

Tanzania Livelihood Baseline Profile

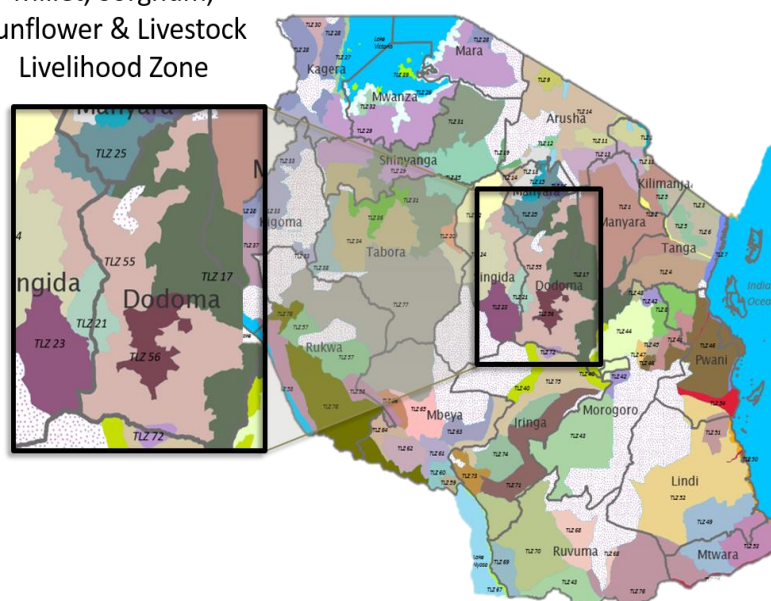
Singida-Dodoma Bulrush Millet, Sorghum, Sunflower & Livestock Livelihood Zone (TLZ 55)

December, 2015¹

Zone Description

The *Singida-Dodoma Bulrush Millet, Sorghum, Sunflower & Livestock Livelihood Zone* is a large zone that spans a section of north eastern Singida and the majority of western and southern Dodoma. The administrative units that make up this zone include parts of Kondoa, Chemba, Chamwino, Bahi and Mpwapwa districts in Dodoma Region and parts of Singida District Council and Manyoni District in Singida Region. The main ethnic groups living here are the Gogo and Rangi in Dodoma and the Nyaturu in Singida. The population density in the part of the zone that falls within Singida is around 28 people per km²; it is higher in Dodoma, averaging around 50 people per km².

Singida-Dodoma Bulrush Millet, Sorghum, Sunflower & Livestock Livelihood Zone



This livelihood zone is found in the semi-arid central region of Tanzania, which experiences low rainfall, a short – often erratic - rainy season, and the frequent occurrence of drought. The topography of this semi-arid midland zone, which lies between 900 and 1,200 meters above sea level, is made up of undulating plains, interspersed with hills and valleys, and covered by a mixed vegetation of bush and savannah grasslands. Total rainfall ranges from 200-400 mm per year, with a large degree of inter-annual variability. Maximum temperatures are 30-38°C in November and 16-20° C in July. Natural resources found here include the fruit of the Baobab tree, which is gathered, consumed and sold by the majority of households. Salt mines are exploited in Bahi and Chamwino and honey is produced in some areas the zone, although these income sources are not typical everywhere. The Sang'anga Mountain is found here, located in Mpwapwa; and there are two significant seasonal rivers – the Kinyasumbwi, in Mpwapwa and the Bubu, in Kondoa. The greater north road runs through the zone, part of the central infrastructure network of Africa that connects Cairo to Cape Town. In addition, a number of roads provide transportation routes throughout the zone, including one that connects Kondoa to Tanga via Chemba and Kiteto; one that connects Dodoma to Singida via Bahi; another that runs from Dodoma to Iringa via Chamwino; one connecting Dodoma to Arusha, from Dodoma to Mpwapwa and finally Dodoma to Dar es Salaam via Morogoro. The Kondoa-Chemba-Farkwa-Kwamtoro-Singida-Dar es Salaam-Dodoma-Kigoma Railway provides another important means of transporting goods and people.

¹ Fieldwork for the current profile was undertaken in October 2015. The information presented in this profile refers to the reference year, which was the consumption year that started in April 2014 and ended in March 2015. Provided there are no fundamental and rapid shifts in the economy, the information in this profile is expected to remain valid for approximately five to ten years (i.e. until 2020-2025). All prices referred to in the document are for the reference year.

Rain fed agriculture and livestock production form the foundation of the local economy. The soils are sandy loams with medium fertility, and when rains occur, bulrush millet - a hardy cereal crop grown in the marginal semi-arid tropical regions of Africa and Asia – does well here. Millet features largely in this livelihood zone as a food crop, providing a drought-tolerant alternative to maize. Maize is still grown by all households, but not in the quantities grown in neighbouring zones. The other main food crops are sorghum, groundnuts, and sunflower (for oil). The most important cash crop is sesame, followed by sunflower and then groundnuts, and finger millet for some wealth groups. All crops are harvested just once a year. Poorer households cultivate using hand hoes, while those in the upper wealth groups use ox ploughs and even tractors. Better off and middle households cultivate more land than they can manage on their own, so they hire local seasonal labourers throughout the agricultural season. Land preparation, weeding and harvesting are the most labour-intensive activities. Farmers do not apply chemical fertiliser, however most who are able use animal manure. *Quelea quelea* birds pose a significant threat to the bulrush millet and sorghum crops and Elegant Grasshoppers threaten the maize, sesame and sunflower harvest on a regular basis.

Livestock contribute a critical source of cash for middle and better off households, allowing them to invest in their land and hire poorer households, among other things. Cattle, oxen and goats are kept, along with chickens. Oxen are used for traction; cows are used for milk, and bulls and goats are slaughtered for meat during festivals and also sold to generate cash. All larger livestock are also used as a source of manure to fertilize the fields. Chickens are used for eggs, eaten throughout the year, and they are sold whenever cash is needed. All livestock graze and/or browse freely, with chickens being fed crop residues and kitchen scraps. Rainy season water sources for livestock include seasonal pools and rivers as well as shallow wells dug in seasonal river beds. In the dry season, livestock rely on water from deep wells, supplemented by purchased water in some villages. In some parts of the zone the livestock herd is moved during the dry season to pasture lands and water points outside the livelihood zone. Men are responsible for taking care of cattle and goats, whereas women manage the chicken flocks.

This livelihood zone experiences a food deficit one out of every two years. Livestock are even more important in years when rainfall levels are too low for crop production, because, as long as pastures can be sustained, animals provide a means of generating cash even when crops fail; and when rains fall again, they help people consolidate gains and recover. Not all households benefit from the contributions livestock make, however. Only those in the top two wealth groups own meaningful numbers of cattle and oxen and very poor households do not own anything except for chickens. These households lack access to animal traction to cultivate their fields, animal manure to fertilise their fields, milk for both consumption and sale, occasional meat from animals that are slaughtered, and sizeable cash income from the sale of livestock on the hoof.

Poorer households, because they have smaller plots for crop production and very few livestock, depend heavily on seasonal agricultural labour - land clearing, ploughing, planting, weeding and harvesting - to generate cash income. The peak for this labour demand occurs from September through June. They also piece together supplemental cash resources in the dry season by burning and selling charcoal, collecting and selling firewood, making and selling bricks and collecting and selling baobab fruits. Most of these sources depend on demand from urban dwellers in local towns.

Services in this zone are on a par with much of rural Tanzania. Water is obtained from seasonal rivers, ponds, open wells, bore holes and taps. The availability of potable clean water is not always ensured, however, and people do buy water in this zone from village taps. Sanitation facilities are variable, with poorer households dependent on uncovered pit latrines, and better off households using covered pit latrines. Garbage is collected and disposed of in designated village spots. Most villages have a health dispensary, which provides basic drugs and medicines; however more complicated medical procedures require a trip to a hospital, found in the regional towns of Singida or Dodoma. In general, though, it is not easy to get access to good quality medical care unless you can afford to pay for care at one of the private hospitals. Primary schools are found in all villages, and secondary schools are available in the ward centres. Better off households may send their children to private schools since they can afford the extra costs of uniforms, stationery, and transportation. Poorer households do not send their children beyond primary school. There is no electricity in this zone. Poorer households depend on kerosene lamps and battery-operated torches or and the upper wealth groups

may use solar lanterns for light. Households in all wealth groups have mobile phones, although the cellular network is not reliable everywhere. Microfinance opportunities are accessible through either FINCA (microfinance institution) and SACCOS (informal cooperative groups). They latter provide loans to groups of people who share out the credit on a rotating basis. Village Community Banks (VICOBA) offer households a chance to save money on a weekly basis for up to a year. The World Food Programme (WFP) was providing school feeding in this zone until 2015, but recently stopped operations. A local NGO, the Tanzania Social Action Fund (TASAF), provides support to a small number of very poor households, supplying grants for education, buying livestock (gifts of dairy goats to feed children), and health. Tanzania Women Lawyers Association (TAWLA) addresses gender equality; Helvetors provides support to the production of horticultural crops by developing irrigation systems in Ntunduu, Singida; and AFRICARE helps on the sanitation side, constructing improved toilets and toilets covers.

Markets

The transportation infrastructure in this zone is relatively well developed. The main roads in the zone are tarmac, with the exception of the Dodoma-Kondoa road, which means that the zone is generally accessible during the rainy season. However, feeder roads connecting main roads to villages are rough dirt roads that quickly become inaccessible during the rains. People travel by foot, bicycle or *boda boda* (motorcycle taxi) from village to village. Traders are able to reach most villages in the zone at harvest time, traveling by small vehicle or truck on dried-out dirt roads after the rains have stopped for at least a month. Many villages have only a weekly market, although wealthier households in some villages own kiosks where they sell things like soap, salt, kerosene, batteries and stationery goods on a daily basis. In the lean season poorer households usually buy grain directly from better off households, somewhat mitigating the need for a physical market in the village.

Dodoma and Singida are the central intermediary markets connecting villages in this zone to terminal markets like Dar es Salaam, India and China. In some cases, regional centres act as the terminal market; for example, sunflower is bought up locally in June and July and transported to Dodoma, Kondoa and Singida, where it gets processed and sold in the local urban markets. Other crops, however, have a longer journey to make. Groundnuts, also marketed in June and July, are bought by traders and transported to Singida and sent on to Dodoma, or sent directly to Dodoma, depending on where they are produced in the zone, after which they are transported by truck to Dar es Salaam. Sesame makes its way all the way to India and China, passing through Singida, and/or Dodoma and Dar es Salaam first. Dar es Salaam is the terminal market for much of the livestock, although some are retained along the way to meet the urban demand in Singida and Dodoma.

Cattle, goats and chickens are the main livestock sold by households in this zone. Although livestock are sold throughout the year, there are two peak periods: one from May through July, when livestock are in the best condition and prices are highest; the second is in January and February, the lean season - when poorer households need to buy food. Households sell one or two animals at a time at mobile markets (for cattle and goats) often near dry season grazing areas; traders collect and transport livestock to Dar es Salaam by truck. The urban demand for meat drives the livestock trade, and Dar es Salaam is the main terminal market for most livestock. Chickens provide small amounts of cash to households in all wealth groups; these are sold throughout the year in local markets, with sales peaking at times when expenditure requirements are high, such as January through February, the lean season, or in June and December, when school fees need to be paid.

Poorer households run out of food from their own harvests by December or January, even in good production years. They need to buy food - mostly maize grain - at this time to cover their staple food needs. This maize is sourced from local households who produce a surplus (those in the upper wealth groups) and it also comes from other surplus-producing areas in Tanzania via the Singida and Dodoma markets. This supply of maize becomes especially important in bad years, when local stocks, even for better off households, contract. Beans, an important source of protein, are purchased by all households, and in larger quantities by those on the upper end of the wealth spectrum. Beans come from Tanga Region via the Handeni market to Dodoma

and are then distributed to local village markets throughout the zone. Rice, purchased almost exclusively by the upper wealth groups, is sourced from Shinyanga or Iringa and distributed via the Dodoma market. Non-food essentials, like salt, soap, batteries and kerosene, are sold in local kiosks, often owned by better off farmers.

Charcoal is sold by poorer households to raise cash for food and other essential goods. The season for charcoal production is June through October. There is a high demand for charcoal from urban dwellers in Singida and Dodoma. Urban demand for building materials, like bricks, also generates income for poorer households in this zone.

Seasonal labour opportunities here are largely local, driven by the demand for agricultural labour on the larger farms. It was estimated that in the reference year, 70% of seasonal labour was found within the zone on local farms. An additional 10% of labour demand came from local towns and the final 10% came from outside the livelihood zone. Both men and women take on paid agricultural work. There are three peak periods of labour demand: September to December for land clearing, land preparation and planting; January and February for weeding; and April through July for harvesting. A small number of people also find work outside the zone, but most people work locally unless it is a bad year. In bad years, the demand for local agricultural labour especially for weeding and harvesting, contracts. As a result, people are forced to travel in the December to February period to places like Tanga, Iringa, Kiteto, Bagamoyo, and Morogoro, where they seek work on larger scale farms or plantations. People also find opportunities in urban centres, like Dodoma town and Dar es Salaam. There is no labour migration into the zone from other areas in any year.

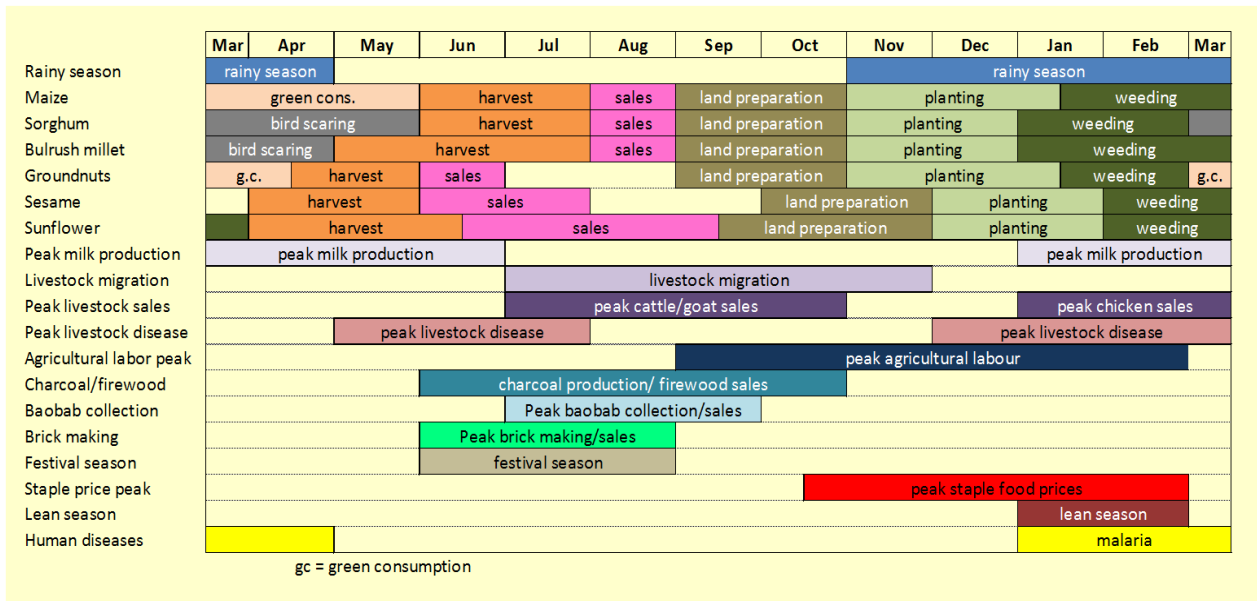
Timeline and Reference Year

The baseline assessment refers to a very specific time period called the reference year. In the *Singida-Dodoma Bulrush Millet, Sorghum, Sunflower & Livestock Livelihood Zone* the reference year covered the **consumption** period from April 2014 to March 2015. During community leader interviews, informants were asked to rank the last five years in terms of seasonal performance with '1' indicating a poor season and '5' an excellent season. The table below, which summarizes the response of the community leaders, shows year quality by *production* year (which starts with the planting season in November/December and ends with the harvest in March-June of the following calendar year). Thus, the production year of 2013-2014 corresponds to the consumption year of 2014-2015. As shown in the table, the production year corresponding to the reference year was average, with average rains, average crop yields and normal food prices. The baseline information presented in this profile, therefore, provides a view into how households in this livelihood zone make ends meet in an average year, drawing on a normal range of options.

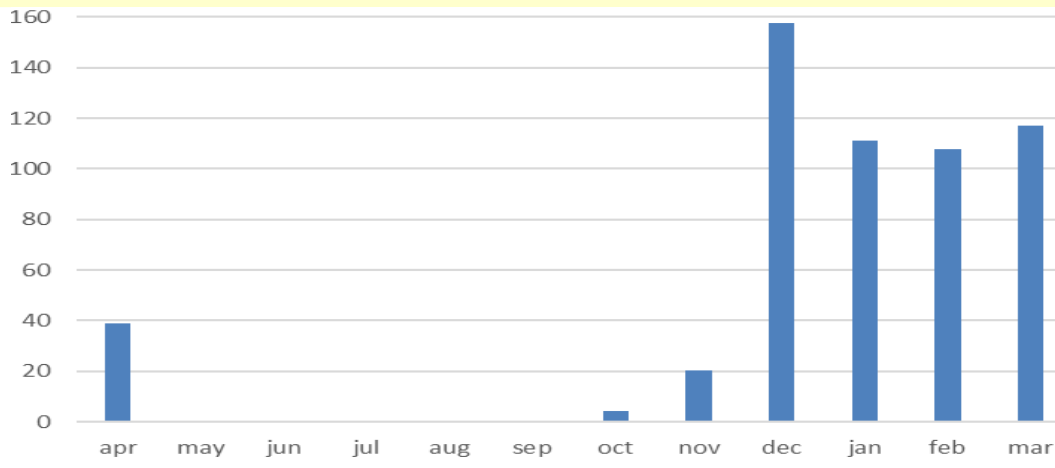
Production Year	Rank	Critical Events
2014-2015	2	Below average rains, low crop yields, high food prices
2013-2014	3	Average rains, average crop yields, average food prices
2012-2013	3	Average rains, average crop yields, average food prices
2011-2012	3	Average rains, average crop yields, average food prices
2010-2011	2	Below average rains, low crop yields, high food prices

5 = an excellent season for household food security (e.g. due to good rains, good prices, good crop yields, etc.)
 4 = a good season or above average season for household food security
 3 = an average season in terms of household food security
 2 = a below average season for household food security
 1 = a poor season (e.g. due to drought, flooding, livestock disease, pest attack) for household food security

Seasonal Calendar for Reference Year



The graph to the right shows average monthly rainfall (mm) in Dodoma Region based on a recent 10-year period (2005 – 2014). Source: TZ Meteorology Department



There is one long rainy season in this livelihood zone, starting in November and lasting until April, although a short dry spell in February often interrupts the rains. Land preparation (clearing and ploughing), with poorer households cultivating by hand and the two upper wealth groups using animal traction, starts in September for most crops and lasts for two months, although it occurs slightly later for sesame and sunflower. Most planting takes place from November through December, once the rains are fully established. Maize is intercropped with groundnuts and sunflower or sesame. Once crops germinate and begin to grow, people start to concentrate on weeding. This period, in January and February, is one of the most labour-intensive times of the year. All poorer households have at least one member working on the larger farms of middle and better off households. The weeding period coincides with a time when poorer households have run out of their stocks from the previous year's harvest. Some, in fact, run out as early as November or December, but by January none of the poorer households have food stocks left at home. These households need to purchase all of their staple foods during these months, just when the price of staple foods is highest; and as this is also the time of year when malaria is most prevalent, spending on health care may also become a pressing need. Thus, demand for labourers from middle and better off households helps provide needed cash to poorer households, allowing them to bridge the gap until March, when the green harvest of groundnuts and maize comes in. However, by spending their time on the farms of their richer neighbours, rather than investing in their own fields, poorer households have less to harvest in the next season, since this negatively affects their yields as well as the amount of land they are able to cultivate.



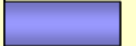

In March the green groundnut harvest is ready, and a bit later on, the green maize harvest is ready, helping poorer households bring an end to the lean season. The main harvest period starts in April for sesame and

sunflower, followed by groundnuts (late April), millet (May), sorghum and maize (June). Sales of all crops follow their respective harvests.

June, July and August are months of relative plenty. This is when the festival season occurs, since there is more cash in the local economy and people can afford to take some time off after the heavy demands of the agricultural season. Poorer households take advantage of the post-harvest dry season to increase charcoal production and to collect and sell firewood. People also collect baobab for home consumption and sale during these months. Households do their best to earn as much money as they can at this time to prepare for the costs associated with the coming agricultural season and to pay back any loans accrued in the past year.

Livestock sales occur throughout the year, but peak at two particular periods. Better off households sell most livestock from July through October, when cattle and goats are away at dry season grazing areas. Mobile markets spring up around the dry season grazing areas, allowing households to sell to traders who then take cattle and goats on to Dodoma, Singida or Dar es Salaam. This is a time when middle and better off households prepare for the coming agricultural season, putting away money to buy seeds and tools and to hire labour. The second peak period is in January and February, when poorer households sell chickens (and goats if they have them) because they need cash to cover their food needs during the lean season. For better off and middle households, who sell milk as well as livestock and crops, milk sales are highest from January through June, when milk production peaks.

Wealth Breakdown

		Wealth Groups Characteristics					
		HH size	Number of wives	Land cultivated (acres)	Livestock	Poultry	Other
Very poor		5 - 7	1	1 - 3	none	0 - 15 chickens	1 cell phone; 0-1 bicycles
Poor		5 - 7	1	2 - 6	0 - 4 oxen; 0 - 4 cattle; 4 - 10 goats	5 - 15 chickens	1 cell phone; 1 bicycle
Middle		6 - 8	1 - 2	5 - 10	2-6 oxen; 7-20 cattle; 8 - 12 goats;	10 - 15 chickens	2 cell phones; 1 bicycle; 1-2 ox plows; 0 - 1 ox cart
Better off		6 - 8	1 - 4	10 - 20	4-8 oxen; 10 - 25 cattle; 10 - 25 goats; 0-12 sheep	10 - 25 chickens	2 cell phones; 1 bicycle; 2 ox plows; 0 - 1 ox cart
0% 20% 40% % of households							

Note: The percentage of household figures represent the mid-point of a range.

Wealth in this livelihood zone is determined mainly by the amount of land a household is able to cultivate, which is related to a number of factors, including how much land it owns (both through inheritance and purchase), the amount of household labour on hand to work the fields, as well as the ability of the household to hire additional labour. Whether or not the household owns plough oxen or can hire them, or hire tractors, is also a factor. Better off households cultivate 10-20 acres. These households own multiple sets of plough oxen and ox ploughs and are able to hire labour to help during critical times of the year. Very poor households, on the other hand, cultivate 1-3 acres by hand and do not have the cash available to hire either plough oxen or extra labour. In fact, one thing that distinguishes poorer households from middle and better off households is that poorer households are the ones who act as a pool of local seasonal labourers, providing labour for those at the upper end of the wealth spectrum. Middle and better off households do not work for others, but hire people to work for them. Poorer households need to work on the farms of others in order to secure enough cash income to make ends meet. This means that they are not able to invest timely and adequate labour in their own land, resulting in lower yields on less land.

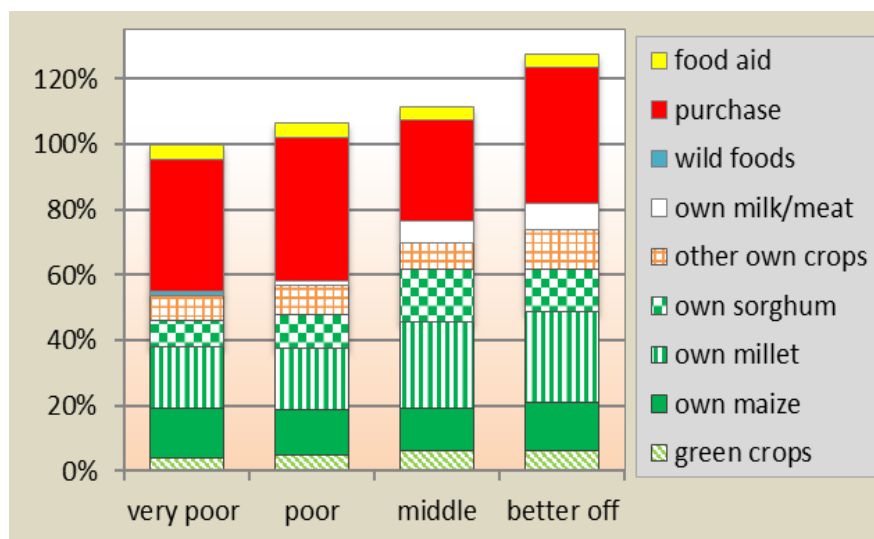
Livestock ownership is another determinant of wealth. Cattle, goats and chickens are owned by middle and better off households, whereas poor households own just goats and chickens, and may keep some cattle borrowed from relatives or neighbours; and very poor households have only chickens. Plow oxen are owned exclusively by both of the top two wealth groups as well as some poor households. Very poor households do not own plough oxen. The more livestock a household owns, the more income it can generate, and the more food it produces (in the form of crops – via animal traction and manure – as well as milk and meat).

The distribution of wealth in this zone is fairly even. Very poor (30%) and poor (30%) households together comprise over half of the households in the zone. Middle (25%) and better off (15%) households combined represent just under half the population. However, as middle and better off households are slightly larger on average (7 people) than the very poor and poor households (6 people), the proportion of *people* (as opposed to households) in the top half (around 56% of the population) would be only slightly more than bottom half (around 44% of the population).

Intra-community labour exchanges are important in this zone. Better off and middle households rely heavily on the labour provided by poor and very poor households. This agricultural labour allows the upper wealth groups to cultivate larger fields and to appropriately time their management activities, helping them to achieve better yields. These exchanges also provide substantial cash and food for those on the lower end of the wealth spectrum, and help them to make it through the worst time of the year. While a certain amount of redistribution takes place through these labour arrangements, it also means that when production is badly affected, due to a drought, or other natural hazard, not only do people’s harvests take a hit, but so does the cash income earned from agricultural labour.

Sources of Food

The graph to the right presents the sources of food for households in different wealth groups in the livelihood zone for the period April 2014 to March 2015. April represents the start of the consumption year because it is when people begin to consume green crops and it marks the end of the hunger period. Food is presented as a percentage of 2100 kcal per person per day for the 12-month period. This was considered an average year.



In the graph, food access is expressed as a percentage of minimum food requirements, taken as an average food energy intake of 2100 kals per person per day.

In this livelihood zone households obtain access to the majority of their food in two ways: they either grow it/produce it themselves (which is shown on the graph above as all four categories of own crops as well as ‘own milk/meat’) or they purchase it from the market (shown as ‘purchase’). In the reference year food aid also provided a small percentage of minimum annual calories for all wealth groups, and wild foods made a very small, almost insignificant contribution for the two poorer wealth groups.

In the reference year - which was deemed by community leaders to be an average year - none of the households relied exclusively on crop production to meet their food needs. Bulrush millet, maize and sorghum were the main staple grains, providing around 45-65% of the minimum calories required by households, with maize (including green maize) and bulrush millet almost equally important and sorghum slightly less so, at least for

the purposes of consumption. Bulrush millet is a hardy, drought-tolerant crop that survives in marginal environments, producing a harvest in years when maize and even sorghum might not come through, and making it an important crop every year. Maize is likely to have been relatively more important in the reference year than it might have been in a bad year. Groundnuts and sunflower contributed an additional 8-12% of minimum food needs. Bulrush millet was grown only for consumption, and none of the wealth groups sold this crop in the reference year. Maize, groundnuts and sunflower were grown for both consumption and sale by all wealth groups; middle and better off households sold some of the sorghum they grew and all of the finger millet they harvested. Poorer households consumed more of their maize green than better off households. This is because their stocks from the previous year's harvest were gone by December, leaving them with a gap of several months to fill with purchased food. As soon as the green harvest was available, therefore, these households began to harvest fresh maize from the fields. This consumption of green maize, while helping households end the lean season, also reduces the amount of grain that can be harvested and stored in the coming year, which means they find themselves without stocks again when December rolls around. Altogether, crop production made up 50-75% of households' minimum calorie requirements in the reference year.

The market accounted for almost all the remaining calorie needs of households, comprising around 30-40% of the reference year's food basket and making it the second most important source of food for all households. The two poorer wealth groups buy food because they simply do not grow enough food to cover all of their calorie needs, even in a relatively good year. Middle and better off households, on the other hand, could have feasibly met all their calorie needs with their own crop production if they had not sold any of their harvests. If very poor households had not sold any of their crops, they would still have been left with a deficit of over 40% of minimum calorie requirements; poor households in the same scenario would have faced a gap of almost 10% of minimum food needs. A typical middle household, on the other hand, produced 106% of minimum calorie requirements and a typical better off household produced 167% of minimum calorie requirements in the reference year. However, all households sell part of their harvests in average years, and they must do so in order to meet their cash needs, such as agricultural inputs, school and medical expenses, salt, soap and other household goods, which are every bit as pressing as their food needs. Given the remaining deficit, the two bottom wealth groups, and to some extent middle households, spent their food budget mainly on the cheapest staples – maize grain and millet; better off households did not buy maize or millet, purchasing rice instead, which costs more than four times as much as maize grain, along with a small amount of wheat, also significantly more expensive than maize and millet. In addition to staple grains, all households purchased non-staple foods as well, such as beans, sugar, oil, meat and dried fish. In general, the better off the household, the more of these non-staple foods they purchased, providing them with a more diverse and nutritious diet.

Milk obtained from households' own cattle provided a meaningful addition to calories for the top two wealth groups. A typical better off household had around 5 cows milking for seven months of the year; a typical middle household had around 4 cows milking; and poor households, who borrow cows from relatives or neighbours and sometimes own their own cow, typically had around 1 cow milking. During the rainy season, when pastures and water supplies were plentiful, cows produced yields of around 1.5 litres a day. In the dry season this dropped down to 0.5 litres a day. On average, throughout the reference year better off households could expect to generate a total of around 1,275 litres of milk; middle households produced around 1,020 litres, and poor households around 255 litres. Households consumed 50-55% the milk they produced, selling the rest. The proportion kept for consumption accounted for 6-7% of minimum calorie requirements for the two upper wealth groups in the reference year, and around 2% for poor households. A small additional contribution was made from the meat that is consumed during festivals, or when an animal died of natural causes.

The final source of food is food aid. All wealth groups benefitted from the school feeding program in the reference year, a service provided by the UN World Food Programme. Most households send around 3 children to school, regardless of wealth group. While at school, the children received one meal a day during the school term, helping alleviate food stress at home. This was especially important for the very poor wealth group, who would not have met its minimum food needs otherwise. It is important to note that this distribution ended as of 2015, which raises the question of how these poorer households will fill this gap in coming years.

Sources of Cash Income

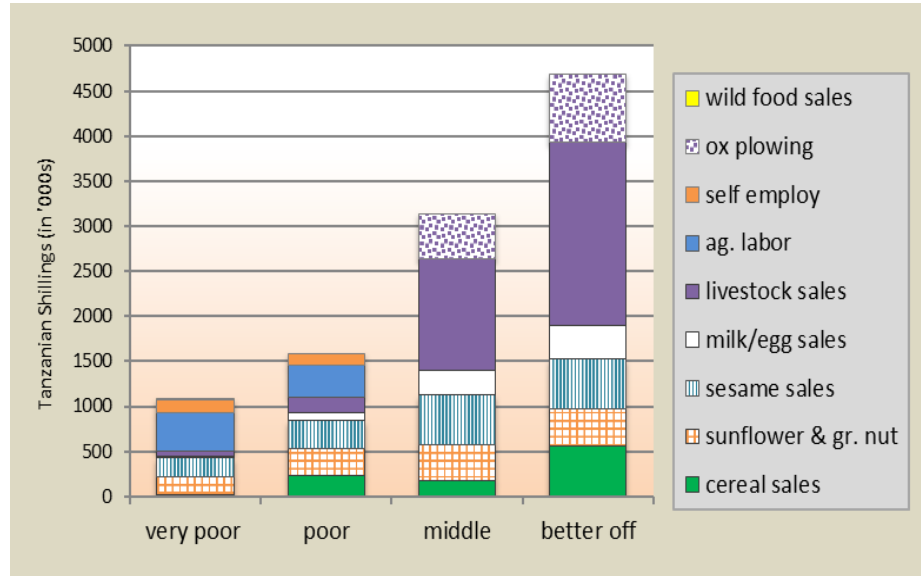
The graph to the right conveys two main points: first, middle and better off households generate all of their cash 'on the farm'. This means that they can depend entirely on their crop production and livestock to meet annual cash needs. The bottom two wealth groups, on the other hand, need to turn to off-farm sources to cover cash needs; very poor households derive less than 50% of their annual cash from their own crop production and livestock sales. They use their labour capital to make up for what their crops and livestock do not provide.

Second, the graph shows us that livestock-based income is more important for middle

and better off households than crop-based income. In other words, livestock are a more reliable and lucrative means of generating cash than crops. This reflects, in part, the fragile nature of crop production in this semi-arid zone, but it also says something about the value of livestock, which is augmented by the growing demand from an increasing urban population. But it is also clear that the advantage afforded by livestock accrues only to the top two wealth groups.

All households sold maize, groundnuts, sunflower, and sesame in the reference year. Sorghum and finger millet were also sold by some, but not all, households. Sesame sales brought in the highest revenue of all crops. For better off households, sesame income was equivalent to almost three times as much as sunflower income, two and a half times as much as groundnuts and over three times more than maize. Sesame is especially important for very poor households, who earned from sesame sales over 12 times what they earned from maize sales in the reference year. This high value crop accounted for 50% of the annual crop income of very poor households, and 37-50% of the annual crop income of the other wealth groups. The next most important crop from a revenue perspective was sunflower, followed by groundnuts and finger millet (for those who sold it). All crop sales combined accounted for 41%, 53%, 36% and 33% of annual cash income for very poor, poor, middle and better off households, respectively.

Livestock sales are a critical source of cash in this zone as well, especially for the top two wealth groups. For better off and middle households, direct sales of livestock were more important than crop income, generating 43% and 39% of annual cash income, respectively, compared to crops, which brought in 33% and 36%, respectively. Middle and better off households are the only wealth groups who own cattle; poor households own goats and chickens, as do the upper two wealth groups. Very poor households have only chickens. Cattle are worth around 10-11 times as much as goats. A typical household in the upper two wealth groups sold 2-3 cattle in the reference year, generating 1,000,000-1,350,000 TZS. Better off households can sell cattle at a



The graph provides a breakdown of total annual cash income in Tanzanian Shillings according to income source.

INCOME SUMMARY TABLE (in Tanzanian Shillings)				
Wealth group	Very poor	Poor	Middle	Better off
Annual income per household ²	970,000 – 1,500,000	1,500,000 – 2,500,000	2,500,000 – 4,000,000	4,000,000 – 5,750,000

² The average exchange rate from April 2014-March 2015 was 1 USD = 1,675 TZS

higher price than middle households because their animals tend to be in top condition and they also sell at markets where prices are higher, and at the time of year when cattle bring in the most money. Cattle sales alone accounted for 65-80% of the total income from livestock sales for these upper two groups and 29- 32% of total annual cash income. Better off households also sell a fattened ox once every two years. Fattened oxen are the most expensive livestock on the market, with one head earning a household 1 ½ times more than one head of cattle. A typical poor household sold around 3 goats in the reference year along with around 10 chickens. The income generated from these combined sales was less than a third of what middle households obtained from the sale of just one of their cattle. Overall, better off households earned from livestock sales more than 11 times what poor households earned in this same category, and over 38 times what very poor households earned. This is important because it highlights the capacity of middle and better off households to convert their productive assets into cash, which enables them to invest in revenue-generating activities in good years and to make it safely through bad years. Poorer households, in large part because they do not own cattle, have serious barriers to doing either.

Owning cattle also brings with it the possibility of generating income from milk sales. In fact, milk sales alone accounted for 4-8% of the annual cash income for poor, middle and better off households. Very poor households did not produce milk for sale, but they did sell eggs. The income from egg sales, however, was negligible, barely showing up on the graph above.

Poorer households have neither sufficient amounts of crop production, nor meaningful herds of livestock, so they need to turn to their own labour to help them generate the rest of the cash they need in the year. Seasonal agricultural labour and self-employment combined accounted for between 30% and 55% of all the cash earned by these two bottom groups in the reference year. Poorer households typically had at least one person working in the fields of middle or better off households during the entire agricultural season. Both very poor and poor households provide hired labour for land preparation planting, weeding and harvesting. Pre-harvest labour contributed around 293,000 TZS for the typical very poor household and 257,000 TZS for the typical poor household in the reference year. Poor households earn slightly less because they tend to focus their labour more on their own plots during the planting and weeding seasons. Harvest labour provided an additional 140,000 to very poor households and 98,000 TZS to poor households.

When the demand for agricultural labour slows, from July through September, poorer households find ways to earn cash on their own, taking on 'self-employment' activities. These include brick and charcoal sales (done mostly by men) and/or firewood sales which are done mostly by women. Another income-generating activity undertaken during this time of year is the collection and sale of baobab fruits. Because poorer households are so dependent on the income earned from their own labour, it is especially important for them to stay healthy and productive. A sick member of the family can quickly turn into an income deficit. In addition, changes in seasonal wage rates have a large impact on the welfare of these households.

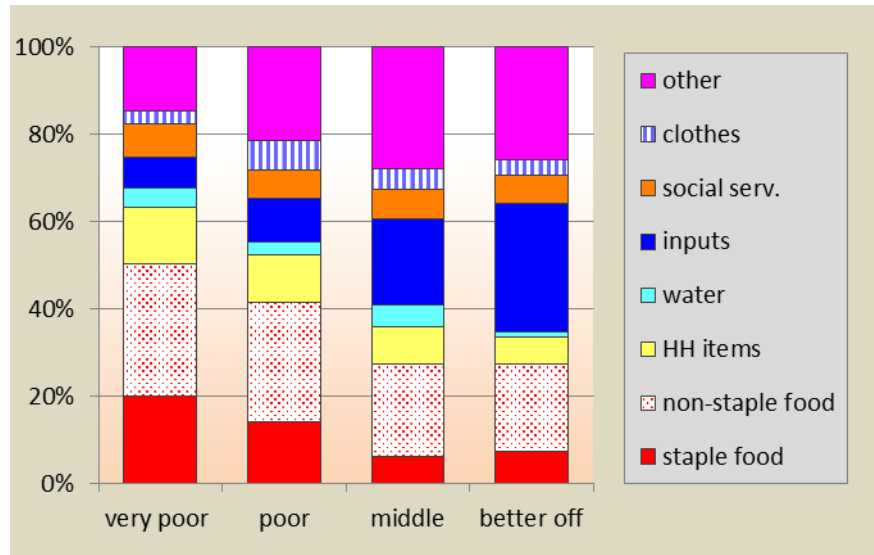
Middle and better off households supplement their crop and livestock income with renting out their oxen for ploughing. For two and a half months before the rains start, households clear their land and plough it in preparation for planting. Oxen help households plough far more land than people can cover with hand hoes alone, which is one reason better off households are able to cultivate twenty times as much area as very poor households. Middle and better off households make a good deal of money by renting out their ploughs and oxen to absentee landlords who live in towns, bringing in over five times the total self-employment income of poor households with this activity alone.

Expenditure Patterns

The graph presents expenditure patterns for the reference year April 2014 to March 2015. While absolute expenditure increases with wealth in line with total cash income, the expenditure breakdown by percent in this graph shows the *relative* amount of income spent on different categories.

As in other parts of Tanzania, households here need to spend money on a range of essential items and services throughout the year, including: food (both staple and non-staple), household items, agricultural

inputs, social services, like schooling and health, along with clothing and other miscellaneous items. The patterns shown in the graph above highlight three important points.



The graph provides a breakdown of total annual cash expenditure according to category of expenditure

First, even in a normal year like the reference year, very poor and poor households must devote a large proportion of their annual cash to meeting immediate food needs, with the proportion of annual cash spent on staple foods highest for very poor and poor households. In the reference year, the poorer two wealth groups bought around 30% of their minimum calories in the form of staple food, in particular maize grain and a small amount of sorghum, the two cheapest staples. Without this purchased grain, they would have been left with an unmanageable deficit. Middle and better off households also purchased staple food, but in smaller quantities, and they bought more rice – a much more expensive alternative to maize grain or sorghum. Middle and better off households also spent a good deal more money on food other than staple grain, such as beans, sugar, meat, vegetables and dried fish. For example, better off households spend 5½ times more than very poor households on meat, 2½ times more on sugar and 2 times more on oil. Overall, better off households purchase 23% of their minimum calories in the form of non-staple foods, while spending around 22% of their annual income on this area of expenditure, whereas very poor households spent a larger proportion of their cash income on non-staple foods (30%) but derived only around 10% of their annual calorie needs from these purchases. This tells us that, in the reference year, better off households could afford a more diversified and nutritious diet than poorer households.

Second, middle and better off households, invest a large proportion of their annual cash in crop production and livestock. This allows them to get as much as they can from their two main productive asset: their land and their livestock. This investment is shown as ‘inputs’ on the expenditure graph above, and includes the following: animal drugs, seeds and tools, labour, livestock purchase, and phone credit. House repairs is also included in this category. Of these items, the poorer two wealth groups spent money only on seeds, tools, house repairs, and phone credit. Better off households invested more than any other wealth group in maintaining and expanding their livelihood potential. Adding up these investments over the year, better off households devoted almost a third of their annual income to productive inputs; the poorer two wealth groups, on the other hand, allocated only 7-10% of total expenditure to inputs. Spending on phone credit comprised (by far) the largest proportion of the inputs budget for the two poorer wealth groups, equivalent to around 10 times what they spent on seeds and tools. Better off households spent most of their inputs budget on hiring poorer household members to work on their farms, followed by livestock purchase and then phone credit. Middle households also spent a portion of their budget on water for their animals in the reference year, devoting 6% of their inputs

budget to this expense. On average, better off households spent over 18 times more on inputs than very poor households did in the reference year, and 9 times more than poor households.

Third, spending on water for human consumption is relatively high in this zone compared to many other zones in Tanzania and elsewhere in rural parts of sub-Saharan Africa. Water shortages are common in this semi-arid zone, and particularly in the dry season. Households here buy water for home use 5-6 months of the year, and this requirement presumably increases in bad years, when rainfall fails.

In the graph above, the 'hh items' category includes basic household necessities, such as tea, salt, soap, utensils, batteries, kerosene, and grinding services. Households tend to buy these items week by week in incremental amounts. Within this category, poorer households spent the most money on payment for grinding, followed by soap. These two items alone comprised 55-68% of the inputs budget for poorer households in the reference year. Better off households spent the most on lighting in the form of either kerosene or solar lanterns, followed by soap. On an annual basis, spending on basic household goods comprised 6-13% of total expenditure, generally decreasing as a proportion of annual expenditure as you move up the wealth scale.

Households also spent money on education and medical services, which are shown on the graph as 'social services'. Schooling expenses included school fees, uniforms, stationery and transportation, where relevant. On a per capita basis, holding household size constant, middle households spent on education about 2.4 times more than the poorer two wealth groups and better off households spent 3½ times more than the poorer two wealth groups. This additional expenditure reflects the fact that poorer households are usually not able to afford to send their children beyond primary school, whereas those at the upper ends of the wealth scale are likely to send them through secondary school and even on to tertiary levels. The costs of secondary school are prohibitive for poorer households, including things like transportation, boarding, higher fees and more expensive uniforms and supplies.

Spending on clothes and other miscellaneous items are the last two categories included here. The 'other' category includes things like beer, tobacco, cigarettes, cosmetics, hair braiding, transportation and festivals. This is discretionary spending that can be reduced or redirected in bad years to buy more essential items if necessary. In both absolute and relative terms, those at the upper end of the wealth spectrum have the most available in this discretionary budget; and because the reference year was a relatively good year, the two bottom wealth groups have more in this budget than they would in a bad year.

Hazards

There are three chronic hazards for all wealth groups in this zone. The first is **unreliable rainfall**. Dry spells and an early cessation to the rains has become a common problem. When the distribution of rains is inadequate, or when the dry spells occur at a critical stage of crop development, it can have a devastating impact on the harvest. **Crop pests**, such as the Elegant Grasshopper, which affects sesame, sunflower and maize; and *quelea quelea* birds, which can ruin the millet and sorghum crop, also cause significant destruction on a regular basis. The third chronic hazard is **livestock disease**. Foot and mouth disease (plaguing cattle), pneumonia (affecting cattle and goats) and New Castle Disease, which can wipe out an entire flock of chickens, cause significant income losses.

The main, and most devastating, periodic hazard is **drought**, which leads to severe crop failures, degradation of pastures, drying up of local water sources and spikes in food prices. Although people in this area have learned to cope with the semi-arid conditions by growing crops like bulrush millet and keeping livestock to help reduce the risks associated with crop production, droughts, which can occur as frequently as one in every two years, create a cycle of continual loss and recovery, seriously impeding longer term economic growth.

Response Strategies

In response to hazards and years with bad production, households attempt to meet their minimum food needs and cash requirements through a number of strategies. These strategies are detailed for this livelihood zone below:

- All households try to **reduce expenditure** on non-essential or more expensive items first, buying less sugar and rice, for instance, and using that money to buy the cheaper staple – maize – instead, or cutting down on festivals and beer.
- Very poor and poor households try to increase cash income through **finding more seasonal agricultural work**, either locally (working in many cases in direct exchange for food) or migrating outside the zone. Some of the locations where people go in bad years include the large scale farms in Kilindi and Handeni (in Tanga) and Kiteto (in Manyara); or sugarcane plantations in Mtibwa (Morogoro) or paddy farms in Pawaga (Iringa). Some people also go to Dodoma town or Dar es Salaam in search of daily work in these urban centres. The expandability of this option is limited in bad years because of the increase in labour supply as more and more people look for work. This puts a downward pressure on wages so that even if people do find more days of work, they may earn less per day, making it hard to substantially increase cash income above normal year levels.
- Poorer households increase their **collection/production and sale of firewood and charcoal**, although there are limits on the effectiveness of this strategy; with more supplies of firewood and charcoal on the market, prices drop, so the increased effort is not rewarded with a proportional pay out. There are also serious environmental concerns related to this strategy.
- The upper two wealth groups try to increase their cash income through **selling more livestock**. However, the value of livestock tends to drop in bad years, both because supplies increase as more people try to earn cash in the same way, and because their body condition deteriorates as grazing and water resources decline.

Key Parameters for Monitoring

The key parameters listed in the table below are food and income sources that make a substantial contribution to the household economy in the *Singida-Dodoma Bulrush Millet, Sorghum, Sunflower & Livestock Livelihood Zone*. These should be monitored to indicate potential losses or gains to local household economies, either through on-going monitoring systems or through periodic assessments.

It is also important to monitor the prices of key items on the **expenditure** side, including staple and non-staple food items.

Item	Key Parameter - Quantity	Key Parameter – Price
Crops	<ul style="list-style-type: none"> • Green maize – amount produced • Maize – amount produced • Sorghum – amount produced • Finger millet – amount produced • Bulrush millet – amount produced • Groundnuts – amount produced • Sesame – amount produced • Sunflower – amount produced 	<ul style="list-style-type: none"> • Beans – producer price • Maize – producer price • Sorghum – producer price • Finger millet – producer price • Sunflower – producer price • Groundnuts – producer price • Sesame – producer price
Livestock production	<ul style="list-style-type: none"> • Cow milk – yields • Fattened ox – numbers sold • Cattle – herd size • Goats – herd size • Chickens – herd size • Oxen rental – number of rentals 	<ul style="list-style-type: none"> • Cow milk – price • Fattened ox – producer price • Cattle – producer price • Goats – producer price • Chickens – producer price • Oxen rental – price per rental

Other food and cash income	<ul style="list-style-type: none"> • Agricultural labour (land clearing and preparation, planting, weeding) – number of jobs • Agricultural labour (harvesting) – number of jobs • Demand for charcoal and firewood 	<ul style="list-style-type: none"> • Agricultural wage rates (land clearing and preparation, planting, weeding) • Agricultural labour rates (harvesting) • Prices of charcoal and firewood
Expenditure		<ul style="list-style-type: none"> • Maize grain – consumer price • Vegetable oil – consumer price

Programme Implications

The longer-term programme implications suggested below include those that were highlighted by the wealth group interviewees themselves and those made by the assessment team following detailed discussions and observations in the field. All of these suggestions require further detailed feasibility studies. All four wealth groups highlighted the same concerns, listed below:

- 1) Improve access to and availability of safe and reliable water supplies
- 2) Provide more affordable and easier access to agricultural inputs, such as tractors, fertilisers, improved seeds, livestock drugs, etc.
- 3) Improve access to and quality of health facilities and services
- 4) Develop reliable and fair markets for crops and local products
- 5) Improve road infrastructure, especially feeder roads
- 6) Provide electric service throughout the zone
- 7) Facilitate access to agricultural loans with affordable interest rates
- 8) Offer agricultural and livestock extension services