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Dietary Intake of Afar Pastoralists in the Lower Highland of Northern Ethiopia

その他（別言語等）のタイトル	エチオピア北部中高地のアフール牧畜民の食料摂取
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Dietary Intake of Afar Pastoralists in the Lower Highland of Northern Ethiopia

Masahiro HIRATA*¹⁾, Shunji ONIKI²⁾, Masaru KAGATSUME³⁾, and Melaku BERHE⁴⁾

Abstract: The purpose of this paper is to 1) understand the state and characteristics of the current dietary intake of Afar pastoralists living in the lower highland of northern Ethiopia at altitude 1,000-2,000 meters, 2) discuss their pastoralist subsistence strategy from the perspective of dietary intake, and 3) discuss how the social and economic changes are affecting their dietary intake and pastoralist subsistence strategy. Some of the characteristics of the dietary intake pattern include: 1) tendency to drink raw camel milk for breakfast, 2) heavy use of flour in cooking, 3) the key ingredients in their diet are flour, raw milk, sour milk, and butter oil, 4) lack of or very little use of meat or vegetables in their everyday diet, 5) diversification of meal contents in the recent years, and 6) sharing of meals with relatives and friends. The characteristics of their nutritional intake can be summarized as follows: 1) about 70% of the caloric intake comes from externally-supplied ingredients like flour, 2) food they can supply themselves consists mainly of raw milk and milk products; majority of the fat and protein in their diet come from raw milk and butter oil, and 3) even though their diet is largely based on just flour, raw milk, and milk products, the pastoralists get sufficient amount of calories, protein and fat. The study of the Afar agro-pastoralists and nomads showed that the main purpose of raising livestock is not to slaughter them for meat, but to keep them alive for their production of raw milk and milk products for personal consumption. This is the essence of pastoralist subsistence. In the 1960s before a periodic market started in a local village, their diet was approximately 80% reliant on raw milk and milk products. Today, they have become very reliant on food they purchase from outside sources, as distribution of goods increased and large quantities of food became available in the outlying market. The social and economic changes, such as development of distribution and economic liberalization have changed pastoralist subsistence from one that was fairly self-sufficient by keeping livestock alive and raising them for milk production to one that is heavily reliant on various foods purchased from outside sources and uses livestock more as trade commodity.

Key Words: Dietary intake, Ethiopia, milk products, pastoralism, subsistence strategy.

1. Introduction

People need to eat to live; people hunt and gather, farm, raise livestock, trade, and perform other various subsistence activities in order to obtain food (Little, 1989). It can be considered how the pastoralists rely on their livestock in this regard by studying the amount of self-produced livestock products, the amount of nutrition that comes from livestock products, the number of livestock and quantity of livestock products sold, and the amount of food purchased at the market. In other words, it can be possible to discuss the significance of owning livestock by studying the way the pastoralists eat (Ellis and Swift, 1988; Leslie and Fry, 1989; Marshall, 1990; Galvin, 1992). Furthermore, we can discuss the changes that took place in pastoralists' dependency on livestock and subsistence strategy that accompanied the social and economic structure changes by comparing the dietary intake of the past and the present. By studying the content of pastoralists' dietary intake, we can understand the subsistence strategy involving the livestock as well as the changes in the strategy (Hirata, 2010, 2012a, 2012b).

The authors of this paper had obtained the opportunity to study the dietary intake of Afar pastoralists living in the lower highland of northern Ethiopia; we will report its findings here. The paper aims to 1) understand the state and characteristics of the current dietary intake of Afar pastoralists living in the lower highland of northern Ethiopia, 2) discuss their pastoralist subsistence strategy from the perspective of dietary intake, and 3) discuss how the social and economic changes are affecting their dietary intake and pastoralist subsistence strategy.

2. Study Area and Methods

2.1. Research site ecology

The on-site research was carried out in Aba'ala district, Zone 2, Afar region in northern Ethiopia (**Fig. 1**). The average monthly temperature in Aba'ala in the lower highland of northern Ethiopia is stable at around 23°C, because of the village's proximity to the equator (National Meteorological Agency, 2012). The highest temperature during the day is about 30°C and the lowest temperature is about 16°C. There is a much bigger variance in temperature throughout the day than throughout the year. In Ethiopia, the temperature rises

* Corresponding Author: masa@obihiro.ac.jp

Nishi 2-11, Inada-cho, Obihiro, Hokkaido 080-8555, Japan Tel: 81-155-49-5485 Fax: 81-155-49-5593

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1) School of Agriculture, Obihiro University of Agriculture and Veterinary Medicine

2) Social Sciences Division, Japan International Research Center for Agricultural Science

3) Graduate School of Agriculture, Kyoto University

4) College of Dryland Agriculture and Natural Resources, Mekelle University

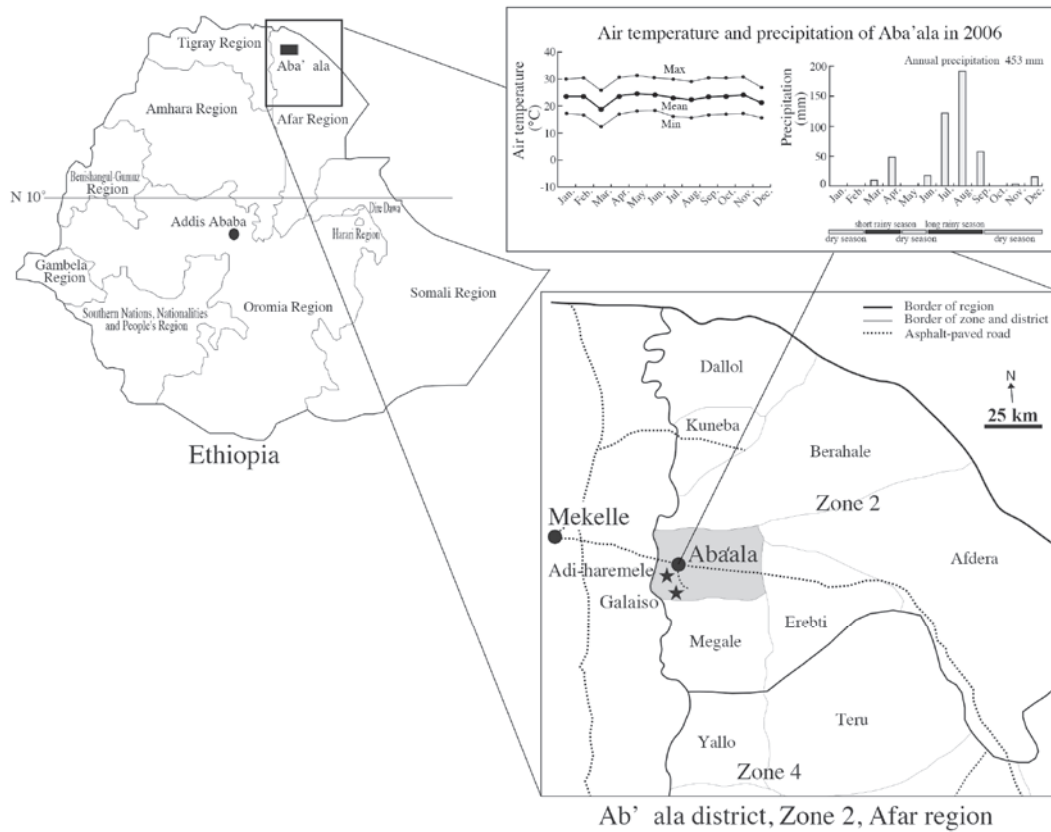


Fig. 1. The location of study area in the lower highland of Aba'ala district, Zone 2, Afar region (■), Ethiopia, and the air temperature and precipitation in Aba'ala district. Source) Meteorological data from National Meteorological Agency, 2012.



Fig. 2. Landscape of vegetation and grazing in the Aba'ala district, Zone 2, Afar region. The Aba'ala district is located in semi-dry area, and covered sparsely with native bushes, shrubs and herbaceous plants. Afar pastoralists attempt to support more feed resources to their livestock by taking seasonal migration.

and the rainfall decreases as the altitude decreases. Compared to Mekelle, a city in northern Ethiopia located at about 2,000 meters above sea level, the average temperature in Aba'ala district at about 1,450 meters above sea level is about 7°C higher. There is a short rainy season from March to April and a long rainy season from mid-June to mid-September. The annual rainfall was 453 millimeters in 2006. Aba'ala is drier compared to Mekelle, which has an average annual rainfall of 620 millimeters, therefore the district covered sparsely with

native bushes, shrubs and herbaceous plants (Fig. 2). Aba'ala is also known to have a large fluctuation in rainfall throughout the year. In summary, the research site, Aba'ala is located in a semi-arid region with rainy and dry seasons and has a relatively high temperature and a large fluctuation of rainfall throughout the year.

2.2. Outline of research households

The two research households are Afar pastoralist household M from Adi-haremele, Aba'ala district and Afar pastoralist household Y from Galaiso, Aba'ala district (Fig. 1). Adi-haremele is 6.1 kilometers in direct line from Aba'ala village, which is located at the center of Aba'ala district, and is about a two hour walk away. Galaiso is 12.5 kilometers in direct line from Aba'ala village, and is about a five hour walk away. A market in Aba'ala village is held every Thursday. The on-site research followed household M from Adi-haremele between September 4 and September 9, 2012 and household Y from Galaiso between September 7 and September 12, 2013. The supplementary survey was conducted in March 2015 in the both households.

Majority of the pastoralist households in Adi-haremele are currently farming along with raising livestock. Household M also combines agriculture and pastoralism. This research paper will refer to this combination of agriculture and

pastoralism as agro-pastoralism. However, every household in Galaiso, including household Y, is a pastoralist who is only involved with raising livestock. These pastoralists from Galaiso had once attempted farming, but they experienced a series of lean harvest from droughts and they are no longer involved in agriculture. The paper will refer to this type of pastoralism limited to raising livestock as nomadic herding. The research was conducted on an agro-pastoralist household from Adi-haremele and a nomadic household from Galaiso.

2.3. Family structure of research households

The 36 year old husband, Mu from household M has six children with his 30 year old wife. The oldest son turned 15 years old and is in charge of goat herding. In the Afar pastoralist household, most children start herding livestock at 10 years old. The second oldest son who is only 5 years old and the other four children are all still too young to work. Mu has a total of ten brothers and sisters, but eight had already passed away. Household M had combined their livestock herd with the herds belonging to Mu's two cousins and his two first cousins once removed. With the fraternity of those sharing a father, the five households share the responsibility of livestock management and seasonal migration. As such, the social structure of the Afar pastoralists is based on a paternal principle (Fukui, 1994). The daily goat herding is led by the oldest son in household M, but the other sons are too young to herd the cattle, camels, and sheep. The cattle herd is left with Mu's cousin's son and his family. The camels and sheep are left with distant relatives who are not part of the five household configuration. Mu revealed that when his sons are grown, they will actively take part in the herding and take care of the livestock of other relatives who are in the face of manpower shortages. The family rarely eats on their own; they almost always eat with members of the five households and other distant relatives. The reliance on each other to take care of the livestock and the sharing of meals are a testament to the strength of personal relationship and interdependence between family members in Afar pastoralists.

The 35 year old husband, Ya from household Y has six children with his 30 year old wife. The oldest son turned 13 years old and is in charge of goat herding. The second oldest son and rest of the children have not turned 10 years old yet and have not started working. Ya has a total of nine brothers and sisters, but three of them had already passed away. Ya cannot share herding responsibilities with his brothers, because household Y is the only one in his family where the man is involved with pastoralism. Household Y has combined their livestock herd with the herds of three of his brother's sons so that the four households can carry out seasonal migration of livestock together. Household Y also leaves their camels with

some distant relatives who are not one of the four household members. Household Y rarely eats alone, but usually shares meals with the members of the four households, as well as with the distant relatives who take care of rest of their livestock.

2.4. Methods

The research studied the dietary intake of Mu from household M from Adi-haremele and Ya from household Y from Galaiso. We stayed in the both households and measured the type and amount of food consumed using visual measurements and portable scale (AND HL-4000). Afar pastoralists rarely eat alone, but usually eat meals with other family members and relatives. Therefore, we measured the weight of the dish before and after the meal and divided the amount consumed by the number of people at the dining table to calculate how much food Mu and Ya consumed. We estimated the amount through visual measurement when they had guests or the meals were not planned in advance. To calculate the amount of food consumed by Mu and Ya according to the type of ingredients used in the dishes, we weighed the ingredients separately and calculated based on the percentage of the amount consumed to the overall weight of the finished dishes. We calculated the calories (kcal), protein (grams), fat (grams), carbohydrates (grams), and ash (grams) of the food that Mu and Ya ate in a day based on the food composition table (Kagawa, 2006; Jenness and Sloan, 1970).

The research also conducted interviews on the households' history with agriculture and pastoralism and on cultural topics relating to the subsistence. We worked together with Mu and Ya and asked these question items to them at their convenient situations through an interpreter. And also, we interviewed a 60 year old male named Se from Galaiso about the dietary intake habit in his childhood. Since Afar pastoralists do not have their own set of alphabets, the names of milk products and other vocabularies are written phonetically in English.

3. Subsistence of agro-pastoralist households M and nomadic household Y

3.1. Livestock composition and seasonal migration (Table 1)

The agro-pastoralist household M from Adi-haremele is raising 5 cattle, 4 camels, and 49 goats and sheep. Since goats are resistant to dry climate, the pastoralists have more goats than sheep. 15 years ago in 1997, household M had 50 cattle, 30 camels, and 250 goats and sheep. The number of livestock has diminished, because of the frequent incidence of drought in the recent years. The men are mainly responsible for milking the cattle and camels and the women are responsible for milking the sheep and goats. The sheep and

Table 1. Numbers (head) of livestock, birth, sale and slaughter in the agro-pastoralist household M and nomad household Y in Aba'ala district.

type of livestock	M household						Y household					
	year 1997	year 2012	milking / non-milking	year 2011			year 2009	year 2013	milking / non-milking	year 2012		
				birth	sale	slaughter				birth	sale	slaughter
cattle	50	5	milking	2	0	1	10	0	milking	0	0	0
camel	30	4	milking	2	2	1	10	5	milking	1	1	0
sheep and goat	250	49	milking	45	10	5	100	60	milking	38	15	3
donkey	unknown	2	non-milking	0	0	0	unknown	0	non-milking	0	0	0

goats raised in the Afar region can have babies as soon as seven months after giving birth, if they are well nourished. After six months of pregnancy and three weeks after delivery, they are ready to be pregnant again. They can have up to two pregnancies per year. They had 45 baby sheep and baby goats in 2011.

Household M stays in Adi-haremele to herd and farm during the long rainy season, followed by a short dry season and a short rainy season, but most of the household members takes the entire livestock herd and migrate to a different location in search for water and grass from May to June during the dry season after the short rainy season. If the children are still in school, they remain in the village with the elderlies. In the past 15 years, the households moved to higher altitude regions, but depending on the distribution of rainy regions, they sometimes moved down to a lower altitude where it was drier. The five households that have combined their livestock herds always migrate together. The size of the livestock herd in this seasonal migration can be made up of up to 15 households. This is the size that would allow them to easily move about together. They welcome any household to join the herd, even when they are not related to each other, as long as they are willing to manage the livestock together and help out with the migration and herding. During the drought, just the young men and boys evacuate the cattle to pastures with better conditions.

Household Y from Galaiso, who only engages in raising livestock and not agriculture, owns 5 camels and 60 goats. They raised 10 cattle in 2009, but lost them all to an epidemic of a disease. Currently in 2013, not a single household in Galaiso is raising cattle. Household Y is currently not raising sheep either, because they lost all their sheep to hyenas and malnutrition from lack of feed. They are currently getting their milk from camels and goats.

All members of household Y stay in Galaiso during the short rainy season, the dry season, and the long rainy season from March to September, but boys and girls above 10 years of age take majority of the livestock to a higher location during the dry season between October and February. Ya, his wife, their children under 10 years of age, and the elderlies stay in Galaiso year round. Some of the lactating animals are left behind to provide food for the people remaining in the village.

3.2. Slaughter and sale of livestock (Table 1)

The annual birth count of livestock was 40 goats, 5 sheep, 2 cattle, and 2 camels for household M in 2011; 38 goats and 1 camel for household Y in 2012. The number of livestock household M slaughtered in a year for personal consumption was 2 goats and 3 sheep; the five households slaughtered a cattle and a camel. Household Y only slaughtered 3 goats. They claimed that they did not normally slaughter their livestock for everyday consumption. They only slaughtered and served meat for Muslim holidays or for special occasions when they had guests. Household M sold 7 goats, 3 sheep, and 2 camels; household Y sold 15 goats and 1 camel in a year. Neither household sold cattle. They sold sheep and goats when they needed to purchase daily essential goods. They sold the animals at the market in Aba'ala held every Thursday to procure funds. They only sold large livestock like camels when they needed substantial funds. Household M sold 2 camels in 2011 so that they could install corrugated metal roof on their concrete house.

3.3. Milk production, milk processing, and milk products usage

Livestock raised for milk production include cattle, camels, sheep, and goats. Cattle reproduce seasonally and mate between September and November, but they can produce milk for twelve months if they do not get pregnant again after delivery (**Fig. 3**). This means the pastoralists can always obtain milk from cattle. Each sheep and goat only lactates for six months, but they do not have a mating season. They mate any time throughout the year and can produce milk after delivery. Camels also have a mating season between September and December, but they can produce milk for twelve months if they do not get pregnant again. The appeal of raising camels is their long lactation period and the fact that they can produce a constant and significant amount of milk. If the Afar pastoralists can secure enough feed for the livestock, they could obtain milk throughout the year from any one of the cattle, sheep, goat, or camel. The constant milk production from livestock has largely impacted their system of milk processing and food culture.

The raw milk from cattle, sheep, and goats is used in cooking, and at the same time, is processed to make milk

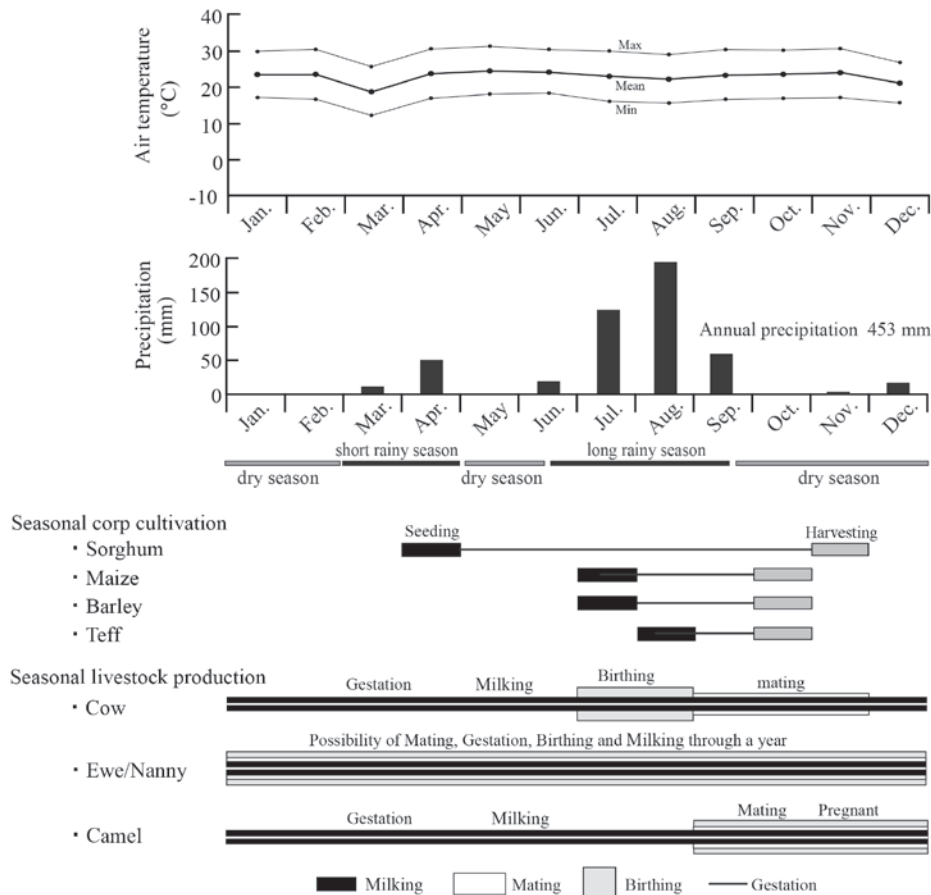


Fig. 3. The air temperature and precipitation of Aba'ala district in 2006, the period of seeding and harvesting of crops by agro-pastoralist household M in Adi-haremele, Aba'ala district, and seasonal livestock production of Afar pastoralists. Note) The period of gestation is 9 months in cow, 6 months in ewe and nanny, and 12 months in camel. The period of milking per a head is 6 months in cow, 4 months in ewe and nanny, and 12 months in camel.

products. Once the raw milk from cattle, sheep, and goat is turned into sour milk, it is churned into butter inside a goatskin pouch (Fig. 4). It is then heated to make butter oil (Hirata *et al.*, 2013). Butter is not consumed, but applied to the skin or the head as it is believed to be good for the brain. While they do not eat butter, they eat butter oil, which is a characteristic usage never observed on the Eurasian continent. The buttermilk produced when making butter is consumed or used for cooking and does not get processed into cheese. The characteristic of Afar pastoralists' milk processing is convergent on separating and preserving fat from raw milk.

The camels are milked three times per day in the morning, evening, and at night. Afar pastoralists drink unpasteurized raw camel milk as they are prohibited from pasteurizing it. The raw camel milk consumption is another characteristic of Afar pastoralists' milk usage.

The sale of raw milk from cattle, camels, sheep, or goats is currently prohibited in 2012 at the time of the research. This practice was put in place by the Afar pastoralist community themselves and not something enforced by an outside entity.



Fig. 4. Butter processing. Butter is processed by churning sour milk inside a goatskin pouch. The goatskin pouch is shook horizontally to process butter. Butter is also processed to butter oil by heating. Butter oil, sour milk processed from buttermilk, and camel's raw milk are important resources for the diet intake of Afar pastoralists. Y household in Galaiso.

They are also prohibited from selling butter oil; it is for the consumption of the Afar pastoralist community only. The sale of butter, on the other hand, is permitted.

3.4. Agricultural activities of agro-pastoralist household M

Household M from Adi-haremele is currently involved in farming of sorghum, teff, maize, and barley. They cannot

cultivate lentils, chickpeas, or wheat, because of the high temperature and low annual precipitation in Ab'ala. Agriculture began in the village in the Imperial period before 1974. It started when the villagers leased some land to highland farmers called Tigray who planted and harvested the crops for them. They split the harvest fifty-fifty. Since around 2000, the Afar agro-pastoralists in Adi-haremele had taken over agriculture. They hire the Tigray farmers to help out at planting time. The crops are planted sequentially using a seeder. Sorghum is planted in April and maize, barley, and teff are planted in July to August (Fig. 3). The harvest occurs between October and December. While they say they had taken over agriculture, they still rely heavily on the seasonal labor of the Tigray farmers for seeding, harvest, and preventing damage from birds and livestock; household M is rarely involved in the actual farm work at the fields. Since 2000, there have been frequent droughts and they were not able to harvest much maize, barley, or teff. They barely managed to harvest some sorghum. They sell and consume what they can harvest. Afar pastoralists mill all the grains, including sorghum, maize, barley, and teff. The consumption of grain mill has deeply influenced the Afar pastoralists' cooking and is closely tied in with their consumption of butter oil.

3.5. Provision of food

Household M and household Y obtain raw milk and milk products from their own livestock. They make all their own raw milk and milk products for personal consumption. When necessary, they can also obtain meat by slaughtering livestock.

Household M grows sorghum, teff, maize, and barley, and consumes what they do not sell. However, the recent drought only allowed them to grow sorghum and it was the only crop they were able to harvest for personal consumption. Household Y does not farm, so they must buy all the agricultural products from the market in Aba'ala.

The government has started to offer assistance program to the poor called Safety Net since 1995. Those enrolled in the program can work to build roads or wells for about five days out of the month and receive 15 kilograms of flour and 1 liter of vegetable oil per person as compensation from the government. There is a total of eight people in household M, so they receive a total of 120 kilograms of flour and 8 liters of vegetable oil per month. They have to buy more from the market if the amount of flour or vegetable oil is not enough. Household Y did not take part in Safety Net nor did they receive any other governmental aid in 2012.

They currently purchase other essential goods, such as flour, red chili pepper, sugar, tea, and coffee by selling their sheep and goats at the Aba'ala market (Fig. 5).



Fig. 5. Periodic market in Aba'ala village. Since roads were developed from highlands to Aba'ala and automobiles became to transport large amounts of goods easily, various agricultural foods and daily commodities are available in the current periodic market in Aba'ala under the free economy. Afar pastoralists sell sheep and goats mainly to purchase necessary foods and commodities in the market.



Fig. 6. Share drinking of camel's raw milk. The agro-pastoralists in Adi-haremele share morning camel's raw milk with their community members who gather at the milking area in the early morning. The camel's raw milk is important nutritional resource for Afar pastoralists, and they enjoy drink camel's raw milk together.

4. Dietary intake pattern and nutritional intake of agro-pastoralist household M

4.1. Dietary intake pattern and food items

Afar pastoralists are Muslims. Mu gets up early in the morning to pray in the house while it is still dark out. At about 5:30am, the sun is hidden behind the mountains, but starts to cast some light in the sky. It is still a little chilly with a temperature of 19°C. At 6am, he starts milking the camels. He raises the camels with several other households. They keep about 20 adult camels and 8 lactating camels in a designated area. The milk collected in the morning is given to anyone who is in the area, even if they do not own the camels or belong to the village. There are usually about twenty men in the area in the morning. They can get about 1.5 liters of milk from a camel and 12 liters from eight camels in the morning. They collect milk in a container called amur and pass it around amongst ten men or so who are gathered there (Fig. 6, Fig. 7 and Fig. 8). If Mu is staying in the

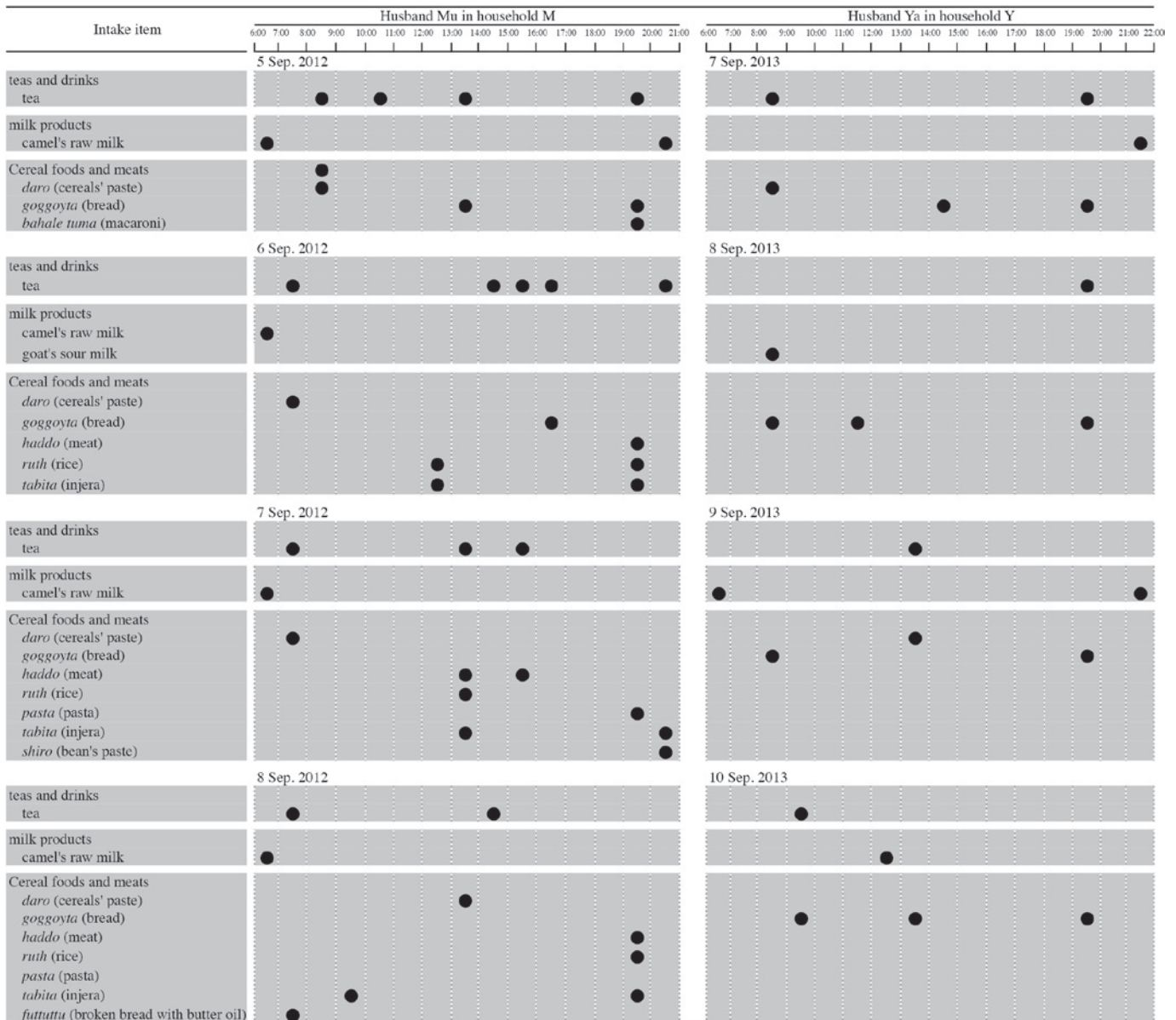


Fig. 7. Pattern of dietary intake of the husband Mu of agro-pastoralist household M and the husband Ya of nomad household Y.

village, he always goes to the milking area in the morning and drinks raw camel milk. The fresh raw camel milk is still warm and tastes mildly sweet and comforting. Afar pastoralists look forward to drinking the raw camel milk in the morning. Mu drinks about 0.6 liters of milk.

When Mu returns home, he opens the door to the goat house and releases the adult goats around the house. Meanwhile, his wife uses branches to start a fire to make breakfast. While preparing breakfast, she milks the goats. It is usually the women's job to milk the goats. It is breakfast after 7am and it often incorporates fresh goat milk. The breakfast on September 5, 6 and 7 was daro and tea. Daro is a paste made by mixing flour and hot water and served with a pouring of fresh goat milk or butter oil infused with red chili pepper and salt (Fig. 9). This seasoned butter oil is called berearo. On September 8, they had fututtu, which is torn

pieces of bread called goggyta eaten with seasoned butter oil. They apparently consume a lot of flour, butter oil, and raw milk.

After breakfast, the herders take the cattle and goats out to pasture (Fig. 2). Mu takes a nap or spends leisurely time with relatives and friends. He goes to the nearby mosque to pray at around 1pm. Lunch is served after 1pm. Lunch served during the research period was goggyta with seasoned butter oil; ruth, a rice dish seasoned with vegetable oil and red chili pepper; tabita, a crepe-like dish made with naturally fermented grains; or daro. Tabita is the same as the dish called injera in Amharic. Tabita was originally a food of the highlanders and not of the Afar pastoralists. Household M began cooking it for the Tigray farmers they hired to do farm work. They had goat meat seasoned with red chili pepper for lunch on September 7 after they slaughtered a goat on the afternoon of

		Husband Mu in household M										Husband Ya in household Y																	
		Meat	Milk products			Cereals			Vegetables		Seasonings			Meat	Milk products			Cereals			Vegetables		Seasonings						
			raw milk	sour milk	butter oil	wheat flour	bean flour	rice	onion	tomato	sugarcane	salt	spices	vegetable oil		raw milk	sour milk	butter oil	wheat flour	bean flour	rice	onion	tomato	sugarcane	salt	spices	vegetable oil		
5 Sep. 2012		wake-up drink	camel's raw milk	●											7 Sep. 2013														
breakfast	daró (cereals' paste)		●	●	●						●	●		daró (cereals' paste)		●	●	●						●	●				
	tea										●			tea		●									●				
lunch	goggoyta (bread)				●						●			goggoyta (bread)				●						●	●				
	berearo (seasoned butteroil)		●	●							●	●		teker (seasoned butter oil/sour milk)		●									●	●			
late dinner	bahale tuma (macaroni)				●			●	●		●	●	●	goggoyta (bread)				●						●	●				
	goggoyta (bread)				●						●			teker (seasoned butter oil/sour milk)		●								●	●				
between-meal eating and drinking	tea										●			camel's raw milk		●									●				
6 Sep. 2012		wake-up drink	camel's raw milk	●											8 Sep. 2013														
breakfast	daró (cereals' paste)		●	●	●						●	●		goggoyta (bread)				●						●	●				
	tea										●			teker (seasoned butter oil/sour milk)		●	●							●	●				
lunch	ruth (rice)					●					●	●		goggoyta (bread)				●						●	●				
	tabita (injera)				●						●	●		teker (seasoned butter oil/sour milk)		●								●	●				
late dinner	haddo (meat)	●									●	●	●	goggoyta (bread)				●						●	●				
	ruth (rice)					●					●	●	●	teker (seasoned butter oil/sour milk)		●	●							●	●				
between-meal eating and drinking	tea										●			tea										●					
7 Sep. 2012		wake-up drink	camel's raw milk	●											9 Sep. 2013														
breakfast	daró (cereals' paste)		●	●	●						●	●		goggoyta (bread)				●						●	●				
	tea										●			teker (seasoned butter oil/sour milk)		●								●	●				
lunch	haddo (meat)	●									●	●	●	daró (cereals' paste)		●	●	●						●	●				
	ruth (rice)					●					●	●		tea		●								●					
late dinner	pasta (pasta)				●			●	●		●	●		goggoyta (bread)				●						●	●				
	shiro (bean's paste)				●	●			●	●	●	●		teker (seasoned butter oil/sour milk)		●	●							●	●				
between-meal eating and drinking	tea										●			camel's raw milk		●								●					
8 Sep. 2012		wake-up drink	camel's raw milk	●											10 Sep. 2013														
breakfast	futtotta (broken bread with butter oil)		●											goggoyta (bread)				●						●	●				
	tea		●											teker (seasoned butter oil/sour milk)		●	●							●	●				
lunch	daró (cereals' paste)		●	●	●						●	●		camel's raw milk		●			●						●	●			
	goggoyta (bread)										●	●		teker (seasoned butter oil/sour milk)		●	●							●	●				
late dinner	haddo (meat)	●									●	●	●	goggoyta (bread)				●						●	●				
	ruth (rice)					●		●			●	●	●	teker (seasoned butter oil/sour milk)		●	●							●	●				
between-meal eating and drinking	tea										●			tea										●					
	tabita (injera)				●																								

Fig. 8. Contents of dietary intake in the husband Mu of agro-pastoralist household M and the husband Ya of nomad household Y.

September 6. Meat and meat dishes are called haddo and are often served with rice and tabita.

The day time temperature in the afternoon could reach up to 35°C, but it feels even hotter under the blazing sun. After lunch, Mu stretches out in the shade of the tent or concrete building and takes a nap or enjoys spending leisurely time with the relatives. He cleans the barn or restack the stone wall if he feels so inclined. Around 4pm, he goes to the mosque again to pray. If he gets hungry in the evening, he often snacks on tabita or goggoyta and drink tea. At household M, they each

drink 3 to 4 cups of very sweet tea every day. The wife begins preparing dinner after 5pm. After about 6pm, the livestock herd starts to return from the pastures and the village becomes noisy. The animals are milked as soon as they return to the village. The milking takes until past 7pm. The sun sets while they are milking and they have to use a flashlight. It is completely dark by the time they finish.

They have dinner after 8pm after they milk the animals. On September 5, they had goggoyta and a macaroni dish called bahale tuma. On September 6 and 8, they had haddo, ruth,



Fig. 9. Share eating. The photo shows that relatives and grazing partners eat together daro which is flour paste with seasoned butter oil. Afar pastoralists are used to eat food together with relatives and grazing partners. Afar pastoralists help each other and strengthen the relationship among the community through shared labor and shared meals. M household in Adi-haremele.

and tabita, and on September 7, they had pasta, bean paste called shiro, and tabita. They started eating pasta about five years ago. They also started eating rice recently.

Raw camel milk is delivered at night. In the morning, the men drink raw camel milk at the milking area, but the milk from the evening and night is delivered to the owner's tent for the women and children of each household. The women's dinner is therefore accompanied by raw camel milk.

After dinner, they enjoy the cool night, drinking tea, and chatting with friends and relatives. Guests leave past 9pm and the family goes to bed before 10pm.

The only vegetables that they consumed were tomatoes and onions, which were only used to flavor the macaroni and bean paste dishes. Household M from Adi-haremele also only ate tomatoes and onions, so the variety of vegetables they consume seems to be very limited as well. Vegetables are not valued highly in their dietary life.

They served meat twice for dinner and twice for lunch during the four day study. This was because the family slaughtered one of their livestock to welcome the authors of this research. It is indelible that the researchers had influenced household M's diet. Mu told us that they did not usually eat meat. They only ate meat several times a year for anniversaries, festivities, and when close friends visited. Afar pastoralists do not eat meat on a daily basis and they are characterized by their only eating meat for special occasions.

On the contrary, their raw milk and butter oil consumption is high. They drink raw camel milk every day and use raw milk and butter oil in daro and goggyta, which are consumed often. They do not make cheese, so they never eat it. Raw milk and butter oil are the essential ingredients used often in the Adi-haremele pastoralists' meals.

The meals at household M are always eaten with relatives and friends, so Mu never eats alone (Fig. 9). About ten people come together to share a meal. Some of the men

taking care of household M's camels and cattle often join them for a meal as well. Likewise, Mu also frequently visits their houses for a meal. The Afar pastoralists coexist and help each other and strengthen personal relationships through shared labor and shared meals.

As such, Adi-haremele pastoralists' dietary intake pattern can be summarized as follows: 1) drink raw camel milk first thing in the morning, followed by breakfast, lunch, and dinner. They snack on goggyta (bread), tabita (crepe), and sweet tea, 2) cook many flour-based dishes, such as daro and goggyta, 3) started diversifying their menu with dishes made of rice, tabita (injera), and macaroni in the recent years, 4) do not routinely eat meat, 5) flour, raw milk, and butter oil are the essential ingredients, 6) only consume tomatoes and onions for vegetables, and 7) always eat meals with relatives and friends. This sharing of meals serve to strengthen the personal relationships among the Afar pastoralists.

4.2. Nutritional intake (Table 2)

Mu's total daily caloric intake averaged over four days between September 5 and September 8 was 2,734 kcal. 30.3% of the calories came from food they farmed or raised and the other 69.7% of the calories came from food procured at the market or supplied by the government. While this pastoralist household farms and raises livestock, it is clear that they are largely dependent on food provided by outside sources. The main reason is that they eat a lot of flour-based dishes, such as daro, goggyta, and pasta. 38.2% of the total calories came from flour. They obtained flour from the market or through government ration. With a hot climate at 1,450 meters above sea level and with just around 400 millimeters of annual rainfall, Aba'ala wareda is not suited for wheat cultivation. All the wheat in this area comes from the highlands above 2,000 meters above sea level. Therefore, because majority of their diet consists of flour, they are very dependent on food procured from outside sources. The Afar pastoralists whom we researched, live and work in the lower highland, but it is clear that their current subsistence is highly dependent on food from the highlands.

Out of the 30.3% of the food they farmed or raised, 23.1% or 633 kcal came from milk products and 3.2% or 86 kcal came from meat. The milk products provided 36.1% of protein and 48.2% of fat consumed. The ratio of fat intake was about half of the daily nutritional intake, because of their frequent use of butter oil as sauce in various dishes. Butter oil is an essential source of fat for the Afar pastoralists. It is now easy to obtain vegetable oil from the market or from the government, but butter oil must have been an extremely important source of fat back when vegetable oil was not readily available. Mu also got about 1/3 of his protein from milk

Table 2. Mean dietary intake per a day of husband Mu in agro-pastoralist household M from 5th of September to 8th of September, 2012 and husband Ya in nomadic household Y from 7th September to 10th September, 2013.

	Husband Mu in household M										Husband Ya in household Y										
	Energy		Protein		Fat		Carbohydrate		Ash		Energy		Protein		Fat		Carbohydrate		Ash		
	Intake	Rate	Intake	Rate	Intake	Rate	Intake	Rate	Intake	Rate	Intake	Rate	Intake	Rate	Intake	Rate	Intake	Rate	Intake	Rate	
	kcal	(%)	g	(%)	g	(%)	g	(%)	g	(%)	kcal	(%)	g	(%)	g	(%)	g	(%)	g	(%)	
Dietary intake per a day																					
Self-production(self-sufficient rate %)	829	(30.3)	36	(50.3)	51	(56.1)	60	(15.0)	6	(21.7)	741	(26.4)	38	(42.0)	42	(77.0)	53	(11.4)	9	(39.0)	
Purchase(market dependent rate %)	1905	(69.7)	35	(49.7)	40	(43.9)	339	(85.0)	22	(78.3)	2064	(73.6)	52	(58.0)	13	(23.0)	414	(88.6)	13	(61.0)	
Total(Total intake rate%)	2734	(100)	71	(100)	90	(100)	399	(100)	28	(100)	2717	(100)	85	(100)	50	(100)	461	(100)	21	(100)	
Self-production																					
Meat(self-sufficient rate %)	86	(3.2)	7	(9.4)	6	(7.0)	0	(0.0)	0	(1.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	
Milk products(self-sufficient rate %)	633	(23.1)	25	(36.1)	43	(48.2)	35	(11.4)	6	(20.0)	741	(26.4)	38	(42.0)	42	(77.0)	53	(11.4)	0	(0.0)	
Sorghum(self-sufficient rate %)	109	(4.0)	4	(5.2)	1	(1.2)	25	(6.2)	0.2	(0.7)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	
Beans(self-sufficient rate %)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	
Purchase																					
Meat(market dependent rate %)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	
Milk products(market dependent rate %)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	3	(12.2)	
Wheat(market dependent rate %)	1046	(38.2)	29	(41.1)	6	(6.6)	207	(52.0)	2	(6.7)	1973	(70.3)	52	(57.7)	11	(20.6)	394	(84.4)	0	(0.0)	
Sorghum(market dependent rate %)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	
Rice(market dependent rate %)	252	(9.2)	4	(6.2)	1	(0.7)	55	(13.7)	0.3	(1.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	
Beans(market dependent rate %)	2	(0.1)	0.2	(0.2)	0.01	(0.0)	0.4	(0.1)	0.02	(0.1)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	11	(48.8)	
Others(market dependent rate %)	605	(22.2)	2	(2.2)	33	(36.6)	77	(19.2)	20	(70.5)	91	(3.2)	0	(0.3)	1	(2.4)	20	(4.3)	0	(0.1)	

products. Much of this came from the 600 milliliters of raw camel milk he drank in the morning. The camels provide raw milk to the Afar pastoralists throughout the year and the constant production of raw camel milk has provided them with an important source of protein. Afar pastoralists raise camels, because not only do the camels produce milk throughout the year, but they also provide the pastoralists with an important source of protein.

The meat only made up 3.2% of the total caloric intake. Mu ate meat, only because they slaughtered a goat on September 6 for the researchers. They only eat meat on holidays and special occasions when friends visit. The researchers ended up affecting household M's food intake during the research period, bumping up the caloric intake of meat to 3.2%, but it is safe to assume that this number is usually close to zero. It is apparent that while these pastoralists raise livestock for a living, they usually do not eat meat. However, when asked what his favorite food is, Mu answered: 1) daro, 2) milk, 3) meat. He apparently wants to eat more meat, but he seems to be restraining himself from slaughtering animals too often.

Mu consumed a total of 2,734 kcal per day. A man in his 40's with a weight of 55 kg, a normal physical activity level consumes about 2,650 kcal per day and a man with a high physical activity level consumes about 3,100 kcal per day (FAO, 2004). Household M does not eat much vegetables or meat, but they get plenty of calories from a diet based on milk products, such as raw milk and butter oil, and flour, such as daro and goggyta. Mu ate 70 grams of protein per day. Adult men require 56 grams of protein per day (Amare, 2012),

so Mu is getting plenty of protein from his diet of milk products and grains (flour). Flour provided 45.9% and raw milk provided 36.1% of the protein intake. It can be determined that the diet based on flour and raw milk has provided the necessary protein. The fat intake in the Household M was 90 grams per day. The recommended fat intake for adults is about 20% to 35% of their total calories (FAO 2010). According to this recommendation, Mu should have gotten 59 grams to 102 grams per day. This means that Mu consumed almost enough fat in the regular diet. He consumed 43 grams per day from raw camel milk and butter oil, and also got an additional 33 grams per day from vegetable oil. The pastoralists started eating more vegetable oil when it became readily available at the market. This is probably how Mu consumed enough fat and ended up consuming 90 grams of fat per day. Until 1995, the people of Aba'ala district had to form a caravan of camels to go for a regional trade at the Mekelle market in the highlands to obtain vegetable oil. Back then, the fat from raw camel milk and butter oil was an important source of nutrients for these people who basically did not eat meat and did not have easy access to another source of fat.

The nutritional intake of Mu from the agro-pastoralist household M can be summarized as follows: 1) 73.8% of the caloric intake came from food provided by an outside source, 2) heavy use of flour in cooking makes them dependent on the food provided by outside sources, 3) most of the self-supplied foods are raw milk and milk products. About half of their fat intake and 1/3 of their protein intake come from raw milk and butter oil, and 4) while the diet is mainly made up of flour, raw

milk, and butter oil, it is providing sufficient amount of calories, protein and fat.

5. Dietary intake pattern and nutritional intake of nomadic household Y

5.1 Dietary intake pattern and food items

Household Y in Galaiso also begins the day with a morning prayer at a small plaza next to the tent. In Galaiso, the villagers do not gather the camel in one area and drink fresh milk communally with the rest of the village. Each household milks their own camels separately and drinks their own milk. After 6am, Ya, the husband and father of household Y milks the camels, drinks the milk, and divides the milk among the three households with whom they share the pastoral duties. Out of the four research days, Ya only drank raw camel milk on the morning of September 9. After milking the camels, he lets the herd of adult goats out of the goat house, and releases them to graze around the village. They only feed milk to baby goats that are under three months of age. At around 6:30am, Ya's wife pours sour milk into a goatskin pouch, hangs it on a tree branch, and shakes it to make butter. She continues to churn butter for about two hours until 8:30am. During this time, Ya tends to the goats or makes repairs on the barn.

Breakfast is served after 8am. Lunch is eaten between 1pm and 3pm, depending on the work schedule. Dinner is served after 7pm. Household Y's meals were limited to daro or goggyta (Figs. 7 and 8) and sometimes accompanied by a drink of milk tea or sour milk. They ate daro and goggyta for all three meals every single day. They did not eat anything else other than daro or goggyta, on which they poured butter oil or sour milk infused with red chili pepper and salt. Household Y called this sauce, teker. They often eat with the members of the three households. According to Ya, all the households in Galaiso eat daro or goggyta or drink raw camel milk or sour milk from a goat or a sheep. Ya eats three substantial meals and does not drink tea or snack on bread between meals.

Ya goes shopping in Aba'ala, repairs the barn, or spends leisurely time with other villagers after breakfast and lunch. The oldest son is responsible for the daily herding of goats. The younger children under the age of ten are in charge of the daily herding of baby goats between the age of three months and one year that are no longer breastfeeding and are grazing around the village. Baby goats under three months old graze freely near the house without a herder. Male camels and non-lactating female camels are sent off to be tended by distant relatives and left to graze in a pasture far from the village for an extended period.

It is time to milk the goats as soon as the herd returns from the pasture in the evening. It is Ya's job to milk the goats. Even when he goes out during the day, he always comes back in the evening in time for the milking. The milking of the goats in the evening starts after 6:30pm at dusk. The sun sets while he is still milking and he uses a flashlight to finish the job. It is completely dark outside by the time he is done after 7:30pm. It is dinner time immediately after the evening milking. After dinner, Ya chats with other villagers gathered outside or milks the camels. He is also in charge of milking the camels. He goes to bed around 10pm.

Household Y did not eat any meat during the four research days. In 2012, they only slaughtered three goats for personal consumption for Muslim holidays and when they invited close friends (Table 1). Raw milk and milk products, on the other hand, are consumed every day. Ya only drank camel milk on September 9, but he had soured goat milk or butter oil with daro or goggyta three meals per day. It is clear that raw milk, sour milk, and butter oil are consumed frequently at meal time and is essential to the diet in Galaiso as well.

In summary, the dietary intake pattern of the nomads in Galaiso can be characterized as follows: 1) they do not always drink camel milk in the morning, 2) the meals are solely limited to daro and goggyta and they eat three meals per day. They do not eat any tabita (injera), rice, or pasta, 3) they do not normally eat meat, 4) flour, raw milk, sour milk, and butter oil are the key ingredients in their everyday diet, 5) they do not eat any vegetables, and 6) they usually eat meals with relatives with whom they share pastoral work.

5.2. Nutritional intake (Table 2)

Ya's total daily caloric intake averaged over four days between September 7 and September 10, 2013 was 2,717 kcal. 26.4% of the calories came from food they produced and the other 73.6% of the calories came from food procured at the market. They are nomadic household only involved in raising livestock, but it is clear that they are largely dependent on agricultural food procured from outside sources. The main reason is due to their dependence on flour-based meals of daro and goggyta. Flour made up 70.3% of the total caloric intake. They get all the flour from the market and their subsistence is currently strongly dependent on food from the highlands. Household Y's entire nutrition comes from milk products, wheat, sugar, salt, red chili pepper, vegetable oil, tea, and coffee.

The self-supplied food that made up the 26.4% of total intake were all milk products. None of it came from meat. 42.0% of protein intake and 77.0% of fat intake came from milk products. The percentage of fat intake from milk products is high, because they used a lot of butter oil as a

flavoring sauce in their dishes. Milk products provide an important source of protein for household Y from Galaiso.

There was no consumption of meat nor vegetables during the four research days. They did not even use tomatoes or onions to flavor sour milk or butter milk as sauce for daro or goggyta. People used vegetables like onions and tomatoes in Adi-haremele, where it is closer to the market. Galaiso is located farther from the market and household Y did not use any vegetables. This means we can presume that Afar nomads are people who originally never ate vegetables. The Afar society slowly began to incorporate vegetables into their meals when agricultural products from the highland became available with the development of the market in a nearby village.

As mentioned above, Ya's total daily caloric intake was 2,717 kcal. Household Y got sufficient calories from raw milk, milk products, and flour without eating meat or vegetables. Ya consumed 85 grams of protein per day. Flour made up the largest percentage at 57.7% of the total protein intake. It is clearly the most significant source of protein in their diet. The milk they get from their own livestock was the second highest source of protein, providing 42.0% of the total protein intake. The pastoralists' diet is based on grains (wheat), raw milk, and milk products, which provide sufficient amount of protein. Ya ate 50 grams of fat per day. This is somewhat lower than the recommended amount of fat for an average person. He got 42 grams of fat from butter oil, raw milk, and milk products. Household Y represents the lifestyle before Afar nomadic households had access to vegetable oil. The diet based on raw milk and milk products, even with a generous use of butter oil, does not lead to excessive amount of fat intake. Quite the contrary, butter oil and other milk products are an essential source of fat for the pastoralists.

The nutritional intake of Ya from nomadic household Y can be summarized as follows: 1) 73.6% of the calories came from food provided by outside sources, 2) they are largely dependent on foods from outside sources, because they eat a lot of flour-based meals, 3) the self-supplied food all consists of raw milk and milk products. Raw milk, sour milk, and butter oil provide majority of the fat and about half of the protein in their diet, and 4) the diet is largely dependent on flour, raw milk, and milk products, but it provides sufficient amount of calories and protein.

6. Characteristics of dietary intake of Afar pastoralists

6.1. Milk dependency and lack of meat dependency

The study on Afar agro-pastoralists and nomads showed that they relied mainly on livestock for their raw milk and milk

products, not for meat. Ya from a nomadic household did not eat any meat during the research period. 26.4% of the total caloric intake came from raw milk and milk products. Mu from an agro-pastoral household ate some meat, which came out to 3.2% of the total caloric intake, but 23.1% of the calories came from raw milk and milk products. It can be said that on a daily basis, the Afar pastoralists' main purpose of raising livestock is for the milk and not meat.

The study conducted on pastoralists in Turkana, northwest Kenya (Coughenour *et al.*, 1985; Galvin, 1992) showed that 61% to 62% of their diet relied on milk throughout the year. Another study reported that 31% to 64% of Masai pastoralists' diet relied on milk (Galvin, 1992). For the Tibetan pastoralists, Karnak-pa, in the western Himalayas, 33% to 46% of the diet was milk (Hirata, 2012b) and for the Mongolian pastoralists from central Mongolia, 24% of the diet was milk (Hirata, 2012a) during the milking season. Many pastoralists are widely recognized as being dependent on raw milk and milk products for food. The meat and blood made up 14% to 18% of the Turkana pastoralists' diet (Coughenour *et al.*, 1985; Galvin 1992) and 39% of the Mongolian pastoralists' diet (Hirata, 2012a), so there are some pastoralists who are relatively reliant on meat and blood. However, most of the pastoralists have an extremely low consumption of meat and blood. For example, only 4% of the Masai pastoralists' diet consisted of meat and blood (Galvin, 1992), 1% to 2% of the Tuareg and Fulani pastoralists' diets consisted of meat and blood (Bernus, 1988; Benefice *et al.*, 1984), and 0% to 8% of the Tibetan Karnak-pa's diet consisted of meat and blood (Hirata, 2012b). Therefore, it can be determined pastoralists generally use the subsistence strategy of raising their livestock for raw milk and milk products and not for meat.

The sheep, goats, cattle, and camels only give birth to one or two babies once or twice a year. When raising such herbivorous, ruminant livestock that do not have multiple pregnancy, it is extremely inefficient to raise these livestock for meat production. However, the production efficiency of livestock improves dramatically if the pastoralists were to switch from meat production to milk production. From the perspective of production efficiency, this switch from meat production to milk production improves the feed energy production by 3.7 times (Kametaka *et al.*, 1979). Raising livestock for milk is a completely different strategy than raising livestock for meat. It is a survival strategy, which allows the pastoralists to keep the animal alive and live off of their milk products. The pastoralists have finally secured regular production from the livestock and dramatically improved the product efficiency of these herbivorous, ruminant animals that had low food productivity.

The study of the Afar agro-pastoralists and nomads also

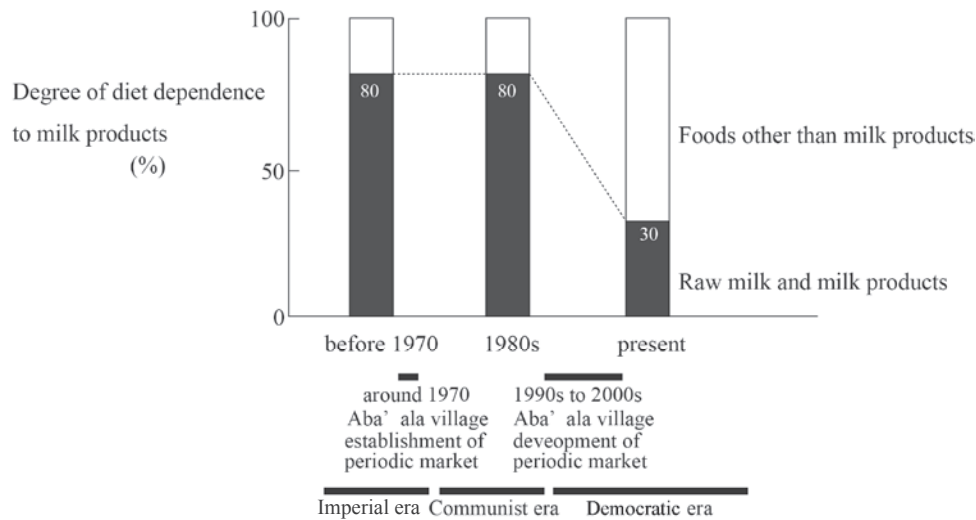


Fig. 10. Transition of diet dependence degree to raw milk and milk products by Afar pastoralists in Aba'ala district.

showed that their main purpose for raising livestock is not to slaughter for consumption, but to keep the livestock alive, and live off their raw milk and milk products. This is the essence of the pastoralist subsistence strategy.

6.2. Self-sufficient subsistence to subsistence dependent on highland agriculture

When we interviewed a 60 year old male named Se from Galaiso, he told us that he only ate two meals in the morning and night when he was just a boy in 1960. The breakfast and dinner consisted of drinking two to three liters of raw camel milk at each meal. They also ate wild nuts and plants that they gathered and wild animals that they hunted with these meals of raw camel milk. Several times a year, they took a caravan of camels, sheep, and goats to trade in the highlands. They sold livestock or animal hides and used the money to obtain agricultural products like sorghum and other essential items. They only had meals that did not consist only of milk about 10 times per month and meals made of sorghum and grains that they purchased from the market several times per year. Their consumption of non-milk products consisted more or less 20% of their total dietary intake when calculated based on the intake frequency (Fig. 10). About fifty years ago, when the market did not exist in the nearby village and there was no distribution of agricultural products from the highlands, Afar pastoralists were almost completely dependent on raw milk and milk products for most of their dietary intake. Fukui also confirmed that aside from the small amount of sorghum obtained from the trade, Afar nomads relied completely on milk and other livestock products (Fukui, 1994).

A periodic market was built in Aba'ala in around 1970, but since the government controlled the market under communism, the pastoralists were not able to freely procure goods. The market flourished after 1991 after the collapse of communism.

From the 1990's through the 2000's, roads were built and people began using automobiles, which slowly led to an increase in quantity, variety, and supply of goods brought into the weekly market in Aba'ala under economic liberalism (Fig. 5). The study of agro-pastoralist household M and nomadic household Y allowed us to understand that the biggest characteristic of Afar pastoralists' dietary intake is that 70% of their calories came from foods supplied from the outside world. While they rely on their livestock, they currently rely heavily on foods they purchase from the market. Galaiso is farther from the Ab'ala market and the extent of their dependence on outside food is mainly flour. They also buy some vegetable oil, red chili pepper, salt, tea, and coffee. In Adi-haremele, a village much closer to the Ab'ala market, they started eating sorghum, rice, and pasta, in addition to flour, increasing the number of food items they have to buy at the market. They also eat tabita (injera) that highlanders make out of flour and sorghum flour. Their consumption of vegetables is limited to tomatoes and onions, but considering that Afar pastoralists did not originally eat vegetables, it is clear that the market has infiltrated vegetables into Afar pastoralists' diet. The variety of food they purchase from the market would most likely continue to diversify as they live closer and become more dependent on the Aba'ala market.

7. Conclusion

Afar pastoralists were originally largely dependent on raw milk and milk products for food. After the market opened in the nearby village, more variety and quantity of agricultural products were brought in from the highlands and became easily accessible with the increased use of automobiles, and the pastoralists became more dependent on agricultural products from the market. Currently, about 70% of their calories

comes from the food purchased at the market. They have started to use livestock as trade items to be able to afford this increased amount of food from the market. However, livestock products are essential to Afar pastoralists' way of eating, that is to say, their habit of drinking raw milk and buttermilk and serving raw milk and milk products with their flour-based meals, that they will continue to consume raw milk and milk products, which make up about 30% of their overall diet. Their dependency on the market could grow in the future, but their use of flour and other food purchased from the market will most likely remain at 70%. We think that the food variety, such as rice, pasta, and vegetables may diversify. The social and economic changes, such as development of distribution and economic liberalization have changed pastoralist subsistence from one that was fairly self-sufficient by keeping livestock alive and raising them for milk production to one that is heavily reliant on various foods purchased from outside sources and uses livestock more as trade commodity.

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エチオピア北部中高地のアファール牧畜民の食料摂取

平田昌弘^{*1)}・鬼木俊次²⁾・加賀爪優³⁾・Berhe Melaku⁴⁾

要旨: 本稿の目的は、エチオピア北部中高地のアファール牧畜民を対象に、1) アファール牧畜民の現在の食糧摂取のあり方とその特徴を把握し、2) 食料摂取の視座から牧畜の生業戦略を考察し、3) 社会・経済の変化が食料摂取や牧畜の生業戦略にどのような影響を及ぼしているかについて考察することにある。食糧摂取パターンの特徴は、1) 朝にラクダの生乳を摂取する傾向にあること、2) コムギ粉を用いた料理が多用され、3) コムギ、生乳、酸乳、バターオイルが重要な食材となっており、4) 肉と野菜は日常では全く、もしくは、ほとんど利用しておらず、5) 近年では食事内容が多様化し、6) 食事は親戚や友人と共食することが常であることである。栄養摂取量の特徴は、1) エネルギー摂取量的に約 70 %が外部から供給されたコムギ粉などの食料であり、2) 自給した食料のほとんどは生乳・乳製品によっており、特に脂肪とタンパク質の半分ほどが生乳とバターオイルから供給され、3) コムギ粉と生乳・乳製品に大きく依存した食体系ではあるが、必要なエネルギー量、タンパク質と脂肪は充足しているとまとめることができる。アファールの農牧民や遊牧民の事例は、家畜を飼養する目的が、家畜を殺して、肉を食べることにはなく、家畜を生かし留めて乳を得て、生乳・乳製品を摂取することにあることを示している。牧畜という生業の本質がここにある。以前は、乳・乳製品への食料依存度は 80%ほどであった。今日、流通が盛んになり、近郊の市場で大量の食料品が販売されるようになって、外部からの購入食料に大きく依存するように変化してしまった。流通整備と経済の自由化という社会・経済の変化が、家畜を屠殺せず、生かし留めながら、その乳を利用し、必要最小限を外部社会に依存する牧畜から、家畜は交換材としての傾向を強め、多品目の外部購入食料へと大きく依存する生業構造へと変化させてきている。

キーワード: 食料摂取, エチオピア, 乳製品, 牧畜, 生業戦略.

*Corresponding Author: masa@obihiro.ac.jp (2016年12月14日受付; 2017年6月9日受理)
〒080-8555 北海道帯広市稲田西2線11番地 Tel: 0155-49-5485 Fax: 0155-49-5593

1) 帯広畜産大学畜産学部

3) 京都大学大学院農学研究科

2) 国際農林水産業研究センター社会科学領域

4) College of Dryland Agriculture and Natural Resources, Mekelle University