 per 1,000), Iringa (90.7), Katavi (88.0), Zanzibar Kusini Unguja (85.9), and Njombe (81.4) Regions have the highest rates and have not reached the MDG as of the 2012 Census. Similar tendency is seen with the IMR. Lowest U5MR and IMR are in Arusha (37.3 and 29.0 respectively) and Kilimanjaro (38.5 and 29.6 respectively) Regions. U5MR and IMR of the Lindi Region is at 65.0 and 47.0; and of Ruangwa District is 65.7 and 47.5. They are both close to the national average of 65.7 and 46.2 respectively, lower than that of Lindi Rural District at 71.7 and 50.7, but have not reached the MDG[8]. The situation in Lindi Region has been a great improvement from the previous 2001 Census with U5MR at 217[9].

Tanzania has improved underweight and children's mortality at the national level, but has high level of chronic malnutrition. Furthermore, there are steep disparities among regions.

2. Research area

Tanzania has almost achieved its MDGs for U5MR, underweight, and malnutrition; and Lindi Region has also shown great improvement in these indicators. However, chronic malnutrition, for which Tanzania

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has not been able to meet the goals, also remains high in Lindi Region, above the national average.

As one of the deprived regions for child survival, Mchinga II Village, located on the coast in Lindi Region has been researched, and factors influencing child survival have been assessed in previous research. One of the contributing factors of child survival was the use of sorghum for children's food[10]. In this respect, this research has been designed to focus on the contribution of indigenous food and wild food for improved nutrition and health. In discussion with authorities of Lindi Region, Malolo Village in Ruangwa District along with Kijiweni Village in Lindi Municipal[11], have been identified as villages that have experienced food shortage, yet have been utilizing indigenous wild food obtainable within the area.

Malolo Village is in Malolo Ward, Ruangwa District, Lindi Region located inland. It is about 110 km away from Lindi town toward the west, and 3.5km from the main road Nangumbu junction. The village is surrounded by Nmitende and Naiwego mountain vegetation and forests within the vicinity (Map 2).

The village has a total population of 1,420 people, consisting of 721 women and 699 men in Malolo Village. It consists of 8 hamlets indicated in Table 1 (see Map 3 for the location of the household in the village center). Naiwego and Namitende hamlets are located in the mountains where cars are not reachable, and it takes two or three hours by foot (about 4-5 km). In other words, residents of the hamlets are likely to walk two to three hours to reach schools, dispensary, water, and church.

Malolo Village was established in 1977. Majority of the people are the Mwera ethnic group, and their religion are mostly Christians. Missionaries settled in Malolo in the past, and have built elementary school and dispensary for the community and housing for teachers and health workers. The ward name has been taken from Malolo Village since it had schools, health center, and church that served for the residents. In 1947, there was a serious food shortage (*njaa*), and people ate Angadi (*Dioscorea cochleari-apiculata*), rat (*panya*), and bamboo (*mianzi*). During 2009-2010, Save the Children under PANITA program with collaboration with Sokoine University, Food and Nutrition Department came for study in the village.

Livelihood of the villagers are farming with some minor livestock such as cows and chickens. Major crops are maize, sorghum, millet, cassava, and sweet potatoes. It has been observed that the crops are destroyed by rats, and that household do not have sufficient food from their farms.

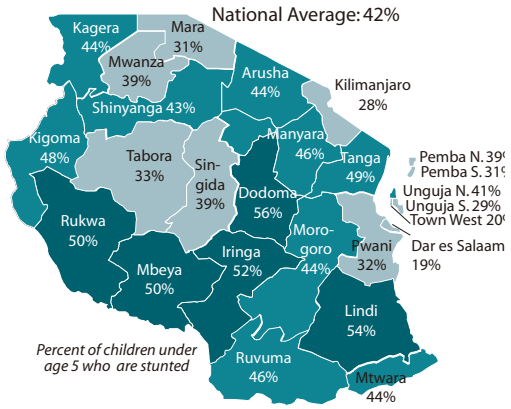
They have a problem of water being salty, as seen in other location such as Mbekenyera of Ruangwa District. Most of the water is obtained from hand dug wells, and the salty water is sold at a cost of TSh50 per bucket. Villagers complain that they get stomachaches, and the dispensary data also indicates that villagers have problems of diarrhea.

3. Methodology

The questionnaire interview was based on a comprehensive questionnaire in Swahili. It included 75 questions about the respondents, marriage and family, livelihood, groups, mutual assistance, children, health, and food intake. Questions on health are based on the standardized SF-12, and the Swahili translation has been based on the verified Swahili SF-36[12]. Questions on food intake frequency have been formulated based on research in Japan[13], adjusted to food in *Tanzania based on Tanzania Food Composition Tables*[14] and discussions with nutrition specialists in Tanzania. Questions on groups and mutual assistance have been formulated with reference to *Measuring Social Capital* [15]. Other questions have been formulated based on the author's previous questionnaire interviews[16]. The questionnaire has been pre-tested in Lindi, Dodoma[17], and Dar es Salaam, and adjusted.

The questionnaire has been conducted by interview by one of the authors and seven research assistants selected in the village based on their writing capabilities during 2-4 Sept. 2019. Four of the research assistants from the village were male, and three were women. Total interviewers including one of the authors were four men and four women.

Map 1. Stunting of children by Region (2010)

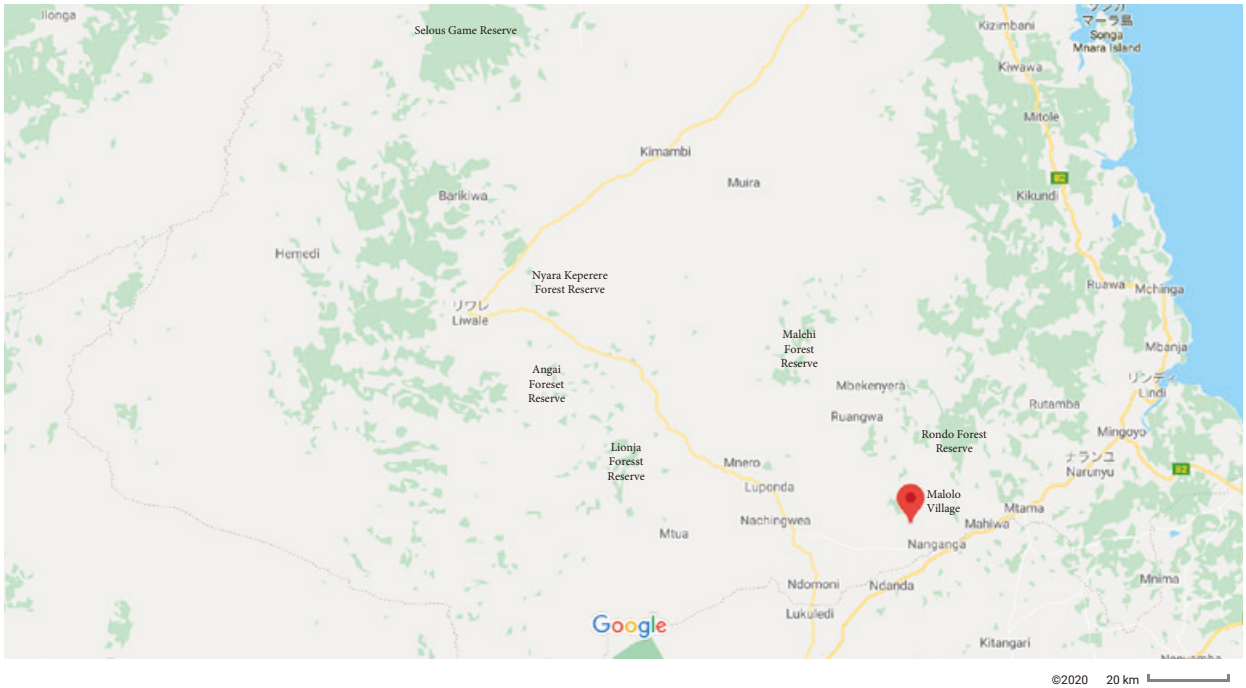


Source: Tanzania 2011, p.10.

Map 3. Malolo Village

Source: Created by Sakamoto from Google Earth 2020

Map 2. Malolo Village in Ruangwa District, Lindi Region, Tanzania



Source: Created by Sakamoto from Google 2020 with reference to UNDP (n.d.).

Table 1. Total household and number of women and men interviewed

Hamlets	Total households	Interviewed		
		Women	Men	Total
Amila	88	7	4	**11**
Changombe	69	6	5	**11**
Mashineni	28	9	2	**11**
Muhimbili	33	6	5	**11**
Mwongozo	78	8	3	**11**
Sokoni	33	7	4	**11**
Naiwego	56	4	7	**11**
Namitende	88	5	6	**11**
Total	**473**	**52**	**36**	**88**

Source: From field research and interviews (Q1).

The interviewees were selected from all hamlets of the village to cover the whole village (Table 1). Eleven respondents were selected per hamlet, with a total of 88 respondents. Interviewees were selected from each household, but not limited to household heads to enable women to also respond to the questionnaire.

Research ethics were followed in accordance with the rules and regulations of the Utsunomiya University (permission granted as H18-0008), such as prior explanation and consent for interview. In this paper, results of a preliminary compilation of the answers to the questions will be reported. Percentage is calculated from the total responding to each question, and not the total respondents. The results are analyzed in reference to previous similar researches in Iringa Region, Dodoma Region, and Kijiweni Village, Lindi Municipal, Lindi Region.

I. Results

The Original Swahili questionnaire, English translation, and the major results are indicated in Table 2. Results of questions indicated with "+" are indicated elsewhere, either in the text or other tables. Percentage is calculated based on the total valid answers for each question unless otherwise stated. All the tables and diagrams are created by the authors based on the questionnaire unless otherwise stated.

1. About the respondents

Relatively more women were interviewed (52 respondents, 59%) in comparison to men (36 respondents, 41%). The ages of the respondents range from 19 to 97 with the average of 52.7, but 18 (20%) are in their 40s and 16 (18%) are in their 50s (Table 3). Most of their religions are Christian (78, 89%) but some are Islam (10, 11%). All of the respondents (87) were of the Mwera ethnic group, except for one that did not answer.

All participated in their initiation. Majority (79, 90%) studied in school: 78 (89%) went to elementary school, 75 (85%) finished their education at elementary including three that finished at Grade II and IV. Three (3%) proceeded to secondary school (Table 2).

2. About marriage and family

Majority of the respondents (80, 91%) have the experience of being married. Majority (76, 95%) decided their marriage on their own, but 4 (5%) had their marriage decided by their parents. Among those that were married, majority (70, 92%) of their families received or paid bridewealth, mostly in the form of money (71, 93%). The average amount of bridewealth in money was TSh 38, 627, ranging from 40 cents to TSh200,000. None received bridewealth in the form of livestock.

Presently, the majority of respondents are married (47, 56%), but 19% are widowed, 14% were divorced, 6% are unmarried, and 5% are separated. Most of their marriages were monogamous (78, 95%), but 4 (5%) of the husbands had 2 wives (Table 2, 11). Majority (52, 60%) lived with their spouses. Average number of people living under the same roof was 3.39, ranging from 1 to 8 people (Table 4). The most common number of people living under the same roof were two (24, 28%), followed by three (18, 21%), and four (14, 16 %). Majority did not have children under-five living under the same roof (65, 76%), but 17 (20%) had one and three (4%) had two (Table 2, 13b).

As for the nutrition status (weight) of children under-five, 13 (52%) understood it as "good / sufficient (green)", 5 (20%) considered it as average which could become "insufficient (gray)", but 2 (8%) considered it "bad / insufficient (red)". Five respondents (20%) did not know the status (Table 2, 13c).

Among the respondents, 24 (38%) of them experienced death of children under-five: 11

Table 2. Questionnaire interview (Swahili and English) and its major results

Swahili original		**English translation**	+	**0**	**%**	**1**	**%**	**2**	**%**	**3**	**%**	**4**	**%**	**5**	**%**	**Average**	**Total**
		English		**No**		**Yes**											**n**
Swahili	Entry code	[Translation omitted when No/Yes question]		Hapana		Ndiyo											
Mkoa: _____	**Mkoa**	Region															
Wilaya: _____	**Wilaya**	District															
Kijiji:_____	**Kijiji**	Village															
Kitongoji: _____	**Kitongoji**	Hamlet	1+														
Jina ya Mhojaji: _____	**Jina ya Mhojaji**	Interviewer															
Tarehe: _____	**Tarehe**	Date															
Taarifa binafsi		**1. About yourself**															
1. Jina: _____	**1 Jina**	Name	-														
Jinsia: □ 1 Ke □ 2 Me	**Jinsia**	Sex: 1 Women 2 Men				52	59%	36	41%							1.41	88
2. Mwaka wa kuzaliwa? 19_____	**2**	Year born?	+													1966	88
a) umri:_____	**a**	Age (calculated from year born)	3+													52.73	88
□ b) sijui	**b**	don't know															0
3. Dini yako? □ 1 Muislam □ 2 Mkristo	**3**	Your religion? 1 Islam 2 Christian 3 Other+				10	11%	78	89%							1.89	88
4. Kabila: _____	**4**	Ethnic group	+														
(5) Umechezwa unyago au jando? □ 0 Hapana □ 1 Ndiyo	**5**	Have your had your initiation?		0	0%	88	100%									1.00	88
6. Ulisoma shule? □ 0 Hapana □ 1 Ndiyo	**6**	Did you study in school?		9	10%	79	90%									0.90	88
□ 1 msingi	**6.1**	Elementary (all)		10	11%	78	89%									0.89	88
		Elementary only		13	15%	75	85%									0.87	88
□ 2 sekondari	**6.2**	Secondary		85	97%	3	3%									0.02	88
□ 3 madrasa	**6.3**	Madras		88	100%	0	0%									0.00	88
□ 4 nyingine_____	**6.4**	Other	+	85	97%	3	3%									0.04	88
Kuhusu ndoa na familia		**2. About marriage and family**															
7. Umewahi kuoa/ kuolewa? □ 0 Hapana→Q11 □ 1 Ndiyo →Q8	**7**	Have you ever been married?		8	9%	80	91%									0.92	88
(8) Je nani alitoa maamuzi ya wewe kuoa/ kuolewa?: □ 1 Wazazi □ 2 Mwenyewe	8	Who decided about your marriage?: 1 Parents 2 Yourself"				4	5%	76	95%							1.95	80
(9) Je familia yako (au wewe mwenyewe) ilipokea au kulipa mahari? □ 0 Hapana →Q11 □ 1 Ndiyo	9	Have your family or yourself receive or paid bridewealth?		6	8%	70	92%									0.92	76
(10) Je walipata/ kulipa nini kwa ajili ya mahari yako? □1 Pesa:	10.1	What did they receive/pay as bridewealth? Money				71	93%									1.00	76
TSh_____	10.1(2)	TSh	(+)													38,627	72
□2 Mifugo:	10.2	Livestock		74	97%	0	0%									0.00	76
11. Sasa ndoa yako ni ipi? ☐ 1 Hamna ndoa (unmarried) ☐ 2 Umeo(le)wa (married) →Q11b ☐ 3 Mmeachwa (Mtaliki, divorced) ☐ 4 Unakaa mahali tofauti (separated) ☐ 5 Mjane/ Mgane (widowed)	11	How is your marriage now? 1 Unmarried 2 Married 3 Divorced 4 Separated 5 Widowed				5	6%	47	56%	12	14%	4	5%	16	19%	2.75	84
(11b) Je ndoa yako ni ya mke mmoja au zaidi matala (polygamy): Wangapi? _____	11b	Is your marriage of one wife or more (polygamy): How many?				78	95%	4	5%							1.04	82
12. Je unaishi pamoja na mume/mke au mwenza wako? ☐ 0 Hapana ☐ 1 Ndiyo	**12**	Do you live with your husband/wife or partner?		34	40%	52	60%									0.62	86
13. Je unaishi na watu wangapi nyumbani? a) Jumla wangapi: _____	**13a**	How many people live in your house? Total:	4+			10	11%	24	28%	18	21%	14	16%	7	8%	3.39	87
b) Watoto chini ya miaka 5 ni wangapi: _____ 0→Q14	**13b**	How many children under-5?		65	76%	17	20%	3	4%							0.27	85
(13c) Hali ya lishe (uzito) ya mtoto chini ya mwaka 5: ☐ 0 Sijui ☐ 1 Inatosha/Kijani (Green) ☐ 2 Haitoshi kiasi/Kimanjano (Yellow or Grey) ☐ 3 Haitoshi kabisa/Nyekundu (Red)"	13c	Nutrition status of children under 5: 0 Don't know 1 Good (Green) 2 Average (Grey) 3 Bad (Red)		5	20%	13	52%	5	20%	2	8%					1.09	25
14a. Je una watoto waliofariki chini ya miaka 5? ☐ 0 Hapana →Q15 ☐ 1 Ndiyo:	**14a**	Do you have children who died under-5?		40	63%	24	38%									0.39	64
Wangapi? _____ →Q14b	14a1	How many?		63	73%	11	13%	7	8%	4	5%	0	0%	1	1%	0.51	86

Swahili original		**English translation**	+	**0**	**%**	**1**	**%**	**2**	**%**	**3**	**%**	**4**	**%**	**5**	**%**	**Average**	**Total**
		English		**No**		**Yes**											**n**
Swahili	Entry code	[Translation omitted when No/Yes question]		Hapana		Ndiyo											
(14b) Sababu gani? □0 Sijui □1 Mgonjwa: malaria □2 Magonjwa mengine: _____ □3 Ajali □4 Nyingine_____	14b	What was the reason? 0 Don't know 1 Sickness: malaria 2 Other sickness 3 Accident 4 Other+	+	11	44%	5	20%	9	36%	0	0%	1	4%			1.24	25
Kuhusu maisha		**3. About livelihood**															
15. Kazi yako? ☐ 1 Mkulima	**15.1**	Your occupation? Farmer		2	2%	86	98%									0.98	88
□2 Biashara	**15.2**	Business		88	100%	0	0%									0.00	88
□3 Ufugaji	**15.3**	Livestock keeping		85	97%	3	3%									0.04	88
□4 Nyingine_____	**15.4**	Other	+	82	93%	6	7%									0.07	88
16. Una mifugo? ☐ 0 Hapana ☐ 1 Ndiyo:	**16**	Do you have livestock?	4+	33	39%	52	61%									0.62	85
17a. Una shamba? ☐ 0 Hapana ☐ 1 Ndiyo	**17a**	Do you have a farm?		2	2%	85	98%									0.98	87
b. Una bustani? ☐ 0 Hapana ☐ 1 Ndiyo	**17b**	Do you have a garden?		86	99%	1	1%									0.01	87
18. a Mazao makuu ya shambani kwako ni yapi? ☐ 1 Mahindi	**18a1**	What is your major crop? 1 Maize		2	2%	86	98%									0.98	88
□5 _____	**18a5**	Other		15	17%	73	83%									0.82	88
Mbaazi	18ambaazi	Pigeon peas				63	72%										88
□4 Muhogo	**18a4**	Cassava		46	52%	42	48%									0.49	88
Ufuta	18aufuta	Sesame				32	36%										88
□3 Mtama	**18a3**	Sorghum		64	73%	24	27%									0.26	88
Kunde	18akunde	Cowpea				12	14%										88
Karanga	18akaranga	Peanuts				8	9%										88
Korosho	18akorosho	Cashewnuts				7	8%										88
□2 Mpunga	**18a2**	Rice		86	98%	2	2%									0.02	88
Alizeti	18aalizeti	Sunflower				2	2%										88
Nyanya	18nanyanya	Tomatoes				1	1%										88
Njugu	18anjugu	Bambara groundnuts				1	1%										88
b Je ni nini sababu ya kulima mazao hayo? ☐ 1 Chakula	**18b1**	What is the reason for you to cultivate the above crop? 1 Food		1	1%	87	99%									0.99	88
□2 Biashara	**18b2**	2 Business		59	67%	29	33%									0.35	88
□3 Mazingira inafaa	**18b3**	3 Environments suits the crop		88	100%	0	0%									0.00	88
□4 _____	**18b4**	4 Other	+	88	100%	0	0%									0.00	88
19. Nani anaamua kuhusu matumizi ya mazao? ☐ 1 Mwanamke tu ☐ 2 Mwanaume tu ☐ 3 Mwanamke na mwanaume	**19**	Who decides about the use of the crop? 1 Women only 2 Men only 3 Women and men				29	33%	9	10%	50	57%					2.27	88
20. Kwa siku hizi chakula kinatosha kwa mwaka mzima nyumbani? ☐ 0 Hapana ☐ 1 Ndiyo	**20**	Do you have sufficient food in the house these days to last a year?		80	92%	7	8%									0.07	87
21. Ni mwezi upi chakula hakitoshi? Mwaka 2018/Mwezi 1	**21.1**	Which months did you have insufficient food? 0=Insufficicinet, 1=Sufficient 2018/1st month January		80	91%	8	9%									0.08	88
2	**21.2**	2 February		84	95%	4	5%									0.04	88
3	**21.3**	3 March		82	93%	6	7%									0.06	88
4	**21.4**	4 April		27	31%	61	69%									0.68	88
5	**21.5**	5 May		3	3%	85	97%									0.96	88
6	**21.6**	6 June		1	1%	87	99%									0.99	88
7	**21.7**	7 July		2	2%	86	98%									0.98	88
8	**21.8**	8 August		5	6%	83	94%									0.94	88
9	**21.9**	9 September		9	10%	79	90%									0.89	88
10	**21.10**	10 October		31	35%	57	65%									0.63	88
11	**21.11**	11 November		51	58%	37	42%									0.42	88
12	**22.12**	12 December		63	72%	25	28%									0.27	88
Jumla mwezi		Total months	5+	1	1%	0	0%	1	1%	1	1%	4	5%	8	9%	6.95	86
21a. Kama chakula hakitoshi; a) Umepata chakula cha porini? ☐ 0 Hapana ☐ 1 Ndiyo	**21a**	When food was insufficient: Did you get food from the forest?		30	34%	57	66%									0.65	87
	Mfano*	Example (number of examples)	6+	26	30%	11	13%	30	34%	11	13%	8	9%	2	2%	1.67	88
b) Umepunguza idadi ya milo kwa siku? □0 Hapana □1 Ndiyo	**21b**	Did you decrease the number of meals?		10	11%	77	89%									0.89	87
c) Umeuza mifugo □0 Hapana □1 Ndiyo	**21c**	Did you sell livestock?		38	45%	46	55%									0.54	84
d) Mtoto amekula kwa ndugu au jirani? □0 Hapana □1 Ndiyo	**21d**	Did children eat at relatives or neighbors?		28	33%	57	67%									0.66	85

Swahili original		**English translation**	+	**0**	**%**	**1**	**%**	**2**	**%**	**3**	**%**	**4**	**%**	**5**	**%**	**Average**	**Total**
		English		**No**		**Yes**											**n**
Swahili	Entry code	[Translation omitted when No/Yes question]		Hapana		Ndiyo											
22. Ni yapi matumizi muhimu ya mapato yako? ☐ 1 Chakula	**22.1**	What are the important use of your income? 1 Food		4	5%	84	95%									0.98	88
□ 2 Nguo	**22.2**	2 Clothes		25	28%	63	72%									0.73	88
□ 3 Elimu	**22.3**	3 Education		40	45%	48	55%									0.56	88
□ 4 Afya	**22.4**	4 Health		24	27%	64	73%									0.71	88
□ 5 Shamba	**22.5**	5 Agriculture		53	60%	35	40%									0.40	88
□ 6 Mengineyo_____	**22.6**	6 Other	+	86	98%	2	2%									0.02	88
23. Nani anamaamuzi kuhusu matumizi ya fedha? ☐ 1 Mwanamke tu ☐ 2 Mwanaume tu ☐ 3 Mwanamke na mwanaume	**23**	Who decides about the use of income? 1 Women only 2 Men only 3 Women and men				30	34%	8	9%	50	57%					2.26	88
24. Chunguza hali ya familia yako kati ya vijiji: ☐ 1 Maskini ☐ 2 Wastani ☐ 3 Tajiri	**24**	Chose the situation of your family within the village: 1 Poor 2 Average 3 Rich				39	44%	49	56%	0	0%					1.54	88
Kuhusu kikundi		**4. About groups**															
25. Je umejiunga kwenye kikundi au vikundi vya kijamii vingapi? _____	**25**	How many groups are you participating in within the community?		10	11%	63	72%	12	14%	3	3%					1.10	88
26. Je kikundi gani kina umuhimu zaidi kwako? Jina: _____	26	What is the name of the group?	(+)	9	10%	79	90%									0.00	88
27. Je shuguli ya kikundi hicho ni nini? ☐ 1 Kilimo	27.1	What is the activity of this group? 1 Agriculture		77	88%	11	13%									0.13	88
□ 2 Dini	27.2	2 Religion		20	23%	68	77%									0.77	88
□ 3 Ngoma	27.3	3 Musical performance		87	99%	1	1%									0.01	88
□ 4 Mkopo	27.4	4 Saving and loans		76	86%	12	14%									0.13	88
□ 5 _____	27.5	5 Other	+	87	99%	1	1%									0.02	88
Kusaidiana nje ya famila (=nyumba)		**5. About mutual assistance outside the family**															
28. Katika kipindi cha mwaka moja je kuna watu wa nje ya familia wamesaidia wakati umepata shida ya chakula? ☐ 0 Hapana ☐ 1 Ndiyo	**28**	Within this month, has anyone outside of your family help you when you needed food?		64	73%	24	27%									0.27	88
29. Katika kipindi cha mwaka moja je umewahi kusaidia watu wengine nje ya familia wakati wamepata shida ya chakula? ☐ 0 Hapana ☐ 1 Ndiyo	**29**	Within this month, have you helped anyone outside of your family when they needed food?		58	66%	30	34%									0.31	88
30. Katika kipindi cha mwaka moja je kuna watu nje ya familia wamesaidia wakati umepata shida ya pesa? ☐ 0 Hapana ☐ 1 Ndiyo	**30**	Within this month, has anyone outside of your family help you when you needed money?		71	82%	16	18%									0.18	87
31. Katika kipindi cha mwaka moja je umewahi kusaidia watu wengine nje ya familia wakati wamepata shida ya pesa? ☐ 0 Hapana ☐ 1 Ndiyo	**31**	Within this month, have you helped anyone outside of your family when they needed money?		76	87%	11	13%									0.13	87
32. Unafikiri watu wa kjiji chako wanasaidiana? ☐ 0 Hapana ☐ 2 Ndiyo	**32**	Do you think people in this village help each other?		22	25%	65	75%									1.47	87
Kuhusu watoto		**6. About children**															
33. Wakati ulipokuwa (mwenza wako) mjamzito ulipata chakula cha kutosha? ☐ 0 Hapana ☐ 1 Ndiyo	**33**	When you (or your partner) was pregnant did you (or your partner) get sufficient food?		14	16%	71	84%									0.85	85
34. Maziwa ya mama yanatosha? ☐ 0 Hapana ☐ 1 Ndiyo	**34**	Was breastmilk sufficient?		12	14%	72	86%									0.88	84
35. Watoto walianza kula chakula gani? ☐ 1 Uji wa:	**35.1**	What was your child's first food? 1 Porridge of:		2	2%	82	98%									0.96	84
☐ 1 mahindi	**35.11**	maize		30	36%	54	64%									0.62	84
□2 mchele	**35.12**	rice		81	96%	3	4%									0.04	84
□3 mtama	**35.13**	sorghum		75	89%	9	11%									0.11	84
□4 muhogo	**35.14**	cassava		51	61%	33	39%									0.40	84
□5_____	35.15	other	+	79	94%	5	6%									0.06	84
☐ 2 Kingine: _____	35.2	2 Other		83	99%	1	1%									0.01	84
36. Chakula cha watoto kinatosha? ☐ 0 Hapana ☐ 1 Ndiyo	**36**	Was children's food enough?		39	46%	45	54%									0.52	84
37. Nani anaamua mtoto mgonjwa apelekwe wapi? ☐ 1 Mke/mwanamke tu ☐ 2 Mume/mwanamme tu ☐ 3 Mume na mke/wote	**37**	Who decided to send the children where when s/he was sick? 1 Wife/women only 2 Husband/men only 3 Husband and wife/all				23	27%	7	8%	54	64%					2.34	84
Kuhusu Afya		**7. About health**															
41. Je kwa ujumla unaonaje hali yako kiafya? ☐ 5 Nzuri kupita kiasi ☐ 4 Nzuri sana ☐ 3 Nzuri ☐ 2 Ya wastani ☐ 1 Mbaya	**41**	**[GH: General Health]** In general would you say your health is: 5 Excellent 4 Very good 3 Good 2 Fair 1 Poor				15	17%	50	57%	21	24%	2	2%	0	0%	2.13	88

Swahili original		**English translation**	+	**0**	**%**	**1**	**%**	**2**	**%**	**3**	**%**	**4**	**%**	**5**	**%**	**Average**	**Total**
		English				**Yes**											**n**
Swahili	Entry code	[Translation omitted when No/Yes question]				Ndiyo											
Shughuli zilizoorodheshwa hapa chini ni shughuli unazoweza kuzifanya kila siku. Je afya yako hivi sasa inakuzuia kufanya shughuli hizi? Kama ndivyo kwa kiasi gani? 42. Kazi za kawaida kama kuchota maji, kufua nguo, kubeba mtoto: ☐ 1 Ndiyo. Inazuia sana ☐ 3 Ndiyo. Inazuia kiasi ☐ 5 Hapana. Haizuii kabisa	**42**	**[PF: Physical Functioning]** The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so how much? 42. Moderate activities such as carrying water, washing clothes, and carrying children: 1 Yes, very limited 3 Yes, limited a little 5 No, not limited at all				20	23%			46	52%			22	25%	3.02	88
43. Kufanya kazi nzito; Kupanda mlima mkali: ☐ 1 Ndiyo. Inazuia sana ☐ 3 Ndiyo. Inazuia kiasi ☐ 5 Hapana. Haizuii kabisa	**43**	Heavy activities; To climb a steep mountain: 1 Yes, very limited 3 Yes, limited a little 5 No, not limited at all				22	25%			45	51%			21	24%	2.95	88
Katika kipindi cha mwezi mmoja uliopita je umewahi kupata moja ya matatizo yafuatayo katika utendaji wako wa kazi ikiwa ni matokeo ya matatizo ya afya yako? 44. Umetekeleza machache kuliko ulivyotarajia? ☐ 1 Ndiyo ☐ 5 Hapana	**44**	**[RP: Role Physical]** During a month have you had any of the following problems with your work or other regular daily activities as a result of your physical health? 44. Accomplished less than you would like? 1 Yes 5 No				69	79%							18	21%	1.82	87
45. Umeshindwa kufanya baadhi ya kazi au shughuli? ☐ 1 Ndiyo ☐ 5 Hapana	**45**	Were limited in the kind of work or other activities? 1 Yes 5 No				67	76%							21	24%	1.95	88
Katika kipindi cha mwezi mmoja uliopita uliwahi kupata moja ya matatizo yafuatayo katika utendaji wako wa kazi ikiwa ni matokeo ya mawazo? 46. Umetekeleza machache kuliko ulivyotarajia? ☐ 1 Ndiyo ☐ 5 Hapana	**46**	**[RE: Role Emotional]** During a month have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)? 46 Accomplished less than you would like? 1 Yes 5 No				68	77%							20	23%	1.90	88
47. Hukufanya kazi au shughuli zako kwa uangalifu kama ilivyo kawaida? ☐ 1 Ndiyo ☐ 5 Hapana	**47**	Did work or activities less carefully than usual? 1 Yes 5 No				71	81%							17	19%	1.76	88
48. Katika mwezi mmoja uliopita maumivu yalikuzuia kwa kiasi gani kufanya kazi zako za kila siku (ndani na nje ya nyumbani kwako)? ☐ 5 Hayakunizuia kabisa ☐ 4 Yalinizuia kiasi kidogo ☐ 3 Yalinizuia kwa wastani ☐ 2 Yalinizuia kwa kiasi ☐ 1 Yalinizuia kwa kiasi kikubwa sana	**48**	**[BP: Body Pain]** During a month how much did pain interfere with your normal work (including work outside the home and housework)? 5 Not at all 4 A little bit 3 Moderately 2 Quite a bit 1 Extremely				12	14%	25	28%	26	30%	10	11%	15	17%	2.89	88
Maswali yafuatyo yanahusu jinsi unavyojisikia kiafya vile vile jinsi gani shughuli zako zilivyofanikiwa kwa kipindi cha mwezi mmoja uliopita. Kwa kila swali tafadhali toa jibu lililo karibu na jinsi livyokuwa unajisikia. Je ni muda gani kwa kipindi cha mwezi mmoja uliopita umekuwa na yafuatayo: 49. Je ulijisikia mtulivu na wenye amani? □5 Muda wote □4 Muda mwingi □2 Muda mchache □1 Hakuna muda wowote	**49**	**[MH: Mental Health]** These questions are about how you have been feeling during the past one month. For each question please give the one answer that comes closest to the way you have been feeling. Have you felt calm & peaceful? 5 All of the time 4 Most of the time 2 Some of the time 1 None of the time				4	5%	66	75%			5	6%	13	15%	2.50	88
50. Je ulikuwa na nguvu nyingi? □5 Muda wote □4 Muda mwingi □2 Muda mchache □1 Hakuna muda wowote	**50**	**[VT: Vitality]** Did you have a lot of energy? 5 All of the time 4 Most of the time 2 Some of the time 1 None of the time				7	8%	65	74%			9	10%	7	8%	2.35	88
51. Je ulijisikia kusononeka? □1 Muda wote □2 Muda mwingi □4 Muda mchache □5 Hakuna muda wowote	**51**	**[MH]** Have you felt down-hearted and blue? 1 All of the time 2 Most of the time 4 Some of the time 5 None of the time				4	5%	25	28%			49	56%	10	11%	3.37	88
52. Katika mwezi mmoja uliopita ni kwa muda gani matatizo ya kiafya au kimawazo yameathiri shughuli zako za kijamii (kama kutembeleana na marafiki ndugu na jamaa nk)? □1 Muda wote □2 Muda mwingi □4 Muda mchache □5 Hakuna muda wowote	**52**	**[SF: Social Functioning]** During the past one month how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends relatives etc.)? 1 All of the time 2 Most of the time 4 Some of the time 5 None of the time				1	1%	19	22%			55	63%	13	15%	3.64	88

Swahili original		**English translation**	+	**0**	**%**	**1**	**%**	**2**	**%**	**3**	**%**	**4**	**%**	**5**	**%**	**Average**	**Total**
		English		**No**		**Yes**											**n**
Swahili	Entry code	[Translation omitted when No/Yes question]		Hapana		Ndiyo											
Kuhusu chakula		**8. About food**															
61. Chagua yote: Unakula chakula (nafakara, mizizi, ndizi) gani? 1 Wali/Mpunga	**61.1**	Choose all: What kinds of food do you eat (cereals, tubers, bananas)? 1 Rice		52	59%	36	41%									0.42	88
2 Mahindi	**61.2**	2 Maize		2	2%	86	98%									0.98	88
3 Mtama	**61.3**	3 Sorghum		55	63%	33	38%									0.38	88
4 Uwele/Ulezi	**61.4**	4 Millet		73	83%	15	17%									0.18	88
5 Ungano	**61.5**	5 Wheat		74	84%	14	16%									0.17	88
6 Mhogo	**61.6**	6 Cassava		31	35%	57	65%									0.65	88
7 Viazi	**61.7**	7 Tubers		60	68%	28	32%									0.33	88
8 Ndizi	**61.8**	8 Bananas		53	60%	35	40%									0.42	88
62. Mboga yako ni nini? 1 Nyama	**62.1**	What is your relish? 1 Meat		60	68%	28	32%									0.32	88
2 Samaki	**62.2**	Fish		50	57%	38	43%									0.44	88
3 Maziwa	**62.3**	Milk		65	74%	23	26%									0.27	88
4 Mikunde	**62.4**	Beans		2	2%	86	98%									0.98	88
5 Mboga mboga	**62.5**	Vegetables		15	17%	73	83%									0.83	88
6 Kingyine	**62.6**	Others		83	94%	5	6%									0.06	88
63. Chagua moja tu kwa kila swali: Wakati ya kiangazi … Unakula chakula (nafakara, mizizi, au ndizi) mara ngapi? *0 Sili 1 Chini ya siku 3 kila wiki 2 Siku 4,5,6 kila wiki 3 Mara 1 kila siku 4 Zaidi ya mara 2 kila siku"	**63**	Choose one answer for each question: During the dry season: How many times do you eat staple food (cereals, tubers, or bananas)? * 0 Don't eat 1 Less than 3 days a week 2 4,5,6 days a week 3 Once every day 4 More than twice a day		1	1%	9	10%	10	11%	8	9%	60	68%			3.30	88
64. Unakula mboga mboga mara ngapi? *	**64**	How many times do you eat vegetables? *		3	3%	41	47%	11	13%	11	13%	22	25%			2.12	88
65. Unakula nyama mara ngapi? **0 Sili 1 Mara 1 au chini kila wiki 2 Siku 2,3 kila wiki 3 Siku 4,5,6 kila wiki 4 Kila siku	**65**	How many times do you eat meat? ** 0 Don't eat 1 Once or less than once a week 2 2,3 days a week 3 4,5,6 days a week 4 Every day		30	34%	52	59%	5	6%	1	1%	0	0%			0.74	88
66. Unakula samaki au dagaa mara ngapi? **	**66**	How many times do you eat fish (or small fish)? **		20	23%	32	36%	35	40%	1	1%	0	0%			1.19	88
67. Una*kunywa* maziwa mara ngapi? **	**67**	How many times do you drink milk? **		57	65%	27	31%	3	3%	0	0%	1	1%			0.43	88
68. Unakula mikunde mara ngapi? **	**68**	How many times do you eat beans? **		2	2%	3	3%	26	30%	13	15%	44	50%			3.05	88
69. Unakula mbegu mara ngapi? **	**69**	How many times do you eat seeds (peanuts, seeds of vegetables)? **		12	14%	40	45%	26	30%	4	5%	6	7%			1.45	88
70. Unakula matunda mara ngapi? **	**70**	How many times do you eat fruits? **		27	31%	43	49%	14	16%	1	1%	3	3%			0.98	88
71. Unakula chakula nyinginyi ya pori mara ngapi? **	**71**	How many times do you eat other food from the forest? **		15	17%	48	55%	19	22%	1	1%	5	6%			1.26	88
Mfano:	**71mfano**	For example?	6+	12	14%	21	24%	21	24%	20	23%	8	9%	5	6%	2.14	88
72. Una*tumia* mafuta mara ngapi? *	**72**	How many times do you use oil? *		4	5%	12	14%	3	3%	23	26%	46	52%			3.04	88
73. Una*tumia* chumvi mara ngapi? *	**73**	How many times do you use salt? *		0	0%	0	0%	0	0%	8	9%	80	91%			3.90	88
	Type of salt	Type of salt: 1. Sea/rock salt, 2. Industrial, shop				88	100%	0	0%								88
74. Un*tumia* sukari *au miwa* mara ngapi? *	**74**	How many times do you use sugar or eat sugarcane? *		9	10%	38	43%	1	1%	27	31%	13	15%			1.94	88
75. Wakati ya masika… Unakula chakula (nafakara, mzizi, au ndizi) mara ngapi? *	**75**	In time of rainy season… How many times do eat staple food (cereals, tubers, or bananas)?*		1	1%	8	9%	19	22%	18	20%	42	48%			3.07	88
76. Unakula mboga mboga mara ngapi? *	**76**	How many times do you eat vegetables? *		0	0%	7	8%	15	17%	8	9%	58	66%			3.32	88
77. Unakula nyama mara ngapi? **	**77**	How many times do you eat meat? **		38	43%	46	52%	4	5%	0	0%	0	0%			0.61	88
78. Unakula samaki au dagaa mara ngapi? **	**78**	How many times do you eat fish? **		26	30%	31	36%	28	32%	1	1%	1	1%			1.08	87
79. Una*kunywa* maziwa mara ngapi? **	**79**	How many times do you drink milk? **		59	68%	22	25%	5	6%	0	0%	1	1%			0.42	87
80. Unakula mikunde (maharage, baazi, kunde) mara ngapi? **	**80**	How many times do you eat beans? **		3	3%	12	14%	41	47%	8	9%	24	27%			2.49	88
81. Unakula mbegu (karanga, mbegu ya mboga) mara ngapi? **	**81**	How many times do you eat seeds? **		13	16%	36	43%	24	29%	4	5%	6	7%			1.48	83
82. Unakula matunda mara ngapi? **	**82**	How many times do you eat fruits? **		5	6%	16	18%	25	28%	3	3%	39	44%			2.68	88
83. Unakula chakula nyinginyi ya pori mara ngapi? **	**83**	How many times do you eat other food from the forest? **		12	14%	42	49%	17	20%	5	6%	10	12%			1.52	86
Mfano:	**83Mfano**	For example? (number of examples)	6+	12	14%	12	14%	30	34%	21	24%	10	11%	2	2%	2.19	88
84. Una*tumia* mafuta mara ngapi? *	**84**	How many times do you use oil? *		8	9%	16	18%	2	2%	19	22%	43	49%			2.82	88
85. Una*tumia* chumvi mara ngapi? *	**85**	How many times do you use salt? *		0	0%	2	2%	0	0%	8	9%	78	89%			3.85	88
		Type of salt: 1. Sea/rock salt, 2. Industrial, shop				88	100%	0	0%								88
86. Un*tumia* sukari mara ngapi? *	**86**	How many times do you use sugar or eat sugarcane? *		17	19%	35	40%	0	0%	22	25%	14	16%			1.77	88

Note: ( ) Questions selectively asked; + Further information available; Number+= Information available in the respective table; - = Confidential; * and ** =Frequency categories

Table 3. Age groups of respondents

Age group	Women	Men	Total	Percentage
10s	2	0	**2**	2%
20s	6	3	**9**	10%
30s	11	1	**12**	14%
40s	9	9	**18**	20%
50s	7	9	**16**	18%
60s	2	7	**9**	10%
70s	10	4	**14**	16%
80s	3	3	**6**	7%
90s	2	0	**2**	2%
Total	**52**	**36**	**88**	100%
Percentage	59%	41%	100%	

Source: From questionaive interview (Q1&2a).

respondents (13%) lost one child, seven respondents (8%) lost two children, four respondents (5%) lost three children, and one (1%) respondent lost five children (Table 2, 14). Most of them did not know the reason of child death (11, 44%), but five (20%) answered that it was malaria, nine (36%) answered sickness other than malaria, and one (4%) other reasons. Other sicknesses were: convulsion (*degedege*, 4), diarrhea (1, *kuharisha*), vomiting (*kutapika*), and stroke (1, *kupooza*).

3. About livelihood

Majority of the respondents are farmers (86, 98%), but three (3%) keep livestock as an occupation. For other occupations: two did not have a job (one, handicapped), one each was a cook, tailor, and a Ward representative in Council Meeting (*Diwani*) respectively (Table 2, 15).

Although not an occupation, majority of respondents (52, 61%) had some kinds of livestock, such as chicken, ducks, cows, pigs, goats, and pigeons (See details in Table 4).

Almost all of the respondents (85, 98%) had farms but only one had a garden. The major crop was maize (86, 98%), followed by pigeon peas (63, 72%), cassava (42, 48%), sesame (32, 36%), sorghum (24, 27%), cowpea (12, 14%), peanuts (8, 9%), cashew nuts (7, 8%), rice, tomatoes, and Bambara groundnuts. Nearly all of them (87, 99%) cultivated their crops for food and some (29, 33%) for business. Majority (50, 57%) answered that they made decisions about the crops together with their partners, but 29 (33%) by women only, and 9 (10%) by men only (Table 2, 19).

Most of the respondents (80, 92%) indicated that they did not have sufficient food these days to last a year. Most of them (65% to 99%) had sufficient food during April to October (in 2018). February was the month when most respondents (84, 95%) lacked food followed by March (93%) and January (91%, Table 2, 21). Average month of food sufficiency was 6.95 months, but ranged from none of the month to 12 months (Table 5). Twenty respondents (23%) had enough food six months a year, and 18 (21%) had for seven months.

When food is insufficient, 77 (89%) of the respondents decrease the number of their meals, 57 (67%) let children eat at relatives or neighbors' houses, 57 (66%) get wild foods from the forest, and 46 (55%) sell livestock. Villagers utilize a variety of wild plants such as Angadi (33), Upupu (*Mucuna pruriens* var. utilis, 19), and Mipama (*Dioscorea cayennensis*, 12), and also eat wild rats (Panya, 9) and other animals

Table 4. Numbers of household members and livestock owned

	Number	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	…	19	20	…	25	26	27	…	30	T
13a	People in the house		10	24	18	14	7	9	4	1																		87
	Percentage		11%	28%	21%	16%	8%	10%	5%	1%																		100%
16	Chicken	42	3	3	3	5	2	3	3		4	4	1	4			3	1			4		1		1		1	88
	Percentage	48%	3%	3%	3%	6%	2%	3%	3%		5%	5%	1%	5%			3%	1%			5%		1%		1%		1%	100%
	Ducks	79				1	1		2	1		2		2														88
	Percentage	90%				1%	1%		2%	1%		2%		2%														100%
	Cows	83			1	2				1										1								88
	Percentage	94%			1%	2%				1%										1%								100%
	Pigs	85	1	1					1																			88
	Percentage	97%	1%	1%					1%																			100%
	Goats	85					1							1		1												88
	Percentage	97%					1%							1%		1%												100%
	Pigeons	87															1											88
	Percentage	99%															1%											100%

Table 5. Numbers of months with food

Months with food	0	1	2	3	4	5	6	7	8	9	10	11	12	Total
Respondents	1	0	1	1	4	8	20	18	11	16	3	0	3	86
Percentage	1%	0%	1%	1%	5%	9%	23%	21%	13%	19%	3%	0%	3%	100%

elaborated in Table 6.

Majority of respondents (84, 95%) considered that buying food is the most important use of income, followed by health (73%), clothes (72%), education (55%), and agriculture (40%). Other usages were school food and utensils used within the house. Majority answered that they made decisions about the use of their income together with their partners (50, 57%), but 30 (34%) decided by women only, and 8 (9%) by men only. Half of the respondents (49, 56%) considered their situations as average within the village, whereas 39 (44%) considered themselves as a poor. None considered themselves as a rich (Table 2, 22-24).

4. About groups

Majority of the respondents (63, 72%) were participating in one group, 12 (14%) in two groups, three (3%) in three groups, but 10 (11%) not participating in any groups within the community. Main objectives of the groups were religion mainly through churches (68, 77%), savings and loans (12, 14%), and agriculture (11, 13%).

5. About mutual assistance

Within a month, 24 (27%) were helped when they needed food. However, 30 (34%) considered themselves helping other people outside of their families who needed food. Furthermore, only 16 (18%) were helped by others when they needed money, and only 11 (13%) considered themselves helping other people outside of their families in the form of money. However, majority of the respondents (65, 75%) generally considered that people in the village help each other.

6. About children

Majority considered that they had enough food during their pregnancy (71, 84%), and breastfeeding was also sufficient (72, 86%). The most common children's first food was porridge (82, 98%) from maize (54, 64%), cassava (33, 39%), sorghum (9, 11%), millet (3, 4%), and rice (3, 4%). Others gave porridge from peanuts, cucumber seeds, and Lishe – a commercially available mix of various ingredients. More than half (45, 54%) considered that children's food was sufficient. Majority (54, 64%) answered that both husband and wife decided together about their children when they were sick, but 23 (27%) by women only, and seven (8%) by men only (Table 2, 37).

7. About health (SF-12)

[GH: General Health] In general, majority (50, 57%) of the respondents considered that they had fair health and 21 (24%) had good health, two (2%) very good health, and 15 (17%) as poor health. None considered themselves as excellent health.

[PF: Physical Functioning] In relation to moderate activities, majority (46, 52%) felt they were limited a little, 22 (25%) felt that they were not limited at all, and 20 (23%) very limited. As for heavy activities, such as climbing a steep mountain, 45 (51%) were limited a little, 22 (25%) were very limited, and 21 (24%) were not limited at all.

[RP: Role Physical] During a month, majority of the respondents (69, 79%) felt that they accomplished work or daily activities less than their expectations due to physical health problems. Majority of the respondents were also limited in the kind of works or activities (67, 76%).

[RE: Role Emotional] Majority felt that they accomplished less than they would like to due to emotional problems (68, 77%). Furthermore, majority indicated that they worked less careful than usual (71, 81%).

[BP: Body Pain] Evaluation of body pain was diverse among respondents. Most frequent answer was moderate body pain (26, 30%) followed by quite a bit of body pain (25, 28%). There were also respondents without body pain (15, 17%) and those with extreme body pain (12, 14%).

[MH: Mental Health] In regard to feelings, majority (66, 75%) felt calm and peaceful some of the time, and 13 (15%) felt it all of the time. Majority felt down-hearted and blue some of the time (49, 56%), whereas 25 (28%) felt it most of the time.

[VT: Vitality] Among the respondents, majority (65, 74%) felt a lot of energy some of the time, while some felt it most of the time (9, 10%), all of the time (7, 8%), or none of the time (7, 8%).

[SF: Social Functioning] In regard to physical health or emotional problems interfering with social activities, majority (55, 63%) considered it some of the time, 19 (22%) most of the time, 13 (15%) none of the time, and one (1%) all of the time.

8. About food intake

The most typical staple foods were maize (86, 98%), followed by cassava (57, 65%), rice (36, 41%), bananas (35, 40%), sorghum (33, 38%), tubers (28, 32%), millet (15, 17%), and wheat (14, 16%). As for relish, majority ate beans (86, 98%) and vegetables (73, 83%), followed by meat (28, 32%), milk (23, 26%), and others (5, 6%). Others include wild food such as

Table 6. Wild foods indicated in the questionnaire

			21a	71	83	
Local name	**Scientific name (English)**	**Edible part**	**Hunger**	**Dry season**	**Rainy season**	**Total**
Angadi	*Dioscorea cochleari-apiculata*	Tuber	33	19	22	74
Mingoko	*Dioscorea hirtiflora* subsp. *orientalis*	Tuber	8	25	26	59
Upupu	*Mucuna pruriens* var. *utilis*	Seed	19	8	10	37
Mipama	*Dioscorea cayennensis*	Tuber	12	6	8	26
Ukwaju	*Tamarindus indica*	Fruit	1	8	7	16
Magurugai	*Vangueria infausta* subsp. *rotundata*	Fruit		7	7	14
Uyoga	(mushroom)	Mushroom	5	2	5	12
Manjichi	*Strychnos* sp.	Fruit	2	4	2	8
Vitundi	unidentified	Fruit	4	1	2	7
Ubuyu, mabuyu	*Adansonia digitata*	Fruit		2	4	6
Mpeta, mapeta	*Dioscorea* sp.	Tuber		3	2	5
Matondo	unidentified	Fruit	2	2	1	5
Mkungu, makungu	*Salacia madagascariensis*	Fruit	1	1	2	4
Upokoro, upokoro	*Grewia* sp.	Fruit	1	1	1	3
Ngwego	unidentified	Root	1		2	3
Upilipili	*Sorindeia madagascariensis*	Fruit		1	1	2
Matunda pori	(wild fruit)	Fruit		1	1	2
Mabungo	*Landolphia parrifolia*	Fruit			1	1
Vitolo	*Landolphia kirkii*	Fruit			1	1
Matopetope pori	*Annona senegalensis*	Fruit			1	1
Embe	*Mangifera indica* (mango)	Fruit			1	1
Hakaa, Akaa	unidentified	Fruit			1	1
Lilende	*Corchorus aestuans*	Leaves			1	1
Matili	*Landolphia buchananii*	Fruit		1		1
Usofi	*Uvaria* sp.	Fruit	1			1
Matongatonga	*Strychnos spinosa*	Fruit	1			1
Yaja	*Strychnos henningsii*	Fruit	1			1
Mavula	unidentified	Fruit			1	1
		Plant sub-total	**92**	**92**	**110**	**294**
Panya	(rat)	Animal meat	9	42	35	86
Nyani	(baboon)	Animal meat	6	22	17	45
Mkalati, makalati		Insect	2	6	6	14
Fungo(fungo)	*Civettictis civetta* (African civet)	Animal meat	1	5	4	10
Nguruwe pori	(wild hog)	Animal meat		2	3	5
Bundi	(owl)	Animal meat		2	3	5
Sungura	(rabbit)	Animal meat	1	2	2	5
Ngolombwe	(antelope)	Animal meat		2	2	4
Ngedere	(small black monkey)	Animal meat		2	2	4
Tumbili	(vervet monkey)	Animal meat		1	2	3
Komba	(bush baby: small monkey)	Animal meat		2	1	3
Mbala, Mbawala	(bushback)	Animal meat		1	1	2
Kondoo mwitu	(wild sheep)	Animal meat		1	1	2
Kenge	(mountain lizard)	Animal meat		1	1	2
Kicheche	(striped polecat)	Animal meat		1	1	2
Chatu	(python)	Animal meat		1		1
Nyama pori	(wild animal)	Animal meat		1		1
		Animal sub-total	**19**	**94**	**81**	**194**
Total			**111**	**186**	**191**	**488**

Notes: Part of the plants have been identified by Frank M. Mbago. Animal and some plants have been translated from the local names.
Source: Formulated based on questions 21a, 83, 71, and translated based on Wazaki (1992), Morino and Nakajima (1992), and Hetherwick (1902), with reference to Stuart and Stuart (1997).

rat (5), monkey (Tumbili), and python (Chatu).

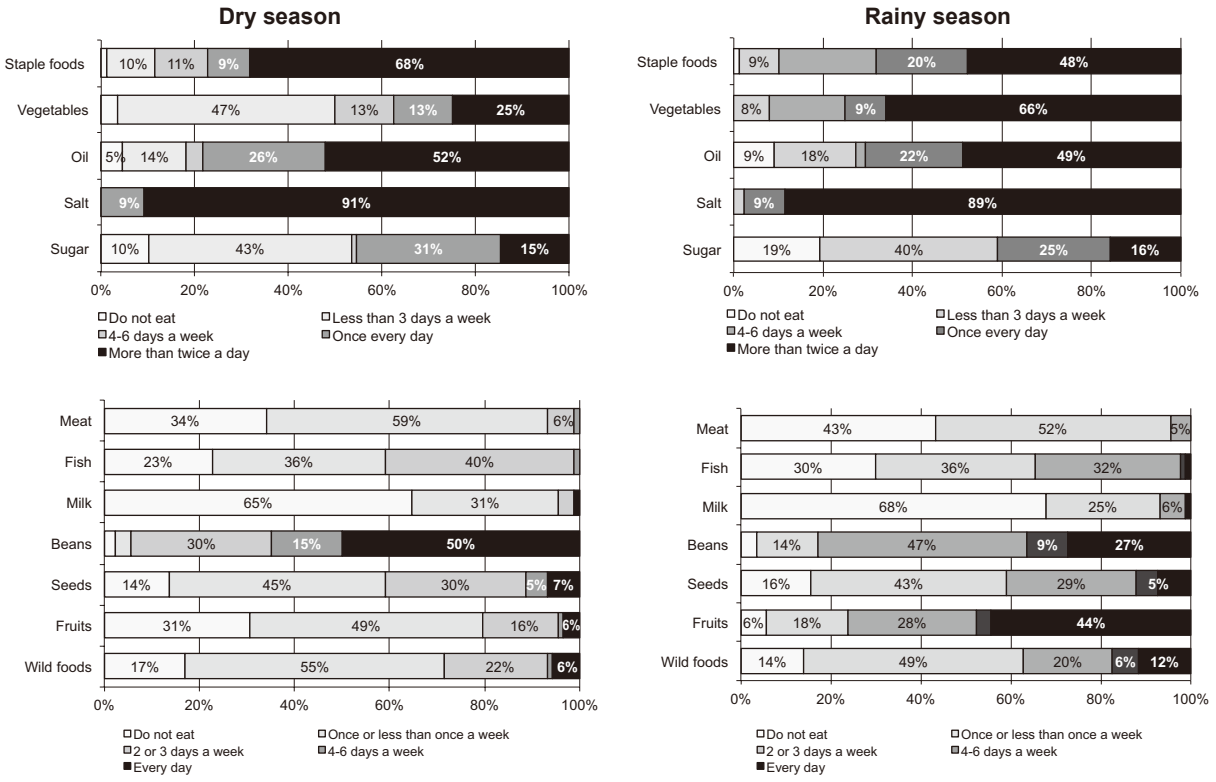
The frequency of food intake of the various food groups in each season is indicated in Diagram 1. During the dry season (May to mid-November), majority (60, 68%) of the respondents eat staple foods more than twice a day. Beans are eaten every day by the majority (44, 50%). As for vegetables, almost half (41, 47%) eat it less than three days a week, and 22 (25%) more than twice a day. Fish is eaten two or three days a week by almost half of the respondents (35, 40%). Meat (52, 59%), fruits (43, 49%), and seeds (40, 45%) are eaten once or less than a week by about half of the respondents. Milk is not drunk by the majority (57, 65%).

Food from the forest is eaten once or less than once a week by the majority (48, 55%), two or three days a week by 19 (22%), every day by five (6%), but not eaten by some (15, 17%) in the dry season. The cumulative total of 186 examples were stated to be consumed, and among them, 94 were animals and 92 were plants. Most common example of wild animal was rats (42) and baboon (22). Most common plants in the dry season were tubers of Ming'oko (*Dioscorea hirtiflora* subsp. *Orientalis*, 25) and Angadi (19). The full list is indicated in Table 6.

In the dry season, majority (46, 52%) of the respondents use oil more than twice a day, and most of them (80, 91%) use salt more than twice a day. Salt is 100% rock or sea salt, and none are industrial salt. However, many of them (38, 43%) use sugar only less than three days a week.

During the rainy season (end of November to April), staple food is eaten twice a day by half of the respondents (42, 48%), which is 20% less in comparison to the dry season. Vegetables is eaten twice a day by majority (58, 66%), which is 41% increase in comparison to the dry season. Fruits are eaten every day by almost half of the respondents (39, 44%) during the rainy season, which is a drastic increase from the dry season. Beans are eaten two or three times a week by almost half (41, 47%), which is a decrease from the dry season. Meat (46, 52%), fish (31, 36%), and seeds (36, 43%) are eaten once or less than once a week by many. Milk is not drunk by the majority (59, 68%).

Diagram 1. The frequency of food consumption

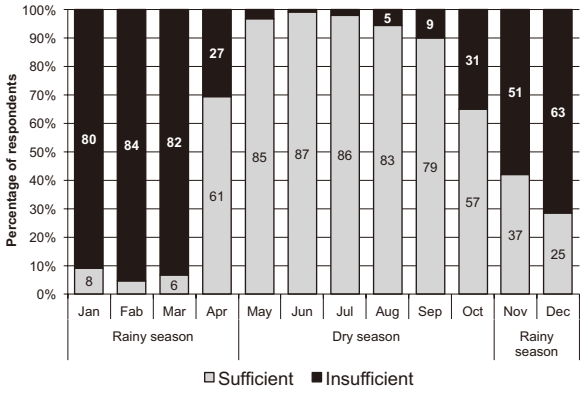


Source: Formulated by Khemmarath

Wild food is eaten once or less than once a week by almost half of the respondents (42, 49%), but those who eat every day increase to 10 (12%) from five (6%) in the dry season. The cumulative total of examples of food from the forest increase from 186 in the dry season to 191 in the rainy season, especially due to the increase of plant number from 92 to 110 (Table 6). Most common edible plants are Ming'oko and Angadi, followed by beans of Upupu (*Mucuna pruriens* var. *utilis*). Many fruits only become available in the rainy season.

Salt is used by the majority (78, 89%), and oil is used by almost half (43, 49%) every day. Sugar is used once or less than once a week by 35 (40%).

Diagram 2. Food sufficiency/insufficiency in 2018



Note: Number indicated is the actual number of respondents
Source: Formulated by Khemmarath

II. Analysis

1. Quantity of food intake

Majority considered that they had enough food during pregnancy (84%), and that children had enough breastfeeding (86%), and enough food for children (54%), although to a lesser extent. However, majority considered that they did not have enough food throughout the year (92%). Food shortage was a big issue for the majority especially from December to March (Diagram 2), and 95% did not have sufficient food in February.

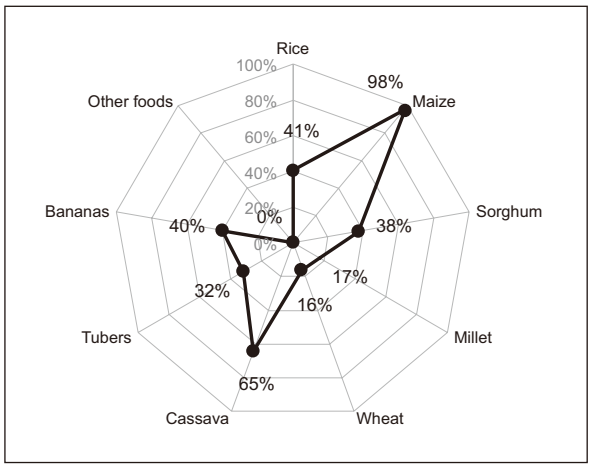
Unlike the food sufficiency in Ifunda, Iringa Region in the previous similar questionnaire[18], the lack of food in the rainy season and its magnitude is common with the case of Chinangali I Village of Dodoma Region[19]. However, the peak of food insufficiency already started in October and continued in Dodoma Region, whereas the peak was during January to March in Malolo Village and March in Kijiweni Village of Lindi Region[20].

2. Balance of food intake

In Malolo, maize and cassava are the main staple food, supplemented by bananas, rice, sorghum, and tubers (Diagram 3-1). Beans and vegetable are the main relish, supplemented by fish and meat (Diagram 3-2).

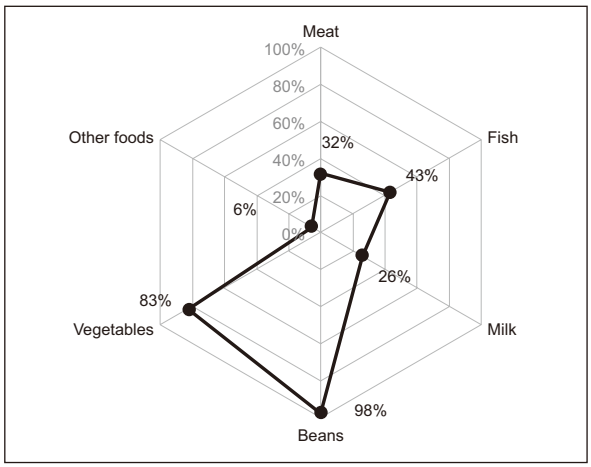
Frequency of eating staple food, meat, fish, and beans decreases from the dry season to the rainy season (Diagram 4). Salt, oil, and sugar also decrease slightly. On the other hand, frequency of eating

Diagram 3-1. Common staple foods



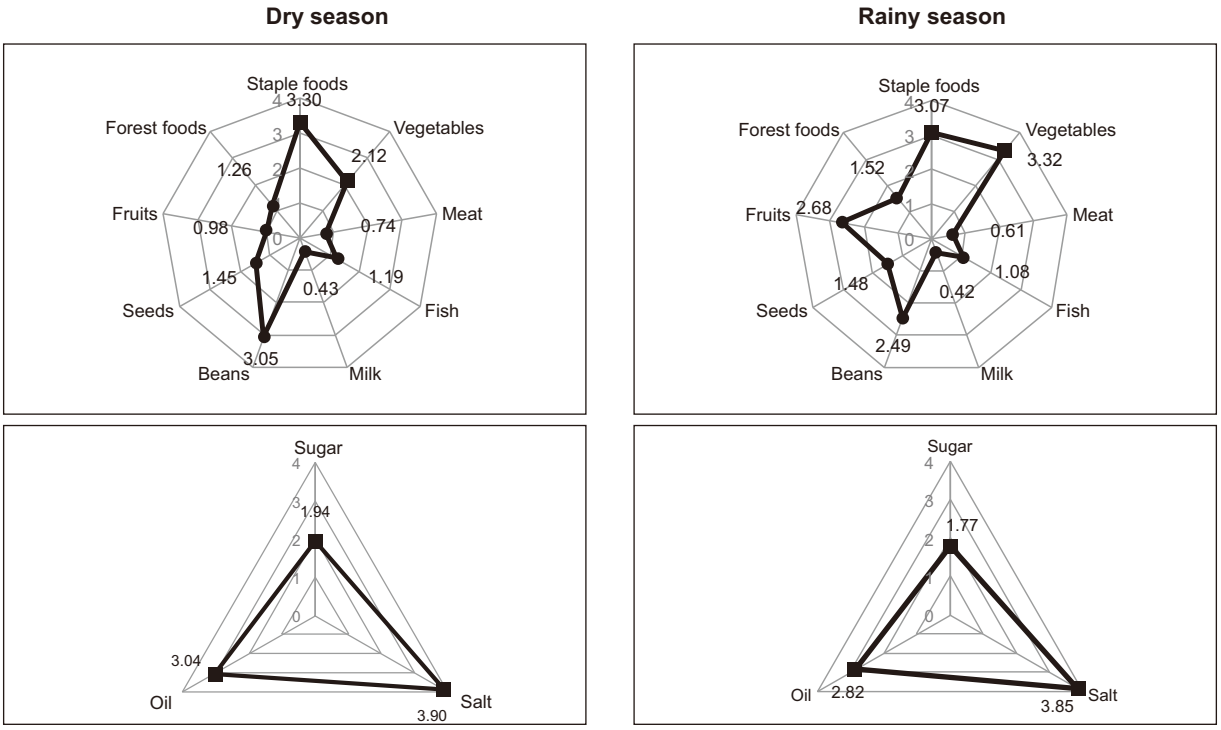
Source: Formulated by Khemmarath

Diagram 3-2. Common relish



Source: Formulated by Khemmarath

Diagram 4. Average food category intake by seasons



Note: ■ = 4: More than twice a day, 3: Once every day, 2: 4,5,6 days a week, 1: Less than 3 days a week, 0: Don't eat
●= 4: Every day, 3: 4,5,6 days a week, 2: 2,3 days a week, 1: Once or less than once a week, 0: Don't eat

vegetables, fruits, and food from the forest increases from the dry season to the rainy season.

Being in inland with mountain forest not far away, the list of examples of food from the forest is elaborate. This has been outstanding in comparison to other villages in coastal Lindi Region and Dodoma Region. There are varieties of edible food from the forest utilizing tuber, fruits, and leaves, and the types of animal eaten has not been seen in other villages researched. The example of animal meat extends from rat, baboon, civet, owl, lizards, to insects (Table 6). This is likely to be supplementing the protein intake.

3. Decision making and social capital

Majority responded that they make decision within the household together with men and women, especially to decide where to send their child where when s/he is sick (64%), followed by usage of crops (57%) and usage of income (57%). However, substantive number of respondents made decisions on her own for crops (33%), income (34%), and children's sickness (27%) in comparison to men alone.

Majority responded that villagers help each other (75%), but majority have not been helped or helped others for food nor money within this month. Having said that, relatively more people helped others with food (34%). Majority (89%) belong to group(s), and 77% belong to a religious group.

Tendency that majority of the respondents make decisions with their partners, and the fact that more made decisions together about children's sickness were common with the other results in coastal Lindi, Dodoma, and Iringa Regions. The tendency that the majority of the respondents consider that the villagers help each other in spite of the fact that less people actually helped or were helped with food or money within this month, was also common to other results in coastal Lindi Region, Dodoma Region, and Iringa Region. Among the research villages, the respondents in Malolo had the highest percentage belonging to groups, and specifically religious groups.

4. Children's nutrition and survival

Eight percent of children were severely underweight, and 20% were moderately underweight totaling to 28% underweight, and 20% did not know

their status. Although the cut-off point is likely to be different from the national data, this is extremely higher than the national average of 13%, the Lindi regional average of 11%, and the MDG target of 12.5%. The percentage of children's underweight is higher than 16% of Lindi coastal research village, 11% of Iringa research village, and 10% of Dodoma research village.

Among the respondents, 24 people (38%) experienced the loss of a child before the age of five. Number of children's death adds up to 42 children. This is lower than the percentage of 49% adding up to 68 children in Dodoma research village, but higher than coastal Lindi Research village with 25% adding up to 26 children. However, this may be related to the age of respondents: the average age of the respondents in Malolo was 52.73 years old in comparison to 45.83 years in Dodoma research village and 41.04 years in coastal Lindi research village.

5. Subjective health evaluation of adults

Diagrams 5-1 to 5-5 provide the distribution of the respondents answer to each questions related to subjective health. The scores of subjective health is calculated in reference to SF-12 (Diagram 6). According to the calculation, the score ranges from 20.75 to 43.26: Role Emotional [RE] is the lowest and Vitality [VT] is the highest.

Diagram 5-1. General Health (GH)

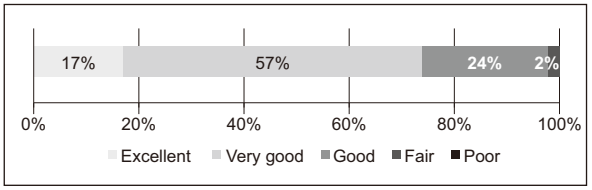


Diagram 5-2. Physical functioning (PH): Limitation in activities

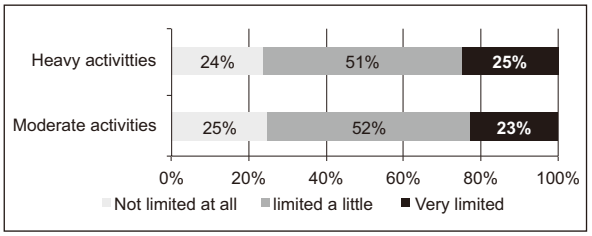


Diagram 5-3. Role Emotional (RE) and Role Physical (RP): Problems with activities

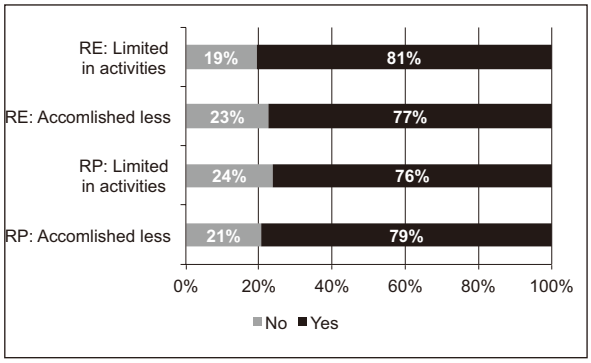


Diagram 5-4. Body Pain (BP): Interference in normal work

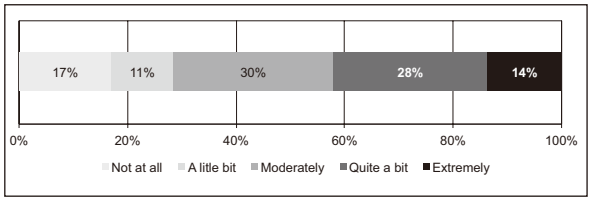
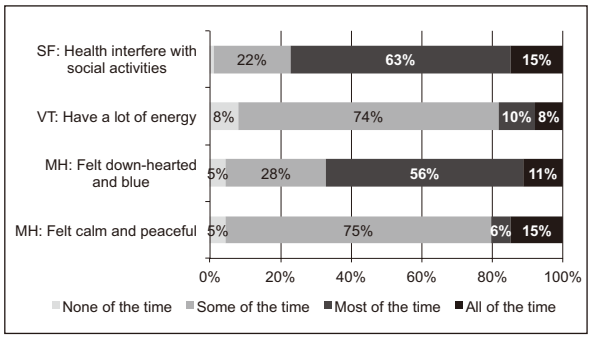
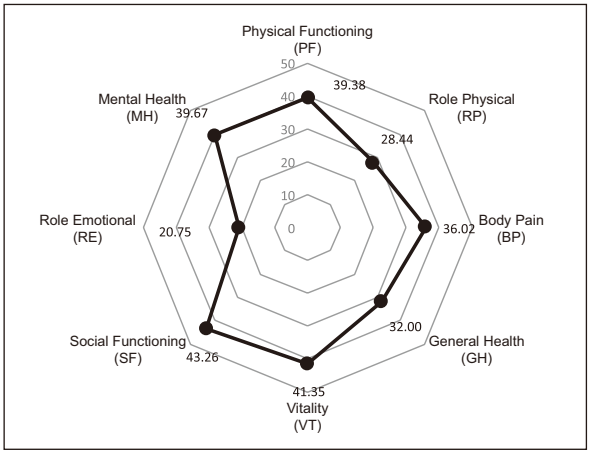


Diagram 5-5. Mental Health (MH), Vitality(VT), and Social Functioning (SF)



Source: Formulated by Khemmarath

Diagram 6. Subjective health evaluation



Source: Calculated by Khemmarath with reference to Ware et al. 1995 and Supervision from Ohmori.

Conclusion, and future analysis

Children's underweight is relatively high in Lindi Region, and the results of the research confirmed and also situated this village as having higher underweight than the regional average. The study also underlined the general understanding of the village lacking food.

Consumption of wild animals was outstanding in comparison to other research villages in Lindi and Dodoma. As for health evaluation, villagers had high SF and VT and low RE as in other research villages. It was also noted that majority of respondents belong to a religious group.

These findings are not conclusive, but preliminary. The following analyses are planned to further understand the situation: (i) In-depth analysis of food intake and subjective health situation; (ii) analyzing correlations between manifestation of health/nutrition status and other factors; and (iii) further comparison with other regions based on the same questionnaire. Furthermore, individual responses on respondent's subjective health evaluation and food intake will be provided as feedback so that it may give an opportunity for improvement of individual health.

Acknowledgement

Tunashukuru Mungu. Tunawashukuru wananchi wa Malolo kwa kushirikiana katika utafiti huu.

Firstly, we would like to thank the women and men of Malolo village to have answered the questionnaires and the village, district, and regional government to have welcomed this research, and COSTECH for permission. Mr. Mwalimu Mohamedi Abdalla (Village Executive Officer), Ms. Honorata Guadence Mussa, Mr. Mussa Yasini Tamba, Mr. Henry Kleophasy Nnonjella, Ms. Victoria Ismail Chaka, Ms. Eligia Kanuth Mwambe have been part of a team to interview the villagers. Mr. Abdala Makwanda (Medical Attendant) has provided information on health issues within the village. Mr. Frank M. Mbago and Mr. Hayashi Masayuki have also accompanied us to Malolo Village, and identified major edible plants in the village. Mr. Tsuda Katsunori has assisted in translating the wild food listed in the questionnaire.

I would also like to thank Dr. Anita Wagner and Dr. Barbara Gande to have shared the Swahili version of their SF-36. Appreciation goes to Dr. Onesmo Mella to have checked and advised on the original Swahili questionnaire, and also to Dr. Joyceline Kaganda to have advised on the food categories at the initial stage.

Among the authors, Sakamoto is responsible for planning of the research; formulation of the questionnaire; initiating and finalizing the article manuscript; and overall supervision of interviews, data input/check, and formulation of diagrams. Khemmarath is responsible for double checking the data input, initial calculation and revison of SF-12 under the supervision of Ohmori, formulating all the diagrams in the manuscript; and assisting in drafting the manuscript. Maro is responsible for interviews based on the questionnaire and direct supervision of the interviewing team, initial data input of all the interviews, providing information of the village, district, and region, and editing the Swahili summary. Ohmori is also responsible for the planning of the research, formulation of the questionnaire, and advising on the evaluation of the response on health and food intake especially as a nutrition expert. All authors have gone through the manuscript and provided contributions and accepted the final manuscript.

The research is supported by the Japanese Government, JSPS Grants-in-Aid for Scientific Research (KAKENHI): mainly "Possibilities of wild edible plants and traditional meals in East Africa (18H03438)", partly supported by 25284171 and 18H00776; Overseas training program for female faculty members, and Utsunomiya University Diversity Research Environment Promotion Headquarters and Research Assistance System of the Office for Promotion of Gender Equality, Utsunomiya University.

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[2] TFNC (2014), pp.10-11; Tanzania (2018), pp.36, 41.

[3] Tanzania (2011), p.10.

[4] TFNC (2014), pp.10, 39.

[5] Tanzania (2018), pp.34-37.

[6] Tanzania (2018), pp.39-41
[7] Tanzania (2018), pp.44-46.
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Health, Livelihoods, and Food Intake in Inland Southeast Tanzania:

From Questionnaire Interviews in Malolo village, Lindi Region

SAKAMOTO Kumiko, Parinya KHEMMARATH, Anna C. MARO, and OHMORI Reiko

Abstract

Lindi Region has a relatively high percentage of stunting, although it decreased from 54% (2010) to 36% (2014). Malolo Village, situated in inland Ruangwa District, with food shortage experience, was selected for the study on villager's health, livelihoods, food intake, and utilization of wild food. The results were compared with those of villages in Dodoma and Iringa regions, and coastal Lindi. For example in 2018, food was insufficient among the majority from January to March and in December during the rainy season, where the situation was better than Dodoma, but worse than Iringa. However, the villagers identify 28 plants and 17 animals as edible wild food that they utilized, which was outstanding in comparison to other research areas. Subjective health by SF-12 indicated high Social Functioning (SF) and Vitality (VT), and low Role Emotional (RE), VT and RE common with other areas. Further analysis is necessary to understand the contribution of food intake and other factors on health situations.

Afya, Maisha, na Ulaji Bara Kusini Mashariki mwa Tanzania:

Uchunguzi Kifani wa Kijiji cha Malolo, Mkoani Lindi

SAKAMOTO Kumiko, Parinya KHEMMARATH, OHMORI Reiko, na Anna C. MARO

Ikisiri

Mkoa wa Lindi una asilimia kubwa ya udumavu, ingawa ulipungua kutoka 54% (2010) hadi 36% (2014). Kijiji cha Malolo, kinachopatikana Wilaya ya Ruangwa, bara, ambacho kwa kawaida huwa kinapata upungufu wa chakula, kilichaguliwa kwa ajili ya utafiti kuona hali ya afya ya wanakijiji, maisha, ulaji wa vyakula vya kawaida na vyakula mwitu. Matokeo ya utafiti yalilinganishwa na vijiji vya mikoa ya Dodoma na Iringa na Lindi ukanda wa pwani (Kijiweni). Kwa mfano, mwaka 2018, chakula kilikuwa haba kwa wengi kuanzia Januari hadi Machi na Disemba kipindi cha msimu wa mvua, hali ilikuwa nzuri zaidi kuliko Dodoma, lakini mbaya kuliko Iringa. Hata hivyo, wanakijiji wametaja mimea 28 na wanyama 17 kwa chakula cha porini, nyingi zaidi kuliko maeneo mengine ya utafiti. Afya ya unafsivu kwa njia ya hojaji SF-12 ilionesha kuwa na Shughuli za kijamii (SF) na Nguvu (VT) nyingi, na Mawazo na kazi (RE) ndogo, VT na RE kama maeneo mengine. Uchambuzi wa ziada ni muhimu ili kuelewa mchango wa ulaji na mambo mengine yanayohusu hali za kiafya.

（2020 年 11 月 2 日受理）