

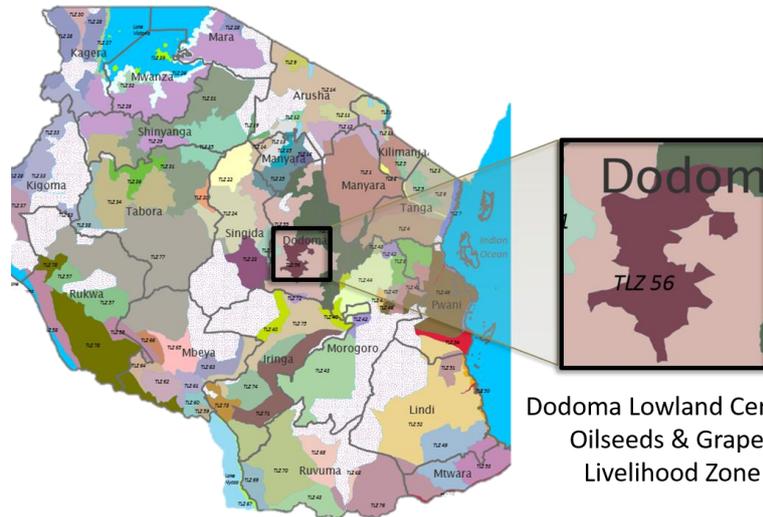
Tanzania Livelihood Baseline Profile

Dodoma Lowland Cereals, Oilseeds & Grapes Livelihood Zone (TLZ 56)

April, 2016¹

Zone Description

The *Dodoma Lowland Cereals, Oilseeds & Grapes Livelihood Zone*² is found in Dodoma Region, in central Tanzania, and includes parts of Bahi, Dodoma Municipal and Chamwino districts.³ This is a warm, semi-arid, lowland area, interspersed with hills and valleys, and located on a broad plateau ranging between 900 and 1,200 metres above sea level. The vegetation is largely semi-desert and bush with areas of savannah grassland. There are no mountains or permanent rivers of note. This



Dodoma Lowland Cereals, Oilseeds & Grapes Livelihood Zone

zone is relatively well-connected to other parts of Tanzania owing to its central location. A major highway connects Dodoma with Dar es Salaam via Morogoro to the east. To the west, there are roads to Mwanza and Kigoma through Tabora. The Great North Road links the area to Arusha via Kondoa to the north. The central railway line also connects Dodoma to Dar es Salaam to the east, Kigoma to the west, and Mwanza to the north-west. The population density is around 38 people per square kilometre.

There is one rainy season, starting in December and lasting until April or May. Annual precipitation is quite limited, ranging from 500 to 600 mm. Poorly distributed rains are a regular occurrence, with dry spells particularly common in January, when most of the crops are sown. Average temperatures vary from 18°C in July to 31°C in November. The cool dry season begins in June and ends in early September. The soils are loamy sands and reddish loamy sands.

The household economy is based on both crop production and livestock raising. Food crops are all rain-fed, and because of poorly distributed and inadequate rainfall, there are frequent bad years, leading to deficits among poorer households that need to be filled with food aid. Grapes are the main cash crop, and they provide a meaningful source of income, but only for households in the upper two wealth groups.

¹ Fieldwork for the current profile was undertaken in February of 2016. 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.

² In the 2008 FEWS NET Livelihood Zoning, this zone was called the Dodoma Lowland Sorghum, Bulrush Millet, Sunflower & Grape Livelihood Zone, but because oilseed crops (like sesame) are important, and sorghum and sunflower are less important, the name has been changed.

³ The wards included in the zone are Mtitaa, Mwitikira and Chibelela in Bahi District; Mpunguzi, Mbabala, Zuzu, Nala, Hombolo, Chihanga, Ipala, Buigiri, Msalato, Nzuguni, Miyuji, Kizota, Mkonze, Mbalawala, Makole, Hazina, Uhuru, Chamwino, Kikuyu North, Kikuyu South, Dodoma Makulu, Kilimani, Tambuka Reli, and Makutupora in Dodoma Municipal; Makang'wa, Mvumi Mission, Mvumi Makulu, Mlowa Bwawani and Iringa Mvumi in Chamwino District. There are some wards originally included in this zone that should be removed and put into Dodoma urban because they are more urban in nature. These include: Kizota, Msalato, Nzuguni, Makole, Miyuji, Hazina, Uhuru, Chamwino, Kikuyu North, Kikuyu South, Dodoma Makulu, Klimani and Tambuka Reli.

Households cultivate bulrush millet, sorghum and maize, with bulrush millet (a relatively successful drought-resistant crop) the most important of the cereal crops for home consumption. Bambara nuts and groundnuts are the main pulses grown for food, and they are grown just as importantly for sale as for consumption. Sesame and sunflowers are two other crops grown principally for sale, but also consumed in small amounts. Grapes, the main cash crop, are grown only by the upper two wealth groups, but they provide an important source of cash, indirectly, to poorer households, who get hired within the vineyards to help prune, spray and harvest.

Oxen are used widely for ploughing. Some at the upper end also use tractors, and poorer households use hand hoes when they are unable to get access (through labour exchange) to plough oxen. Most households do not use improved seeds or industrial fertilizers and pesticides. However, middle and better off households do buy pesticides for use in their vineyards, and they may use animal manure to fertilise their fields.

The peak agricultural labour period is from December through March, corresponding to planting and weeding periods; but other times of year are also busy. Extra labour is required in the vineyards for land preparation, pruning, spraying and harvesting; and it is also needed for land preparation, harvesting and threshing of the food and oil crops, in addition to planting and weeding. Middle and better off households hire members of very poor and poor households to work for them during the labour-intensive times of the year. This provides the most important source of cash for poorer households, who could not survive without this seasonal work. It also provides essential labour for middle and better off households, without which they could not produce their surplus crops.

Livestock is also a vital source of cash (and a minor source of food) for some. Cattle, goats, sheep and chickens are raised. All of these animals are sold live throughout the year when cash is needed and milk from cattle is sold for cash and consumed at home. Chickens are the only animals owned by all wealth groups; very poor households do not own cattle, goats or sheep. All livestock graze and/or browse freely, and also eat crop residues at harvest time. None of the livestock are stall-fed. The main water sources for livestock during the wet season are seasonal rivers, open wells, boreholes, seasonal ponds and dams. In the dry season, they turn to shallow wells and boreholes, and there is payment for tap water in some villages. In addition, the larger livestock are taken to areas in Morogoro, where pastures and water sources are more reliable. Men are usually in charge of taking care of the cattle; boys, and sometimes girls, are responsible for taking care of goats, sheep and calves.

In addition to crop and livestock-related income, and – for poorer households – casual employment income, households earn cash through self-employment activities (such as firewood/charcoal sales for poorer households) and petty trade (such as prepared food sales for poorer households, or owning kiosks, renting out oxen, or *boda boda* for middle and better off households).

The services in this zone are very basic. Access to water in this semi-arid zone is more limited here than in many other areas of the country. Open wells, shallow wells, boreholes, and seasonal ponds are the main sources of water. In some villages, payment for water is typical. Access to clean, potable water is not guaranteed throughout the zone. Health dispensaries are found at the ward centre, health centres are found at each division, and every district has a hospital; however, these are not always well-stocked or fully-staffed with qualified medical professionals. Primary schools are found in the villages and secondary schools are present in the ward centres. It is common for all households to send their children through primary school, and some (but not all) poorer households also send their children to secondary school; however, only middle and better off households are able to afford the extra costs of vocational schools or colleges. There is no electricity, so poorer households depend on kerosene lamps and battery-operated torches, whereas better off households also use solar panels. Households in all wealth groups have mobile phones, with better off households having multiple phones. There are no sources of credit, nor are there savings schemes available. There are no NGOs operating in this zone.

The transportation infrastructure in this livelihood zone is mixed. There are tarmac roads connecting the central market of Dodoma to Morogoro, to Iringa, to Singida and to Arusha via Kondoa. From all of these points it is possible to reach terminal markets like Kenya and Dar es Salaam. However, the many feeder roads that connect villages to Dodoma are made of dirt or marram, and most are in poor condition. They function adequately during the dry season, but in the wet season access becomes challenging. Inundation by seasonal streams during the wet season is a common occurrence, requiring long waiting periods until waters recede and vehicles are able to make their way through. Bridges are few and far between; most passages over rivers are not bridges at all, but cemented portions of the river bed. Nevertheless, the zone is well-connected to other urban centres and market access, once commodities reach Dodoma town, is good.

Households sell a range of food and cash crops, as well as livestock. Maize, sorghum, bulrush millet, groundnuts, Bambara nuts and sesame are grown for both home consumption and sale. The cash income generated from sesame and pulses (groundnuts and Bambara nuts) is especially important, as discussed below in the section on 'Sources of Cash Income'. Sunflowers and grapes are the main cash crops, grown almost exclusively for sale. Whereas the cereal crops are sold locally, rarely leaving the region, the other crops are exported to other regions. Traders purchase bulrush millet or maize at the farm gate and take it by truck to markets and stocking facilities in Dodoma and Dar es Salaam. Traders from village shops also go to farmsteads to buy maize or bulrush millet. Some farmers carry bulrush millet by bicycle or head-lots to ward markets (in Kiswahili known as *minadas*) or village shops. Most maize and bulrush millet farmers in the zone do not have storage facilities and must sell all bulrush millet or maize immediately after harvest. If local grain storage facilities were improved, many farmers would not need to sell their grain at a low price directly after harvest only to buy bulrush millet or maize later in the season at a high price.

Sunflowers are transported to Dodoma and then on to Dar es Salaam and other regional centres for processing into oil. Sesame and groundnuts get exported to Dar es Salaam and then on to distant markets in Asia. Some groundnuts are also destined for Nairobi. Groundnuts are sold from April to August; sesame and sunflowers have a more limited window of sale, from June to August. Grapes have a number of different terminal points: some are used within Dodoma Region for wine production; some are sent via Dodoma to Dar es Salaam as fruit for direct consumption; others are transported via Dodoma to Arusha and then on to Kenya for both consumption and wine production. The two periods of peak grape sales are February to March and August to September. The first period coincides with the rainy season, when road access is often compromised, which means some grapes never make it to market before rotting.

Cattle, goats and sheep are sold to traders at mobile markets within the zone, from where they get transported to Dodoma and then on to Dar es Salaam. Chickens are sold locally. Sales occur throughout the year, when people need extra cash for school fees, medical expenses, festivals, or unexpected emergencies. However, peak sales are from January through March, the lean season, when most households need extra cash to purchase food; and in the harvest season, from June through August, when livestock prices are high after animals have been fattened on crop residues. (See 'Seasonal Calendar' section, below.)

Poorer households buy maize grain, the cheapest staple, to cover their needs for two to three months of the year (December through February), even in relatively good production years. Most maize is sourced from Iringa and sold through the Dodoma market. Rice, purchased by middle and better off households, comes from Shinyanga and Morogoro to the Dodoma market.

The labour market is mostly local and consists of seasonal agricultural labour. There is also a small demand from local towns and some seasonal employment is found outside the livelihood zone. It was estimated that in the reference year, 80% of seasonal labour was found within the zone on local farms. An additional 15% of the casual employment opportunities were from local towns, and the other 5% came from outside the livelihood zone, mainly from Kongwa (in Dodoma), Kiteto (in Manyara), Mvomero and Kilosa (both in Morogoro) and Kilindi (in Tanga). The balance shifts in bad years, with more people traveling to local towns

or to areas outside the zone to find work, especially from December to February. There is no labour migration into this zone.

Timeline and Reference Year

The baseline assessment refers to a very specific time period called the reference year. In the *Dodoma Lowland Cereals, Oilseeds & Grapes Livelihood Zone* the reference year covered the **consumption** period from April 2014 to March 2015. The production year starts with the planting season in November/December and ends with the harvest in April through July of the following calendar year. Thus, the 2014-2015 consumption year corresponds to the production year that starts with the 2013-2014 agricultural season. During community leader interviews, informants were asked to rank the last five production years in terms of seasonal performance with '1' indicating a poor season and '5' an excellent season. The table below summarizes the responses of the community leaders. The production year of 2013-2014, which corresponds to the consumption year of 2014-2015, was considered an above average year. In the past 5 years, there have been 2 average or above average years; 2 slightly below average years; and 1 well-below average year. The baseline information presented in this profile, therefore, provides a view into how households in this livelihood zone make ends meet in an above-average year.

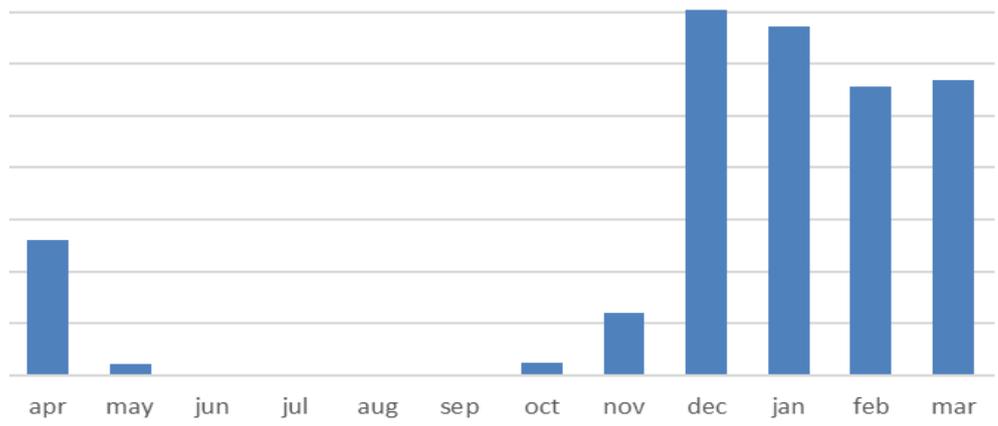
Production Year	Season	Rank	Critical Events
2014-2015	Masika	1.4	Poor rainfall distribution, low crop yields, poor pastures, high staple food prices, low livestock prices, higher livestock mortality; unusual migration of livestock; food aid was distributed; extra livestock sales; more charcoal sales.
2013-2014	Masika	3.7	Good rainfall distribution; good crop yields; good pastures; low staple food prices; good livestock prices.
2012-2013	Masika	3.1	Average rainfall distribution; average crop harvests; average pastures; average food prices; average livestock prices.
2011-2012	Masika	2.4	Average rainfall distribution, below average crop yields; average pastures; average staple food prices; average livestock prices.
2010-2011	Masika	2.5	Average rainfall distribution; average crop harvests; average pastures; average food prices; average livestock 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

There is one long rainy season in this zone, starting in December and lasting partway through April. Agricultural activities are linked to the timing of the rains, but because irrigation is also used in the vineyards, households here are occupied year-round with different crop-based and livestock-rearing activities. Land preparation starts in September – a full two months before the planting period – as the cereal and oilseed crops are all planted in November and December, with some planting extending into the beginning of January. Sorghum, maize and groundnuts are inter-cropped, while Bambara nuts, grapes, sesame, sunflower and bulrush millet are grown as single stands. From late December through March, people are busy with weeding. The main harvests occur in May and last through July; however, sesame is harvested as early as March; and part of the maize, groundnut and Bambara nut harvests are eaten green, beginning mid-way through March. Grapes are harvested twice a year, once in March and once in August/September. A period of threshing (where applicable) and sales follows the harvest of each crop.

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Rainy season												
Crops												
Maize												
Bulrush millet												
Sorghum												
Groundnuts												
Bambara nuts												
Sunflower												
Sesame												
Grapes												
Livestock												
Milk peak												
Livestock sales peak												
Livestock migration												
Livestock diseases												
Other												
Agricultural labor peak												
Off farm labor peak												
Firewood sales												
Petty trade peak												
Remittances peak												
Wild food collection												
Stress & High Expenditure Periods												
High staple prices												
Human diseases												
Festival season												
Lean season												
Legend												



The graph to the right shows average monthly rainfall (mm) in Dodoma District based on a 35-year period (1980-2014). Source: TZ Meteorology Department

The peak agricultural labour period is from December through March, corresponding to planting and weeding of the cereal and oil seed crops; but that does not mean that the other times of year are not busy. Extra labour is required in the vineyards almost year-round for land preparation, pruning, spraying and harvesting; and it is also needed for the land preparation, harvesting and threshing of food and oil crops. Middle and better off households cultivate large areas of land, which they cannot manage without extra help. They hire members of very poor and poor households to work for them during these labour-intensive times of the year. Thus, poorer households are busy working for others while, at the same time, tending to their own fields. The ultimate result

is that poorer households have lower yields due to less-intensive management on their own fields during critical management times.

One reason that poorer households seek work off their own farms is that they run out of their own food stocks from the previous year's harvest before the next harvest is available. This means they need to buy a good bit of their food every year, and they need cash to do that. Local agricultural labour offers them the best means for earning cash without having to migrate away from the villages. Very poor households can deplete their stocks as early as December, but by February and March (the lean season) almost all households in the lower two wealth groups are buying food. Thus, the paid work for weeding helps provide needed cash, allowing them to bridge the gap until mid-March or April, when green harvests are available. Unfortunately, this is also a time of year when human diseases, and especially malaria, peaks. The most important livelihood capital that poorer households have is their own labour, so when an active labourer is sick in a poor household, income for this household is lost. Because the months of peak human illness coincide with one of the peak labour periods, it can be especially damaging for a productive household member to be sick at this time. Protecting the health and well-being of poorer households goes hand in hand with protecting their income.

People in this zone are not only busy with cropping activities, but also with livestock-related work. Milk sales peak from January through March (as pastures and water sources regenerate with the rains) and again from June through August (as livestock benefit from harvest residues). Milking animals is a time-consuming task, competing with the demands of weeding and harvesting in these months, but it brings with it the reward of extra nutrition for the household and cash income from milk that is sold. These same two periods (January through March and June through August) are when livestock sales are highest. In January through March, livestock are sold (by poorer households) in response to the need for cash to pay for food during the lean season, and (for middle and better off households) to cover the cost of hiring labour during the agricultural season. The June to August period of peak sales corresponds to the fact that livestock are in good condition at this time and garner high prices, and this is also when middle and better off households are putting aside cash for the coming agricultural season. In September, as the dry season deepens, livestock are taken to areas in Morogoro, where pasture and water sources are more reliable, returning to the villages in January or February.

Those without livestock are busy with other activities in the dry season, especially collecting and selling firewood. Wild foods are also available at this time. Petty trade peaks in the harvest months, with some households transporting and re-selling local commodities, and others transporting goods into the zone for sale to local households that have new cash from crop sales. The festival season also takes place at this time, when the proceeds from the harvest are available to spend, and before the intensive work of the coming agricultural season has kicked into high gear.

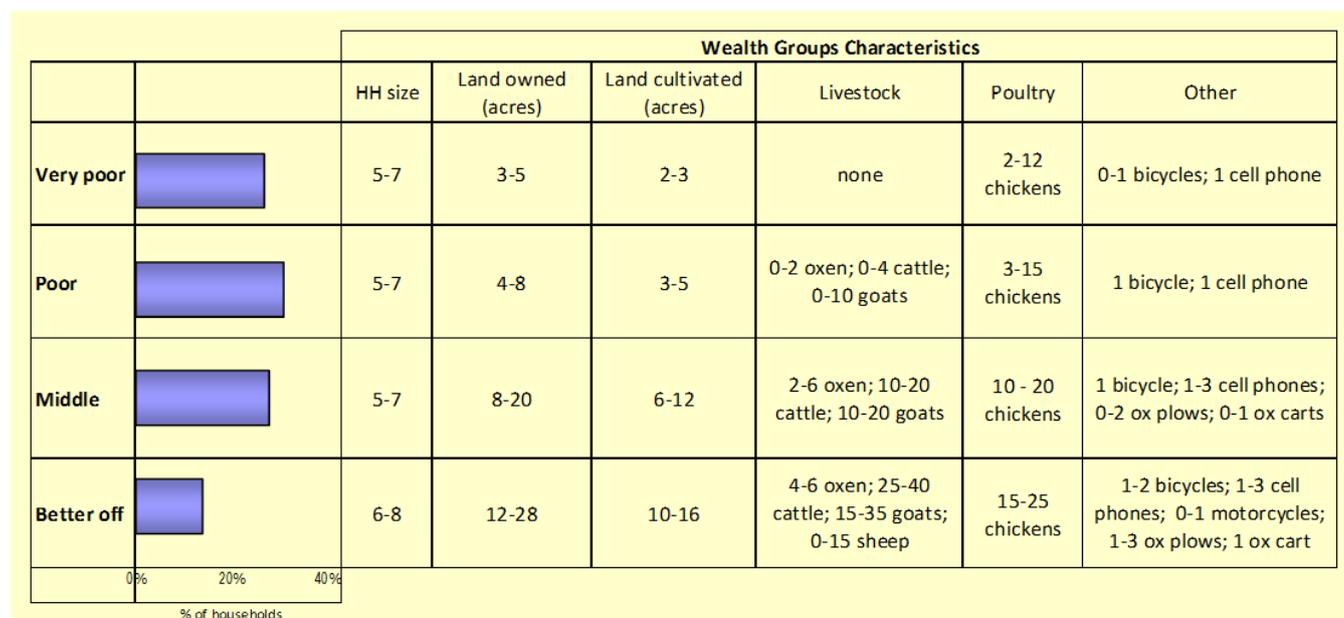
Wealth Breakdown

The main determinants of wealth in this zone are, first, the amount of land a household cultivates and, second, the number of livestock - particularly oxen and cattle - it owns. In important ways these two things are inter-related: ownership of oxen allows people to increase the area they cultivate; and bigger herds generate more cash, which enables people hire labourers to carry out the many tasks associated with having more land. On the other side, the more land a household has under cultivation, the larger its harvests; and with more crop production, a household is able to generate proceeds from crop sales that can be invested in the health and growth of its livestock herd. Additional factors that determine how much land a household cultivates include the amount of land they own, the intra-household labour they have on hand, and their ability to hire additional help.

Typical better off households own around 12-28 acres of land and cultivate 10-16 acres of these, using several teams of their own oxen for ploughing, or tractors in some cases. They also hire seasonal agricultural labourers. Better off households have more livestock than other households, usually keeping a herd of around 4-6 oxen, 25-40 cattle, 15-35 goats and 0-15 sheep, alongside 15-25 chickens. Their household sizes are a little bigger than the other wealth groups. These households also own other assets, such as 1-3 ox-ploughs, an ox cart, a bicycle or two,

and possibly a motorcycle for *boda boda*. They typically own several cell phones, which are used to gather price and market information as well as to keep in touch with far-away relatives.

Typical very poor households, on the other hand, own around 3-5 acres and cultivate only 2-3 acres, usually by hand, although they may exchange labour for access to plough oxen from better off households. They do not produce enough in any year to cover all of their food and cash needs. Very poor households have no livestock at all, except for 2-12 chickens. They have around 5-7 household members and face many competing labour requirements during the cropping season, because they need to work in both their own fields and in the fields of middle and better off households, where they earn cash that is critical to their survival. These households do not have any additional assets other than, possibly, a cell phone and a bicycle, but many do not even have these.



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

Another distinction between the wealth groups is that middle and better off households grow grapes, whereas very poor and poor households do not, lacking the financial means to invest in the inputs and labour required to manage successful vineyards. In addition, the upper two wealth groups grow more sesame and sunflower, the other main cash crops, and they hire people to work for them, whereas the lower two wealth groups are the hired labourers.

The distribution of wealth in this zone is weighted towards the bottom. Very poor (20-38%) and poor (25-35%) households together make up around 45-70% of households in the zone. Middle (20-35%) and better off (10-20%) households combined represent around 30-55% of the households.

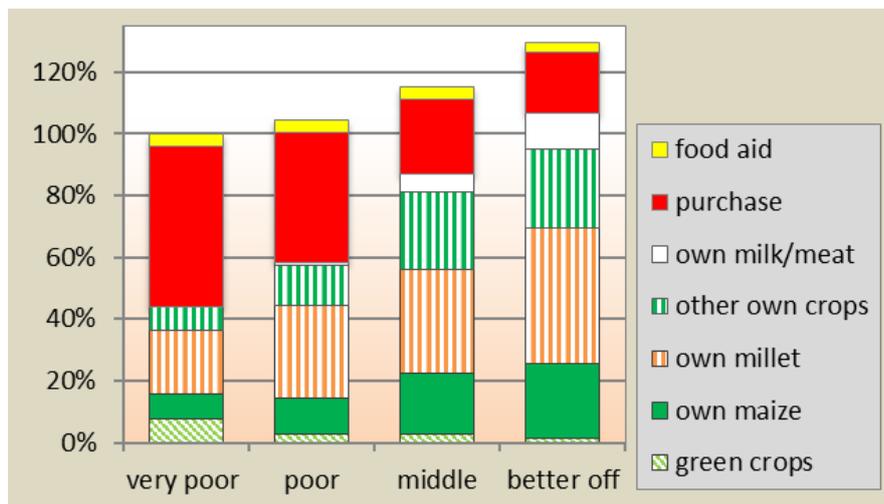
Sources of Food

The graph below 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 harvest green maize 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 above-average year, with good rains, good crop yields, and low staple food prices.

There are two main sources of food in this livelihood zone, and two supplemental sources: own crops and purchased food make up the majority of calories, while those in the upper two wealth groups also benefitted from their own milk and meat; and all households received a small amount of food aid. As you move up the wealth spectrum, reliance on own crops increases and the importance of the market decreases.

Own crops covered 44-95% of minimum calorie needs in the reference year, increasing with wealth. In this lowland, semi-arid zone, maize is not the primary food crop; a more drought-tolerant crop – bulrush millet – is. Alongside maize and bulrush millet, households grow sorghum, groundnuts, Bambara nuts, and sunflower. Bulrush millet provides the most calories of any single crop, accounting for 20-44% of minimum food needs in the reference year.

Maize, on the other hand, contributed 15-25% of minimum calories (including eaten green).



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

The other crops, which were mainly pulses, made up 8-14% of reference year food needs. Taking a closer look at production, typical very poor, poor, middle and better off households produced around 400 kg, 630 kg, 750 kg and 1,240 kg of bulrush millet, respectively, in the reference year; along with 150 kg, 400 kg, 500 kg and 840 kg of maize; 40 kg, 120 kg, 330 kg and 450 kg of sorghum; 80 kg, 140 kg, 210 kg and 300 kg of groundnuts; 50 kg, 100 kg, 130 kg and 150 kg of Bambara nuts; as well as 65 kg, 80 kg, 320 kg and 500 kg of sesame, all respectively. In the reference year, households sold a sizeable portion of all of these crops, but if they had consumed, rather than sold, all of their maize, sorghum, groundnuts, bulrush millet and Bambara nuts, all but the very poor group would have been able to cover their minimum calorie requirements. In fact, in pure calorie terms, these crops could be converted into 60%, 108%, 150% and 205% of minimum calorie needs for very poor, poor, middle and better off households, respectively. The point here is not that households should not have sold their crops: crop sales offer a necessary means for generating the cash required to cover a range of essential goods and services. But it is important to note that households in the top two categories are able to produce substantially more than those in the bottom two categories, and this has implications for their ability to survive in bad years. Even if half of their crop production is wiped out in a bad year, better off households still have enough to cover their minimum needs, whereas very poor households would be left with a deficit of over 70% of minimum calories. It also explains differences in what these households purchased in the reference year, as discussed below.

Purchased food accounts for most of the remaining calories consumed by all households in the reference year, covering 20-52% of minimum calorie requirements, decreasing with wealth. The poorer two wealth groups purchased mostly maize grain and bulrush millet, the cheapest staples. Purchased maize grain and bulrush millet together accounted for around 44% of minimum calories (for typical very poor households) and 32% of minimum calories (for poor households) in the reference year, or over three-quarters of their purchased calories. Middle households, on the other hand, purchased only around 4% of their minimum calories in the form of maize grain and no millet; and better off households purchased no maize or millet at all. For middle and better off households, the 'purchase' component was comprised of more high-value, preferred foods, such as wheat flour, rice, beans, sugar, meat, oil and dried fish. Thus, almost the entire value of their purchased calories came from high-value preferred foods. By comparison, very poor and poor households purchased only around 8% of their minimum calories in the form of these higher-value food items, and did not buy meat or wheat flour in meaningful amounts.

The final two sources of food are own milk/meat and food aid. Only middle and better off households obtain significant quantities of milk and meat from their livestock. In the reference year a typical middle household had around 4 cows milking, and better off households had around 6 cows milking. Milk yields vary over the year, reaching their peak of around 1.75 litres per day in the rainy season, and dropping off to around 0.5 litres per day in the dry season. Given this variation and the period of time that cows here continue to lactate, households obtained a total of around 1,085-1,630 litres over the year. Approximately 45-50% of the milk got sold, leaving middle and poor households with enough to cover 6-8% of their minimum calorie needs in the reference year. An

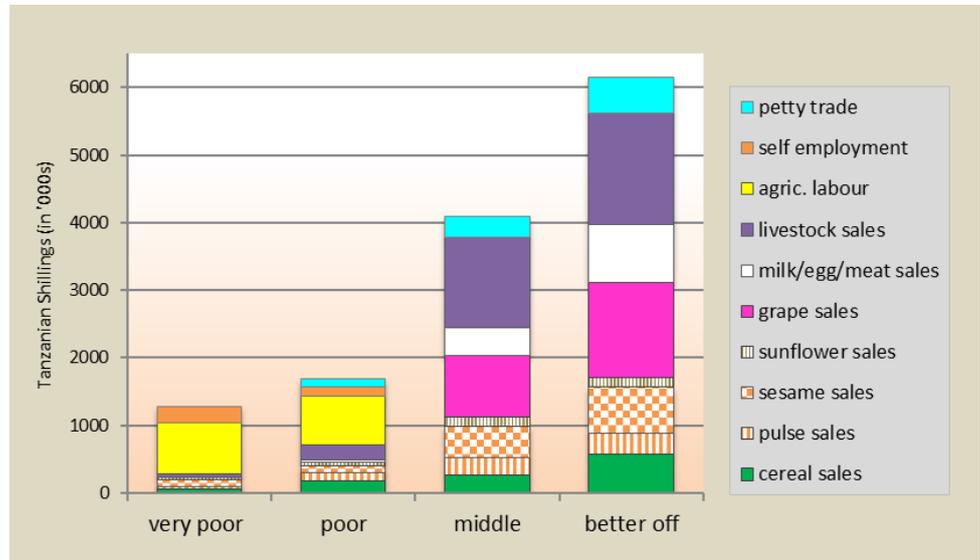
additional 3% or so of minimum calories accrued to better off households in the form of meat from slaughtered cattle and goats.

While only the upper two wealth groups benefitted from milk (and meat), all households who sent their children to school received some help in the form of school feeding, shown as 'food aid' on the graph. Most households have at least 1 child attending school, and this household member was fed one meal a day during the school term, helping to add to the required calories for the household in the reference year.

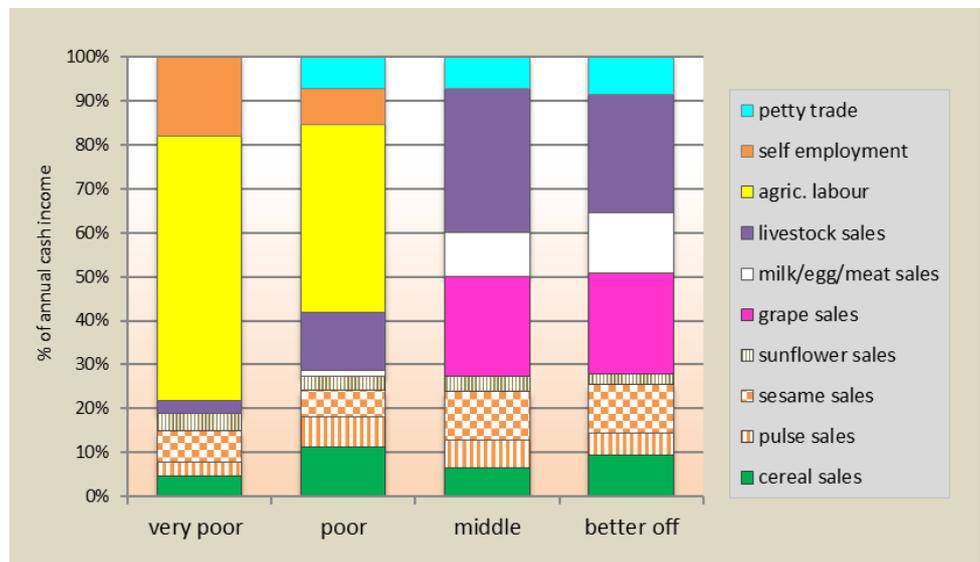
Sources of Cash Income

The graphs to the right present an accounting of cash income sources for all four wealth groups in the reference year, first in terms of absolute values, and next as a proportion of annual cash income.

It is immediately clear that households in the upper two wealth groups have a very different income profile from those in the bottom two wealth groups. Although 'grapes' is in the title of this zone, the income from this source only benefits middle and better off households directly. The land, labour and pesticides required to grow a successful crop of grapes puts this crop out of reach for very poor and poor households. The other major difference is that middle and better off households round out their cash income with livestock-related income, relying on milk sales and live animal sales to meet almost all of the rest of their needs. Poorer households, on the other hand, do not have enough livestock to make this possible, and rely instead on casual labour and self-employment. Neither of these provide guaranteed income in any year, and both sources



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



The graph provides a breakdown of total annual cash income as a percent of annual cash income.

INCOME SUMMARY TABLE (in Tanzanian Shillings)				
Wealth group	Very poor	Poor	Middle	Better off
Annual income per household ⁴	900,000 – 1,400,000	1,400,000 – 2,500,000	2,500,000 – 5,500,000	5,500,000 – 7,500,000

⁴ The average exchange rate from April 2014 - March 2015 was 1 USD = 1,800 TZS

are linked to the surpluses held by those at the upper end of the wealth spectrum. Poor households also depend to a small extent on petty trade, as do middle and better off households, but the nature of this trade is different, as discussed below.

In the reference year, the combined value of crop sales accounted for 19%, 27%, 50% and 51% of the annual cash income of typical very poor, poor, middle and better off households, respectively. Maize, sorghum, groundnuts, Bambara nuts, Bulrush millet, sunflower, and sesame are all sold, as well as grapes, the main cash crop. Sesame, Bambara nuts and groundnuts are the highest value crops, sold at around 850-1,500 TZS/kg in the reference year. The lower end of the range corresponds to the price that poorer households got for their groundnuts. Middle and better off households are able to get a higher price for their groundnuts (1,200 TZS/kg) because the quality of their produce is higher and they sell at more advantageous times of the year and/or to markets where they get a better price. The upper end of the range applies to sesame. Either way, these prices compare favourably with the cereal crops, which are valued at around 400-500 TZS/kg. Therefore, even small amounts of pulses and sesame can earn households a meaningful amount of cash. For example, in the reference year, typical middle and better off households sold 300-450 kg of sesame, 150-185 kg of groundnuts and 130-150 kg of Bambara nuts. The combined total for these three crops represented around 16-18% of annual cash income for the upper wealth groups. The poorer two wealth groups only sold 50-90 kg of groundnuts, 60-70 kg of sesame and 0-40 kg of Bambara nuts but still earned around 132,500-221,500 TZS, or approximately 10-13% of their annual cash from these relatively small quantities. Cereal crop sales (maize, sorghum and bulrush millet) contributed around 5-11% of annual cash income for all wealth groups. Sunflowers only earned households 2-4% of their annual cash. The real cash earner was grapes, but these were only grown by the top two wealth groups. Grape sales alone provided middle and better off households with 20-25% of their annual cash income. **Better off households earned from grapes alone more than very poor households earned from all of the cash sources combined in the reference year.** As a whole, better off households generated 13 times more from crop sales than very poor households, despite only having, on average, 5 times more land under cultivation. This is explained, at least in part, by the capacity of better off households to buy sufficient inputs and to apply timely management practices. Poorer households cannot afford to buy many inputs, and their labour pool is split during key times of the year, partly on their own farms and partly working for others, but never fully devoted to their own fields. The resulting difference in yields is apparent in these figures.

For middle and better off households, livestock sales and livestock product sales (including milk, meat and eggs) are the next most important income earner, making up 40-45% of annual cash income; on the other hand, very poor and poor households only derived 3-14% of their annual cash from these sources. As discussed in the 'Sources of Food' section, middle and better off households both own milking cows. Around half of the milk produced in the reference year was sold. In addition, better off households sell eggs and meat. The total income from livestock product sales accounted for 10-15% of cash income for the two upper wealth groups. Poor households also sold a very small amount of milk, but this resulted in an insignificant amount of cash. More important than the livestock product sales were sales of live animals, which made up 25-35% of cash income for middle and better off households, and 3-13% of annual cash for very poor and poor households. Cattle, goats, chickens, and a few sheep, are sold. Cattle bring in the most cash per animal (at around 95,000-1,320,000 per head); in contrast goats are sold for around 40,000 TZS and chickens for 6,500-8,000. Better off households typically sold around 3 cattle, 6 goats, 1 sheep and 7 chickens in the reference year; very poor households only sold around 6 chickens. The other two wealth groups fell in between these two extremes.

Casual labour is the most important source of income for very poor and poor households. In the reference year, this stream of earnings accounted for 60% of a typical very poor household's annual cash income and 40-45% of poor households' cash income. Middle and better off households cultivate more land than they can manage with their own household labour, so they hire members of these poorer households to help throughout the agricultural season. People are hired to prepare land, to plough, to plant, weed, harvest and thresh. The majority of the cash income is associated with pre-harvest tasks, which account for 60-70% of the agricultural labour income. It is important to keep in mind that this income, as critical as it is in an average year, shrinks in a bad year because

losses in production translate into losses in the demand for labour, especially for harvest and threshing labour. This leaves poorer households struggling to find ways to fill this large gap.

The last source of cash income for very poor households is self-employment, which means, primarily firewood and charcoal sales. Both women and men from the poorer wealth groups engage in this activity, with women focusing more on firewood, and men focusing on charcoal burning and sale. July to October, the dry season, is when these sales are concentrated. The environmental damage that ensues from this cash income is of concern, especially as the population grows and especially given the large proportion of the population already depending on this income. Self-employment made up almost a fifth of the cash income of very poor households in the reference year.

Poor, middle and better off households also engage in 'petty trade' to earn extra cash. This may take the form of prepared food sales (for poorer households), or sales of household items, which middle and better off households are able to buy in bulk; they set up kiosks in the villages and generate extra income through this business. Some also make money from *boda boda*, or motorcycle hire, which can be used to transport goods and people, or ox plough and/or ox cart hire.

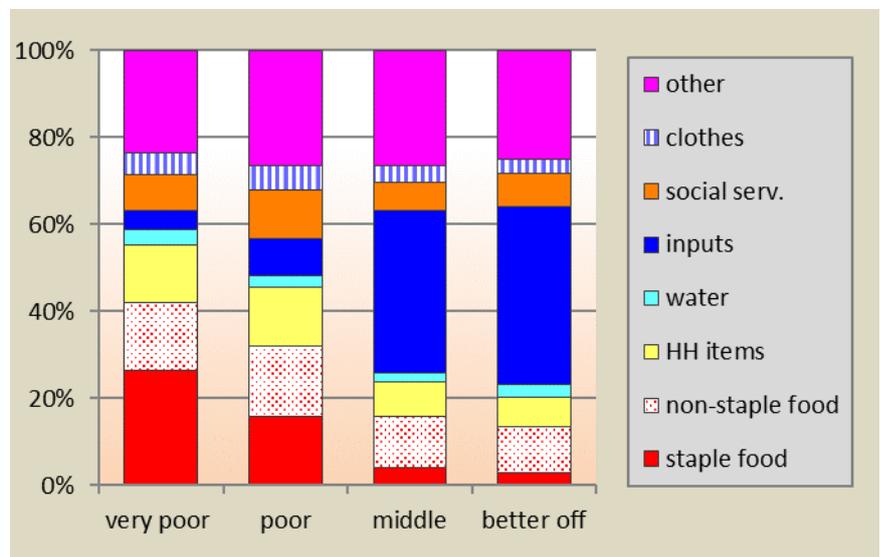
Expenditure Patterns

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 areas of the country, households need to spend cash on a range of goods and services throughout the year, including: staple and non-staple food, household items, productive inputs, social services, like schooling and health, clothing and other non-

essential items, such as tobacco, cosmetics and festivals. As shown in the graph to the right, two common trends appear in this zone, mirroring the findings in other rural areas: first, the poorer you are, the more cash you have to spend on securing basic staple foods; second, the richer you are, the more money you need to spend on productive inputs. The fact that typical households here need to buy water sets this zone apart from many other rural areas of the country; and the relatively large amount of cash in the 'other' category is also notable.

All wealth groups spend some of their available cash on staple foods, which includes (in this case) maize grain, millet, wheat and rice. In both absolute and relative terms, very poor households spent more than the other wealth groups on staple foods. In the reference year, very poor and poor households spent around 16-26% of their annual cash on staple foods; and middle and better off households spent only 3-4%. The make-up of the staple food basket is not the same for all wealth groups. Typical very poor and poor households spent a total of 265,000-340,000 TZS on staple food, and 220,000-305,000 TZS (or 80-90%) of this was on maize grain and millet, the cheapest staples. Middle and better off households spent around 160,000-180,000 TZS, respectively, on staple foods, but only middle households spent a small amount on maize grain and neither bought millet at all. They spent money on rice, first, which is a preferred food, and better off households also bought a small amount of wheat flour. Thus, middle and better off households did not need to buy staple grains to fill a calorie gap; but rather to fill a preference gap.



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

Although middle and better off households spent much less in both absolute and relative terms on staple food, on *non-staple foods*, they spent 2 ½ to 3 ½ times more in absolute terms than very poor households. The non-staple food category included beans, sugar, meat, oil, dried fish, and vegetables. Of these, the lower two groups spent the most on beans, dried fish, and oil, supplementing their heavily grain-based diet with proteins and fats. They spent the least on vegetables. Middle and better off households spent the most on meat and sugar. In the reference year, the proportion of cash income spent on non-staple foods was around 16% for very poor and poor households, and around 11-12% for middle and better off households. The calories purchase for this expenditure (in relation to minimum calories required for the year) were 6-8% (for very poor and poor households) and 13-15% (for middle and better off households). Thus, middle and better off households are able to buy a more nutritious and diverse diet than the other wealth groups, even though in relative terms they spend less than the other two wealth groups.

In the reference year, middle and better off households both spent the largest portion of their annual cash income on productive inputs, as represented by the dark blue bar in the graph. In proportional terms, their spending on productive inputs (37-41% of annual expenditure) is larger than any other wealth group spends on any of the other categories. The following are included in this category: livestock drugs, seeds/tools, pesticides/fertiliser, livestock purchases, labour hire, business investment, phone credit and house repairs. Within this set, very poor households spent money only on seeds/tools and phone credit, with the most spent on phone credit. Poor households, in addition to these two categories, spent on money on livestock drugs. Middle and better off households spent money on all items within the category (with the exception of business investment, which only applies to better off households). The majority of their inputs budget was devoted to labour hire (47-57% of their inputs budget), followed by livestock purchase (15-19% of their inputs budget). Collectively, seeds, tools, pesticides and fertilisers comprised only around 11-12% of their inputs budget. In absolute terms, better off households spent **44 times more** on productive inputs than very poor households, 17 times more than poor households, and 1 ½ times more than middle households.

The 'hh items' category (in yellow) includes basic household necessities, such as tea, salt, soap, lighting (such as batteries, solar lamps solar panels, etc.), grinding services, firewood and utensils. These are items that households usually pay for in incremental amounts on a week-by-week basis. Within this category, very poor and poor households spent the most money on grinding, which took up around a quarter to a third of this budget, followed by payment for lighting. Middle and better off households spent the most on utensils, followed by lighting and soap. All households spent the least on salt and tea. On an annual basis, spending on basic household goods made up 7-13% of annual expenditure. Somewhat unusually, households in this zone also needed to spend money regularly on water, especially during the dry season, highlighting the particularly poor access people have to fresh, potable water.

'Social services', shown in orange on the graph, includes schooling and health costs. In the reference year, households spent 8-11% of their annual cash on these services. Schooling expenses included school fees, uniforms, stationery and transportation, where relevant. On a per capita basis, holding household size constant, better off households spent around 25% more than middle households and around 2-3 times more than poor and very poor households on schooling. In addition, better off households spent up to 11 times more on health care than very poor households on a per capita basis, indicating that these households may have had access to better clinics and private hospitals.

Spending on clothes and other miscellaneous items are the last two categories included here. Spending on clothes accounted for 3-5% of the annual budget for all households. The 'other' category includes things like cosmetics, hair, beer, tobacco, cigarettes, community obligations, transportation and festivals; in the reference year households devoted 24-26% of their cash to these items. 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 in the upper three wealth groups had the most available in this discretionary budget (better off households had 6 times more in this category than very poor households); and because the reference year was an above average year, even the very poor wealth group had more in this budget than it would in a bad year. In fact, this discretionary

budget, in relative terms, is larger than in most other zones, which is related to the fact that in many other zones the reference year was average, not above average.

Hazards

Three hazards affect this zone on a regular basis. The first is **poor rainfall distribution**. All the food crops in this zone are rain-fed; only grapes benefit from irrigation. Crops require an even, reliable distribution of rain to perform well. When too much or not enough rain falls during critical development periods, especially the vegetative and reproductive stages, yields can drop dramatically. Thus even if overall seasonal precipitation is normal, poor distribution can cause crop losses of 50-60%. The second chronic hazard is **crop and livestock pests and diseases**. *Quelea quelea* birds are especially problematic, damaging both the sorghum and bulrush millet crops. Army worm, which affects all cereal crops, and fungal diseases, which affect grapes, also reduce yields on a regular basis. The most commonly-occurring **livestock diseases** are contagious bovine pleuropneumonia (CBPP) for cattle, caprine pleuropneumonia (CCPP) for goats, and Foot and Mouth Disease (FMD). Newcastle Disease is also common and can wipe out an entire flock of chicken. Livestock diseases reduce the value of animals, lowering income levels, while at the same time increasing expenditure requirements related to livestock drugs. In the worst case, animals die, reducing the productive asset holdings of a household. The third chronic hazard is **human diseases**, especially malaria and typhoid fever. Because household labour is so critical to income generation, especially for poorer households, having a household member sick at a critical time of year can translate into significant drops in income, while at the same time increasing the medical expenditure requirements.

The main periodic hazards are **drought**, which can seriously damage crop production once every three years. Droughts result in a series of inter-related shocks, such as rapid increases in staple food prices, declines in livestock production, reduced labour income and reduced returns on self-employment. **Floods** occur once every three years as well. Floods can damage standing crops and wash away roads, making it difficult for people to reach markets, and usually causing a spike in staple food prices. Less of a hazard, and more of a structural constraint, **poor marketing infrastructure** means that households are selling their agricultural commodities at prices that barely cover their production costs.

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 instead, or cutting down on festivals, tobacco and beer.
- Very poor and poor households try to increase cash income through **finding more agricultural labour and casual employment**, either locally or migrating outside the zone. In particular, people may go to Kongwa in Dodoma, Kiteto in Manyara, Mvomero and Kilosa districts in Morogoro, and Kilindi in Tanga. The expandability of this option is limited in bad years because the labour market gets saturated 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. This problem is somewhat mitigated if the bad year is localised.
- All households also try to increase their self-employment income. Poorer households try to increase cash income from **charcoal and firewood sales**. However, as more and more households try to do the same thing in a bad year, the value of each bundle of wood or charcoal decreases, which makes it difficult to expand this source of income substantially. The environmental damage that accumulates from this pursuit should be a cause for serious concern. Middle and better off households try to increase income from **petty trade**.

- Middle and better off households also try to increase their **livestock sales**. 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 *Dodoma Lowlands Cereals, Oilseeds & Grapes 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"> • Maize – amount produced • Sorghum – amount produced • Groundnuts – amount produced • Sunflower – amount produced • Sesame – amount produced • Bulrush millet – amount produced • Bambara nut – amount produced • Grapes – amount produced 	<ul style="list-style-type: none"> • Maize– producer price • Sorghum – producer price • Groundnuts – producer price • Sunflower – producer price • Sesame – producer price • Bulrush millet – producer price • Bambara nut – producer price • Grapes – producer price
Livestock production	<ul style="list-style-type: none"> • Cows’ milk – yields • Meat – amount sold • Cattle – herd size • Goats – herd size • Chickens - numbers 	<ul style="list-style-type: none"> • Cows’ milk – producer price • Meat – producer price • Cattle – producer price • Goats – producer price • Chickens – producer price
Other food and cash income	<ul style="list-style-type: none"> • Agricultural labour (land preparation, planting, weeding) – number of jobs • Agricultural labour (harvesting) – number of jobs • Bricks – numbers produced • Firewood/charcoal – amount sold • Petty trade – volume of trade 	<ul style="list-style-type: none"> • Agricultural wage rates (land preparation, planting, weeding) • Agricultural labour rates (harvesting) • Bricks – price per brick • Firewood/charcoal – price per bundle • Petty trade – returns on trade
Expenditure		<ul style="list-style-type: none"> • Maize grain – consumer price • Rice – 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.

Very poor/poor households

- Provision of health services at village level, including building dispensaries and providing qualified health professionals and sufficient and affordable supplies of medicines
- Improved maintenance of existing road networks
- Timely and affordable provision of crop and livestock inputs
- Access to safe and sufficient water at all times of year
- Provision of school buildings, qualified teachers and appropriate teaching materials for all children

- Development of fair, standardised and efficient agricultural markets
- Construction of dam for irrigation

Middle/better off households

- Timely and affordable provision of crop and livestock inputs
- Development of livestock health infrastructure, including affordable veterinary services and dip tanks, etc.
- Access to safe and sufficient water at all times of year
- Provision of school buildings, qualified teachers and appropriate teaching materials for all children
- Development of fair, standardised and efficient agricultural markets
- Provision of electricity at village level
- Construction of dam for irrigation