

# Tanzania Livelihood Baseline Profile

## Kiteto-Kongwa-Mpwapwa-Mvomero Maize, Sorghum and Pigeon Pea Livelihood Zone (TLZ 17)

December, 2015<sup>1</sup>

### Zone Description

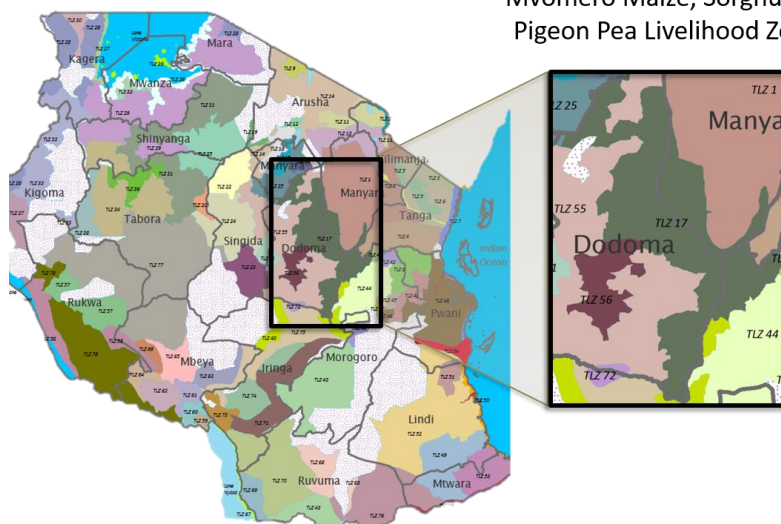
Agriculture is the mainstay of the rural economy in this large zone in eastern-central Tanzania, most of which lies in Dodoma Region. The zone is part of the central plateau maize belt. Farmers from the maize belt supply a lot of maize to the Kibaigwa market, an international maize market located in Kongwa District which attracts traders from neighbouring countries such as Ethiopia, Kenya and South Sudan. Maize is the staple food grown and consumed by all households. However, the zone is also known for a variety of other supplementary crops, including sorghum, sunflowers, bulrush millet, pigeon peas, groundnuts and sesame (*sim sim*). Livestock are also marketed as well as kept for milk.

Farms are relatively large in size and the majority of households make a living primarily from crop and livestock production. Very poor households, however, are more reliant on paid agricultural labour for their livelihood. Overall, the zone is considered food surplus most years notwithstanding chronic crop pests and disease, livestock disease and periodic drought. The zone is located in 5 districts of Dodoma Region (Chamwino, Kongwa, Mpwapwa, Kondoa, Chembu) and in 2 districts of Morogoro Region (Gairo and Mvomero) as well as in Kiteto District (Manyara Region). The zone is densely populated (50-80 people per km<sup>2</sup>). The people of this area are the Wagogo, Wakaguru, Wanguu and Warangi, all of Bantu origin who were originally pastoralists before settling in villages and adopting a more sedentary agro-pastoral lifestyle.

Farms in this predominantly semi-arid zone are moderately productive. The climate is warm throughout the year with daytime temperatures fluctuating from 30-34° C during the hot season (September-March) to 20-29°C during the cool season (June-August). The altitude is midland (1,000-1,500 meters above sea level) which allows more maize cultivation than in the neighbouring sorghum-dominant lowland zone (LZ55). Moreover, soils (both clay and sandy) are considered relatively fertile. Rainfall falls from December-April in a single rainy season, with annual accumulations of 500-800 mm. In this part of the central plateau, the topography is varied with rolling and flat plains, and hills and mountains. Vegetation is likewise varied with bush, forest and grassland. A dominant feature of the zone are the Udzungwa Mountains which are a national park and destination spot for trekkers, ornithologists and ecologists. The Udzungwa Mountains are part of a mountain chain called the Eastern Arc Mountains. Thirteen distinct forest-covered mountains in southwest Kenya and eastern Tanzania form the Eastern Arc Mountains and this mountain chain has been identified by Conservation International as a biodiversity hotspot.

Aside from the mountain, the zone is not noted for any other major topographical features. However, a notable economic landmark is the Kongwa Livestock Ranch. The ranch is one of ten ranches country-wide that are operated

Kiteto-Kongwa-Mpwapwa-Mvomero Maize, Sorghum & Pigeon Pea Livelihood Zone



<sup>1</sup>Fieldwork for the current profile was undertaken from 1-18 October 2015. The information presented in this profile refers to the reference year, which started April 2014 and 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 5-10 years (i.e. until March 2025). All prices referred to in the document are for the reference year.

by the government-owned National Ranching Company (NARCO). The Kongwa Ranch is located on the main Dar-es-Salaam – Morogoro road which runs through the *Maize, Sorghum and Pigeon Pea Zone*.

For crop production in this zone, farmers depend on local rain only. There is one rainy season which lasts from December-March. These “short” rains are used to grow a range of crops both for consumption and for sale. Maize is the staple grain but it is supplemented by sorghum and bulrush millet. All of these crops are sold, especially maize as there is steady export demand from markets in Kenya, Ethiopia and South Sudan. Pigeon peas are another crop sold in relatively high quantities. In fact, a feature of this zone is the variety of crops sold, including sunflowers, groundnuts and sesame (*sim sim*). Farm work is carried out jointly by men and women who do much of the land clearing, sowing, weeding and harvesting by hand on small-holder family farms. The hand hoe is the main tool used for digging and weeding although ox-ploughs are used by about half of the households. A few wealthier households use tractors too. Inputs such as fertiliser, pesticides and improved seeds are used very rarely in this zone due to in part to their cost. However, even cattle manure is not regularly applied to farmers’ fields. The other constraint to high-yield farming are pests and disease. Cereal crops are affected by army worms as well as attacks by stalk borers. Various fungal diseases also reduce sunflower and sesame yields. Additionally, *quelea* birds are a particular challenging pest for farmers to manage as it requires a family member(s) to physically scare the birds away from eating the sorghum, sunflower and sesame grains. Pesticide and fungicide sprays as well as disease tolerant seeds are available for private purchase through the Ministry of Agriculture or through private agro-dealers. However, not many farmers regularly make these purchases due to their cost.

Cattle, goats and sheep are all reared by villagers in this zone. Most households also keep a flock of chickens around the compound. Livestock are watered at seasonal pools and from shallow wells in the wet season, and from deeper wells and tap water in the dry season. Villagers also pay for water in the dry season (TSh 50-100 per animal). Not all villages pay for water but it is relatively common in the zone. Livestock graze freely either on pasture and browse that is available in the wet season or on crop residues in the dry. Herders do not migrate with their cattle to other rangelands during the year but let their livestock graze in nearby fields throughout the year. Livestock are marketed by households when they need cash. This occurs most frequently in January-February when there are few alternative sources of income and households need to buy food. Milk cows produce milk for about 8 months. Yields are highest during the rains when pasture and water are relatively abundant. Yields drop by half in the dry season. Goats are not milked in this zone, nor are sheep. Livestock diseases are a chronic problem, particularly CBPP and CCPP which affect cattle and goats respectively.<sup>2</sup> Farmers with the cash resources can purchase treatment drugs from agro-dealers. Newcastle disease also regularly wipes out flocks of chickens, and worms are a chronic issue as well in all livestock.

The zone is reasonably well served with transport infrastructure. There is a single tarmac road, the Dar-es-Salaam to Morogoro main road, which passes through the zone. Secondary roads to district and ward centres as well as tertiary roads to villages, are dirt or gravel. Market access is relatively good by smaller vehicle most of the year although some road sections are impassable during the rains. Most people travel from village to ward or district centres on foot or by bicycle or by *bodaboda* (motorcycle taxis) as larger vehicles and buses have difficulty reaching many villages. Other services are rudimentary but are widespread and do meet basic needs. However, for a better level of service, a household needs private means. This applies to health, hygiene, education and infrastructure. For example, there is potable tap water at the village level (which villagers pay a fee to access) with cheaper “hard” water accessed by the poor and pricier “soft” water paid for by better-off households. Water for washing or for livestock is drawn at no cost from ponds near the village or drawn from open wells within the village for a fee. Almost all households use basic pit latrines to manage waste and use torches for lighting at night. Some better-off households use their own solar panels as well. There are dispensaries in every village but villagers need to go to ward centres (on average 10-20 km away) to access a health centre and often these facilities are not adequately stocked with supplies or staff. Those with more income pay for private health care and go to hospitals based in major urban areas. In terms of education, all villages have primary schools but for a secondary school education, students need to leave the village and pay for boarding at a school in the ward or district centre. The zone has good mobile phone coverage with 3-4 companies providing service. Votacom, Tigo and Airtel provide access to most phone-owners; better-off households pay for access to Halotel as well. Financial services are weak at the village

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<sup>2</sup> CBPP refers to Contagious Bovine Pleuropneumonia. CCPP refers to Contagious Caprine Pleuropneumonia

level with credit facilities and banks only located in market hubs. However, the Tanzania Social Action Fund (TASAF) provides direct assistance to very poor households with a monthly cash transfer of TSh 10,000. TASAF also assists students from very poor households by giving TSh 2000/month/primary school pupil and TSh 4000/month/secondary school student. They also run a cash-for-work program that operates over 4 months (January-April) and provides TSh 2,300/day/worker for 14 days of work each month.

## Markets

Sales of agricultural produce and sales of livestock are a central part of the income of most households in this zone. In general, traders travel to the various villages where they purchase produce directly from the farmer at farm-gate prices. Crop sales are highest directly post-harvest. The harvest month itself differs by crop. Maize, sunflowers and pigeon peas are two of the main crops sold and the months of peak selling for these crops is August-September. Sorghum is harvested and sold earlier, beginning in June and continuing until July. Groundnuts are ready for sale even earlier in the year with the peak period occurring in April-May.

The market hub for this zone is Kibaigwa. Kibaigwa is a major market centre for all crops in this zone. The Kibaigwa International Cereal Market attracts traders from other East African countries who come specially to purchase local maize for export. The market is located just off the main Dar-Morogoro road around 90 km from Dodoma city. Maize is also supplied to district market centres such as Kongwa, Kiteto and Gairo. These district centres also serve as transit markets for the onward sale of much of the zone's produce, including maize, sorghum and sunflowers. The destination markets for these three crops are typically Tanzania's major cities such as Dodoma, Arusha and Dar-es-Salaam. Pigeon peas and groundnuts are also supplied to markets in Zanzibar as well as to Morogoro city market.

Staple grains are purchased by many households during the year when their own stocks are finished. This occurs at different times depending on a household's available stocks. However, the peak period for cereal purchases is January-March. This period is often called the "hunger" season because food prices rise and are highest just when demand also peaks. For example, in 2014-2015, the post-harvest price for maize was TSh 5,000/debe. However, the consumer price about 6 months later was TSh 15,000/debe.<sup>3</sup> Staple cereals are usually bought in village kiosks but are supplied to the villages by traders who have vehicles to transport food from market centres to the local level.

Staple grains are often purchased with cash earned through the sale of livestock. Traders travel directly to local-level livestock markets where they purchase and transport the animals to either district or regional market hubs or to destination markets. For the most part, the final destination for livestock are city abattoirs. In all the major cities, such as Dodoma, Arusha and Dar-es-Salaam, the demand for meat is high year-round. Demand is highest for cattle or shoat meat from July/August-October which is the main period in the year when local festivals are celebrated. Chickens, however, are typically sold throughout the year.

The need for hired labour on local farms is relatively high in this zone. Consequently, during years of decent rainfall, there is very little labour migration out of the zone. In the reference year itself, an estimated 90% of casual labour was found locally on the farms of better-off households.

Labour markets are primarily local in this zone. The most common type of work that is found during the year is agricultural labour. During the reference year, 90% of the work found in the year was found in rural areas within the zone. Only during crisis years do poor labourers leave the zone in search of work. Usually, they go to Kilindi or Handeni in Tanga Region in north eastern Tanzania in hope of finding paid agricultural work there. The months for this type of distress seasonal migration are September-October and January-February.

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<sup>3</sup> In Tanzania, prices are monitored by the Ministry of Agriculture as part of their early warning system.

## Timeline and Reference Year

In the *Maize, Sorghum and Pigeon Pea Livelihood Zone*, the reference year is April 2014 to March 2015. Overall, the reference year was considered a good year due to well-distributed rains from November 2013-April 2014. As a result, livestock were healthy, the 2014 harvest was good and prices for both crops and livestock were also good. In addition, there were very few pest outbreaks in the reference year.

In this zone, the last few years have been relatively average. The last poor year was 2009-2010 when below-average rainfall led to poor crop outcomes and poor livestock health. Food prices rose to relatively high levels and at the same time livestock prices dropped. In response, there was labour migration to north eastern Tanzania (Kilindi, Tanga Region). The government also provided food aid to affected households.

Production Year**	Rank	Critical Events
2014-2015	2-3	A little below-average rainfall and slightly below-average crop production. Crop and livestock prices were average to good. Quelea birds attacked sorghum and bulrush millet.
2013-2014	3	Average rains, healthy livestock, average harvest and good livestock prices.
2012-2013	3	Average rains, healthy livestock, average harvest and good livestock prices
2011-2012	3	Average rains, healthy livestock, average harvest and good livestock prices
2010-2011	3	Average rains, healthy livestock, average harvest and good livestock prices
2009-2010	2	Below-average rainfall, low yields, high crop prices but low livestock prices and high staple grain prices. Food aid from the Government. Labour migration to Kilindi in Tanga Region

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

\*\* Production Year refers to the period November-October.  
 Consumption Year refers to the period April-March

## Seasonal Calendar for Reference Year

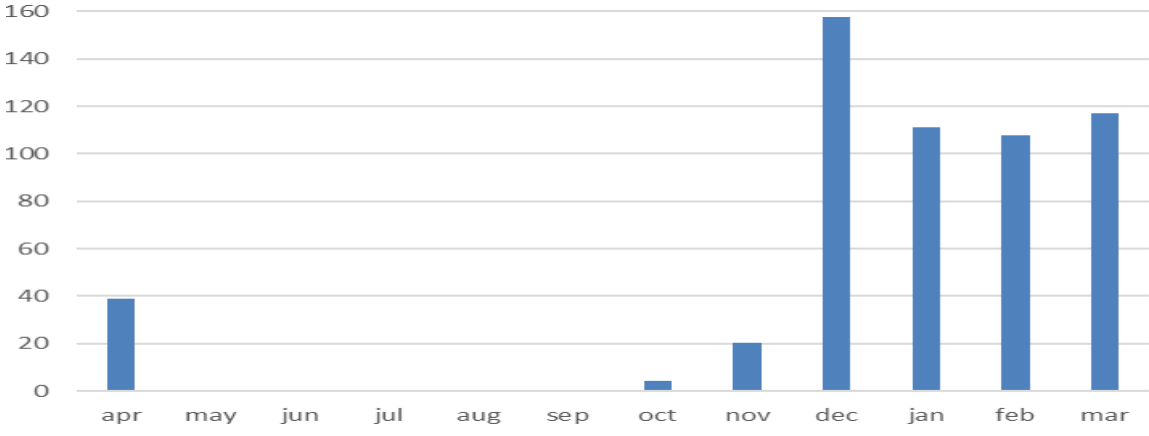
The year is divided into two seasons in this zone: the wet season and the dry season, each approximately six months long. Rains typically arrive in November and continue until April. Crops are rain fed, hence the cropping calendar parallels the rainy season. Land preparation is carried out from September-November generally in advance of the rains but carried out in stages to accommodate different crops. Once the rains are established planting occurs. Long-cycle staple grains, such as maize, sorghum and bulrush millet, are planted first in November-December. Short-cycle legumes, such as pigeon peas, Bambara nuts and cowpeas are planted later in December-January. These crops are often intercropped with maize. Oil seeds are short-cycle crops too and hence sesame and sunflowers are also planted later in December-January. Weeding is carried out throughout the growing period (December-March). Bird scaring is an important farm task carried out in March-May when sorghum and millet mature. Short-cycle legume and oil seed crops are harvested first in April-May. At this time, poorer households also begin to consume maize and cowpeas green from the field due to food shortages at home. The main cereal harvest takes place from May-July/August, first sorghum and then maize and millet.

Livestock production is also largely governed by the rains. After the start of the rains in November, cattle give birth and with calving, the milking season begins. The milk season lasts for 8 months for cattle with yields highest during the wet season (January-April) but continuing at a reduced level until August. The kidding and lambing season also take place early in the wet season when pasture and browse are most plentiful. Sales of cattle, sheep

and goats are also highest in the wet season (December-February) which is when many households need cash to purchase staple grains. By contrast, the sales of pigs are highest from July-December and chicken sales occur throughout the year (except for a two-month period from March-April). Livestock are generally kept near the village as migration is not practised in this zone. However, in a year of very poor rainfall, farmers will migrate with their cattle herd in search of pasture and water. Bad year migration typically occurs at the end of the dry season from October-December.

Month	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Rainy/dry season	wet season	dry season						wet season				
Land preparation							land preparation					
Planting										planting		
Weeding											weeding	
Green consumption	maize											
Harvest	g/nuts	maize, p/peas, sorghum, millet										
Crop sales				peak crop sales								
Cow milk peak		milk							calving		milk	
Cattle vaccinations						vaccinations						
Livestock sales										livestock sales		
Pig sales							pig sales					
Pig births				pig births			pig births					
Agricultural labour			ag labour							ag labour		
Firewood sales						firewood						
Brick sales					non-ag labour							
Human diseases				disease						disease		
Festivals				festivals								
Hunger season										hunger season		
Peak staple prices										peak staple prices		

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

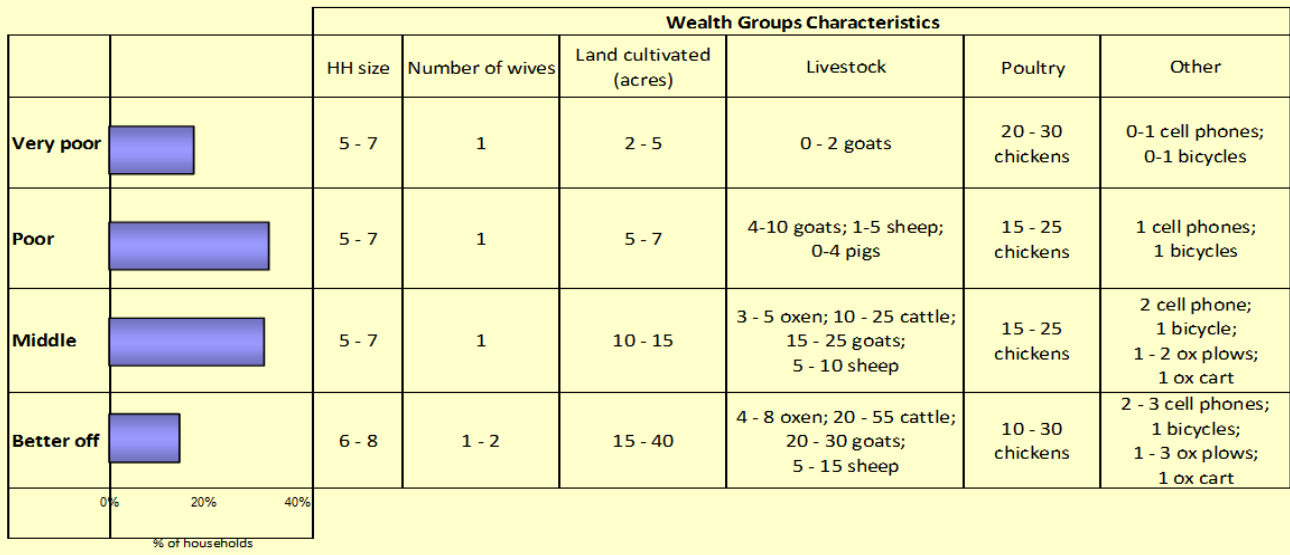


The wet season and the dry season are associated with other activities as well. Non-agricultural work (such as petty trade or construction) occurs in the dry season (May-October). Firewood and charcoal sales are also associated with the dry season, and peak in September-October. Paid agricultural work overlaps with the cropping cycle – which is essentially a wet and dry season activity.

The other notable periods during the year is the timing of festivals (June-October) and the timing of the lean season (January-March) which coincides with the period of peak staple food prices.

## Wealth Breakdown

About two-thirds of households in this zone fall in the poor and middle wealth groups (67%). These two groups are fairly evenly split between the poor (34%) and the middle (33%). The other third of households are split between the extreme wealth groups: the very poor (18%) and the better-off (15%). Across the wealth groups, household sizes are fairly similar averaging 6 household members for the very poor, poor and middle households, and averaging 7 members for the better-off.



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

Very poor households have very limited assets but not all of the very poor are asset-less. Chickens are one asset that all of the very poor own. Their flocks are relatively large, and each household on average owned 20-30 chickens in 2014-2015. It is also relatively common for the very poor to own at least 1 goat (0-2 is the range). More importantly, the very poor do own some land: an estimated 2-5 acres was cultivated in the reference year. The very poor often lack the resources to farm all of the land they own and it was common to rent out small amounts of land (0.5 acres) during the year. With these resources, the very poor were able to meet about 4.5 months of their food needs (36%) and secured 45% of their income from crop and livestock production. However, more than 50% of their food and cash needs had to be met through casual labour. A few households also owned a cell phone and a bicycle for transport.

Poor households have a little more land and livestock assets and these are reflected in their food and income access. In the reference year, poor households secured about 6 months of food from crop production, and about 60% of their income was from crop and livestock production (including land rental). This food and income came from cultivating 5-7 acres of land as well as selling a couple of goats, a couple of pigs, about 9 chickens and eggs. Thus the poor are land owners and livestock owners but small ruminants only (4-10 goats; 1-5 sheep; 0-4 pigs) as well as chickens (15-25). Most of the poor also own a cell phone and bicycle.

Middle households are not self-sufficient from their land but in the reference year they produced enough food for 9 months and secured 70% of their income from crop and livestock production. Middle households have quite substantial land and livestock assets. In 2014-2015 for instance, they cultivated 10-15 acres using their own ox and plough. Middle households also own a mix of cattle (10-25), shoats (20-35) and chickens (15-25) which provided milk, meat and livestock for sale (including a fattened ox). In addition to the team of oxen and plough, many middle households also own an ox cart for transporting goods. A bicycle and a couple of cell phones were also common assets owned by middle households.

Better-off households have the most resources in their communities. In this zone, the level of resources owned by the better-off included 15-40 acres of land from which they produced about 11 months of food (89%) as well as earned about 45% of their income from crop sales. Livestock assets were sizeable too. In the reference year, better-off households owned 2-4 teams of oxen as well as 1-3 ox ploughs and an ox-cart. They also kept 20-55 cattle and 25-45 *shoats*. This gave them access to milk and meat during the year as well as a steady source of income. Like crop sales, livestock sales generated 45% of their annual income. Thus better-off households are largely self-sufficient from their land and livestock resources.

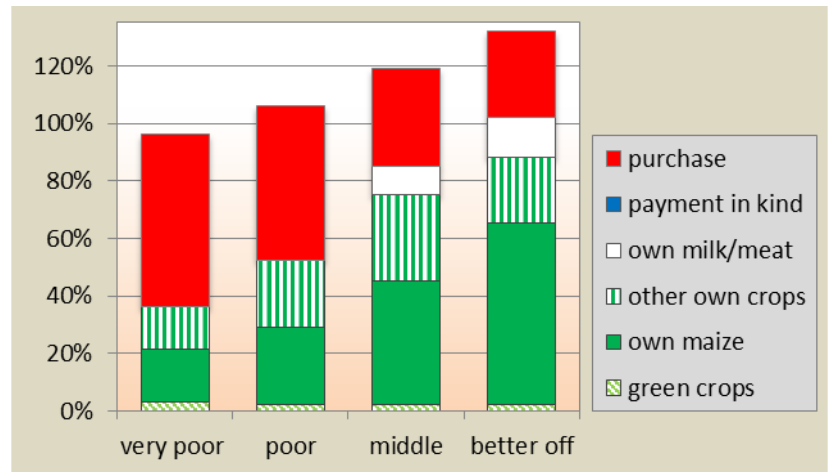
## Sources of Food

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-March 2015. April 2014 represents the start of the **consumption** year because it is when people begin to consume green crops and 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.

In 2014-2015, own-crops were a key food source, in particular the staple crop, maize. Maize alone met an estimated 45-65% of the annual food needs of middle and better-off households. However, the contribution of maize production was

significantly lower for poor and very poor households who, in the reference year, met about 20-30% of their annual food needs from the staple, maize. Maize was supplemented with a range of other crops, including a mix of sorghum, bulrush millet, pigeon peas, groundnuts and sunflower. This mix of other crops added a further 15-20% of food energy for the very poor and poor, and a further 30% more food energy for middle and better-off households. Notably, households from all wealth groups ate some green maize in April-May although the very poor ate more, and this reflected their lack of other food options during those critical months.

For the most part, what was not produced directly on their farm (either own-crops or milk/meat) was purchased. Very poor and poor households had to buy much more of their food than middle and better-off households as they produced so much less. In the case of the poor and very poor, in 2014-2015, they purchased an estimated 55-60% of their food needs even though the reference year was a relatively good production year. Their staple, maize, comprised a bit more than half of this food. The other half comprised a range of food items, including sorghum and millet, as well as small amounts of rice, beans, potatoes, sugar, cooking oil, vegetables, meat and dried fish. This pattern contrasted with the purchases made by middle and better-off households who bought very little maize (or none in the case of the better-off) nor any sorghum nor millet. Instead, these households bought different types of cereals, such as wheat flour and rice as well as beans, sugar, cooking oil, vegetables, meat and dried fish.



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

## Sources of Cash Income

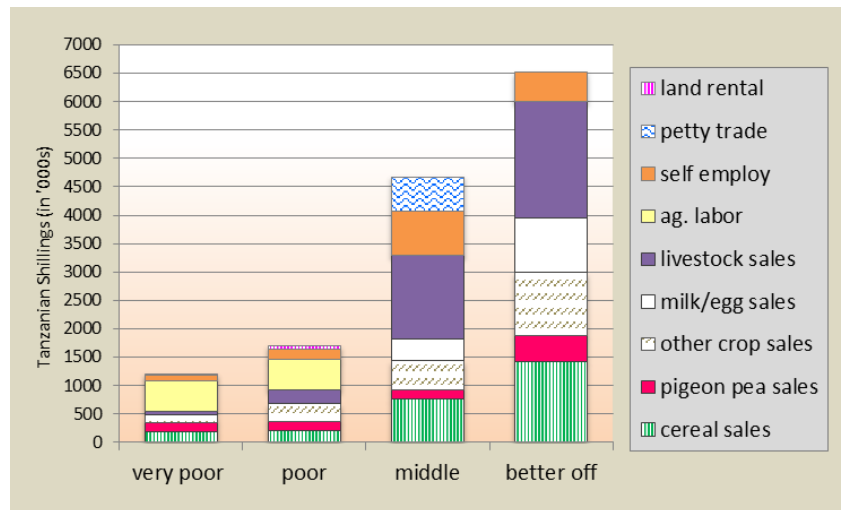
Agricultural labour was the most important source of income for the very poor and for the poor in the 2014-2015 reference year. For the very poor, earnings from casual on-farm work was an estimated 45% of their annual income, and a little less (30%) for the poor. What this meant in practice was that a couple of family members found about a day's work every week over about 10 months of the year carrying out paid farm tasks. The amount of pay reflected the work burden with the highest pay received for land preparation and clearing (on average TSh 10,000/day/person) compared to the lowest pay received for threshing (TSh 1,200/debe) and planting (on average 5,300/day/person).

The balance of income of the poor and very poor came mainly from crop sales. Pigeon peas are an important cash crop in this zone and sales of pigeon peas alone

generated about 10-15% of their annual income. Sales of maize, sorghum and millet in a further 15% of income as did sales of groundnuts and sunflowers (11% of annual cash income for the very poor). Poor households earned more income from the sale of oil seeds as they also grew sesame (*sim sim*). Thus, cash earned from the sale of nuts and oil seeds generated about 20% of the poor's cash income. In total, crop sales accounted for about 40% of the cash income of poor and very poor households. Both the poor and very poor also earned cash by renting out some of their land and by selling honey. In addition, at the end of the dry season in September-October, they sold firewood and charcoal. Poor households also earned cash by selling livestock (i.e., a couple of goats and pigs during the year) as well as chickens and eggs which generated a further 15% of their annual income. Poor households sold chickens and eggs only.

The income stream of middle and better-off households included a much higher level of livestock sales. Sales of livestock and milk comprised an estimated 40-45% of their annual cash income in 2014-2015. Cattle sales were in the range of 2-3 cows per year and this generated the most income, together with the sale of a fattened ox. They also earned cash by selling goats (4 on average), sheep (2), chickens, eggs and milk. In this regard, middle and better-off households typically sold about 50% of the milk produced by their cows.

Crop sales were also an important income source for middle and better-off households. The proximity of the International Cereal Market in Kiabagwa encouraged the sale of maize in particular as well as some sorghum and millet. These cereal sales amounted to about 20% of their income. Pigeon pea sales added another 5% of cash income, and nuts and oil seeds a further 10-20%. Of equal importance – especially for middle households – was the income earned by running a small *boda* motorcycle taxi service and renting out their ox-cart for a fee, or using their ox and plough to plough another farmer's land. These activities generated 30% of the annual cash income of middle households but just 10% of the income of better-off households.



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

INCOME SUMMARY TABLE (in Tanzania Shillings)				
Wealth group	Very poor	Poor	Middle	Better off
Annual income per household <sup>4</sup>	885,000 - 1,650,000	1,480,000 - 2,200,000	2,910,000 - 7,930,000	4,630,000 - 9,260,000

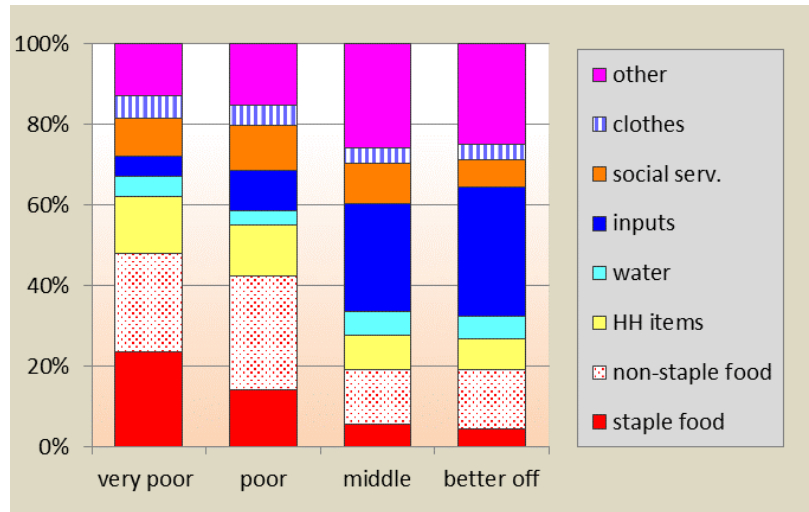
<sup>4</sup> The average exchange rate during the reference year from April 2014-March 2015 was 1 USD = 1,675 TZS



## Expenditure Patterns

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

In 2014-2015, about 40-50% of cash spending by the poor and very poor was on food. Maize was a significant portion of this spending. However, in the case of the poor, they spent more on supplementary food items than on maize. These items included sorghum, millet, beans, vegetables, sugar, cooking oil, meat and dried fish. The balance of spending was on a range of household goods (such as water, soap, salt, kerosene, grinding fees and tea), of which two expenses – grinding fees and water – were their greatest expense. The two poor wealth groups paid for other basic goods as well such as clothes, inputs, education and medicine. The poor spent proportionately more on livelihood inputs as they paid for animal drugs, seeds and tools, as well as for ploughing and the purchase of a young goat or two during the year. By contrast, the only livelihood input expense of the very poor was animal drugs, seeds and tools. All households spent a small amount on phone credit and transport costs as well as on non-essential expenses such as social events and festivals, hair and cosmetic supplies, and beer and tobacco. These “other” costs came to just over 15% of their annual expenditures.



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

The spending patterns of the better-off were very similar to the spending patterns of middle households (the difference was that better-off households spent more, reflecting their higher income). For both wealth groups, food costs accounted for just 20% of their annual expenditures. Only a very small amount (about 5%) was on staples such as wheat flour, rice and maize. Their greatest expenditure was on livelihood inputs. Both wealth groups paid for a range of livelihood expenses including water, animal drugs, seeds and tools, labour, household and motorcycle repairs, and livestock purchase. Better-off households had two additional expenses: firewood and land rental. Together, these livelihood expenses accounted for about 30-35% of their annual expenditures. The other major category of spending was “other” (just under 30% of annual expenditures) which includes a mix of costs like transport and phone credit as well as more non-essential costs such as cosmetics, beer and festivals.

## Hazards

Drought, irregular rainfall and dry spells during the growing season are the most common periodic hazards that farmers face in this zone. The last severe drought was in 2010 after the failure of the 2009-2010 rains. The most recent rains of November 2014-April 2015 were also a little below-average. Prior to the 2010 drought, the 2003 production year was also very poor due to the failure of the 2002-2003 rains in central Tanzania. Thus it is quite common for this zone to experience two drought years in a single decade.

In addition to problems of drought, farmers face chronic problems of pests and disease which reduce the productivity of crops and livestock. Livestock diseases are particularly widespread especially diseases such as CBPP in cattle, CCPP in goats and Newcastle disease in poultry. *Striga*, a parasitic weed, is another chronic problem that can lead to significant crop losses. Moreover, a crop of sesame, sorghum and sunflowers can be devastated by *quelea* birds unless guarded carefully. Herders' cattle also cause damage to growing crops. This is a particular problem when rangelands are affected by drought, pushing herders and their cattle to search elsewhere for water and pasture. This search often puts herders in conflict with farmers if their herd roams too close (or into) farmers'

fields. Finally, army worm outbreaks do not necessarily occur every year but they are nonetheless considered a chronic problem due to the relative frequency of the outbreaks.

## Response Strategies

There are not many fall-back strategies for the very poor and poor households when faced with an economic shock. Typically, their first response is to look for additional paid agricultural work locally. If not enough work is available locally, family members will migrate to an area with better casual labour opportunities. From this zone, labourers usually migrate to Kilindi in Tanga Region. Their last option is to sell a goat if possible.

The main coping strategy of better-off and middle households is to sell more livestock. They keep livestock in part as a safety net to sell when crops fail or when additional cash is needed. However, selling livestock has its limitations (an over-supply often leads to a collapse in prices and poor terms of trade for instance). Thus, better-off and middle households may combine selling a few livestock with engaging more in petty trade or running a small business (such as a village kiosk).

## 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 *Maize, Sorghum and Pigeon Peas 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
<b>Crops</b>	<ul style="list-style-type: none"> <li>• Maize</li> <li>• Sorghum</li> <li>• Bulrush millet</li> <li>• Pigeon peas</li> <li>• Groundnuts</li> <li>• Sunflower</li> <li>• Sesame (<i>sim sim</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• Maize</li> <li>• Sorghum</li> <li>• Bulrush millet</li> <li>• Pigeon peas</li> <li>• Groundnuts</li> <li>• Sunflower</li> <li>• Sesame (<i>sim sim</i>)</li> </ul>
<b>Livestock production</b>	<ul style="list-style-type: none"> <li>• Cow's milk (season 1)</li> <li>• Cow's milk (season 2)</li> <li>• Fattened ox sales</li> <li>• Cattle sales</li> <li>• Goat sales</li> <li>• Sheep sales</li> <li>• Pig sales</li> <li>• Chicken sales</li> </ul>	<ul style="list-style-type: none"> <li>• Cow's milk prices (season 1)</li> <li>• Cow's milk prices (season 2)</li> <li>• Fattened ox prices</li> <li>• Cattle prices</li> <li>• Goat prices</li> <li>• Sheep prices</li> <li>• Pig prices</li> <li>• Chicken prices</li> </ul>
<b>Other food and cash income</b>	<ul style="list-style-type: none"> <li>• On-farm labour (cultivation)</li> <li>• On-farm labour (harvesting)</li> <li>• Firewood, charcoal sales</li> <li>• Honey sales</li> <li>• Small business – volume of trade</li> </ul>	<ul style="list-style-type: none"> <li>• On-farm wage rates (cultivation)</li> <li>• On-farm labour wage rates (harvesting)</li> <li>• Firewood, charcoal prices</li> <li>• Honey prices</li> <li>• Small business profit</li> </ul>
<b>Expenditure</b>	<ul style="list-style-type: none"> <li>• Maize (staple grain)</li> <li>• Sorghum</li> </ul>	<ul style="list-style-type: none"> <li>• Maize price</li> <li>• Sorghum prices</li> </ul>
		<ul style="list-style-type: none"> <li>• School fees</li> <li>• Water fees (domestic use)</li> </ul>

## Program Implications

The longer-term program implications suggested below are those highlighted by the wealth group interviewees themselves. All of these suggestions require further detailed feasibility studies.

In general, households in this zone would like to see improved infrastructure (roads, water, electricity markets and houses) as well as improved services (education and health).

They would also like to have better access to livelihood inputs (seeds; fertilizer, pesticides) as well as better access to agricultural extension workers in order to improve their farming practices. Better access to these service and inputs is one goal; timely delivery and access to inputs is another.

Very Poor	Poor	Middle-Income	Better-off
Construction of modern houses	Construction of health centres	Improvement of water services	Construction of primary school classrooms and teachers' houses
Education of children to secondary school level	Construction of village office	improvement of market for livestock	Installation of electricity
Loan provisions for agriculture	Construction of more teachers' houses	Construction of water sources	Construction of village dispensary
Construction of teachers' and health workers' houses	Improvement of water services	Installation of electricity	Bring water supply close to households
Construction of health centres	improvement of markets for livestock	Provision of agri. Inputs	Improvement of medical services
Improvement of water services	improvement of primary school classrooms	Improvement of road infrastructure	Provision of agri extension workers
Development of road infrastructure	Vaccination against Newcastle disease	Construction of school buildings	Increase number of primary school teachers
Availability of water for irrigation	Drugs for control of sunflower pests	Construction of health worker house	Health centre improvements
Availlability of Improved seeds	Road construction	Improvement of water avaiability	Construstruction of crop markets
Construction of crop markets	Improvement of health centre	Control of destructive animals	Control of destructive animals
Provision of timely agri inputs	Construction of bore holes	Agri inputs	Road maintenance