SEEDS OF LIFE (SOL) FINI BA MORIS

SOCIO-ECONOMIC STUDY (SOSEK)

PATTERNS OF FOOD CONSUMPTION AND ACQUISITION DURING THE WET AND DRY SEASONS IN TIMOR-LESTE: A LONGITUDINAL CASE STUDY AMONG SUBSISTENCE FARMERS IN AILEU, BAUCAU, LIQUISA AND MANUFAHI DISTRICTS

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EXECUTIVE SUMMARY

For farmers in Timor-Leste, food availability is closely correlated with the harvest cycle of the staple food crops and traditional seasonal coping mechanisms involving shifting consumption patterns from rice and maize, to roots and tubers (cassava, sweet potato, kumbile tuber, taro, arrowroot, pumpkin). Food is stored from the previous harvest but when reserves are exhausted the household is required to bridge the period until the next harvest. Subsistence farmers in Timor Leste are categorised as 'food insecure'. That is, they have a cereal and tuber-dominant diet lacking in animal protein and fats, and are unable to regularly acquire adequate amounts of food.

This report draws on a longitudinal study of food consumption among 14 subsistence farmer households, each of them participants in the Seeds of Life (SOL) On Farm Demonstration Trials. These farmers' sole cash income is derived from the occasional sale of surplus produce (mainly chickens, pig, palm wine and sweet potato in the dry season, and cassava and leafy greens in the wet). Farmers selected represent a range of biophysical and topographic conditions in each district. Visits were made every 4-6 weeks to track food consumption, wild food foraging, and food access strategies across the dry and wet seasons. Based on a total of 119 interviews during the period April 2006-March 2007, the data provides a baseline study of subsistence households' consumption practices and their strategies for securing food access prior to the impact of higher yielding staple food varieties trialed by SOL

Maize is an important staple food and demand outstrips a farmer's reserves even though rationing methods are practiced. The length of time that maize reserves can be sustained until the new harvest depends on maize yield and access to rice. Whether a farmer can grow a second maize crop is influenced by their access to water. In rice-dominant areas some farmers do not ration maize as their rice harvest is ready to consume just three months after the maize harvest.

When maize reserves are exhausted, farmers may resort to eating maize seed that they have set aside for planting the following year. Respondents in this study had consumed maize set aside as seed at least 1 and as many as 3 times since 1999. Farmers may borrow maize seed for planting from members of their extended family, or neighbours, and the most common principal of borrowing is based on interest, although some places practice an interest-free system. When maize reserves are exhausted, farmers are much more likely to purchase rice rather than maize due to factors of distribution, cost, and labour required for preparation. Subsistence farmers rely on imported rice as a reserve food during the wet season, and especially the hungry season.

Maize that produces higher yields and allows farmers to place more maize in storage, thereby reducing maize deficit, will reduce the need for farmers to sell livestock assets such as goats and pigs, and dogs, to purchase rice. Surplus production of saleable staples such as sweet potato and peanuts will provide subsistence farmers with the means to purchase other foods considered essential such as salt, oil, MSG, and sugar, without depleting their own fragile food reserves, or selling livestock.

Subsistence farmers suffer most food insecurity during the wet season. The variety of food available in the wet season is significantly less than the dry due to seasonality of tubers and roots, and exhaustion of maize reserves. Bitter cassava dried and stored as a reserve food is a critical back-up food in this period. Reflecting food shortages, farmers sell less agricultural produce during the wet season as a whole, and probably as a result of decreased income, also purchase less during the wet season (except for rice purchases which increase).

During the wet season, a 'hungry season' occurs but it does not coincide with the beginning and end of the wet. It is a period when crops are growing but are not yet ready to be harvested; maize has not yet been harvested (usually March), nor rice (usually June/July in the north and August/September in the south).

The hungry season also coincides with the labour intensive activity of weeding maize. The period designated as the hungry season coincides with the tail-end of the period without maize, usually 1-3 months prior to the new maize harvest in March, and is considered to have ended when the main maize is harvested.

Wild food foraging occurs in both seasons, but mainly in the dry (most tubers are seasonal and harvested in the dry, and leafy greens are foraged in the wet). The extent of foraging depends on a combination of factors: the season in which foraging is carried out, the level of food deficit in that location which can be affected by an extended dry season, and the type of forest cover to support growth of food-bearing plants. Kumbile tuber, bitter beans and sago are everyday foods in the dry season throughout all of the eight subdistricts of this study. The practice of repeated boiling of wild tubers and beans to remove bitterness and poison has a particular labor burden for women who are primarily responsible for drawing water and gathering firewood, as well as cooking. One of the social impacts of surplus agricultural production may be reduced reliance on wild tubers that require labour-intensive preparation.

The common practice of giving and receiving food throughout Timor Leste does not aim to affect a net food gain but functions to strengthen social networks between neighbours who are non-kin, and in-laws, and in doing so, helps secure access to food. The practice of sharing maize and rice at the point of harvest among members of mutual labour groups may spread risk, secure food for some members, and consolidate relations between group members which indirectly helps to sure up access to food.

INTRODUCTION

Food availability for subsistence farmers in Timor-Leste is closely correlated with the harvest cycle of staple food crops. Food is stored from the previous harvest but when reserves are exhausted the household is required to bridge the period until the next harvest. Subsistence farmers in Timor Leste are categorised as 'food insecure'.¹ That is, they have a cereal and tuber-dominant diet lacking in animal protein and fats, and are unable to regularly acquire adequate amounts of food. The World Food Program's (WFP) profile of subsistence farmers indicates production with little surplus, and pressure to sell surplus to raise cash for other goods and services. This report draws on a longitudinal study of food consumption among 14 subsistence farmer households, each of them participants in the Seeds of Life (SOL) On Farm Demonstration Trials (OFDTs). Located in eight sub-districts across four districts, these households were visited every 4-6 weeks for a twelve-month period commencing April 2006 until March 2007.

The report begins by outlining the situation of food security for Timorese people generally, and subsistence farmers particularly, drawing on recent secondary data from the WFP's Comprehensive Food Security and Vulnerability Analysis,² and the GoTL's National Food Security Policy for Timor Leste released in 2006. Against this backdrop, the longitudinal study data is presented. The data elaborates the food security situation of subsistence farmers by focusing on patterns of consumption of staple foods (cereals, tubers, root crops), meat, and wild foods during the dry and wet seasons, and the characteristics of the 'hungry season' which occurs during the wet season. The data also offers important insights into different strategies to acquire adequate amounts of food, namely, sale and purchase of food, giving and receiving food gifts, and wild food foraging strategies throughout the year.

Given the variability of rainfall and crop yield in any 12-month period, and the sample size, both the data and analysis offer indicative trends only.

Food security in the context of Timor Leste

The GoTL's 2006 National Food Security Policy for Timor-Leste places current food insecurity in historical context. During the period of the Indonesian occupation from 1975, Timor had the worst nutrition situation, defined in terms of wasting and stunting among children under 5 years of age, of any Indonesian province.³ Availability, access, and utilisation combine to restrict Timor Leste's current food security. Using the UNDP Human Development Index as a reference, Timor Leste is ranked 140 out of 175 countries, and is the lowest ranking nation in South-east Asia. Some 38 per cent of the population consume less than 2,100 kcal required for a healthy life. Of a population of 1.06 million, 36 per cent are considered to be 'food secure' and the remainder are either insecure or vulnerable (20 per cent insecure, 23 per cent highly vulnerable, 21 per cent moderately vulnerable).

'Food security' is defined in terms of three elements: availability (amount of food present in the country), access (a household's ability to acquire food) and utilization of food (a household's use of food) (WFP 2006). In addition, 'vulnerability' is defined as the level of risk for future food insecurity. Groups considered to be food-insecure include subsistence farmers, female-headed households, and households without access to irrigated land. In fact, subsistence farmers are considered most food insecure with 30 per cent categorised as food insecure, and 25 per cent as highly vulnerable. Subsistence farmers compared to other households (livestock farmers, petty traders, unskilled labourers, skilled labor and traders, wage

¹ World Food Program (WFP) Comprehensive food security and vulnerability analysis, 2006.

² The final sample consisted of 1700 households spread over 163 villages in the 13 districts comprising Timor Leste. ³ GoTL MAFF 2006, p.12

earners) have substantially lower access to credit, and a substantially lower average proportion of income that is monetised (WFP 2006).

In the districts in which this longitudinal study was conducted (Aileu, Baucau, Liquisa, Manufahi) there are some geographic patterns of food insecurity defined in terms of food access and dietary frequency/diversity. Aileu and Manufahi districts are located in the centre of the county where 53 per cent of households are considered food insecure or highly vulnerable, and Baucau is located in the north-east quadrant where 51 per cent of households are considered food insecure or highly vulnerable. WFP's prediction of the prevalence of food insecurity in the future takes demographic changes into account to project that the centre and north areas including Aileu and Liquisa districts will be most food insecure with about 58 per cent food insecure or highly vulnerable, followed by central and south-west areas including Manufahi district with 42-50 per cent food insecure or highly vulnerable. These figures compare with 29 per cent for the urban and peri-urban areas of the capital Dili.

Since 1999, agricultural GDP has declined in Timor Leste. In 1999 as a result of widespread dislocation and destruction, agricultural GDP declined significantly and was exacerbated further by drought in 2001/2002 and 2002/2003. In this same period the agricultural sector has undergone a transition from a regulated and subsidised sector under Indonesia, to a free-market economy.⁴ Data on crop production in East Timor is both patchy and unreliable. Yield data in particular is highly variable due to the combination of two principal factors, namely, the difficulty of estimating production levels and yield (based on areas of land under cultivation), and the highly variable pattern of monsoon rainfall across Timor from one year to the next. Upland farm yields are especially vulnerable to climatic factors such as wind effects, rainfall timing, intensity, and duration; as well as physical factors including slope and orientation, soil fertility, texture, and micro-climatic effects. In addition, crop production is also affected by social factors such as labour shortages at critical times especially for weeding. Exchange obligations and illness in the household can result in the neglect of crop management, with additional risks of problems with animal incursions into poorly maintained garden fences and damage to crops by insects and other pests. Access to irrigation and ploughing technology is another factor. Fifteen per cent of WFP respondents utilised some form of river-fed irrigation, with 1 per cent from a dam or canal, and 1 per cent pump-driven. In terms of ploughing, 4.5 per cent had access to animal-drawn ploughs or hand tractors, and 1 per cent had access to a tractor.

Background to SOL longitudinal case study on food consumption

The first phase of 'The Seeds of Life–East Timor' (SOL) project was an initiative of the Australian Centre for International Agricultural Research (ACIAR) designed to address the issue of food security for the Timor Leste population. The first phase of the project was implemented between 2000 and 2005. Recognizing that the lack of new and improved germplasm was a serious constraint to improved food production, ACIAR drew on its links with the Consultative Group for International Agricultural Research (CGIAR) and its food crop centres to obtain prospective planting material. The main objective of the first phase was to identify and trial new varieties of food crops through on-station agricultural trials. Several cultivars of irrigated rice, maize, sweet potatoes, cassava and peanuts with apparently higher yields than local varieties and adapted to local agro-ecological conditions were selected.

The conclusion that improvements in food security could only be generated by improvements in crop productivity in the upland and dryland areas of the country, provided justification for a second phase of the Seeds of Life initiative in mid-2005. The second phase continues to direct its efforts towards increased food production in Timor Leste as part of the broader goal of improving food security. The new program includes three inter-related components:

• seed production, storage and distribution;

⁴ National Food Security Policy for Timor Leste, Democratic Republic of Timor-Leste Ministry of Agriculture, Forestry and Fisheries, November 2006, p.3.

- identification of improved and culturally acceptable food crop varieties and associated technologies for subsistence farmers in upland areas;
- testing and extending new food crop varieties to Timorese farmers through extensive on-farm demonstration and trials with improved crop production 'packages'.

One of the outputs of the second phase of the SOL project focuses on the collection and analysis of relevant socio-economic data from participating villages, particularly on farmer's food production constraints. Specific outputs include detailed agricultural calendars for each sub-district of the project, and summary reports on individual issues or groups of issues.

In March 2006, a small socio-economic study (SOSEK) team was formed to carry out research in villages participating in the SOL program. The SOSEK team comprises two socio-economics graduates from the University of Timor Leste (UNTL), Modesto Lopes and Anita Ximenes, and two anthropologists from the Research School of Pacific and Asian Studies at the Australian National University (ANU), Dr Andrew McWilliam and Dr Diana Glazebrook. Additionally, Marcellino de Jesus, a socio-economics graduate from UNTL and SOL staff member, joined the team for analysis of the longitudinal case study data. Diana Glazebrook led the research from the SOL office in Dili, and Andrew McWilliam based at ANU acted as research advisor. Other members of the research team included interpreters for Waimua and Makassae languages for Baucau district (Joao Manuel Correia Vital Ximenes and Manuel Calistro Ximenes) and Tokodede language for Liquica district (Bartolomeuw Da Silva).

Early in the SOSEK research program two principal methodologies were developed and trialed:

- Agricultural calendars. Over a twelve-month period, researchers collected data on cultivation techniques for maize, rice, sweet potato, cassava, peanuts and pigeon pea, providing a baseline study of techniques for the species being trialed by SOL. Data was also collected on how labour is organized for cultivating these species, highlighting the prevalence of mutual labour exchange, and the social networks in which farmer households are embedded. Allegiance to ritual houses comprises one such network, and the research reveals the continuing significance of the ritual house and ritual beliefs in relating to cultivating staple foods. These research results offer a social and cultural context to agricultural practice in Timor-Leste.
- Longitudinal case study. Visits were made to subsistence OFDT farmer households every 4-6 weeks to track food consumption, wild food foraging, and food access strategies across the dry and wet seasons. This data provides a baseline study of subsistence households' consumption practices and their strategies for securing food access prior to the impact of higher yielding staple food varieties trialed by SOL

Methodology

This report is a summary report on the issue of subsistence farmer households' food consumption and strategies for securing food. A longitudinal case study method, gathering data over a 12-month period, was used to allow for different consumption patterns and food gathering strategies across the wet and dry seasons experienced during the period of research i.e., March 2006-February 2007. During this period, the wet season occurred in March and April 2006, followed by the dry season May-November 2006, and wet again December until data gathering ended in February 2007.

Initially, visits were planned to interview fourteen households every 4-6 weeks across eight sub-districts for a period of 12 months. However this schedule was not fulfilled due to the unstable political situation in mid-2006 which restricted mobility during May and June 2006, and time constraints associated with the concurrent writing of the commodity report in November 2006. 119 interviews in total were carried out across the 12-month period.

March2006wet14 households, all districtsApril2006wet9 households in Manufahi, Aileu, and Liquisa districts

May	2006	dry	6 households in Baucau and Aileu
June	2006	dry	7 households in Liquisa and Baucau
July	2006	dry	11 households in Liquisa, Baucau, Aileu
August	2006	dry	11 households in Liquisa, Manufahi, and Baucau
Sep	2006	dry	11 households in Liquisa, Manufahi, and Aileu
Oct	2006	dry	6 households in Baucau, Aileu
Nov	2006	dry	8 households in Manufahi, Baucau
Dec	2006	wet	14 households, all districts
Jan	2007	wet	14 households, all districts
Feb	2007	wet	8 households in Baucau, Liquisa, and Aileu

Respondent households were all participants in OFDTs. Their farming practice can be categorized as subsistence, namely, they have no off-farm income, and their sole cash income is derived from the occasional sale of surplus produce. In the case of the cohort of subsistence farmers in this study, the main agricultural produce sold includes chickens, pig, palm wine and sweet potato in the dry season, and cassava and leafy greens in the wet (See Tables 21 and 22 below). The 14 farmers selected represent a range of biophysical and topographic conditions in each district. Elevation was a key criteria as the research sought to look broadly at the range of consumption and foraging practices within the four districts of the study.

District	Sub- district	Village	Hamlet	Household	Local language	Elevation	Agro-climatic zone
				respondent	guuge		classification ⁵
Manufahi	Alas	Maha kidan	Debuwain	Juginda da Costa	Tetun Terik	20m	South coast lowland
Manufahi	Same	Betano	Selihasan	Domingas da Costa	Tetun Terik	4m	South coast lowland
Manufahi	Alas	Dotik	Datulor	Juliana Soares	Tetun Terik	32m	South coast lowland
Manufahi	Same	Letefoho	Ladiki	Julieta da Silva	Mambae	408m	Southern upland
Liquiza	Liquiza	Dato	Hekar	Ilda de Jesus Soares	Tokodede	575m	Northern slopes
Liquiza	Maubara	Vatuvou	Vatunao	Helena do Santos	Tokodede	4m	North coast lowland
Liquiza	Maubara	Maubara lisa	Lisalara	Domingos da Silva	Tokodede	1006m	Northern upland
Aileu	Leqidoe	Manucasa	Fatuk merei	Maliqias	Mambae	1279m	Northern Upland
Aileu	Aileu	Seloi Kraik	Lio	Domingos	Mambae	1101m	Northern Upland
Aileu	Aileu	Sarin	Malani	Filomena Tilman	Mambae	912m	Northern Upland
Baucau	Vemasse	Watulari	Nau lale	Fausta da Costa	Waimua	733m	Northern slopes
Baucau	Baucau	Bucoli	Wai semu	Henriketa da Silva	Waimua	343m	Northern slopes
Baucau	Vemasse	Waigai	Lari	Tereza Soares	Waimua	27m	North coast lowland
Baucau	Baucau	Seisal	Ague	Luis Correia	Waimua	7m	North coast lowland

Table 1: List of locations for the longitudinal case study on food consumption

⁵ Source: ARPAPET (1996)

Structured and semi-structured interview formats were used, with duration ranging between 15 and 60 minutes. An open-ended questionnaire was used as a basis for inquiring about food consumption. In order to get an extensive list of local food types, in the first interview respondents were asked to list wild foods usually consumed, raw foods usually consumed, snack food usually eaten, food items usually purchased, food usually gifted, and food usually received. In every subsequent interview, respondents were asked what food was eaten at every meal in the previous day. Then, in relation to each food listed, the respondent was asked about the origin of the food, that is, whether it was grown, purchased, gifted, or the subject of ceremonial distribution e.g., wedding ceremony or funeral. Given that this data referred only to what was eaten on the previous day, a further sequence of questions was added that focus on consumption since the previous visit: wild foods, meat, food gifted, food received, food purchased, food sold.

In addition to the structured questionnaire, two semi-structured interviews were undertaken directly following the food consumption interview. The subjects of these interviews were:

- Characteristics of the hungry season in terms of weather, maize rationing and borrowing practices, and the relationship between cereal deficit and the hungry season
- Processing, preparation and seasonality for all wild foods mentioned during the research

THE 'HUNGRY SEASON' AS A CONCEPTUAL FRAMEWORK

Rainfall

In the crudest terms, weather across Timor Leste can be categorised into two main seasons: the dry season (Tetum: tempo bai loron) and the wet season (Tetum: tempo udan). There is greater subtlety than this however, with transitional seasons where days may alternate between sun and light rain, and a second short rainy season on the south coast. For reasons of clarity however, this report classifies time in terms of wet and dry seasons only.

Based on the data gathered across eight sub-districts in a 12-month period, the dry season varies from approximately 3-6 months according to elevation (upland or coastal lowland), and north or south coastal location. Dry season days are characterised by no rain whatsoever and full sun. On the south coast (Manufahi) which receives a second brief wet season, the dry season may commence in August until November (\pm 3 months). In the upland area (e.g., Aileu), the dry season may commence earlier, in June or July, and continues until August to October (\pm 3-4 months). In contrast, the dry season in Baucau district on the north-east coast is substantially longer, commencing between April and June, and continuing until October or November (\pm 6 months). As an example of the impact of elevation on the dry season period, in upland areas in Liquica district the dry season commences in June until October (\pm 4 months), while in coastal lowland areas in Liquica district the dry season commences two months early from April to October (\pm 6 months).

Table 2: Normative times for dry and wet seasons

Location of research	Dry season	Wet season	
Aileu (southern uplands)	June-July until August-November	September-December until May-	
	$(\pm 3-4 \text{ months})$	June (±6-9 months)	
Baucau (north coast lowlands and	April-June until October-November	November-December until March-	
slopes)	$(\pm 5-6 \text{ months})$	May (±4-5 months)	
Liquisa (north coast lowlands, slopes	April-June until October (±4-6	November until March-May (±4-6	
and upland)	months)	months)	
1 /	·	<i>,</i>	
Manufahi (south cost lowlands and	August until November (3 months)	December until July (7 months)	
slopes)			

The 'hungry season' (Tetum: tempo rai hamlaha) occurs during the wet season but does not coincide with the beginning and end of the wet. Respondents described the hungry season as a period where crops are growing but are not yet ready to be harvested. Neither maize has been harvested (usually March), nor rice (usually June/July in the north and August/September in the south). Some respondents described the hungry season as a time that coincides with the weeding of maize. Weeding of maize is a labour intensive activity, particularly the first weeding activity which is usually undertaken by mutual labour exchange groups requiring farmers to give his/her labour to each other member of the group (See SOSEK cultivation practices report 2007). The labour-intensive activity of weeding maize takes place at a time when farmers possibly have the least amount of energy due to the difficulty of acquiring food: reserves are exhausted, and many of the staple foods (rice, maize, sweet potato) are harvested at the end of the wet season, or in the dry season.

The period designated as the hungry season coincides with the tail-end of the period without maize, usually 1-3 months prior to the new maize harvest. The hungry season is considered to have ended when the maize is harvested in February or March. This is the harvest of the main maize (Tetum: batar bo'ot) literally, 'big' maize. Approximately 2-4 weeks prior to the harvest of the main maize, a short-season maize variety (Tetum: batar lais), literally, 'quick' maize, is harvested. Short-season maize is a small, short-cobbed variety grown in sufficient quantities to 'tide over' the household for a 3-4 week period until the harvest of the principal maize crop. As a sort of bridging food, short-season maize is said to be grown for children to satisfy their hungry while waiting for the main maize crop. Unlike long-season maize, it is not cultivated with the aim of storing as a reserve food throughout the remainder of the dry season.

The hungry season is also said to be characterised by the physical condition of people. The following illnesses were mentioned: weight loss (Tetum: isin tu'un), diarrhea (Tetum: kabun moras), dizziness (Tetum: oin halai), headaches (Tetum: ulun moras), indigestion/stomach ulcers (Tetum: estomak), fever (Tetum: isin manas), and lethargy (Tetum: isin baruk or kolen). Diarrhea is said to occur frequently because in the absence of food, people are reduced to eating large quantities of leaves such as banyan leaf tips and kabik tips that they forage from the forest. This bodily weakness occurs during a period when much energy is expended seeking out food, and weeding maize.

Drying root vegetables and tubers as reserve food

Tubers and roots harvested in the dry season include: sweet potato, taro, arrowroot, cassava, and some seasonal wild yams and tubers such as maek, kuan, and uhi. While sweet potato and some wild yams and tubers are seasonal, they can be dried and stored as a reserve food for the hungry season. However, bitter cassava was dried in 85 per cent of research sites with the two exceptions being lowland areas in Baucau.

Cassava is dug for drying in August to September, about 4 months after farmers begin to dig cassava for daily consumption needs. The cassava skin is removed and then the tuber is cut into small pieces prior to drying. To make dried cassava ready for use it is re-hydrated by soaking in water for several days until soft, dried out a little, and then boiled for consumption. Dried cassava is then stored using several methods:

- above the hearth in the kitchen (Aileu, Manufahi, Liquica)
- in a sack placed in a second hand drum (Aileu)
- on an elevated and roofed platform near the main house (Liquica)
- an elevated platform located in the main house (Liquica)
- in a sack made from woven reed and hung inside the house (Baucau)

Where a surplus of sweet potato is harvested, many farmers dry sweet potato as a reserve food. However, if yields are low sweet potato is dug on demand for daily consumption only. Some subsistence farmers dry sweet potato in order to sell it during the hungry season in January and February. The process of drying is similar for all locations: following harvest, the skin is removed and each tuber is chopped into several pieces for drying, and laid in the sun to dry on palm mats or nylon tarpaulin. Sweet potato may also be dried on the house roof. Storage methods for dried sweet potato vary: above the fire place, in a sack inside a large drum, in a woven sack from a shady tree, or in a woven basket stored inside the main house.

Foraging wild food

Respondents were asked to list the total variety of wild foods that could be harvested or foraged locally during the hungry season specifically. The most common wild foods are kumbile and maek tubers, sago starch, and bitter beans. The percentage of respondents who mentioned wild food types that they forage for locally in the hungry season are listed below. (See Tables 17 and 18 for wild foods actually consumed during the 12-month period of research.)

kumbile (45.7%) bitter beans (37.2%) sago (20.3%) kuan/biahulu tuber (13.5%) buraisa cassava, maek tuber, bianmalala tuber (each 10.1%) tamarind, wild fowl (8.47%) wild deer, uhi tuber, sinkumas/bengkoang yam bean, velvet bean/lehe (6.77%) mango, feral pig, rock pawpaw, pawpaw leaves, wild taro (5%) pawpaw, wild sweet potato, aidak fruit, bet, kabura leaf tips, monkey, reptile/meda (3.3%) wild buffalo, leaves (passionfruit, kleleik, aitutuk, banyan, bitterbean, aikabi, kedidilau, maek, maruingi, cassava), lelerek, ai same tuber, kalik bean, goiabas fruit, buah nona fruit, kaisake, mustard greens, large turtle dove, possum, cockatoo (each 0.84%)

Table 3: Wild foods, parts utilized and preparation

	Part eaten	Preparation	Side effect	Season
Kumbili (tuber)	Flesh	Roast or boil	None	Dry season
Wild beans	Leaves	Boil leaves with maize kernels (some squeeze in cold water twice prior to cooking	Poisonous if not	Dry season
villa oculto	Bean	with maize). Boil beans up to 10 times, discarding water after each boiling, then eat,	boiled	Dig season
Maek (tuber)	Flesh	Boil leaves 1-2 hours before cooking with maize kernels.	Can produce	Drv season
	Leaves	Flesh can be dried, pounded into meal and finally steamed (peel tuber, cut into	itchiness if not	J
		pieces and dry, then pound to become meal, soak in hot water, pound again then	boiled properly	
		steam for eating) or soaked, dried and finally boiled (peel tuber then slice then boil,	1 1 5	
		then soak for 5-6 days then dry, then boil for eating together with maize or mix with		
		green vegetables).		
Wild cassava	Flesh	Boil leaves and squeeze twice prior to cooking for eating. Soak tuber flesh in water	Poisonous if not	Dry and wet
	Leaves	for 2 days then boil.	boiled properly	seasons
Bianmalala (tuber)	Flesh	Cut into pieces, dry, then soak in water for one week. Squeeze out water, dry again,	Poisonous if not	Dry season
		then pound before boiling with leafy greens.	prepared	
Kuan/Biahula (tuber)	Flesh	Bake until cooked then scrape away the downy surface before eating.	None	Dry season
Velvet bean/lehe	Bean	Boil beans up to 10 times, discarding water each time	Poisonous if not	Dry season
	Flower		prepared	
Sinkumas (tuber)	Flesh	Can eat raw tuber uncooked	None	Dry season
Uhi (tuber)	Flesh	Boil or roast	None	Dry season
Ai same (tuber)	Leaves	Leaf tips are boiled together with maize. Tuber can be soaked in water for 3 days	None	Dry season
	Flesh	and nights then boiled for eating.		
Kalik bean	Bean	Roast and remove shells then boil and cut then mix with bitter bean and boil	Poisonous if not	Dry season
	Leaves	together 7-8 times and finally soak in cold water before eating.	prepared	
Pawpaw leaves	Leaves	Boil together with maize	None	Dry and wet
				seasons
Wild taro	Leaves	Boil leaves together with maize. Boil tuber with skin for 1 night then skin and eat.	None	Dry season
	Flesh			
Banyan leaf	Leaves	Pick tender leaves and boil together with maize	None	End of dry, early
				wet season
Passionfruit leaf	Leaves	Leaves can be boiled with maize or as a leafy green to accompany rice.	Should not eat	Dry season
	Fruit		unripe	
Maruingi leaves	Leaves	Boil maruingi leaves, fruit and flowers with maize to make porridge/sasoro.	None	Dry and wet
	Fruit			
	Flower		1	

At least one and sometimes up to three parts of a wild food may be harvested, for example, flesh, seed, flower, fruit and leaves. Most wild leaves picked from bushes or trees are selected for tenderness and then boiled with maize in the same cooking pot, and eaten together. The leaves of some tubers (ai same and wild taro) do not require specific preparation and are also cooked concurrently with maize. Maek and wild cassava leaves are the exception and must be boiled and squeezed prior to cooking. Beans (bitter bean, velvet bean, kalik bean) are all boiled repeatedly up to 10 times. The process of repeated boiling to remove bitterness or poison is such a common practice in the preparation of wild foods in Timor Leste that a specific term exists in the Tetum language to describe this practice ('tisi'). It is apparent from the table above that many of the wild foods, especially tubers, require labor-intensive processing prior to cooking, in addition to carting firewood and water.

The extent of wild food foraging depends on a combination of factors: the season in which foraging is carried out (most tubers are seasonal and harvested mainly in the dry season, and leafy greens are foraged in the wet season), the level of food deficit in that location usually affected by an extended dry season, and the type of forest cover to support growth of food-bearing plants. We assume that a mixed forest which is moist but does not have a dense canopy will support a greater variety of wild foods, while a denser forest combined with low population density supports habitat for larger game (See Table 4 below). This is evident for Alas sub-district in Manufahi district where large game such as deer, pig and buffalo are hunted in forests that include 27 per cent cover of moist dense lowland forest and nearly 10 per cent moist mixed highland forest. Foraging of roots and tubers is most prevalent in Same sub-district of Manufahi.

Table 4: Wild foods available during the hungry season, by sub-district

		Aileu sub-	Baucau sub-	Liquisa sub-	Alas sub-	Liquidoe sub-	Vemasse sub-	Maubara sub-	Same sub-	Totals
Kumbili (uber) 4 3 7 2 2 6 1 2 27 Wild beans 5 1 6 1 3 2 1 1 1 6 1 0 1 1 6 1 <th></th> <th>district</th> <th>district</th> <th>district</th> <th>district</th> <th>district</th> <th>district</th> <th>district</th> <th>districto</th> <th></th>		district	district	district	district	district	district	district	districto	
Wild beans 5 1 6 1 3 2 1 1 6 3 1 6 3 1 6 3 1 6 3 1 1 1 1 1 1 1 6 3 3 1 1 1 1 1 1 1 1 <th1< th=""> 4 4 4 4 1 <th1< td=""><td>Kumbili (tuber)</td><td>4</td><td>3</td><td>7</td><td>2</td><td>2</td><td>6</td><td>1</td><td>2</td><td>27</td></th1<></th1<>	Kumbili (tuber)	4	3	7	2	2	6	1	2	27
	Wild beans	5	1	6	1	3	2	2	2	22
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Sago	5	1	0	2	5	5		5	12
Wild cassiva I <thi< th=""> I <thi< th=""> <th< td=""><td>Maek (tuber)</td><td></td><td>1</td><td></td><td>2</td><td></td><td>3</td><td></td><td>1</td><td>6</td></th<></thi<></thi<>	Maek (tuber)		1		2		3		1	6
Distribution Distribution<	Wild cassava		1	3	2	1	5	2	1	6
Tamana Image: Constraint of the second	Bianmalala			5		1		1		6
Tanarind 1 1 3 5 Wild fowl 4 1 5 Kuan (tuber) 1 1 1 2 Sinkumas 2 1 1 4 Velvet bean 3 1 4 Sinkumas 2 1 1 4 (tuber) 1 1 2 4 Wild deer 1 1 2 4 Mango 1 2 3 3 Rock 1 2 3 3 Pawpaw 3 3 3 3 3 Wild taro 1 2 3 3 3 Wild taro 1 2 2 2 2 Nid kruit 1 2 2 2 2 2 Aidak fruit 1 1 2	(tuber)			5				1		Ū
Wild fowl 1 4 1 1 1 1 1 1 1 1 1 1 1 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 4 1 <th1< th=""> <th1<< td=""><td>Tamarind</td><td></td><td>1</td><td></td><td></td><td></td><td>1</td><td></td><td>3</td><td>5</td></th1<<></th1<>	Tamarind		1				1		3	5
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Wild fowl			4				1		5
Velvet bean 3 1 4 Sinkumas 2 1 1 4 Sinkumas 2 1 1 4 Uhi (tuber) 1 1 2 4 Wild deer 1 1 2 4 Mango 1 1 3 3 Rock 1 2 3 3 Pawpaw 3 2 3 3 Pawpaw 3 2 3 3 Pawpaw 3 2 3 3 Pawpaw 1 1 2 3 Wild stro 3 3 3 3 Pawpaw 1 1 1 2 Wild sweet 2 2 2 2 Atdak fruit 2 2 2 2 Reptile 1 1 1 1 Atdus fruit 1 1 1 1 <tr< td=""><td>Kuan (tuber)</td><td>1</td><td></td><td>1</td><td>1</td><td>1</td><td>2</td><td>1</td><td>1</td><td>8</td></tr<>	Kuan (tuber)	1		1	1	1	2	1	1	8
Sinkumas (tuber) 2 1 1 4 Uhi (tuber) 1 1 2 4 Mango 1 1 2 4 Mango 1 1 3 3 Wild deer 1 2 3 3 Bayapaw 1 2 3 3 Pawpaw 3 2 3 3 Pawpaw 3 3 3 3 Pawpaw 1 1 2 3 Wild taro 3 3 3 3 Pawpaw 1 1 2 2 Potato 1 1 2 2 Mokey 2 2 2 2 Monkey 2 2 2 2 Monkey 2 2 2 2 Monkey 1 1 1 1 Kabura leaf 1 1 1 1 <td>Velvet bean</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>4</td>	Velvet bean	3						1		4
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Uhi (uber) 1 1 2 4 Wild deer 1 1 2 4 Mango 1 1 1 3 Wild pig 1 2 3 Rock 1 2 3 pawpaw 3 3 3 Pawpaw 3 3 3 Pawpaw 1 2 3 Wild taro 3 3 3 Pawpaw 1 2 2 Wild sweet 1 1 2 potato 1 1 2 Adak fruit 2 2 2 Kabura leaf 2 2 2 Morkey 2 2 2 Wild buffalo 1 1 2 Wild buffalo 1 1 1 Leierek 1 1 1 I 1 1 1 1 Jasoi fruit	(tuber)									
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Wild pig123Rock123pawpaw33Pawpaw33leaves33Wild taro11Pawpaw11Pawpaw11Vild sweet11potato2Aidak fruit2Kabura leaf2Question111Question1Aidak fruit1Kabura leaf2Question1Question1Monkey2Reptile111Question1Aitutuk leaf111Lelerek1Goiabas fruit111Passionfruit111Ieaf1Buah nona1fruit1Kaisake111Mustard1greens1Keidilau1Maek leaves1Matek leaves1I1Matek leaves1I1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan <td>Mango</td> <td></td> <td>1</td> <td>1</td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td>3</td>	Mango		1	1			1			3
Rock pawpaw Pawpaw123Pawpaw leaves33Wild stro3Wild stro1Pawpaw1Pawpaw1Wild stro3Pawpaw1Pawpaw111Pawpaw1Pawpaw1Pawpaw1Wild sweet potato1Pawpaw2Aidak fruit2Aidak fruit2Kabura leaf2Q2Monkey2Q1Z1Wild buffalo1I1Kleick leaf111Aitutuk leaf111I1Banyan leaf111I1Iafa1Iafa1Isiterbean1Ieaf1Buah nona1If1Kaisake1I1Itahan1Mack leaves1I1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1Itahan1	Wild pig	1			2					3
pawpaw 3 <td>Rock</td> <td></td> <td></td> <td>1</td> <td></td> <td>2</td> <td></td> <td></td> <td></td> <td>3</td>	Rock			1		2				3
Pawpaw leaves 3 3 3 3 Wild taro 3 3 3 Pawpaw 1 1 2 Wild sweet potato 1 1 2 Aidak fruit 2 2 2 Aidak fruit 2 2 2 Aidak fruit 1 1 2 Kabura leaf 2 2 2 Monkey 2 2 2 Reptile 1 1 2 Wild buffalo 1 1 1 I Kleleik leaf 1 1 1 I Kleleik leaf 1 1 1 I Lelerek 1 1 1 I Goiabas fruit 1 1 1 Banyan leaf 1 1 1 I Banyan leaf 1 1 1 Bitterbean 1 1 1 1 I Baah nona 1 1 1 1 Kaisake 1 1 1 1 Kedidila	pawpaw									
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potato 2 Aidak fruit 2 2 Kabura leaf 2 2 Monkey 2 2 Monkey 2 2 Reptile 1 1 2 Wild buffalo 1 1 2 Wild buffalo 1 1 1 Keleik leaf 1 1 1 Aitutuk leaf 1 1 1 Lelerek 1 1 1 Banyan leaf 1 1 1 Banyan leaf 1 1 1 Iteaf 1 1 1 Banyan leaf 1 1 1 Iteaf 1 1 1 Bitterbean 1 1 1 Ieaf 1 1 1 Kaisake 1 1 1 Kaisake 1 1 1 Mustard 1 1 1 <	Wild sweet							1	1	2
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leaves	leaves			1						

	Aileu sub- district	Baucau sub- district	Liquisa sub- district	Alas sub- district	Liquidoe sub- district	Vemasse sub- district	Maubara sub- district	Same sub- districto	Totals
Large turtledove			1						1
Possum			1						1
Cockatoo			1						1
Cassava leaves			1						1
Total wild foods mentioned as foraged during a hungry season period	18	8	52	18	11	21	15	19	

The proportion of wild food foraged in Liquisa sub-district, particularly leaves and small game, is significantly higher than all other sub-districts (52 compared to the next highest ranking of 21). Situated west of Dili on the north coast, Liquisa is prone to an extended dry season along the coast and hinterland. The district's chronic food deficit area with highly variable maize and other rainfed food crop production necessitates wild food foraging strategies. This sub-district is the only location where small game (monkey, cockatoo, bush fowl, turtledove, possum, reptile) are hunted.

In contrast, the least foraging of wild food occurs in coastal lowland Baucau (8) and upland Liquidoe (11). In the case of Baucau this could be due to capacity for surplus agricultural production where there is access to river or streams for irrigation allowing second season planting of commodities like upland rice, maize, sweet potato and cassava. Additionally, the coastal hinterland around Baucau may not support extensive wild food as it comprises an extensive plateau area with sparsely wooded eucalyptus forests and savanna grasslands. Upland Liquidoe produces no rice or second season harvest and experiences regular severe wind damage to maize crops - suggesting a food deficit area. The low level of wild food foraging is probably due to the type of forest cover in this sub-district: single species dry forests (particularly Eucalyptus Urophylla) growing on steep hillsides and low nutrient soils.

Sago consumption is confined to coastal areas, suggesting little marketing to upland areas. Data from this research does not distinguish between the two trees described as 'akar' which is commonly translated as sago in Timor Leste: 'true' sago (L: Metroxylon sagu) and 'false' sago which is actually sugar palm (L: Arenga pinnata). These distinctions are made in local language, for example, in the Waimua language of Baucau district, akar known as sago is 'buto', and akar known as sugar palm is 'tuo'. Edible starch is harvested from the trunks of both palms in the same way. Sago may be sold as processed starch, and also, as de-barked blocks where the pith is intact. Elsewhere in SE Asia, sugar palms which have not respondent to tapping are considered to yield the highest quantity of starch. However, starch recovered from the pith of the trunk is secondary to tapping the palm's stalks for juice from which palm sugar is obtained, and from which palm wine (Tetum: tuak) is fermented and distilled (Westphal).

District	Hectares	Forested land	Settledandagriculturallandincludingcommercialagriculture	Grassland	Savannah
Aileu	73,944.1	82.5% ⁶	17.25%	0.3%	0%
Baucau	150,794.9	71.5% ⁷	16.13%	10.7%	1.6%
Liquisa	55,095.4	63.8% ⁸	36%	0.1%	0%
Manufahi	132,659.8	46.65% ⁹	45.34%	1.3%	0%

Table 5: Vegetation cover and land use, by district

(source: ALGIS landsat imagery 2001)

Rationing and borrowing maize

The length of time that maize reserves can be sustained until the new harvest depends on maize yield and access to rice. Whether a farmer can grow a second maize crop is influenced by their access to water. The second rainy season in Manufahi allows a second maize harvest, and access to rivers and springs for hand irrigation allows some Baucau farmers a second harvest also. Maize yield is affected by poor rains (e.g., north coast lowlands), strong winds (e.g., north and south upland areas) and pests such as rats, monkeys (e.g., Liquica), and locusts. Maize reserves may last for up to 11 months (Alas sub-district, Manufahi) or as few as 3 months (Liquisa sub-district, Liquisa).

Table 6: Maize deficit for 'normal' yielding year¹⁰

District	Reserve	Deficit
Aileu	9 months	3 months
Baucau	6 months	6 months
Liquisa	3-8 months	4-9 months
Manufahi	10-11 months	1-2 months

Maize reserves may be affected by access to rice. In rice-dominant areas in Aileu and Baucau, some farmers do not ration maize as their rice harvest is ready to consume just three months after the maize harvest. In Manufahi and Baucau districts where rainfall or irrigation access allows a second maize harvest, farmers may consume maize at least twice daily for a longer period (e.g., in Selihasan and Debuwain in Manufahi district, maize is eaten at least twice daily in March, April and September, the month in which the second maize crop is harvested).

In the month of the maize harvest, usually March, farmers eat maize as often as three times per day. However, after two or three months farmers may begin to ration maize. They may eat maize every second

⁶ Forested land in Aileu includes: lowland forest single species (52.1%), highland forest single species (28.1%), dry lowland forest (1.7%) and montane forest (0.7%)

⁷ Forested land in Baucau includes: mixed dry lowland forest (38.6%), lowland forest single species (22.7%), sparse lowland forest (3.4%), moist mixed highland forest (3.2%), dense moist lowland forest (2.5%), coastal forests (0.8%), and highland forests single species (0.3%)

⁸ Forested land in Liquisa includes: dry lowland forest (45.3%) and lowland forest single species (18.5%)

⁹ Forested land in Manufahi includes: moist dense lowland forest (27%), moist mixed highland forest (9.6%), moist sparse lowland forest (7.1), coastal forests (6%), lowland forest single species (3.3%) and montane forest (0.25%) ¹⁰ These figures are considerably higher than WFP's figures for 'number of months your maize harvested lasted'

¹⁰ These figures are considerably higher than WFP's figures for 'number of months your maize harvested lasted' calculated in terms of much wider regions. For example, Region 1 including Baucau (5 month's reserve), Region 2 including Manufahi (5 month's reserve), Region 3 including Aileu (3 month's reserve) and Region 4 including Liquica (6 month's reserve).

day alternating with rice, or a small amount of maize is mixed with other carbohydrates such as rice, sweet potato, cassava, taro, wild bitter beans, arrowroot, kumbile, sago flour, or banana. Very few farmers have maize reserves that tide them over completely until the following harvest.

Exhaustion of food reserves during this period is evidenced by the fact that many subsistence farmers resort to eating maize seed that they have set aside for planting the following year. Respondents in this study had consumed maize set aside as seed at least 1 to 3 times since 1999. There is no pattern in relation to the years that maize seed set aside for planting was consumed, and no correlation either for the same year at a national level, or the same elevation. The WFP 2006 survey found that 17 per cent of respondents consumed seed stock in the event of 'unavailability of food'.

TT 1 - 4	Elene 4tem	Dental	Desited subset of the		
Hamlet	Elevation	is consumed daily	rationed when maize is	Period without maize	
Malani	912m	Harvest until July	August-December	August-December –	
				harvest (±3-7 months)	
Lio (rice-	1101m	Harvest until May or	No rationing because rice is	July until harvest (±7	
dominant area)		June	harvested in June-July	months)	
Fatuk merei	1279m	Harvest until August	August – December	High yield season: 3	
				months.	
				Low yield season due to	
				strong winds: 10 months.	
Ague	7m	Harvest until June-	June-July until August	September until harvest	
		July		(±6 months)	
Lari	27m	Harvest until June-	June-July until August	September until harvest	
		July		(±6 months)	
Nau lale	733m	Harvest until August-	August-September	High yield: reserves last	
		September		12 months	
				Low yield: ±6-7 months	
Hekar	575m	Harvest until June	May-June	June-July until harvest:	
				$\pm 8-9$ months	
Vatunao	4m	Harvest until August	August until October	November-harvest (±4	
				months)	
Lisa lara	1006m		January-February	February-March until	
				harvest ($\pm 0-1$ month)	
Selihasan	4m	Harvest until	December until January-	February – harvest (±1	
		December	February	month)	
Datulor	32m	Harvest until August	August (due to maize given	September until harvest	
			to relatives in upland	$(\pm 6 \text{ months})$	
			Ainaro) ¹¹		
Ladiki	408m	Harvest until	November until December	January until harvest (±2	
		November		months)	
Debuwain	20m	Harvest until October	October until February	February until harvest (±1	
				month)	

Table 7: Maize deficit period, by hamle	t
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Farmers may 'borrow' (Tetum: deve) maize seed for planting from members of their extended family, or neighbours. The most common principal of borrowing is based on interest (1:2), although some places

¹¹ The household respondent in Dotik, Manufahi district, is able to produce two maize crops annually due to the second short rainy season on the south coast. In spite of this, their maize reserve is exhausted in August, one month only after the second harvest in July. The household head's family from the coffee-growing region of upland Ainaro visit annually in July to collect maize. They give coffee in return for which there is a market in lowland coastal areas.

(Betano, Bucoli) practice an interest-free system (1:1). In a rice-producing area like Seloi kraik in Aileu district, rice may be offered as repayment for borrowed maize at a rate of 2:1. Maize is measured using a 12kg can (Tetum: lata), a basket (Tetum: bote), or a wreath (Tetum: talin).¹² Farmers may also borrow seed because their first planting fails due to no follow-up rain, forcing them to re-plant. This was the case in upland Maubaralisa (Liquisa district) in November 2006.

While some farmers borrow maize seed for planting, others purchase maize seed for planting either from their own extended family, from neighbours, or in the local market. Maize seed purchased for planting undergoes the same selection process as seed grown and set aside by the farmer: kernels from both ends of the cob are removed and set aside for eating, and kernels from the middle of the cob are selected for the following characteristics: fat, flat, clean and with a sculletum that is not black.

District	Hamlet	Borrowing system
Aileu	Malini	Borrow from extended family, then sell chicken or pig to pay in cash (one $12 \text{kg tin} = \text{USD5}$)
Aileu	Lio	Borrow maize then when the rice has been harvested, repay with rice (two 12kg tins of rice paid for every one tin of maize borrowed i.e., 2:1)
Aileu	Fatuk merei	No borrowing system
Baucau	Wai semu	Borrow and return again after the maize harvest (one tin is returned for every tin given i.e., no interest)
Baucau	Agia	Borrow from neighbours (two tins given for every tin borrowed i.e., 2:1)
Baucau	Lari	Borrowing system: always pay with interest (two tins must be returned for every tin borrowed e.g., 2:1)
Baucau	Nau lale	No borrowing system
Liquisa	Hekar	No borrowing system
Liquisa	Vatunao	No borrowing system
Liquisa	Lisalara	Borrowing system (two baskets must be returned for every basket borrowed i.e., 2:1)
Liquisa	Datulor	Depending on the agreement made, borrow from extended family until the new harvest then return (7 wreaths given for 5 wreaths borrowed i.e., 1.5:1)
Liquisa	Debuwain	Borrowing system: return one wreath (Tetum Terik: sohen) for every wreath borrowed (i.e., 1:1)
Manufahi	Ladiki	Depending on the agreement made with the person who loans the maize, return two wreaths for every wreath given (i.e., 2:1)
Manufahi	Selihasan	Borrowing system also known as helping each other (Tetum: ajuda malun). One basket is returned for every basket borrowed i.e., 1:1.

Table 8:	Borrowing	systems	for	maize
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¹² Farmers tie maize sheaths into a wreath (Tetum: talin) by means of knotting the sheath, or tucked/slipped the maize stem (Tetum: taang) to form a wreath for those varieties without a long enough sheath for knotting. These wreaths are then smoked above the kitchen hearth, or dried in full sun. Then the sheaths are stored either on a shelf above the hearth (Tetum: ai leten); in an elevated structure next to the main house; stacked on a wooden disc above a pole (Tetum: tidin ai ri'in); suspended from a frame made of two vertical uprights and one horizontal pole (Tetum: ai ri'in tara), or suspended from a tall tree near the main house (Tetum: ai hun bo'ot nia leten).

PATTERNS OF FOOD CONSUMPTION

Using primary data, this section details staple foods (usually cereal or root crop/tuber), secondary foods (leafy greens, fruits, legumes), and meat (livestock and wild game) consumed by household respondents during the research period April 2006 until March 2007.

Everyday consumption of staple foods (cereals, roots, tubers)

Breakfast

Tubers, roots and cereals are the main foods consumed for breakfast (Tetum: matabisu or han dader). The percentage of respondent households that consumed each of the various types of foods at the breakfast meal during the 12-month period of research is listed below.

cassava (43.6%) maize (14.2%) rice (12.6%) banana (9.2%) bread/wheat flour (7.5%) sweet potato (5.8%) sago (5%) taro, kumbile (4.2%) mango and arrowroot (each 2.5%) wild bean and pumpkin and marungi (each 1.6%) bianmalala (0.84%)

Table 9: Most commonly eaten breakfast foods, by season

Season	1	2	3	4	5
Dry	Cassava (41.6%)	Rice (15%)	Sweet potato	Taro or kumbile	Bread (6.6%)
			(9.9%)	(8.3%)	
Wet	Cassava (45.7%)	Maize (22%)	Banana (15.2%)	Rice (10.1%)	Bread (8.4%)

Cassava is by far the most common breakfast food across the year (43.6% of all respondents). However, in rice-production areas such as Seisal, Bucoli and Waigai in Baucau district, and Seloi kraik and Sarin in Aileu district, rice is more commonly eaten at breakfast than cassava. While maize is the second most common breakfast food in the wet season as a whole, in the period October until January no maize is consumed, reflecting exhaustion of maize reserves. The small quantity of maize consumed in February indicates harvest of short-season maize (Tetum: batar lais). In March when the main maize is harvested, 64 per cent of respondent households ate maize for breakfast suggesting that maize rationing does not commence in the first month. In the period immediately after the maize harvest i.e., February until May, maize tends to replace bread and rice as a breakfast food. Bread is made from wheat flour imported from Indonesia and Thailand.

	May	Jun	Jul	Aug	Sept	Oct	Nov	Percentage of respondents who ate food type in dry season (%)	Dec	Jan	Feb	Mar	Apr	Percentage of respondents who ate food type in dry season (%)	Percentage of respondents who ate food type in 12- month period (%)
Number of respondents	6	7	11	11	11	6	8	Total: 60	14	14	8	14	9	Total: 59	Total: 119
Cassava	3	3	3	5	6	2	3	41.6(25/60)	7	5	4	3	8	45.7(27/59)	43.6(52/119)
Maize	1		1	1	1			6.6 (4/60)			1	9	3	22 (13/59)	14.2(17/119)
Rice		2	3	1		1	2	15 (9/60)	2	2	1	1		10.1 (6/59)	12.6(15/119)
Banana				1		1		3.3 (2/60)	1	2		1	5	15.2 (9/59)	9.2(11/119)
Bread		1	1		2			6.6 (4/60)	2	2			1	8.4 (5/59)	7.5 (9/119)
Sweet potato		2	1	2	1			9.9 (6/60)			1			1.6 (1/59)	5.8 (7/119)
Taro			1	1	2	1		8.3 (5/60)					1	1.6 (1/59)	4.2 (5/119)
Sago			1				1	3.3 (2/60)	1	1	1	1		6.7 (4/59)	5 (6/119)
Kumbili tuber	1			1	1	1	1	8.3 (5/60)							4.2 (5/119)
Mango							1	1.6 (1/60)		2				3.3 (2/59)	2.5 (3/119)
Arrowroot	1				1			3.3 (2/60)					1	1.6 (1/59)	2.5 (3/119)
Pumpkin	1			1				3.3 (2/60)							1.6 (2/119)
Marungi leaf					1			1.6 (1/60)			1			1.6 (1/59)	1.6 (2/119)
Wild bean					1	1		3.3 (2/60)							1.6 (2/119)
Bianmalala tuber									1					1.6 (1/59)	0.84 (1/119)

Table 10: Respondents' consumption of breakfast foods, by season

Lunch

Cereals and tubers are the main foods consumed for lunch (Tetum: han meu dia), usually accompanied by leafy greens, beans or pawpaw flowers/leaves. The percentage of respondent households who consumed each of the various types of foods at the lunch meal during the 12-month period of research is listed below.

maize (42%)
rice (39.4%)
cassava (26.8%)
leafy greens (17.6%)
pawpaw (15.1%)
long beans (10.9%)
pumpkin (7.5%)
kidney beans (5%)
sweet potato (4.2%)
kumbile tuber and sago (each 2.5%)
bitter bean and mango (each 1.6%)
breadfruit, noodles, soya bean, mung bean, banana, arrowroot, coconut (each 0.84%)

Table 11: Most commonly eaten staple foods for lunch, by season

Season	1	2	3	4	5	
Dry	Rice (51.6%)	Maize (38.3%)	Cassava (23.3%)	Pumpkin, sweet		
				potato (6.6%)		
Wet	Maize (45.7%)	Cassava (30.5%)	Rice (27.1%)	Pumpkin (8.9%)	Sweet	potato
					(1.6%)	

Consumption of rice is almost twice as common in the dry season compared to the wet, and least likely to be consumed in February until May when maize replaces rice as the main food. The maize harvest coincides with the period immediately prior to the rice harvest when rice reserves are most likely to be exhausted. Maize is eaten in December and January prior to the maize harvest in Manufahi district (Dotik, Letefoho, Selihasan and Debuwain) where a second maize crop is harvested in the second short rainy period between April and June. Farmers may purchase and eat rice all year round if they can afford to. However, rice farmers e.g., in Aileu and Baucau, and parts of Manufahi, are more likely than non-rice farmers to consume rice in the wet season. Unlike rice which experiences greater variation across the two seasons and significantly less consumption in the wet, maize and cassava remain more constant across both seasons with a fairly significant rise in the wet season.

	May	Jun	Jul	Aug	Sept	Oct	Nov	Percentage of respondents who ate lunch food type dry	Dec	Jan	Feb	Mar	Apr	Percentage of respondents who ate lunch food type during	Percentage of respondents who ate lunch food type during
								season (%)						wet season (%)	year (%)
Number of	6	7	11	11	11	6	8	Total: 60	14	14	8	14	9	Total: 59	Total: 119
respondents															
Maize	4	3	3	4	5	1	3	38.3(23/60)	5	3	3	9	7	45.7(27/59)	42 (50/119)
Rice	1	5	6	7	5	4	3	51.6(31/60)	6	5	2	2	1	27.1(16/59)	39.4(47/119)
Cassava		2	4	2	3	2	1	23.3(14/60)	2	6	3	4	3	30.5(18/59)	26.8(32/119)
Leafy		1	3	1	4	4		21.6(13/60)		3	1	1	3	13.5(8/59)	17.6(21/119)
greens															
Pawpaw	2	2	2	5	2	1	2	26.6(16/60)	1	1				3.3(2/59)	15.1(18/119)
Long beans	1	2			4		1	13.3(8/60)	1				4	8.4(5/59)	10.9(13/119)
Pumpkin	4							6.6(4/60)			1		4	8.4(5/59)	7.5(9/119)
Kidney	2				1	1		6.6(4/60)					2	3.3(2/59)	5 (6/119)
beans															
Sweet		1	2	1				6.6(4/60)				1		1.6(1/59)	4.2(5/119)
potato															
Sago									1	1		1		5(3/59)	2.5(3/119)
Kumbile	1					1	1	5(3/60)							2.5(3/119)
Wild bean					1			1.6(1/60)	1					1.6(1/59)	1.6(2/119)
Mango							1	1.6(1/60)		1				1.6(1/59)	1.6(2/119)
Breadfruit							1	1.6(1/60)							0.84(1/119)
Noodles				1				1.6(1/60)							0.84(1/119)
Soya beans	1							1.6(1/60)							0.84(1/119)
Mung beans					1			1.6(1/60)							0.84(1/119)
Banana									1					1.6(1/59)	0.84(1/119)
Arrowroot			1					1.6(1/60)							0.84(1/119)
Coconut	1		1					1.6(1/60)							0.84(1/119)

Table 12: Respondents' consumption of lunch foods, by season

Evening meal

Like lunch, the evening meal (Tetum: han kalan) consists of cereals and tubers accompanied by leafy greens, beans, pawpaw leaves/flowers, or other vegetables. The percentage of respondent households who consumed each of the various types of foods at the evening meal during the 12-month period of research is listed below.

rice (50.4%)
maize (30.2%)
leafy greens (23.5%)
cassava (21%)
pawpaw (13.4%)
pumpkin (9.2%)
long beans (6.7%)
sweet potato (3.3%)
banana (2.5%)
kidney beans (2.5%)
breadfruit, kumbile, sago, eggplant (each 1.6%)
wild beans, mango, egg, mung beans, soya beans (each 0.84%)

Table 13: Most commonly eaten evening meal staple, by season

Season	1	2	3	4
Dry	Rice (61.6%)	Maize (23.3%)	Cassava or	Pumpkin (11.6)
			pawpaw (18.3)	
Wet	Rice (38.9%)	Maize (37.2%)	Cassava (23.7%)	Pawpaw (8.4%)

Rice is the most common food eaten for the evening meal in both seasons, but frequency of consumption decreased dramatically during the end of the wet season (February-May). In the dry season, rice is almost three times more likely to be consumed than maize, whereas in the wet season, rice and maize are equally likely to be eaten. Cassava is common to both seasons but slightly more likely to be consumed in the wet season prior to the maize harvest when fewer foods are available. Sweet potato and kumbile, both harvested in the dry season, form part of the evening meal during this period, and are not consumed at all in the wet season. Although in some places where a surplus of sweet potato is harvested drying is carried out so that sweet potato can be carried as a food reserve during the wet season (See section above headed 'Drying root vegetables and tubers'). Sago is consumed in the months of December and January in Waigai only, one of 6 coastal lowland areas and suffering from chronic food deficit.

	May	Jun	Jul	Aug	Sept	Oct	Nov	Percentage	Dec	Jan	Feb	Mar	Apr	Percentage	Percentage
	-				_			of					_	of	of
								respondents						respondents	respondents
								who ate						who ate	who ate
								food type						food type	food type
								for evening						for evening	for evening
								meal in dry						meal in wet	meal in
								season (%)						season (%)	year (%)
Number of	6	7	11	11	11	6	8	Total: 60	14	14	8	14	9	Total: 59	Total: 119
respondents															
Rice	3	5	7	7	6	4	5	61.6(37/60)	6	7	3	3	4	38.9(23/59)	50.4(60/119)
Maize	3	1	2	3	2	2	1	23.3(14/60)	4	3	2	8	5	37.2(22/59)	30.2(36/119)
Leafy		2	4	3	4	3	2	30 (18/60)	2	5	1	2		16.9(10/59)	23.5(28/119)
greens															
Cassava	1	1	2	2	3	1	1	18.3(11/60)	5	3	2		4	23.7(14/59)	21 (25/119)
Pawpaw	3	1		3	3		1	18.3(11/60)	1			2	2	8.47(5/59)	13.4(16/119)
Pumpkin	5	1		1				11.6(7/60)			2		2	6.7(4/59)	9.2 (11/119)
Long beans	1	1	1	1	1		1	10 (6/60)					2	3.3(2/59)	6.7 (8/119)
Sweet		2	1	1				6.6 (4/60)							3.3 (4/119)
potato															
Kidney						1		1.6 (1/60)	1				1	3.3(2/59)	2.5 (3/119)
beans															
Banana				1				1.6 (1/60)	1		1			3.3(2/59)	2.5 (3/119)
Kumbili						1	1	3.3 (2/60)							1.6 (2/119)
tuber															
Breadfruit			1					1.6 (1/60)			1			1.6(1/59)	1.6 (2/119)
Sago									1	1				3.3(2/59)	1.6 (2/119)
Eggplant										1			1	3.3(2/59)	1.6 (2/119)
Soya beans									1					1.6(1/59)	0.84 (1/119)
Mango										1				1.6(1/59)	0.84 (1/119)
Eggs				1				1.6 (1/60)							0.84 (1/119)
Mung beans			1					1.6 (1/60)							0.84 (1/119)
Bitter beans					1			1.6 (1/60)							0.84 (1/119)
Bean						1		1.6 (1/60)							0.84 (1/119)
(foresikote)															

Table 14: Respondents' consumption of evening meal foods, by season

Snacks

Cassava and bananas are the most common snack foods eaten between the three main meals across the whole year. The percentage of respondents who consumed each type of snack food (Tetum: merenda) during the 12-month period of research is listed below.

cassava (21%) banana (11.7%) maize (10%) sweet potato (5.8%) rice, pawpaw, mango, taro (each 3.3%) coconut (2.5%) cucumber (1.6%) pumpkin, sago, wild beans, sweet cake/biscuit (each 0.84%)

Table 15: Most commonly eaten snack food, by season

Season	1	2	3	4
Dry	Cassava (25%)	Banana (15%)	Sweet potato (10%)	Coconut or pawpaw
				(5%)
Wet	Cassava or maize	Banana (8.4%)	Rice or mango or	
	(16.9%)		taro (5%)	

The most common snack food in both seasons is cassava (25% of respondents eat in the dry and 16.9% in the wet). Maize is five times more likely to be eaten as a snack food in the wet season than the dry, reflecting rationing to prolong reserves until the wet season. Rice is also rarely consumed as a snack in the dry season, and much more likely in the wet season, particularly December and January during the hungry season. An unexpected result is the almost negligible recording for peanuts, a common protein food grown across Timor (0.84% of respondents consumed peanuts during the 12-month period). This may be due to the fact that peanuts are a cash crop in many areas (e.g., Manucasa village in Aileu district, and Gariwai village in Baucau district), although the list of foods sold during the 12-month period of this survey does not support this. A household survey conducted in Timor Leste 2002 (Timor Lorosae Household Survey) revealed that 4 per cent of households grew peanuts and 1.7 metric ton was produced annually.

	May	Jun	Jul	Aug	Sept	Oct	Nov	Respondents	Dec	Jan	Feb	Mar	Apr	Respondents	Respondents
								who eat type						who eat type	who eat type
								of snack in						of snack in	of snack
								dry season						wet season	during year
								(%)						(%)	(%)
Number of	6	7	11	11	11	6	8	Total: 60	14	14	8	14	9	Total: 59	Total: 119
respondents															
Cassava	1		5	1	5	1	2	25 (15/60)	3	1		3	3	16.9(10/59)	21 (25/119)
Banana	1	1		4	2		1	15 (9/60)	1	3		1		8.4 (5/59)	11.7(14/119)
Maize	1						1	3.3 (2/60)	2	1	1	5	1	16.9(10/59)	10 (12/119)
Sweet			3	3				10 (6/60)					1	1.6 (1/59)	5.8 (7/119)
potato															
Mango							1	1.6 (1/60)	1	2				5 (3/59)	3.3 (4/119)
Taro							1	1.6 (1/60)	1	2				5 (3/59)	3.3 (4/1190
Pawpaw		1		1			1	5 (3/60)				1		1.6 (1/59)	3.3 (4/119)
Rice					1			1.6 (1/60)	1	1			1	5 (3/59)	3.3 (4/119)
Coconut		1			2			5 (3/60)							2.5 (3/119)
Cucumber	1							1.6 (1/60)					1	1.6 (1/59)	1.6 (2/119)
Arrowroot	1				1			3.3 (2/60)							1.6 (2/119)
Pumpkin	1							1.6 (1/60)							0.84 (1/119)
Peanuts					1			1.6 (1/60)							0.84 (1/119)
Sago	İ.		1					1.6 (1/60)							0.84 (1/119)
Wild beans		İ				1		1.6 (1/60)		İ					0.84 (1/119)

Table 16: Respondents' consumption of snack foods, by season

Wild foods

The earlier section headed 'foraging wild food' detailed the total variety of wild foods that could be harvested or foraged locally during the hungry season specifically. In contrast, this section focuses on those wild foods (Tetum: ai han fuik) recorded as consumed during the 12-month period of research. A much smaller variety of wild foods was elaborated. The most common foods consumed across both seasons were kumbile tuber, bitter beans, and sago. The percentage of respondents who consumed various types of wild foods during the 12-month period of research is listed below.

Kumbile tuber (26.8%) Wild beans (13.4%) Sago (10%) Pawpaw (4.2%) Wild cassava, uhi tuber, kuan tuber, maek tuber (each 3.3%) Aisame tuber, wild taro, tamarind, velvet bean (each 1.6%) Kanko greens, Bia tuber, Kalik bean, Koiabas fruit, Dubun banana, Singkumas tuber, Biahula tuber (each 0.84%)

Season	1	2	3	4
Dry	Kumbile (45%)	Bitter beans (18.3%)	Sago (13.3%)	Maek or uhi tubers
				(6.6%)
Wet	Kumbile (8.4%)	Bitter beans (8.4%)	Sago (6.7%)	Buraisa cassava,
				pawpaw (5)

Table 17: Most commonly consume	d wild foods consumed, by season
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Wild tubers such as kumbile, maek and uhi are foraged in the dry season only. The variety of wild foods available to be harvested is far more extensive in the dry season compared to the wet, and no foraging was carried out at all during the period January and February, but significant foraging was done earlier in the wet season i.e., November and December. Consumption of kumbile, bitter beans and sago are the most commonly foraged foods across both seasons, but dramatically less in the wet season. Kumbile may be harvested in the wild, or may be transplanted into a garden and cultivated for consumption, and is sold in urban markets in Dili during periods of food shortage such as the period before the maize harvest. Sago consumption is highest in November and December in the hungry season.

	May	Jun	Jul	Aug	Sept	Oct	Nov	Respondents	Dec	Jan	Feb	Mar	Apr	Respondents	Respondents
								who ate wild						who ate wild	who ate wild
								foods during						food during	foods during
								dry season						(%) wet season	the year (%)
Number of	6	7	11	11	11	6	8	Total: 60	14	14	8	14	9	Total: 59	Total: 119
respondents															
Kumbile tuber	3	2	5	6	4	3	4	45 (27/60)	5					8.4 (5/59)	26.8(32/119)
Wild beans	1	1	1	2	5	1		18.3(11/60)	4			1		8.4 (5/59)	13.4(16/119)
Sago		1	1	1	1		4	13.3 (8/60)	3			1		8.7 (4/59)	10 (12/119)
Pawpaw						2		3.3 (2/60)	1			1	1	5 (3/59)	4.2 (5/119)
Wild cassava	1							1.6 (1/60)	1			2		5 (3/59)	3.3 (4/119)
Uhi tuber		1		1	1		1	6.6 (4/60)							3.3 (4/119)
Kuan tuber				1			1	3.3 (2/60)	2					3.3 (2/59)	3.3 (4/119)
Maek tuber		1		1	1		1	6.6 (4/60)							3.3 (4/119)
Wild taro	1							1.6 (1/60)	1					1.6 (1/59)	1.6 (2/119)
Tamarind					1		1	3.3 (2/60)							1.6 (2/119)
Velvet bean				1	1			3.3 (2/60)							1.6 (2/119)
Aisame			2					3.3 (2/60)							1.6 (2/119)
Kojabas					1			1.6 (1/60)						-	0.94 (1/110)
fruit					1			1.0 (1/00)							0.04 (1/119)
Dubun banana					1			1.6 (1/60)							0.84 (1/119)
Singkumas				1				1.6 (1/60)							0.84 (1/119)
tuber				1											
Biahula tuber				1				1.6 (1/60)							0.84 (1/119)
Kanko leafy						1		1.6 (1/60)							0.84 (1/119)
Bia tuber			1					1.6 (1/60)			<u> </u>		<u> </u>		0.84 (1/110)
			1					1.0 (1/00)							0.04 (1/119)
Kalik bean												1		1.6 (1/59)	0.84 (1/119)

Table 18: Respondents' consumption of wild foods, by season

Wild foods may be the subject of 'taboo' (Tetum: bandu) if they are deemed to be prohibited (Tetum: lulik). The word 'lulik' has a complex sense of both sacred and dangerous (Andrew McWilliam pers comm..). Consumption by those for whom the food is taboo is believed to provoke natural disaster such as fatal lightning strike and strong winds damaging crops (e.g., Sarin, Aileu district), sickness or insanity (e.g., Bucoli and Waigai, Baucau district), fever and anaemia (e.g., Watulari, Baucau district), and even death of children (e.g., Seloi kraik, Aileu district). Foods are determined to be lulik according to custom which is socialized through large ritual houses made up of networks of small ritual houses which comprise households headed by men who are younger or elder siblings. Generally the taboos affect elderly men, and male and female custodians of ritual houses.

Meat including horse, buffalo, dog, cat, and bat are common taboo foods, as are beans including kidney bean, pigeon pea, kalik bean, and bitter bean (See Table 19 below). The WFP 2006 nutritional analysis claimed that food taboos and dietary practices lead to poor diets, citing a 2004 Oxfam baseline nutrition assessment of Oecusse which claimed that food taboos were often in relation to protein-rich foods such as fish, shrimp, chicken and dog but may also be in relation to cereals such as maize and rice. However, in the course of this research, there was no mention of staple cereals or tubers as objects of food taboo. (Note that this study did not collect data on taboo foods for Liquisa district.)

District	Hamlet	Type of food	Taboo followers
Aileu	Malani	Kidney beans, buffalo meat, sweet potato	Ritual elder only i.e., custodian of ritual house
	Lio	Pigeon pea, red banana, horse meat, meat of foreign goat	Elderly men and ritual elders
	Fatuk merei	No food taboos	
Baucau	Waisemu	Cat meat, bat meat, snow peas, cocoa, pigeon pea	For all mature men, but young boys may eat these foods
		Bat meat, wild kalik bean and bitter bean	For all mature women but depends on local custom whether followed or not
	Lari	Bitter bean, wild kalik bean, dog meat, red fish, pumpkin	For all mature men and women but depends on local custom whether followed or not. Some ritual houses prohibit consumption of these items by male members.
	Naulale	Pigeon pea, horse meat	Ritual elder only i.e., custodian of ritual house
	Ague	Horse meat and dog meat	Men and women
Manufahi	Ladiki	Baria (bitter leafy green), pumpkin leaves	Male and female ritual elders who attend the ritual house
	Selihasan	No food taboos	
	Datulor	No food taboos	

Table 19: Taboo foods (wild and cultivated), by hamlet

Meat

Fish and pork are the most common meats (Tetum: na'an) consumed. In Liquisa sub-district, monkey, cockatoo, turtledove, reptile, and possum were mentioned in response to the question about meat available locally for consumption during the hungry season, but as they were not mentioned by respondents during the period of this research, they are not listed below. The percentage of respondents who consumed various types of meat during the 12-month period of research is listed below.

fish (39.4%) pig (30.2%) buffalo (18.4%) chicken (10%) goat (7.5%) deer (3.3%) dog (2.5%) shrimp/boek (0.84%)

 Table 20: Most commonly eaten meats, by season

Season	1	2	3	4	5
Dry	Pig (45%)	Fish (33.3%)	Buffalo (16.6%)	Chicken (10%)	Goat (8.3%)
Wet	Fish (45.7%)	Buffalo (20.3%)	Pig (15.2%)	Chicken (10.1%)	Goat (6.7%)

Pig is three times more likely to be consumed in the dry season than the wet, reflecting the ritual season which takes place in the period August until October, prior to the rain and planting season. In the dry season and the wet, and particularly in the months of December and January i.e., the hungry season, fish is commonly consumed. However, meat consumption is not evenly spread: highest in upland Aileu, and lowest in lowland coastal Liquisa and Baucau. This suggests marketing of fish to upland areas occurs, and raises questions about the apparently low consumption of fish in coastal areas. The percentage of respondents who eat chicken is virtually identical in both seasons, while buffalo is less in the dry season. Fish, and to a lesser extent chicken, can be categorized as everyday meats, while pig, buffalo, and in some contexts chicken, are only consumed after being slaughtered for ritual occasions. Deer is consumed in Manufahi only, reflecting the high proportion of dense forest cover in this district which provides suitable habitat for large game.

Table 21: Respondents' consumption of meats, by season

Ma	Jun	Jul	Au	Sep	Oct	No	Meat	Dec	Jan	Feb	Mar	Apr	Meat	Meat
							eaten						eaten	eaten

								during						during	during
								dry						wet	year
								season						season	(%)
								(%)						(%)	
No. of resp.	6	7	11	11	11	6	8	Total:	14	14	8	14	9	Total:	Total:
_								60						59	119
Fish	1	2	6	3	3	1	4	33.3	9	7	2	4	5	45.7	39.4
								(20/60)						(27/59)	47/119
Pig		6	4	6	7	3	1	45	2	2	1	1	3	15.2	30.2
_								(27/60)						(9/59)	36/119
Buffalo		1	2	2	4	1		16.6	2	3	1	2	4	20.3	18.4
								(10/60)						(12/59)	22/119
Chicken		1	1	2	2			10		1	1	3	1	10.1	10
								(6/60)						(6/59)	12/119
Goat		1			2	2		8.3	1	1		1	1	6.7	7.5
								(5/60)						(4/59)	9/119
Deer			1	1	1			5					1	1.6	3.3
								(3/60)						(1/59)	4/119
Dog	1						1	3.3				1		1.6	2.5
								(2/60)						(1/59)	3/119
Shrimp								0	1					1.6	0.84
					1	1								(1/59)	1/119

SECURING ACCESS TO FOOD

Subsistence farmers secure access to food through several means including trading food (most commonly palm wine, cassava and leafy greens, and chickens and pigs) in order to buy other food (most commonly rice, salt, oil and sugar), and gifting food. The gifting of food between neighbours and members of extended family can be characterized as 'delayed reciprocity', in other words, the gift is replied at a later date when the household that has received the gift has surplus of their own, and/or they are aware that the other household has a shortage. Food items that are the subject of gifting are predominantly cassava, maize, hulled rice, and leafy greens. The practice of reciprocal gifting of food underlines the inter-dependency of Timorese households on extended family ties and the resources that may be mobilized and re-distributed through these networks.

Buying food

The most commonly purchased foods are rice, salt, oil, and monosodium glutamate (MSG) known locally as metcin. The extent of purchases of salt, MSG, garlic and sugar would suggest that subsistence farmer households use condiments to enhance diets of starchy foodstuffs, low in fats and proteins. Across the year, rice is the most commonly purchased product/foodstuff; significantly higher than all other items bought (58.8 per cent of respondents purchased rice during the 12-month period of research). Purchases are significantly higher during the wet season when other reserve foods have become exhausted. The percentage of respondents who purchased each item of produce mentioned during the 12-month period of research is listed below.

rice (58.8%) salt (47.8%) oil (34.4%) MSG (27.2%) sugar, maize (18.4%) two-minute noodles (supermi) (13.4%) coffee (10%) garlic/onion (8.4%) leafy greens (7.5%) cassava, taro, kidney beans, fried banana (each 4.2%) sweet potato, long beans (each 3.3%) biscuits (2.5%) bananas, bread, kumbile, peanuts (each 1.6%) meat, masako, pigeon pea, milk, breadfruit, fish (each 0.84%)

Table 22: Most commonly purchased foods, by season

Season	1	2	3	4	5
Dry	Salt (60%)	Rice (53.3%)	Oil (30.5%)	MSG (22%)	Sugar, maize (15.2%)
Wet	Rice (64.4%)	Salt (35.5%)	Oil (30.5%)	MSG (22%)	Sugar, maize (15.2%)

The main foods consumed, and their order of prevalence, are identical across both seasons (See Table 22 above). Purchase of maize is highest in the period November to January during the hungry season, and maize is consistently high throughout the year (See Table 24 below). In fact, 5 out of 14 respondent households purchased maize eleven times during the 12-month period of research, and eighty per cent of these purchases were made during the hungry season. The highest rate of purchase occurred in January when 28 per cent of respondents purchased maize. In contrast, 11 out of 14 respondent households purchased rice forty-one times, with significant purchases occurring in January and September. Households in Liquisa district were most likely to purchase maize and rice, while those in Baucau district were least likely.

		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April
	Number of respondents	6	7	11	11	11	6	8	14	14	8	14	9
District	Hamlet												
Manufahi	Debuwain							X		Х			
Manufahi	Selihasan			X	X	X		X	Х	Х			
Manufahi	Ladiki			X	X	X				Х			
Liquisa	Datulor			Х		X		Х	Х	Х			
Liquisa	Hekar					X							Х
Liquisa	Vatunao		Х		X								Х
Liquisa	Lisalara	Х	Х		X	X				Х			Х
Aileu	Lio	Х								Х			
Aileu	Malani	Х				X	X		Х	Х		Х	Х
Baucau	Nau lale		X					X					
Baucau	Wai semu	Х							Х	Х		Х	
	Percentage	66%	42%	27%	36%	54%	16%	50%	28%	57%	0%	14%	44%
	of	(4/6)	(3/7)	(3/11)	(4/11)	(6/11)	(1/6)	(4/8)	(4/14)	(8/14)	(0/8)	(2/14)	(4/9)
	households												

Table 23: Rice purchases, by month

that						
purchased						
rice						

As the longitudinal data suggests, rice may be consumed throughout the hungry season by those non-rice farmers who can afford to purchase it, and by rice farmers whose yield was sufficient to store until the new rice harvest (June until August). In fact the rice consumption figures for the months of January and February 2007 are not typical as critical rice shortages occurred across the country during these months. It is claimed that Timorese generally spend 30 per cent of monthly expenditure on cereals including 24 per cent on rice, and 6 per cent on maize and other grains, and 2 per cent on cassava and other roots and tubers (WFP 2006).

This study did not differentiate between consumption of imported or local rice. However, other studies have shown that households spend 9.75 per cent of total household expenditure on imported rice, and 1.59 per cent on local rice.¹³ Local rice has poor distribution channels and imported rice is readily available in remote areas. Further, retail prices for rice grown in Timor Leste are close to \$USD0.60 per kilogram compared to pre-2007 prices for imported rice of \$USD0.35 per kilogram.¹⁴ As suggested, rice is popular because it is readily available throughout the year and throughout Timor, and it is relatively cheap (in 2006, USD15 per 45kg bag in Dili, or USD0.30-0.40 cents per kilogram sold by the kilogram in local markets)¹⁵. The WFP 2006 survey reported rice being eaten on 46 per cent of occasions compared to maize at 28 per cent and cassava 26 per cent. Reasons that rice is more frequently eaten than other staples revolve around issues of labour, resources, and taste.

- rice cooks in 5-10 minutes when boiled and therefore requires little fuel (e.g., firewood) compared to maize which takes up to 40 minutes to boil¹⁶
- cooked rice that is not refrigerated overnight can be readily re-heated and eaten the following day, and maintains good taste
- cooked rice becomes soft and may be consumed by the entire family including the elderly and babies
- imported long grains are said to grow more during cooking and are therefore more filling (WFP 2006)
- rice sates the appetite, and where rice is not served among those accustomed to eating rice regularly the meal is considered to be incomplete, causing 'hamlaha' which may be translated as hunger

¹³ Based on data gathered from households in Maliana, Maubisse and Baucau in October 2006 by Carlos Rispatron, Economic Adviser, Office of the Prime Minister of Timor Leste.

¹⁴ Data on rice in this paragraph is drawn from two studies titled 'The Household Consumer Behavior and Inflation in Timor Leste: An Introduction' and 'Timor-Leste Rice Markets in the Crossroad: 2004 – 2007 Data' by Carlos Rispatron, Economic Adviser, Office of the Prime Minister of Timor Leste in November 2006 and February 2007.

¹⁵ WFP 2006 study

¹⁶ 98.5% of households in the WFP 2006 survey used firewood for cooking fuel.

	May	Jun	Jul	Aug	Sep	Oct	Nov	Respondents	Dec	Jan	Feb	Mar	April	Respondents	Respondents
	_			_	_			who					_	who	who
								purchased						purchased	purchased
								food during						food during	food during
								the dry						the wet	the year (%)
								season (%)						season (%)	
Number of	6	7	11	11	11	6	8	Total: 60	14	14	8	14	9	Total: 59	Total: 119
respondents															
Rice	5	4	8	4	1	4	6	53.3(32/60)	11	4	9	8	6	64.4(38/59)	58.8(70/119)
Salt	4	6	2	6	5	3	10	60 (36/60)	8	2	1	6	4	35.5(21/59)	47.8(57/119)
Oil	1	4	4	5	3		6	38.3(23/60)	6	2	2	4	4	30.5(18/59)	34.4(41/119)
MSG	3	4	3	3	2	1	4	33.3(20/60)	3	2	1	4	3	22 (13/59)	27.7(33/119)
Sugar		2	4	2	3	2		21.6(13/60)	2	1		4	2	15.2 (9/59)	18.4(22/119)
Maize	2	1	3	1	1	1	4	21.6(13/60)	3	3	2		1	15.2 (9/59)	18.4(22/119)
Noodles	1	1	2	1	1	2	2	16.6(10/60)	1	1		3	1	10.1 (6/59)	13.4(16/119)
Coffee		1	2		2	2	2	15 (9/60)				3		5 (3/59)	10 (12/119)
Garlic/onion	1		2	1				6.6 (4/60)			1	2	3	10.1 (6/59)	8.4 (10/119)
Leafy	1	1	1	1		2	2	13.3 (8/60)	1					1.6 (1/59)	7.5 (9/119)
greens															
Fried	2		1				1	6.6 (4/60)	1					1.6 (1/59)	4.2 (5/119)
banana															
Kidney		1	1				1	5 (3/60)		1	1			3.3 (2/59)	4.2 (5/119)
beans															
Taro		1	1		1		1	6.6 (4/60)		1				1.6 (1/59)	4.2 (5/119)
Cassava		2			1	1	1	8.3 (5/60)							4.2 (5/119)
Sweet		1	1	1	1			6.6 (4/60)							3.3 (4/119)
potato															
Long beans			1	1				3.3 (2/60)	1	1				3.3 (2/59)	3.3 (4/119)
Biscuit	1							1.6 (1/60)				2		3.3 (2/59)	2.5 (3/119)
Bananas				1		1		3.3 (2/60)							1.6 (2/119)
Bread	2							3.3 (2/60)							1.6 (2/119)
Kumbili			1		1			3.3 (2/60)							1.6 (2/119)
Peanuts		1	1					3.3 (2/60)							1.6 (2/119)
Masako			1					1.6 (1/60)							0.84 (1/119)
(stock															
cubes)															
Pigeon pea			1					1.6 (1/60)							0.84 (1/119)

Fish	1							1.6	(1/60)						0.84 (1/119)
Milk	1							1.6	(1/60)						0.84 (1/119)
Breadfruit			1					1.6	(1/60)						0.84 (1/119)
Meat			1					1.6	(1/60)						0.84 (1/119)
Total	25	30	42	27	22	19	40			37	18	17	36	24	
purchases															
by month															

Selling agricultural produce

Subsistence farmers may sell agricultural produce in order to purchase the foods mentioned above, particularly, rice. Significantly more produce is sold in the wet season than the dry season. Kumbile is the only wild food foraged and then sold. While kumbile may be foraged in the forest, it may also be transplanted and cultivated in one's garden. Most produce is sold during the hungry season in December and January, for example, coffee, and livestock such as pigs, chickens and dogs. This lends further evidence to the claim that assets such as livestock may be sold during the hungry season to raise cash to purchase rice or other food. The most common items of agricultural produce sold to raise cash are chickens, palm wine, cassava, leafy greens and pigs. The percentage of respondents who sold each item of produce during the 12-month period of research is listed below.

chicken – live (10.9%) palm wine, cassava (each 9.2%) leafy greens (7.5%) pig, coffee, banana (each 6.7%) sweet potato, maize (each 5%) rice (4.2%) coconut (4) dog, taro, mango (each 2.5%) pawpaw, bread, goat, salt, kumbile (each 1.6%) eggplant, betel leaf, areca nut, pumpkin, dried meat, shrimp/boek, fish, kidney beans, oranges, beans, kangkung (each 0.84%)

Table 25: Most commonly sold agricultural produce, by season

Season	1	2	3	4
Dry	Chicken (15%)	Sweet potato,	Cassava, rice	Coffee, banana,
		pig, palm wine	(8.3%)	coconut (6.6%)
		(10%)		
Wet	Leafy greens	Cassava (10.1%)	Palm wine	Coffee, banana,
	(11.8%)		(8.4%)	maize, chicken
				(6.7%)

Leafy greens are a significant wet season cash crop. Cassava sales are slightly higher in the months of December and January reflecting a market for cassava in the hungry season because other food reserves are exhausted prior to the new harvest. Sale of maize during the wet season occurs almost solely in Manufahi where a second maize crop is harvested. Rice sales in the dry season reflect harvest time in the dry season. Palm wine is not seasonal and fairly constant across both seasons, as are bananas and coffee. Chickens are more than twice as likely to be sold in the dry season compared to the wet. According to the WFP 2006 survey, 10 per cent of villages have a permanent market where local farmers sell their own produce, and 30 per cent use a periodic market. While there were no instances of sago being sold by respondents, during the period of research it was observed that 'sago' flour (from the sugar palm) was sold in the market in Alas sub-district, and blocks of unprocessed sago were sold on the roadside in Maubara sub-district.

Maize-dominant farmers sell livestock assets to raise cash to purchase rice mainly. Ownership of small livestock (chickens, pigs, goats) is fairly evenly distributed across all regions, however, holdings are not substantial with less than 1 per cent of WFP respondents claiming that they owned more than 20 chickens, pigs or goats (WFP 2006). 84 per cent of respondents owned chickens with 5.8 the average, 90 per cent owned pigs with an average of 2.8 pigs per household, and 35 per cent of households owned goats or sheep with 4.4 head being the average ownership. WFP describe the strategy of selling livestock as one

among several that food insecure households may use to mitigate effects of 'shocks': defined as drought, unavailability of food, reduced income of household member and cost of agricultural inputs. Further, households may have two stages of strategy: the first may involves 'consumption smoothing' i.e., reducing size and number of meals and changing content of meals, while the second stage is described as a 'negative crisis' strategy and involves loss of productive assets such as livestock and cash. Over time, repeated shocks and deployment of crisis strategies as a reaction, further decreases a household's food security.

The WFP data claims that when drought causes failure in maize and rice crops, 14 per cent of respondents sold assets (8 per cent poultry, 4 per cent goat and sheep, 2 per cent cow/buffalo). It is important to note that the quantity of livestock available to sell to purchase food is affected by livestock already committed to ceremonies carried out at the time of the death of a relative of one's extended family (Tetum: kore metan). In the event of the death of a man's family member (Tetum: fetosan), his wife's family is obliged to contribute pigs, and in the event of the death of a woman's family member (Tetum: umane), the husband's family is obliged to contribute animals including horse, buffalo, goat and chicken, as well as cash money.

	May	Jun	Jul	Aug	Sep	Oct	Nov	Resp	pondents	Dec	Jan	Feb	Mar	April	Resp	ondents	Respondents
				-	-			who	sold					-	who	sold	who sold
								prod	luce						produ	ıce	produce
								duri	ng the						durin	g the	during the
								dry	season						wet	season	year (%)
								(%)							(%)		
Number of	6	7	11	11	11	6	8	Tota	al: 60	14	14	8	14	9	Total	: 59	Total: 119
respondents																	
Chicken	2	1		1	2	1	2	15	(9/60)	1		3			6.7	(4/59)	10.9 (13/119)
(live)																	
Cassava	1		2				2	8.3	(5/60)	3	1	1	1		10.1	(6/59)	9.2 (11/119)
Palm wine	1		2	1	1		1	10	(6/60)	2		2	1		8.4	(5/59)	9.2 (11/119)
Leafy				1			1	3	(2/60)	2		3	1	1	11.8	(7/59)	7.5 (9/119)
greens																	
Pig (live)	1			1	1		3	10	(6/60)			1	1		3.3	(2/59)	6.7 (8/119)
Coffee		1		1	1		1	6.6	(4/60)	2	1			1	6.7	(4/59)	6.7 (8/119)
Banana	1	1	1	1				6.6	(4/60)	2	1		1		6.7	(4/59)	6.7 (8/119)
Maize		1			1			3.3	(2/60)			2	2		6.7	(4/59)	5.0 (6/119)
Sweet	2	1	2	1				10	(6/60)								8.4 (10/119)
potato																	
Rice	1	1		1	1	1		8.3	(5/60)								4.2 (5/119)
Coconut	1					2	1	6.6	(4/60)								3.3 (4/119)
Dog (live)							2	3.3	(2/60)	1					1.6	(1/59)	2.5 (3/119)
Mango						1	1	3.3	(2/60)		1				1.6	(1/59)	2.5 (3/119)
Taro		1		1				3/3	(2/60)	1					1.6	(1/59)	2.5 (3/119)
Pawpaw	1	1						3.3	(2/60)								1.6 (2/119)
Bread					1		1	3.3	(2/60)								1.6 (2/119)
Salt	1							1.6	(1/60)		1				1.6	(1/59)	1.6 (2/119)
Kumbili		1				1		3.3	(2/60)								1.6 (2/119)
Goat (live)	1						1	3.3	(2/60)								1.6 (2/119)
Eggplant		1						1.6	(1/60)								0.84 (1/119)
Betel leaf							1	1.6	(1/60)								0.84 (1/119)
									. ,								. ,
Areca nut							1	1.6	(1/60)								0.84 (1/119)
Pumpkin											1				1.6	(1/59)	0.84 (1/119)
Buffalo					1			1.6	(1/60)								0.84 (1/119)
meat (dried)																	

Table 26: Respondents' sale of agricultural produce, by season

Shrimp	1							1.6	(1/60)								0.84	(1/119)
Fish	1							1.6	(1/60)								0.84	(1/119)
Kidney											1				1.6	(1/59)	0.84	(1/119)
beans																		
Oranges														1	1.6	(1/59)	0.84	(1/119)
Beans														1	1.6	(1/59)	0.84	(1/119)
Kangkung			1					1.6	(1/60)								0.84	(1/119)
Total sales	15	10	8	9	9	6	18			14	7	12	7	4				
by month																		

Gifting food

Gifts function to maintain and build social relationships. Gifts are given to, and received from, extended family members and neighbours. Gifts of agricultural produce are very common among subsistence farmers with the most common staples, cassava, maize, and hulled rice, also the most commonly gifted foods. Sago, kumbile, and bitter beans, are the most commonly consumed wild foods, and the only wild foods that are gifted. The percentage of respondents who gifted items of produce during the 12-month period of research is listed below.

cassava (29.4%) maize (17.6%) hulled rice (10%) leafy greens (7.5%) unhulled rice, banana (6.7%) sweet potato (5%) meat (4.2%) kumbile (3.3%) long beans, taro, kidney beans (each 1.6%) sago, salt, sugar, arrowroot, pawpaw, chicken (each 0.84%)

Table 27: Most commonly gifted food, by season

Season	1	2	3	4	5	6
Dry	Cassava	Hulled rice	Maize (15%)	Banana (10%)	Sweet potato	Unhulled rice,
	(38.3%)	(18.3%)			(8.3%)	leafy greens,
						kumbile (each
						6.6%)
Wet	Cassava,	Leafy greens	Unhulled rice	Banana	Meat (3.3%)	
	maize	(8.4%)	(6.7%)	(3.3%)		
	(20.3%)					

Cassava and maize are the most common gifts across both seasons. Most maize is gifted in the month of the maize harvest (February-March). Higher prevalence of cassava gifting occurs in the months of the hungry season i.e., November and December (as well as August). Maize is a much more prestigious gift and a preferred food to cassava which is used in many places as a back-up food when maize or rice is in short supply. Also, maize demand always outstrips supply while cassava is produced in such surplus that it is fed to animals. Very little rice is given in the wet season (1.6% for hulled and 6.7% for unhulled compared to dry season figures of 18.3% for hulled 6.6% for unhulled). However, there were five instances where respondent households purchased rice and then gave a portion of that rice away to neighbours or family members. We can assume that rice farmers' reserves are low or exhausted during the hungry season, when farmers are waiting for the new rice harvest (approximately April to June for irrigated rice, and the end of the wet season for upland rice).

Categorization of gifted rice into hulled (Tetum: fos) and unhulled (Tetum: hare) signals that rice gifted is self-grown, or perhaps local rice, as imported rice is sold as hulled rice only. The same amounts of unhulled rice are gifted in both seasons. Hulled rice has greater prestige than unhulled rice which cannot be consumed immediately and requires energy to process. This is reflected in the market price in Dili for unhulled rice (US\$0.13 per kilo) compared to hulled rice (US\$1.00 per kilo). In spite of the fact that reserve food becomes exhausted in the hungry season, the months of November and December still see significant gifting occurring with the months of January and March significantly less.

Table 28: Respondents' food gifting, b	oy season
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	May	Jun	Jul	Aug	Sep	Oct	Nov	Resp	ondents	Dec	Jan	Feb	Mar	April	Resp	ondents	Resp	ondents
				-	-			who	gifted					-	who	gifted	who	gifted
								food	during						food	during	food	during
								the	dry						the	wet	the y	ear (%)
								seaso	n (%)						sease	on (%)		
Number of	6	7	11	11	11	6	8	Total	: 60	14	14	8	14	9	Tota	l: 59	Tota	: 119
respondents																		
Cassava	3	3	3	6	2	2	4	38.3	(23/60)	6	1	3	1	1	20.3	(12/59)	29.4	(35/119)
Maize	1	3	2	2		1		15	(9/60)	3	1	5	1	2	20.3	(12/59)	17.6	(21/119)
Hulled rice	3	2	2	1	1		2	18.3	(11/60)	1					1.6	(1/59)	10 (12/119)
Leafy		1	1	1		1		6.6	(4/60)	2	1		1	1	8.4	(5/59)	7.5	(9/119)
greens																		
Unhulled			1	1	1		1	6.6	(4/60)	2		1		1	6.7	(4/59)	6.7	(8/119)
rice																		
Bananas		1	1	2			2	10	(6/60)			1		1	3.3	(2/59)	6.7	(8/119)
Sweet	1	1	2	1				8.3	(5/60)					1	1.6	(1/59)	5.0	(6/119)
potato																		
Meat			1	1	1			5	(3/60)		1		1		3.3	(2/59)	4.2	(5/119)
Kumbili				1	1	1	1	6.6	(4/60)								3.3	(4/119)
Long beans						2		3.3	(2/60)								1.6	(2/119)
or soya																		
beans																		
Taro	1				1			3.3	(2/60)								1.6	(2/119)
Kidney			1					1.6	(1/60)	1					1.6	(1/59)	1.6	(2/119)
beans																		
Sago						1		1.6	(1/60)								0.84	(1/119)
Salt				1				1.6	(1/60)								0.84	(1/119)
Sugar										1					1.6	(1/59)	0.84	(1/119)
Arrowroot				1				1.6	(1/60)								0.84	(1/119)
Pawpaw														1	1.6	(1/59)	0.84	(1/119)
Chicken		1						1.6	(1/60)								0.84	(1/119)
Total food	9	12	14	18	7	8	10			16	4	10	4	8				
gifts by																		
month																		

Receiving gifts of food

The most commonly received gifts of food are maize, cassava, leafy greens and rice, as expected, mirroring the food types mentioned as gifted (see Table 27 above). The percentage of respondents who received gifts of agricultural produce during the 12-month period of research is listed below.

maize (21%) cassava (13.4%) leafy greens (10%) hulled rice (6.7%) unhulled rice (5.8%) sweet potato (4.2%) banana, meat (3.3%) coffee (2.5%) sago, arrowroot, salt, garlic, kidney beans, sago (each 1.8%) bitter beans, kumbile, chicken, cooking oil, pawpaw, velvet bean (each 0.84%)

Table 29: Most commonly received foods, by season

Season	1	2	3	4	5
Dry	Maize (60%)	Cassava (15%)	Hulled rice	Sweet potato,	Unhulled rice
			(10%)	leafy greens	(6.6%)
				(8.3%)	
Wet	Maize (18.6%)	Cassava, leafy	Unhulled rice	Hulled rice	
		greens (11.8%)	(5%)	(3.3%)	

Across both seasons, maize is most commonly received as a gift, followed by cassava which is received throughout the year. In the two months of November and December, in the early part of the hungry period, there is an increase in the number of food gifts received. Hulled and unhulled rice are both received as gifts, with more than twice as many respondents receiving rice in the dry season compared to the wet, but no rice received during the tail-end of the hungry season in February, March and April in the period prior to the rice harvest. Unhulled rice is much more likely to be gifted in the wet season suggesting that reserves of hulled rice are exhausted.

Table 30: Respondents' receipt of food gifts,	by season
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	May	Jun	Jul	Aug	Sep	Oct	Nov	Resp	ondents	Dec	Jan	Feb	Mar	Apr	Resp	ondents	Resp	ondents
				Ũ				who	•						who		who	
								rece	ived						recei	ved	rece	ived
								food	gifts						food	gifts	food	gifts
								duri	ng dry						durir	ng wet	duri	ng year
								seas	on (%)						seaso	n (%)	(%)	
Number of	6	11	11	11	11	6	8	Tota	ıl: 60	14	14	8	14	9	Tota	: 59	Tota	d: 119
respondents																		
Maize		3	1	2	1	1	6	60	(14/60)	3	1	6	1		18.6	(11/59)	21	(25/119)
Cassava		2	1	4		2		15	(9/60)	2	1	3	1		11.8	(7/59)	13.4	(16/119)
Leafy		2		1			2	8.3	(5/60)	5		1	1		11.8	(7/59)	10	(12/119)
greens																		
Hulled rice	1	1	1			1	2	10	(6/60)	1	1				3.3	(2/59)	6.7	(8/119)
(hare)																		
Unhulled	2		1		1			6.6	(4/60)	2	1				5	(3/59)	5.8	(7/119)
rice (fos)																		
Sweet	1	1	1	2				8.3	(5/60)								4.2	(5/119)
potato																		
Banana				2			1	5	(3/60)			1			1.6	(1/59)	3.3	(4/119)
Meat	1		1			1		5	(3/60)				1		1.6	(1/59)	3.3	(4/119)
Coffee					1		1	3.3	(2/60)			1			1.6	(1/59)	2.5	(3/119)
Sago			1					1.6	(1/60)		1				1.6	(1/59)	1.6	(2/119)
Arrowroot				2				3.3	(2/60)								1.6	(2/119)
Salt			1	1				3.3	(2/60)								1.6	(2/119)
Garlic				1	1			3.3	(2/60)								1.6	(2/119)
Kidney				1	1			3.3	(2/60)								1.6	(2/119)
beans									. ,									` ´
Kumbili					1			1.6	(1/60)								0.84	(1/119)
Bitter beans										1					1.6	(1/59)	0.84	(1/119)
Chicken	1							1.6	(1/60)								0.84	(1/119)
Oil	1	1		1	1	1	1	1.6	(1/60)			1	1	1	1		0.84	(1/119)
Pawpaw		1			1			1.6	(1/60)			1					0.84	(1/119)
Lehe								0	(•)	1					1.6	(1/59)	0.84	(1/119)
Total food	6	10	8	16	7	5	12	-		15	5	12	4	0		(=, = >)		(=, ==>)
received by					ľ	[.								ľ				
month																		

Sharing the harvest

Subsistence farmers may also secure food through sharing in another farmer's maize or rice crop at the time of harvest. Land owner farmer members of mutual labour exchange groups (Tetum: grupo servisu hamutuk) may give a share of their harvest to other members in exchange for their labour (See SOSEK Cultivation of staple foods report 2007). This may not result in a net food gain for the respective members of the mutual labour group as each farmer gives away a substantial quantity of their own harvest to other members. It does however potentially spread risk, and consolidate social relations between labour exchange group members comprising neighbours who are non-kin, and extended family (husband's side and wife's side). The subject of sharing the harvest is under-researched, but it is important to our understanding of food security as it can be conceived as another strategy of securing access to food by farmer households.

Members of mutual labour groups undertake intensive activities in large gardens that are beyond the labour availability of the household unit e.g., felling and burning tall trees in the process of 'opening' a new garden, or weeding maize. These activities have the highest labour requirement in the cultivation cycle. Sharing a maize harvest is more likely to occur where a mutual labour group has participated in several activities related to that crop's cultivation e.g., garden preparation and burning, planting, weeding, and harvesting. The maize offered may be of a certain type e.g., young maize, mature maize, large cobs or small cobs. Further, the quantity of maize distributed may be measured. For example, members of a mutual labour group in Fatuk merei hamlet (Aileu district) who participated in maize cultivation activities throughout the season were given one wreath (Tetum: talin) comprising ± 50 cobs per person. However, the use of mutual labour groups to harvest maize and the quantity of maize shared is dependent on the size of the harvest. A poor harvest might mean that only the household producers gather in the crop.

In Datulor hamlet (Manufahi District), farmers invite others to provide assistance at the time of harvesting maize or rice. Those assisting usually do not have their own gardens and are compensated with a share of the harvest. However, where extended family members assist with the harvest, the farmer must give them a share of the harvest regardless of whether they have their own garden. This system was seen to be burdensome by the respondent in question as the farmer was often left with a substantially reduced harvest for storage.

CONCLUSION

- For subsistence farmers, food availability is closely correlated with the harvest cycle of the staple food crops and traditional seasonal coping mechanisms involving shifting consumption patterns from rice and maize, to roots and tubers (cassava, sweet potato, kumbile tuber, taro, arrowroot, pumpkin).
- Maize is an important staple food and demand outstrips a farmer's reserves even though rationing methods are practiced. Such is the hunger for maize that it is not uncommon for households to consume maize seed set aside for planting. Some households borrow seed for planting, usually with interest, from neighbours or relatives, while others purchase maize seed in a random manner from sellers in the market. These practices are a direct response to cereal deficit and have implications for the dissemination of new varieties of maize.
- When maize reserves are exhausted, farmers are more likely to purchase rice rather than maize due to factors of distribution, cost, and labour. Subsistence farmers' reliance on imported rice as a reserve food during the wet season, and especially the hungry season, means that the GoTL must ensure distribution and affordability of rice during this period particularly.
- Maize that produces higher yields and allows farmers to increase reserves, thereby reducing the maize deficit period, will reduce the need for farmers to sell livestock assets such as goats and pigs, and dogs, to purchase rice. Surplus production of saleable staples such as sweet potato and peanuts will provide subsistence farmers with the means to purchase other foods considered essential such as salt, oil, MSG, and sugar, without depleting their own fragile food reserves, or selling livestock. Palm wine is the second most common trading commodity next to chicken, and functions as an important source of cash revenue that depletes neither food reserves nor assets.
- Consumption of wild tubers, leaves and small game from forested areas constitutes a critical food security strategy. Kumbile tubers, bitter beans and sago are everyday foods in the dry season throughout all of the eight sub-districts of this study. Subsistence farmers' reliance on wild foods for survival highlights the importance of maintaining the integrity of forested areas.
- The technique of repeated boiling to remove bitterness and poison in wild foods including bitter beans and tubers other than kumbile, renders a particular labor burden for women who are primarily responsible for drawing water and gathering firewood, as well as cooking. Further research into the division of labour for foraging and preparation of wild food types would provide more detailed insights into the labour burden associated with wild food consumption. One of the social impacts of surplus agricultural produce may be reduced reliance on wild tubers that require labour-intensive preparation
- A 'hungry season' occurs over several months when crops are growing but are not yet ready to be harvested. The hungry season coincides with the labour intensive activity of weeding maize, and the tail-end of the period without maize, usually 1-3 months prior to the new maize harvest in March. It is considered to have ended when the main maize is harvested. The data from this study has revealed little about a second minor hungry season in August to September (mentioned in ARP I and II Baseline 2004) and further research could be carried out in relation to occurrence, causes, and food acquisition strategies during this period.

• The common practice of giving and receiving food throughout Timor Leste does not aim to affect a net food gain, but functions to strengthen social networks between neighbours who are non-kin, and in-laws, and in doing so, helps to secure access to food. Research into the way that food is distributed through extended family ties, and through mutual labour exchange groups will further extend understanding about food security in Timor.

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