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Zimbabwe farm typologies report

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Cover photo: Farmer Maureen at her hay-sorting workstation in Gwanda District (photo credit Johnson Siamachira/Cirad).

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Contents

Tables

Figures

1. Introduction

This farm typology and analysis of overperforming and underperforming farms for each type informs technology, market-oriented and social network interventions under the EU-funded project Improved adoption and scaling up of Zimbabwe 2020 - 23. The typologies guide interventions for strengthening the role of livestock to increase farm productivity, farm income, food security and nutrition security for smallholders. Tailoring interventions to household specific resource endowment levels, farming objectives and to the contexts informs better integration of crops and livestock in support of the project's objectives, improved productivity and market offtake. It also helps in identifying local employment options that support the functioning of livestock value chains.

Objectives of identifying farm types

- Better understanding of the levels of resource endowments, how these resources are being used under different management practices and how they impact on agricultural production and participation in livestock markets among smallholder households in the project districts.
- Better targeting of interventions, based on the farm types and how the composition of farm types conclude within the contexts.
- Evaluating how different farm types engage in their envisaged pathways, mechanisms that make them succeed, learn from failures.
- Generating applicable recommendations on the scalability of technology, market-oriented and social network related interventions to areas with similar conditions.

The farm typology approach chosen for this study was generated from baseline data, using R-statistics. It delineates farm households based on dissimilarity over a set of selected variables.

- Farm typologies: Here we first illustrate the distribution of farm types across the project districts to identify areas that will require similar portfolios of interventions. We then characterize the farm types for each of the districts, against the local specific constraints and opportunities.
- Deviant analyses: In a next step, we calculated a measure of efficiency for each farm (based on crop and livestock productivity), tested the impact of adopting different crop and livestock technologies on the variability of efficiency for each district and farm type. We then identified 10 overperforming farms—or 'positive deviants'—and 10 underperforming farms that will be subjected to detailed studies, in particular to understand what makes positive deviants overperform compared to the rest of the farms in the type and district they belong to.
- District and farm type specific recommendations: Sets of farm type and district specific recommendations were generated, available for revision with farmers and in aid to plan interventions. These recommendations can then be extrapolated for intervention priorities and policy design at national level.

The farm typology is part of a series of interlinked project outputs:

- Baseline data are used to build the farm types.
- District profiles, situation analyses and feedback meetings inform the farm type and district specific recommendations and implications.
- Participatory visioning in the districts can make use of the profiles, to concretize how the different farm types can participate in and benefit from local development pathways.

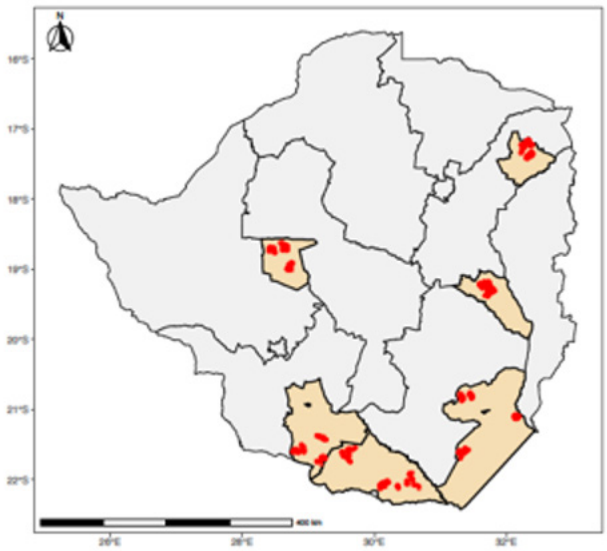
2. Methods

The data collection for the typology development is based on the baseline household survey (Baudron, Chakoma and Matangi 2021). In each district, surveyed wards were purposely selected through stakeholder consultations based on the following factors (Figure 1):

- Situated in agro-ecological region IV or V
- Cooperativeness of beneficiary communities
- Recommendations by district council office
- Acuteness of livestock feed challenges

Households were randomly selected from the ward's household lists. In total 1,848 households were interviewed, between 01 February 2021 and 01 March 2021, including 325 households in Beitbridge, 309 households in Buhera, 302 households in Chiredzi, 300 households in Gwanda, 310 households in Mutoko and 302 households in Nkayi (Figure 1).

Figure 1. Location of households sampled in the baseline survey.



Source: Baudron et al. (2021).

The typology analysis, using R-statistics, provides a robust outcome for the situation of the project districts. Dimensionality of the dataset was first reduced using multi dimensional scaling, which as the advantage compare to principal component analysis to allow the use of discrete variables in addition to continuous variables. This was followed by calculating dissimilarities and delineating clusters using hierarchical clustering. The data used for this analysis included a set of structural variables, a set of functional variables, a set of variables of adoption of crop technologies and a set of variables of adoption of livestock technologies:

- Six continuous structural variables were used (age of the head of the household, family size, total cropped area, cattle ownership, sheep and goats ownership and total value of agricultural equipment).
- Four continuous functional variables were used (total cereal produced during the 2019/20 season, total quantity of fertilizer used during the 2020/21 season, total quantity of organic amendments—manure and compost—used in the 2020/21 season and total livestock offtake in the last 12 months).

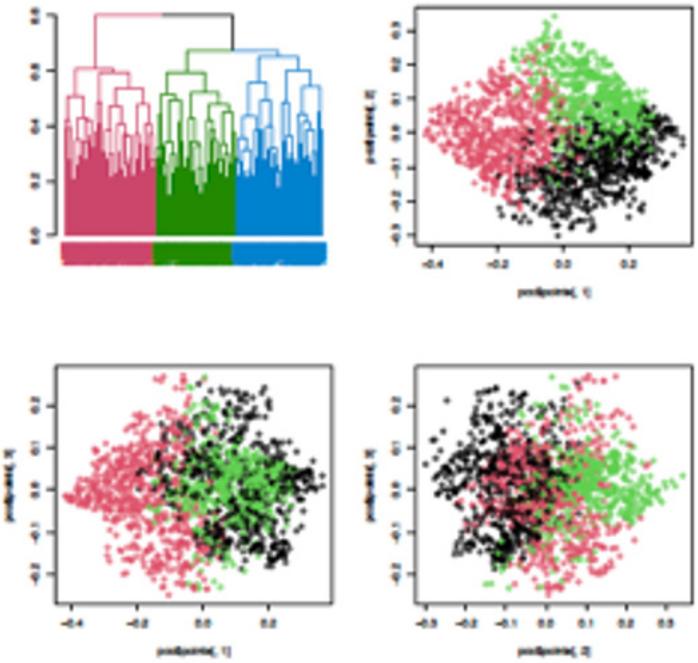
- Seven discrete structural variables with 2 levels (Yes/No) were used (female headed household, education of the head of household higher than primary level, helping relatives outside of the household, being helped by relatives outside the household, hiring labour, selling labour and owning a garden).
- Two discrete functional variables with 2 levels (Yes/No) (own production as main source of food and having consumed animal products in the last 24 hours) and one discrete functional variables with 4 levels (main source of income, with the levels 'crop sales', 'livestock sales', 'casual labour' and 'other') were used.
- Twelve discrete adoption variables (Yes/No) related to improved crop practices (certified seeds, community seed bank, drought tolerant varieties, small grains, crop rotation, intercropping, cover crops, mulching, integrated pest management, use of compost/manure, drip /micro-irrigation and optimum plant density).
- Seventeen discrete adoption variables (Yes/No) related to improved livestock practices (improved livestock breeds, improved shelters, water infrastructure, routine vaccination, home vaccination, castration, deworming, dipping, home spraying, paraveterinary, homemade feed, fodder production, fodder preservation, survival feeding, commercial feed, artificial insemination and pen fattening).

Data Envelop Analysis (DEA), a non-parametric linear programming method, was used to identify sets of 10 farms with highest efficiencies as overperforming or 'positive deviants' and 10 with lowest efficiencies as underperforming households, for each district and each farm type, based on efficiency calculation for each farm. We used output-oriented DEA, whereby efficiency was measured against the maximum output achieved for a given level of input, within the population of farms included in the analysis. Total cropped area and total livestock ownership in tropical livestock unit (TLU) were used as input and total cereal production during the season 2019–20 (in kg) and livestock offtake during the 12 months preceding the interview (total livestock sold and slaughtered, in TLU) were used as output. DEA was performed for each district and each type separately. Generalized linear models, for each district and each type, were then used to test the impact of adopting different crop technologies and livestock technologies on the variability of efficiency.

3. Results

The structure of the overall data (all six districts) indicates that 3 clusters of farm types can be distinguished, that distinctively differed from each other, based on the 50 structural, functional and adoption data mentioned above (Figure 2).

Figure 2. Hierarchical clustering and plotting of clusters.



3.1 Characterizing farm types

Figures 3 to 6 illustrate basic characteristics of the three farm types common across the project districts.

Farm type 1: Large herds, large farms

These crop–livestock farmers own more livestock, about double the number of cattle and goats as compared to the other types. This enables them to distinctively generate more income from livestock and set more land under cultivation. These farmers also depend on more assets. They seem to benefit more from integration of crop and livestock; more farmers invest in improved livestock management practices and many also adopt improved crop practices. They have more labour available, as they depend on larger family sizes and also hire more labour, with more family members outside of the household who help, hence depend less on off farm labour. They also seem to engage more in mutual networks of supporting each other. Female headed households are fewer. The household heads are slightly older, reflecting a more matured state of the agricultural operation. With higher income, they can afford to buy more food while also consuming more livestock based foods, rather than depending on own production as main source of food. This farm type seems in a better position to adequately manage crops and livestock, they illustrate the stage that crop–livestock systems can evolve towards conducive conditions for agricultural production.

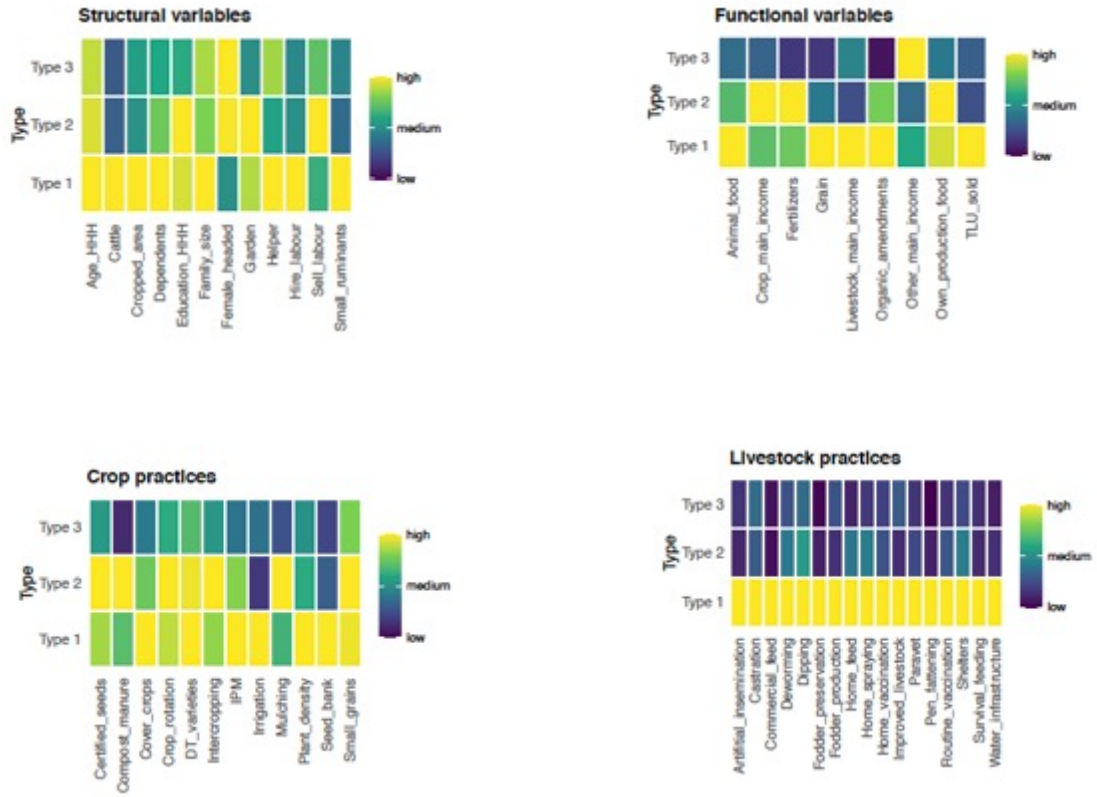
Farm type 2: Focus more on crop production

These farmers tend to own less assets and livestock, they cultivate less cropland and have less labour available for agriculture. About a third of the households are female headed. Their main source of income is from crops, while they also live off crops as their main source of foods. These farmers diversify more crop production, tend to have gardens more often than other types and widely adopt improve crop practices; they apply double the amount of fertilizer, while more farmers access improved seeds, take up small grains, practice crop rotation, intercrop and compost manure, while they also apply more mulching. They often supplement their farm income by selling labour. These farmers often also adopt some of the improved livestock management practices, dipping, deworming, home feeding and home spraying and improved shelters.

Farm type 3: Resource poor, reliance on off farm labour

Farmers in this group are most resource constrained, about half the households are female headed. Least endowed in terms of assets, crop and livestock, their crop and livestock management practices are constrained and crop diversity compromised. They also seem to be less involved in local networks of mutual assistance. They depend mostly on off farm income supplementing the limited income from agriculture. Labour constraints restrict these farmers further to practice good crop and livestock management. Given low agricultural production, they live more on foods from outside than from own production. Lack of resources, labour constrained and food insecure, these households are often forced to overutilize their natural resource, which is reflected in the fact that they often crop on poor quality soils, which fixes them further at a state of low agricultural productivity.

Figures 3–6. Structural variables, functional variables, climate smart crop practices and improved livestock practices per farm type.



3.2 Distribution of farm types across districts

Figure 7 shows that the farm types are differently distributed across the districts, which reflects the different agro-ecological and socio-economic conditions, challenges and opportunities for developing livestock enterprises.

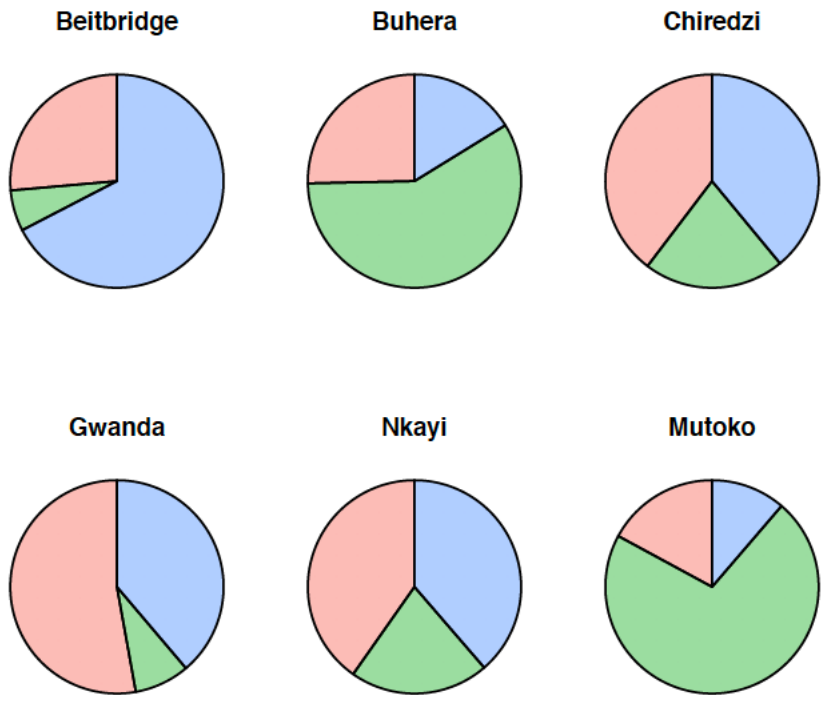
Farm type 1, better off livestock producers predominate in Gwanda District with advanced livestock markets and high quality livestock for sale and are also common in Nkayi and Chiredzi districts.

Farm type 2, crop production-oriented farmers predominate in Buhera and Mutoko districts, where farmers often combine crop production with market gardening and livestock ownership is rather small.

Farm type 3, reliance on off farm income, was predominant in Beitbridge District, given high vulnerability due to agro-ecological conditions and the closeness to South African border and high occurrence of cross border trade.

Nkayi and Chiredzi districts represented farming systems with large proportion of mixed crop-livestock-oriented farm types and those relying on off farm income and fewer households relying on crop production.

Figure 7. Distributing farm types per districts.



3.3 District-level farm types and recommendations

Here we illustrate how the farm types shape out at the level of each district. We analyse efficiency for each type in these districts and identify positive deviants to understand what distinguishes the successful farmers, as base for refining priorities and recommendations within the local context.

3.3.1 Gwanda District: Market-oriented livestock production

Context

Gwanda District is situated in agro-ecological region V with dry climate and favourable conditions for livestock production, crop production is extremely low. About half the households own substantial herd sizes and participate in livestock markets, livestock offtake and quality are comparatively high. Livestock markets have been advanced, auction sales are an important livestock market channel, facilitated by the Rural District Council (RDC). The focus in livestock production is oriented towards sales, cattle are not being used for draught power. This and multiple interventions in livestock production and marketing have contributed to a relatively wide uptake of improved crop and livestock management technologies. Farmers already invest in dry season feeding technologies and often use livestock manure to increase crop productivity. Improving livestock value chains can provide employment opportunities around livestock aggregation, feed and fodder production and processing.

Farm types

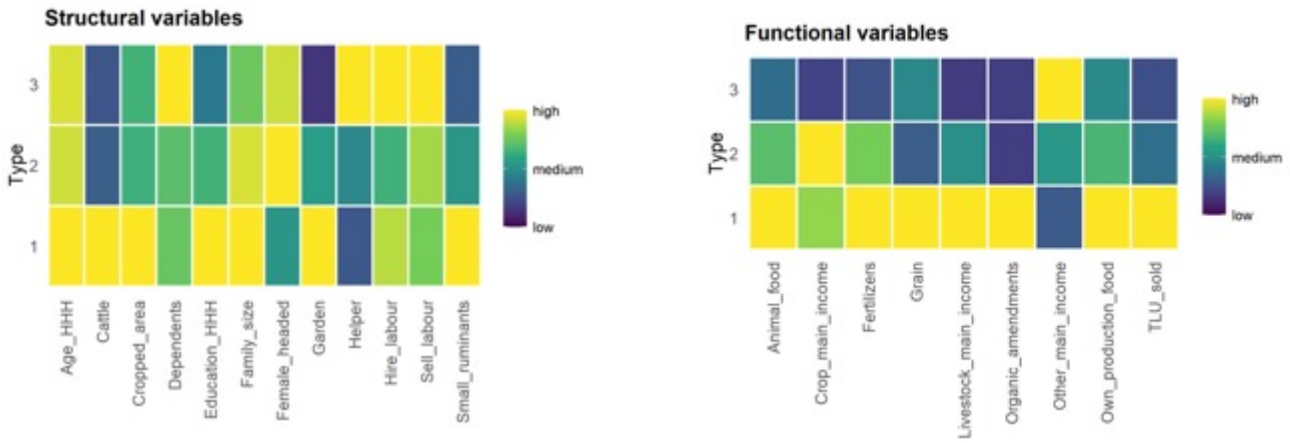
- **Farm type 1, Large herds, large farms**: Many farmers engage in livestock production, having more than double the herd size of cattle and goats than the other farmers, selling more livestock and livestock as most important source of income. They cultivate more cropland and gardens, achieve higher crop production, with higher application of organic soil fertility amendments. These livestock-oriented farmers are largely male headed. They clearly practice more of the improved crop and livestock production technologies.
- **Farm type 2, Greater focus on crop production**: Many farmers are engaged at an intermediary state, with fewer livestock and less crop production, almost two-thirds of these households are female headed. These farmers seem to take up more improved crop production technologies; investments in livestock technologies and improved feeding are limited; labour saving technologies are critical.
- **Farm type 3, Resource poor, reliance on off farm labour**: A smaller proportion of households depends more on off farm income. Uptake of crop and livestock practices seems low, as labour is prioritized to off farm activities. Improved production of indigenous heat tolerant poultry and goats could contribute to improving nutrition, through consumption of eggs and meat.

Table 1. Farm type characteristics for Gwanda District

Characteristic	1, N = 119[1]	2, N = 106[1]	3, N = 68[1]
Age of head of the household (years)	60.32 (13.39)	55.73 (14.95)	56.82 (16.37)
Female-headed households	30%	58%	53%
Education (higher than primary)	58%	38%	24%
Helping others	13%	23%	49%
Being helped	11%	10%	15%
Hiring labor	24%	17%	26%
Selling labor	31%	34%	40%
Family size (n)	6.88 (3.27)	6.46 (3.78)	5.18 (2.19)
Owning a garden	78%	43%	12%
Total cropped area (ha)	2.79 (2.28)	1.78 (1.12)	1.81 (1.44)
Proportion of non-cereal crop (%)	0.09 (0.10)	0.08 (0.12)	0.06 (0.11)
Cereal produced in 2019/20 (kg)	189.64 (357.26)	57.45 (103.92)	89.68 (182.82)
Cattle (n)	6.98 (8.23)	2.15 (4.36)	1.87 (3.20)
Goats and sheep (n)	21.78 (16.30)	11.46 (9.24)	6.44 (6.61)
Poultry (n)	13.88 (13.17)	7.67 (5.68)	6.72 (6.76)
Livestock sold (TLU/year)	0.88 (1.33)	0.33 (0.54)	0.22 (0.39)
Fertilizer applied (kg)	38.40 (71.32)	30.07 (76.83)	9.66 (26.62)
Organic amendment (kg)	748.78 (1,649.20)	131.60 (348.69)	138.97 (584.87)
Consumed animal products in past 24 hours	97%	69%	35%
Equipment value (USD)	588.40 (275.21)	446.13 (299.79)	323.01 (343.50)
Livestock as main source of income	51%	25%	8.8%
Crop as main source of income	24%	29%	5.9%
Off-farm activities as main source of income	24%	45%	85%

[1] Mean (SD); %

Figure 8–11. Structural, functional, crop and livestock practice variables by farm types in Gwanda District.



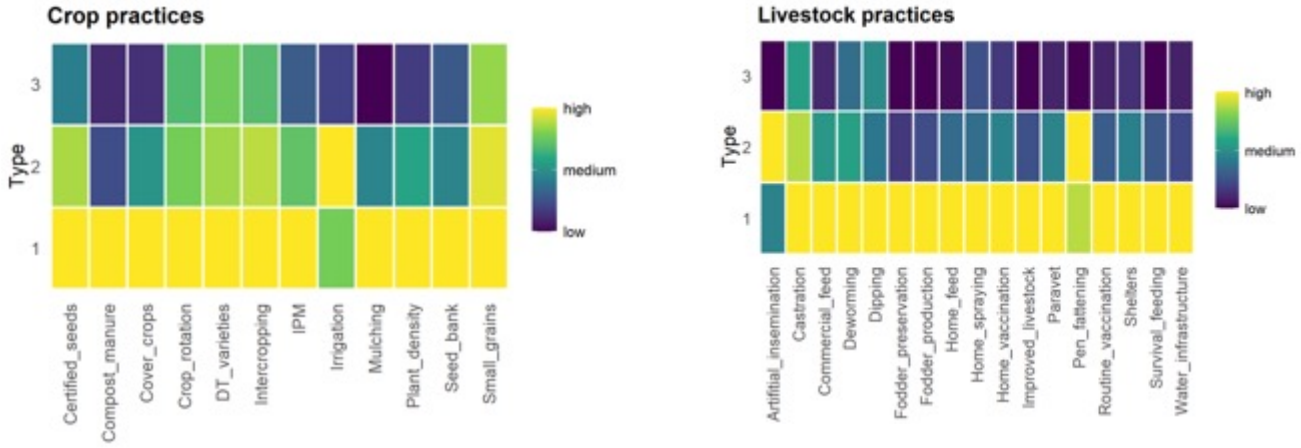


Figure 12. Total cereal produced in 2019/20 as a function of cropped area for Type 1 farms, Type 2 farms and Type 3 farms in Gwanda, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

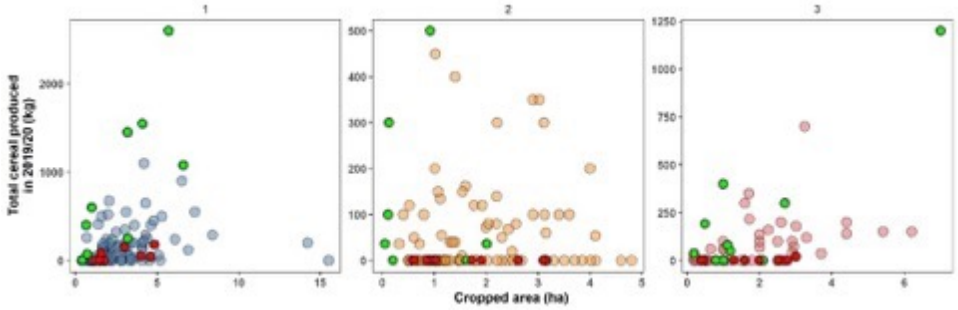


Figure 13. Livestock offtake as a function of livestock ownership for Type 2 farms, Type 3 farms and Type 4 farms in Gwanda, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

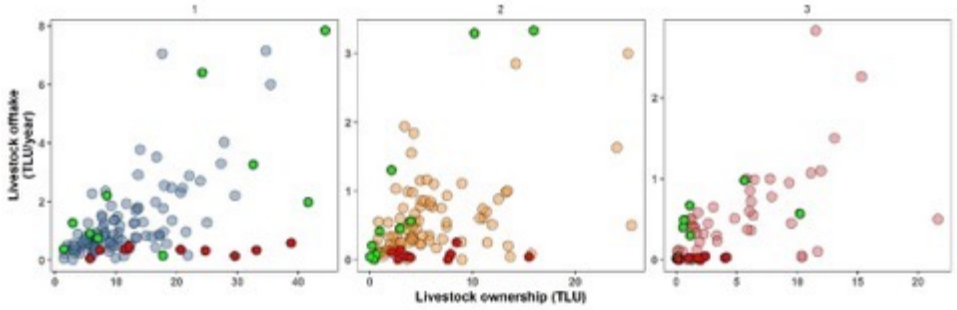


Table 2. Entry points for farmers in Gwanda District with market-oriented livestock production

	Farm type 1: Large herds	Farm type 2: Focus on crops	Farm type 3: Off farm income
Technology development	Drought tolerant dual purpose sorghum, legumes, perennial fodder	Drought tolerant dual purpose sorghum, legumes, perennial fodder	Drought tolerant dual purpose sorghum, legumes, perennial fodder
	Organic soil fertility management	Organic soil fertility management	Small stocks like chickens and goats, feeding strategies integrated with dryland cropping
	Dry season feeding technologies, including feed processing, post harvest management	Fodder production for sale	Veterinary health control, castration
	Veterinary health control	Labour/business services around feed and fodder aggregation, processing	Labour/business services around feed and fodder aggregation, processing

Market development	Revitalizing cattle and goat auction sales	Access to feed, fodder, forage seed, small ruminant markets	Access to feed, fodder, small ruminant markets
	Price quality mechanism	Labour options around livestock markets, livestock products	Labour/business services around livestock markets, livestock products
	Local fattening		
	Value addition to livestock products		
Social capital, networks	Represent farmer interests, lobby	Gender sensitive approaches, strengthening women and youth initiatives	Gender sensitive approaches, strengthening women and youth initiatives
	Digital market information	Small ruminant, feed and fodder marketing networks	Inclusiveness in access to livestock markets
	Organizing farmers into commodity/business associations, interest groups, e.g. cattle marketing groups, feed producers	Reinstating farmer field school approaches	Nutrition sensitive programs that improve access to livestock based protein

3.3.2 Beitbridge District: Market-oriented livestock production, with high levels of off farm income

Context

Beitbridge District is situated in agro-ecological region V with driest climate and high climatic risk; these conditions favour livestock production; crop production is extremely low. Resource distribution seems more unequal as compared to other districts. Few farmers own the largest herd sizes. Livestock offtake and quality are comparatively high. Livestock markets are more advanced, auction sales are an important livestock market channel, facilitated by the RDC. The fact that farmers do not use cattle for draught power is an advantage to raise the commercial offtake, through improved breeding and fattening initiatives. The area has potential for irrigation infrastructure development which can be expanded to improve seed multiplication and fodder production. Expanding fodder production and processing would improve efficiency of feed resources and create business opportunities with irrigation facilities in place.

At the same time, more than half of the households are extremely resource constrained and depend largely on off farm income; more than two-thirds of these households are female headed. Closeness to the South African border provides income opportunities. The location serving as a transit town for cross border travellers attracts various trading opportunities, as farmers also access various goods and services from nearby towns across the border. The closeness to South Africa implies that especially young men migrate for labour while only the elderly and women remain. Creating opportunities around the livestock value chains would benefit those without livestock, through off farm labour services and inclusive business models and Small and Medium Enterprises (SMEs), around livestock aggregation, feed and fodder production and processing.

Farm types

- **Farm type 1, Large herds, large farms, market oriented**: A very small group of farmers, male headed, has advanced in commercializing livestock; livestock production is their main source of income. They own the largest herds of cattle and goats; offtake levels are high. They also set more than three times the land under crop cultivation and produce more diverse non-cereal crops, than any other farmers. Uptake of improved crop and livestock technologies is high.
- **Farm type 2, Income from livestock, income from crops**: About 20% of the farmers have substantial livestock herds. Half of these farmers generate income primarily from livestock production; a large share of farm

households also depends on crops as main source of income; fewer prioritize off farm activities. A third of these farmers are female headed. Use of irrigation is high among these farmers. The uptake of improved livestock technologies is lower as compared to Type 1; they tend to use veterinary health control technologies such as dipping, deworming, vaccination and water infrastructure, improved feed technologies seem however less important. This suggests high potential for management improvement once barriers have been removed, labour saving technologies will be critical.

- **Farm type 3, Off farm income and farming**: About a quarter of the farmers have shifted to off farm activities being the most important source of income. Livestock is the most important source of income for a substantial number of farmers. These farmers take up various improved livestock management technologies; some also produce fodder. Uptake of improved crop practices is generally higher, with advanced levels of fertilizer use. Access to off farm income could ease investing into improved agricultural technologies, labour saving will also be critical for them.
- **Farm type 4, Resource poor, reliance on off farm labour**: This is the single largest group of farmers, more than half depend on off farm income as the predominant source of income. Lower levels of equipment values, income from livestock and crop production suggests that these households are comparatively poor and vulnerable. Creating income opportunities through livestock value chains can make important contributions for these households. Indigenous heat tolerant small stocks like poultry and goats could contribute to improving nutrition through consumption of eggs and meat.

Table 3. Farm type characteristics for Beitbridge District

Characteristic	1, N = 6[1]	2, N = 74[1]	3, N = 85[1]	4, N = 177[1]
Age of head of the household (years)	53.50 (10.17)	51.86 (13.93)	53.11 (12.98)	47.28 (12.67)
Female-headed households	0%	39%	35%	42%
Education (higher than primary)	83%	68%	45%	37%
Helping others	50%	57%	42%	40%
Being helped	50%	51%	25%	21%
Hiring labor	67%	47%	22%	16%
Selling labor	0%	28%	22%	44%
Family size (n)	7.00 (1.79)	6.36 (2.25)	7.40 (2.76)	6.55 (3.68)
Owning a garden	83%	82%	56%	44%
Total cropped area (ha)	3.68 (1.99)	1.74 (3.64)	1.86 (1.48)	1.79 (2.75)
Proportion of non-cereal crop (%)	0.31 (0.33)	0.04 (0.06)	0.12 (0.15)	0.07 (0.10)
Cereal produced in 2019/20 (kg)	208.33 (440.93)	59.84 (107.66)	31.28 (64.81)	22.28 (65.14)
Cattle (n)	13.33 (4.84)	7.38 (9.04)	5.67 (5.45)	2.45 (3.83)
Goats and sheep (n)	21.67 (11.36)	11.66 (7.91)	13.56 (11.55)	6.56 (5.80)
Poultry (n)	35.50 (33.74)	13.08 (6.76)	12.04 (12.31)	9.34 (7.98)
Livestock sold (TLU/year)	4.32 (2.13)	0.94 (1.30)	0.71 (1.17)	0.13 (0.40)
Fertilizer applied (kg)	141.67 (102.06)	37.41 (41.54)	71.12 (75.64)	11.19 (29.87)
Organic amendment (kg)				
0	33%	95%	94%	96%
50	0%	0%	0%	2.3%
100	0%	1.4%	0%	0.6%
200	0%	0%	1.2%	0%
300	0%	1.4%	3.5%	0.6%
600	33%	1.4%	0%	0%
900	17%	1.4%	1.2%	0.6%
2100	17%	0%	0%	0%
Consumed animal products in past 24 hours	100%	62%	69%	38%
Equipment value (USD)	529.17 (389.71)	509.05 (313.17)	502.47 (295.74)	338.25 (291.37)
Livestock as main source of income	83%	53%	19%	13%
Crop as main source of income	17%	34%	3.5%	6.2%
Off-farm activities as main source of income	0%	14%	78%	81%

[1] Mean (SD); %

Figure 14–17. Structural, functional, crop and livestock practice variables by farm types in Beitbridge District.

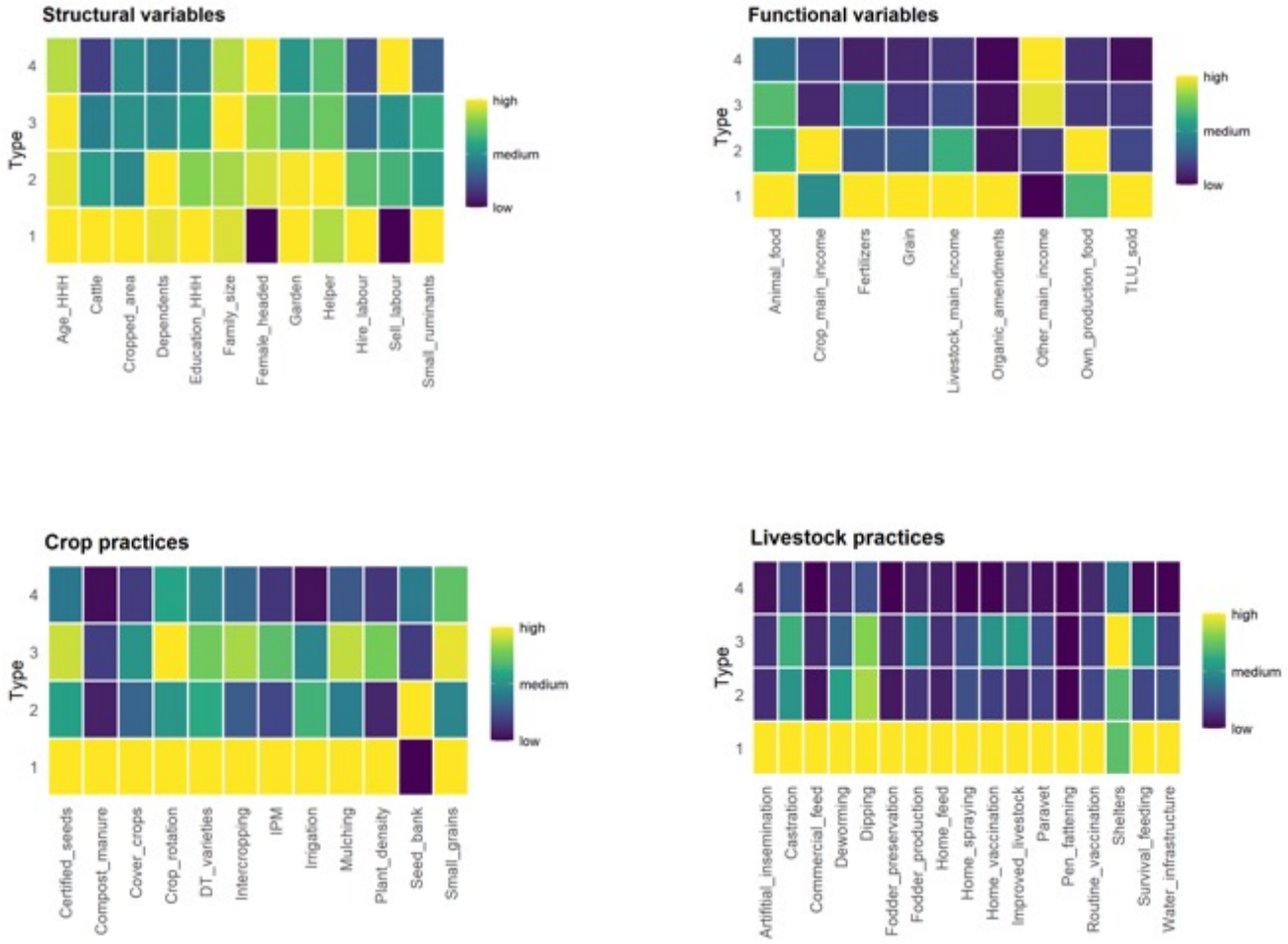


Figure 18. Total cereal produced in 2019/20 as a function of cropped area for Type 2 farms, Type 3 farms and Type 4 farms in Beitbridge, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

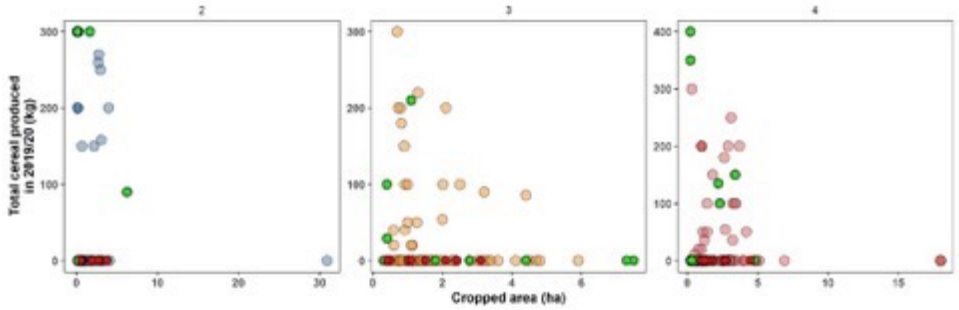


Figure 19. Livestock offtake as a function of livestock ownership for Type 2 farms, Type 3 farms and Type 4 farms in Beitbridge, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

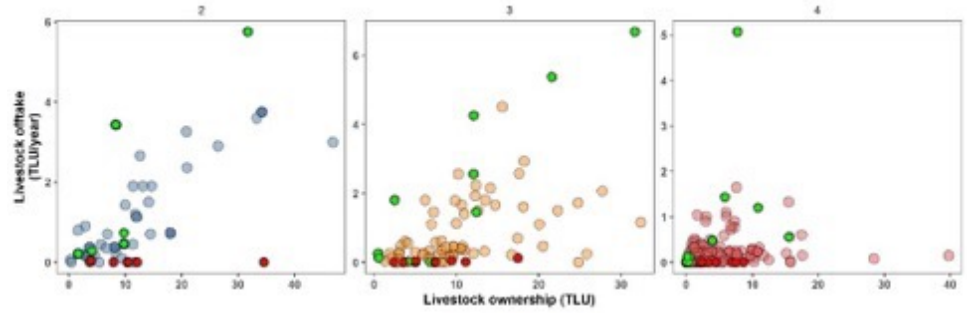


Table 4. Priority entry points for Beitbridge District with market-oriented livestock production

	Farm type 1: Large herds	Farm type 2: Livestock and crops	Farm type 3: Off farm income and farming	Farm type 4: Off farm income
Technology development	Drought tolerant dual purpose sorghum, legumes, perennial fodder production Irrigated fodder gardens Dry season feed processing, post harvest management, feed formulation and feeding strategies Veterinary health control	Drought tolerant dual purpose sorghum, legumes, perennial fodder production Irrigated fodder gardens Dry season feed processing, post harvest management, feed formulation and feeding strategies Veterinary health control	Drought tolerant dual purpose sorghum, legumes, perennial fodder Certified seeds Irrigated fodder gardens Dry season feed processing, post harvest management, feed formulation and feeding strategies Veterinary health control	Drought tolerant dual purpose sorghum, legumes, perennial fodder Improved dryland cropping, including mulching, intercropping, crop rotation Irrigated gardens (food, feed) Small stocks like chickens and goats, feeding strategies integrated with dryland cropping Inclusive technologies that promote entrepreneurship among women and youth
Market development	Expanding livestock permit or auction sales Price quality mechanism Local fattening Value addition to livestock products, e.g. abattoir	Expanding livestock permit or auction sales Price quality mechanism Local fattening Value addition to livestock products, e.g. abattoir	Access to feed, fodder, forage seed, small ruminant markets Fodder seed production and link with private sector for supply to other areas outside the district	Labour/business services around processing of crop residues and other feed resources (collecting pods, bush meal etc.), aggregating feed and fodder, processing Encouraging entrepreneurship around livestock and livestock feed and fodder related markets
Social capital, networks, SMEs	Representing farmer interests, lobby Digital market information Organizing farmers into commodity/business associations, interest groups, e.g. cattle marketing groups, feed producers	Gender sensitive approaches, strengthening women and youth initiatives Representing farmer interests, lobby Digital market information Reinstating farmer field school approaches around agricultural business, feed and fodder	Small ruminant, feed and fodder market networks Reinstating farmer field school approaches around agricultural business, feed and fodder	Youth and women involvement in livestock, feed and fodder value chains Nutrition sensitive programs that improve access to livestock based protein Explicit participation of the disadvantaged Business incubation and trainings

3.3.3 Nkayi District: Mixed crop–livestock farming and off farm income

Context

Nkayi District is in agro-ecological region IV. Farmers engage in mixed crop–livestock farming as primary activity. Most livestock are sold through farmgate sales, permit sales and local meat processing. The market function of cattle is compromised by cattle being used for draught power. Mechanized cropping is critical to release livestock for its market functions. The agro-ecological conditions are suitable to intensify integrating crops and livestock, addressing feed shortages through increased biomass from dual purpose crops and forage production and processing; levels of manure application are already high. Expanding food and feed/dual purpose legumes would provide higher income from crops and residue aggregation and processing.

About 40% of the farmers seem extremely resource constrained and depend largely on off farm income. Legume and biomass markets provide high value income opportunities also for farmers without or with few livestock. Closeness to national parks expose livestock to high risks of contagious diseases and human–wildlife conflicts.

Farm types

Farm type 1, Mixed crop–livestock farmers: About a third of the households own meaningful herd sizes and cultivate more than 2 ha of land. These mixed crop–livestock farmers are widely taking up improved crop and management technologies. With higher levels of crop production, cropping is the most important source of income. Livestock offtakes are low and seem underutilized.

Farm type 2, Livestock and off farm income: Farmers generate income from livestock and supplement this with off farm activities; resource endowments are below those in group 1. Many take up improved veterinary health technologies, uptake of improved feeding is however low. These farmers could benefit more from diversified crop production for food and feed.

Farm type 3, Resource poor, reliance on off farm labour: The largest proportion, about 40% of farmers, were severely resource constrained. They depend largely on off-farm income because income contributions from crop and livestock production are limited. Raising the value per unit land is critical for them, through greater diversification of nutrition sensitive non-cereal foods for human consumption, notably legumes as by products can be used as livestock feeds. Promoting small stocks could further support quality nutrition through livestock based foods.

Table 5. Farm type characteristics for Nkayi District

Characteristic	1, N = 106[1]	2, N = 79[1]	3, N = 128[1]
Age of head of the household (years)	58.92 (12.44)	54.03 (15.35)	49.36 (16.17)
Female-headed households	26%	13%	27%
Education (higher than primary)	25%	18%	23%
Helping others	32%	13%	11%
Being helped	22%	24%	9.4%
Hiring labor	38%	13%	10%
Selling labor	22%	59%	53%
Family size (n)	7.86 (4.44)	7.59 (3.63)	6.25 (2.79)
Owning a garden	73%	65%	50%
Total cropped area (ha)	2.15 (1.09)	1.62 (1.19)	1.52 (1.22)
Proportion of non-cereal crop (%)	0.16 (0.16)	0.13 (0.14)	0.07 (0.12)
Cereal produced in 2019/20 (kg)	739.01 (706.68)	569.84 (529.90)	232.75 (247.14)
Cattle (n)	10.26 (8.02)	8.15 (6.26)	1.41 (2.43)
Goats and sheep (n)	10.24 (7.31)	8.13 (5.82)	3.23 (3.73)
Poultry (n)	18.07 (13.21)	15.16 (9.28)	7.90 (5.78)
Livestock sold (TLU/year)	0.35 (0.68)	0.33 (0.43)	0.07 (0.17)
Fertilizer applied (kg)	64.40 (69.70)	25.06 (52.30)	18.34 (40.55)
Organic amendment (kg)	1,456.13 (2,909.56)	1,397.47 (3,150.78)	106.25 (282.29)
Consumed animal products in past 24 hours	71%	91%	33%
Equipment value (USD)	613.30 (274.48)	456.14 (335.22)	206.33 (263.94)
Livestock as main source of income	29%	47%	18%
Crop as main source of income	43%	2.5%	17%
Off-farm activities as main source of income	27%	51%	65%

[1] Mean (SD); %

Figure 20-23. Structural, functional, crop and livestock practice variables by farm types in Nkayi District.

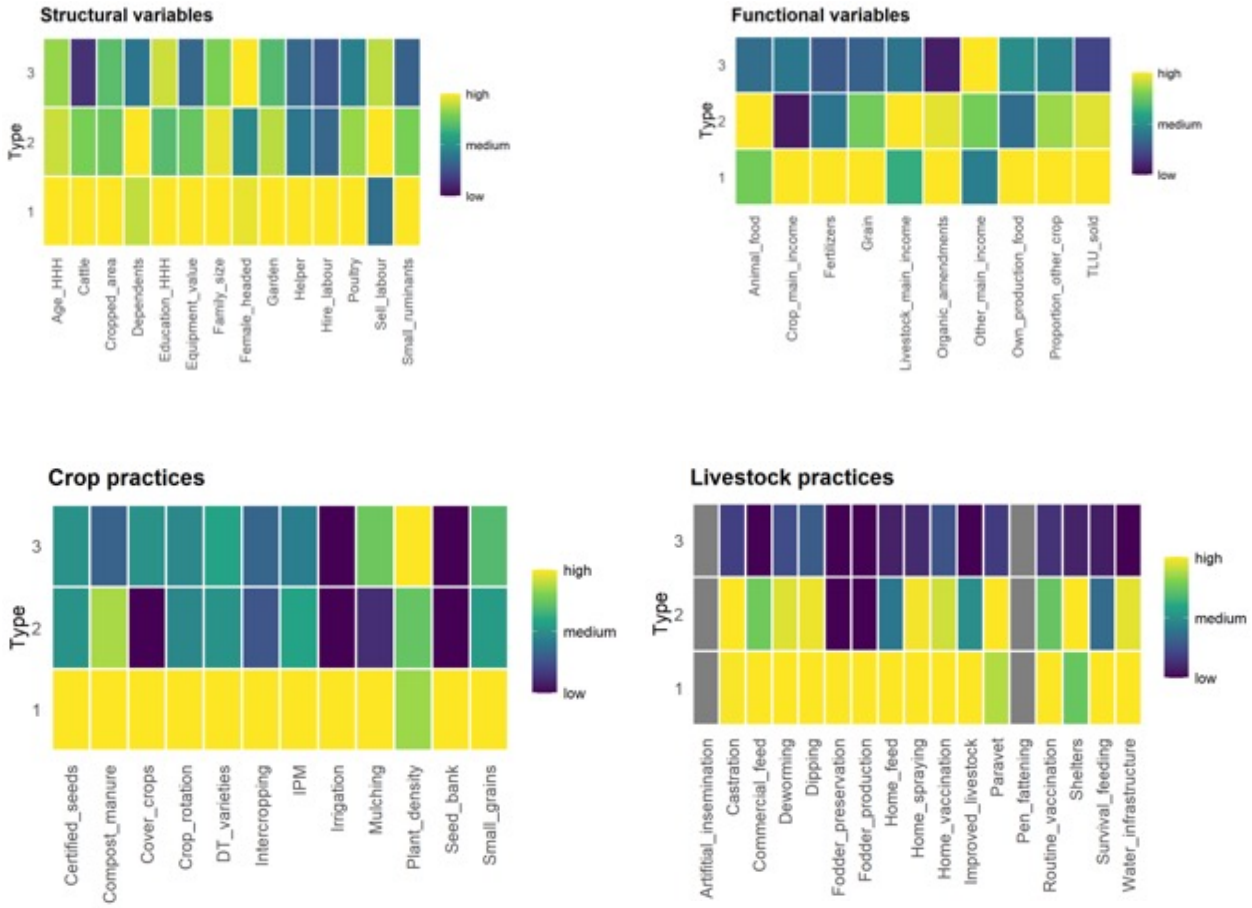


Figure 24. Total cereal produced in 2019/20 as a function of cropped area for Type 1 farms, Type 2 farms and Type 3 farms in Nkayi, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

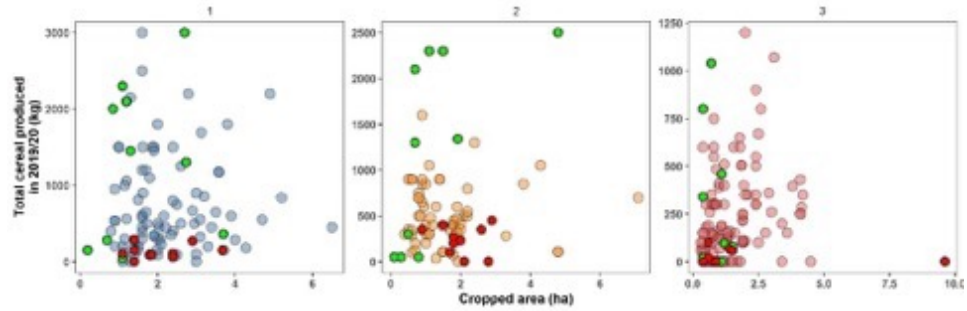


Figure 25. Livestock offtake as a function of livestock ownership for Type 1 farms, Type 2 farms and Type 3 farms in Nkayi, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

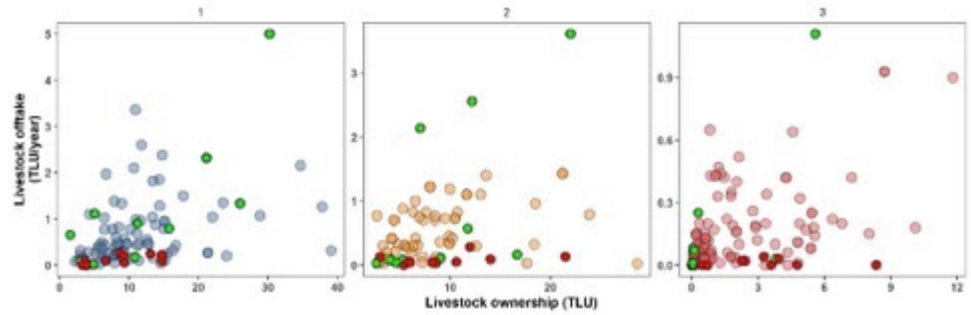


Table 6. Priority entry points for Nkayi District with mixed crop–livestock production

	Farm type 1: Mixed crop–livestock	Farm type 2: Livestock and off farm income	Farm type 3: Off farm income
Technology development	Drought tolerant dual purpose maize, sorghum, legumes, perennial fodder Certified seeds Crop and soil fertility management (Conservation Agriculture (CA), spacing, weeding, compost, crop rotation, intercropping) Small-scale irrigation supported fodder production and seed multiplication, especially legume forages Crop mechanization, also to release cattle from ploughing Dry season feeding technologies, including feed processing, post harvest, feed formulation, feeding Veterinary health control Human–wildlife management technologies Pen finishing livestock	Drought tolerant dual purpose maize (small intensive plots for household food security), with emphasis on diversifying into sorghum, legumes, perennial fodder Crop and soil fertility management, (CA, spacing, weeding, compost, crop rotation, intercropping) Irrigation schemes to support sustainable crop, feed and fodder production Dry season feeding technologies, including feed processing, post harvest, feed formulation, feeding Crop mechanization, also to release cattle from ploughing Veterinary health control Human–wildlife management technologies	Drought tolerant dual purpose maize (small intensive plots for household food security), sorghum, legumes, perennial fodder Crop and soil fertility management (CA, spacing, weeding, compost, crop rotation, intercropping) Mechanized planting and processing Small stocks like chickens and goats, feeding strategies integrated with dryland cropping Herd building and shelter Borehole supported community nutrition gardens Human–wildlife management technologies
Market development	Livestock permit sales for efficient sales Livestock price quality mechanism to enhance offtake levels Local fattening and meat processing Local feed and fodder trade mechanisms	Collective marketing of groundnuts, sorghum, forage seed, feed and fodder, small ruminants Labour/business services around crop and livestock markets and products Crop and natural resources value addition	Market support for legumes, small ruminants Labour/business services around feed and fodder aggregation, processing Crop and natural resources value addition
Social capital, networks, SMEs	Represent farmer interests, lobby Strengthen commodity/ business networks and platforms Digital market information Farmer field schools on agricultural business, forage seed multiplication, feed and fodder production and sale	Groundnut, sorghum, forage seed, feed and fodder, small ruminant marketing networks/ SMEs Reinstating/codesigning agricultural business farmer field school approaches Strengthening social networking and resourcefulness Strengthening capacity on community advancement	Inclusiveness in access to legume and livestock markets Nutrition sensitive programs that improve access to livestock based protein Strengthening women and youth initiatives Strengthening requisite social cohesion

3.3.4 Chiredzi District: Mixed crop–livestock farming and off farm income

Context

Chiredzi falls in agroecological region V, with less than 500mm annual rainfall. Agricultural production is severely affected by climate change. Despite climatic variability there are farms with large crop land sizes and generating income from crops. Livestock production seems more suitable to the climate, and many people earn a living from livestock production, goats, cattle and chickens. A few own large herds of livestock and extensive grazing has impacted on the surrounding environments. Livestock production is also being affected by climate variations, with crop failure and feed and water shortages causing livestock deaths. Lack of livestock market development hinders livestock offtake, and the market function of cattle is also compromised by cattle being used for draught power. Closeness to national parks also imposes health threats to livestock and human wildlife conflicts. Cross border trading, and labour migration to neighbouring countries is a common strategy to buffer the climatic and other risks.

Farm types

Farm type 1, Mixed crop–livestock farmers: The largest group of farmers own large livestock herd sizes and cultivate more than 4 ha cropland. Crop production is their main source of income, supplemented with off farm income. They seem in transition to take up improved crop and livestock management practices; they invest more in diversifying into non-cereal crops, as well as in organic and inorganic soil fertility. Livestock feed technologies seem however not important. There are readily available opportunities to better integrate crops and livestock.

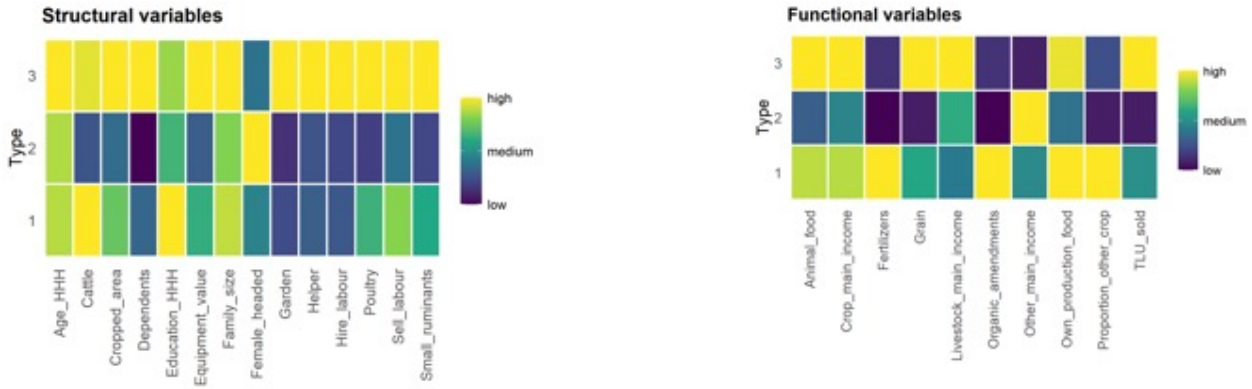
Farm type 2, Resource poor, reliance on off farm labour: About a third of the households seem severely resource constrained, about a third of these households being female headed, with off farm income as the most important source of income. They own few livestock and their uptake of improved livestock management practices is low. Promoting high value legumes, while enhancing labour use efficiency in agriculture will be critical for them.

Farm type 3: Large farms, integrating crops and livestock: These farmers stand out by their high uptake of improved management practices and integration of crops and livestock. They cultivate more than 6 ha cropland and own about the same herd size as Type 1. They generate most income from crops, supplemented with income from livestock. With available biomass, improved livestock feeding can enhance market-oriented offtake.

Characteristic	1, N = 127[1]	2, N = 100[1]	3, N = 71[1]
Age of head of the household (years)	49.55 (12.38)	49.09 (13.59)	56.07 (11.24)
Female-headed households	17%	37%	14%
Education (higher than primary)	57%	37%	48%
Helping others	23%	19%	75%
Being helped	18%	0%	55%
Hiring labor	23%	18%	83%
Selling labor	60%	28%	73%
Family size (n)	7.43 (3.50)	6.68 (3.37)	8.25 (5.73)
Owning a garden	20%	12%	87%
Total cropped area (ha)	4.66 (2.25)	2.22 (1.51)	6.27 (2.98)
Proportion of non-cereal crop (%)	0.34 (0.21)	0.02 (0.06)	0.08 (0.08)
Cereal produced in 2019/20 (kg)	1,064.31 (952.26)	123.93 (219.13)	1,796.00 (1,861.05)
Cattle (n)	8.39 (6.64)	2.26 (3.60)	8.01 (9.46)
Goats and sheep (n)	7.77 (7.42)	2.75 (3.93)	12.94 (7.31)
Poultry (n)	20.16 (20.11)	5.85 (8.28)	31.46 (22.01)
Livestock sold (TLU/year)	0.34 (0.69)	0.05 (0.26)	0.67 (1.09)
Fertilizer applied (kg)	109.35 (139.44)	0.33 (2.33)	15.46 (40.76)
Organic amendment (kg)	227.17 (424.25)	0.00 (0.00)	32.39 (150.02)
Consumed animal products in past 24 hours	88%	30%	99%
Equipment value (USD)	500.71 (375.60)	239.25 (320.79)	802.11 (265.17)
Livestock as main source of income	8.7%	13%	21%
Crop as main source of income	66%	34%	75%
Off-farm activities as main source of income	25%	53%	4.2%

[1] Mean (SD); %

Figure 26–29. Structural, functional, crop and livestock practice variables by farm types in Chiredzi.



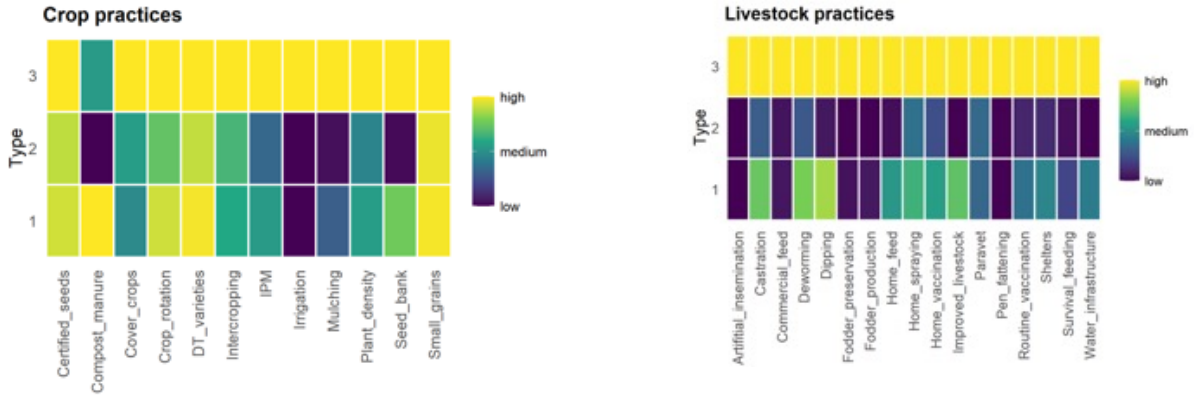


Figure 30. Total cereal produced in 2019/20 as a function of cropped area for Type 1 farms, Type 2 farms and Type 3 farms in Chiredzi, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

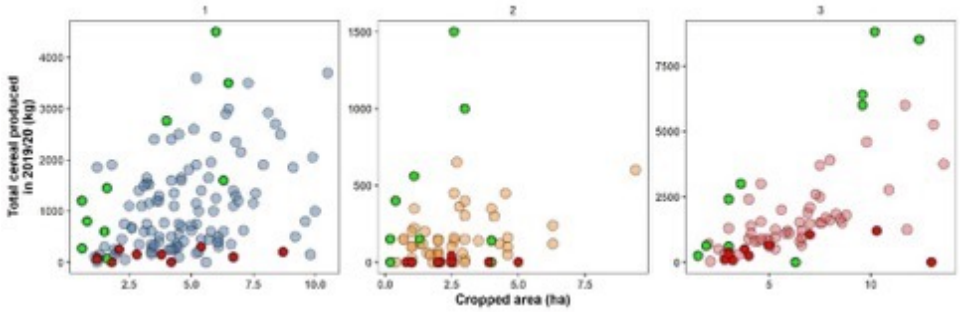


Figure 31. Livestock offtake as a function of livestock ownership for Type 1 farms, Type 2 farms and Type 3 farms in Chiredzi, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

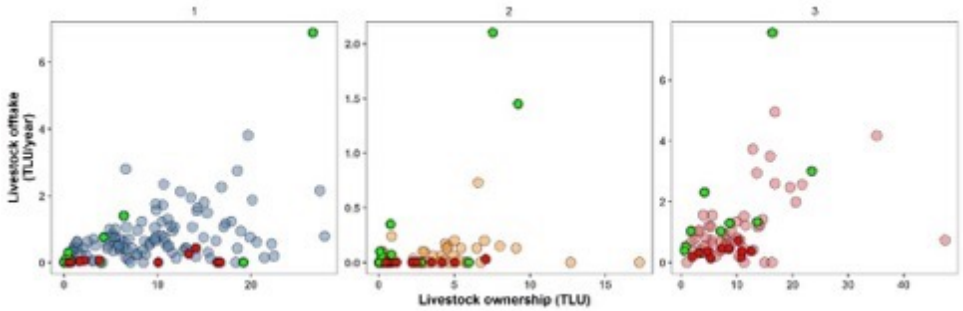


Table 8. Priority entry points for Chiredzi District with mixed crop–livestock production

	Farm type 1: Mixed crop–livestock	Farm type 2: Off farm income	Farm type 3: Large farms
Technology development	Drought tolerant dual purpose maize, sorghum, legumes, perennial fodder Crop and soil fertility management, (CA, spacing, weeding, compost, manure, crop rotation, intercropping) Crop mechanization, also to release cattle from ploughing Dry season feeding technologies, including feed processing, post harvest Veterinary health control Human–wildlife management technologies Pen finishing livestock	Drought tolerant dual purpose maize (small intensive plots for household food security), sorghum, legumes, perennial fodder Crop and soil fertility management, (CA, spacing, weeding, compost, crop rotation, intercropping) Mechanized planting and processing Herd building and improved shelter Small stocks like chickens and goats, feeding strategies integrated with dryland cropping Borehole supported community nutrition gardens Human–wildlife management technologies	Drought tolerant dual purpose maize (small intensive plots for household food security), sorghum, legumes, perennial fodder Crop and soil fertility management, (CA, spacing, weeding, compost, manure, crop rotation, intercropping, cover crops) Crop mechanization also to release cattle from ploughing Small-scale irrigation to support sustainable crop, feed and fodder production Dry season feeding technologies, including feed processing, post harvest Veterinary health control Human–wildlife management technologies Pen finishing livestock
Market development	Livestock permit sales for efficient sales Livestock price quality mechanism to enhance offtake levels Local fattening and meat processing Local feed and fodder trade mechanisms	Market support for legumes, small ruminants Aggregating labour/business services around feed and fodder processing Crop and natural resources value addition Strengthening women and youth initiatives	Livestock permit sales for efficient sales Livestock price quality mechanism to enhance offtake levels Collective marketing of groundnuts, sorghum, forage seed, feed and fodder, small ruminants Labour/business services around crop and livestock markets and products, aggregating feed and fodder processing Crop and natural resources value addition
Social capital, networks, SMEs	Representing farmer interests, lobby Strengthening commodity networks and platforms Digital market information	Inclusiveness and gender sensitive approaches, in access to legume and livestock markets Nutrition sensitive programs that improve access to livestock based protein Strengthening women and youth initiatives Strengthening requisite social cohesion	Groundnut, sorghum, forage seed, feed and fodder, small ruminant marketing networks/SMEs Reinstating/codesigning farmer field school approaches Strengthening social networking and resourcefulness Strengthening capacity for community advancement

3.3.5 Mutoko District: More crop-oriented farming

Context

Mutoko District cuts across agro-ecological regions III to IV. Due to proximity to urban centres, high human population densities limit available land for agriculture. Farmers focus more on crop farming, with a wide range of diversified crop farming activities, including maize, wheat, small grains and legumes. Livestock play an important role, though herd sizes are relatively small, depending largely on extensive grazing, with dry season feed shortages due to expanding human settlements. Small-scale irrigation and market gardening are common, as farmers grow vegetables in low lying areas with better access to water. They market their produce in Harare and other centres such as Mutoko Centre.

Farm types

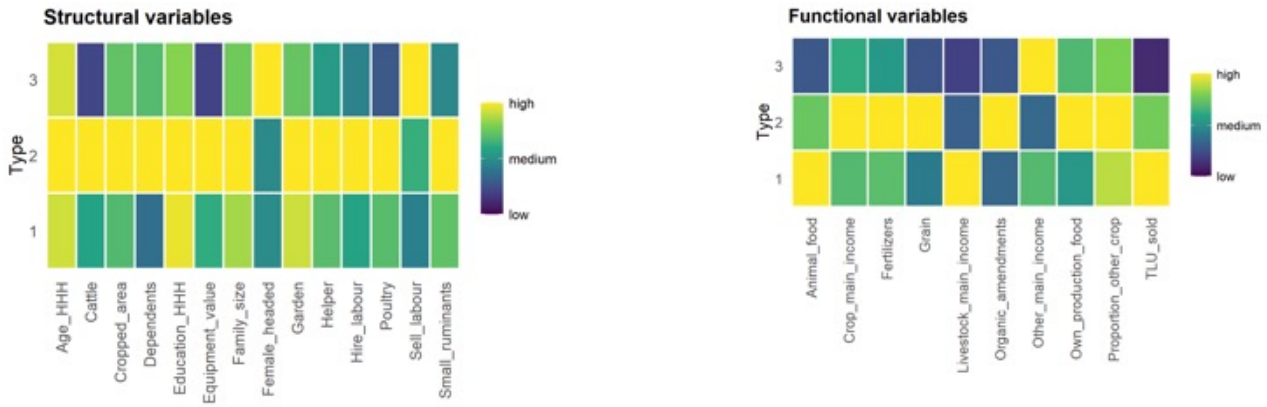
Farm type 1, Focus on crops: Crops are the main source of income, supplemented by off farm income and to a lesser extent income from livestock. These farmers practice a range of improved crop management technologies, integration with livestock seems however limited. Uptake of organic fertilizer and improved feeding of livestock could be tightened for improved farm productivity.

- **Farm type 2, Mixed crop–livestock farmers**: The largest group of farmers derive most of their income from crops, they have some livestock. Integrating their crops with livestock, high levels of manure application, they achieve higher crop production. Their uptake of improved crop and livestock management is high, probably with more labour available as they focus less on off farm income.
- **Farm type 3, Resource poor, income from crops and off farm labour**: More than two-thirds of these farm households in this group are female headed. They are more resource constrained, making income from crop production and off farm income. Improving labour use efficiency will be critical, as they already take up improved crop management.

Characteristic	1, N = 78[1]	2, N = 139[1]	3, N = 91[1]
Age of head of the household (years)	52.74 (14.55)	57.09 (14.06)	53.29 (15.36)
Female-headed households	32%	32%	66%
Education (higher than primary)	54%	55%	45%
Helping others	28%	40%	22%
Being helped	12%	32%	22%
Hiring labor	27%	47%	21%
Selling labor	26%	37%	59%
Family size (n)	5.01 (3.29)	5.85 (3.41)	4.46 (2.95)
Owning a garden	85%	92%	68%
Total cropped area (ha)	1.04 (1.57)	1.52 (1.67)	1.11 (1.79)
Proportion of non-cereal crop (%)	0.37 (0.21)	0.41 (0.19)	0.33 (0.22)
Cereal produced in 2019/20 (kg)	244.89 (233.45)	594.14 (661.45)	157.57 (145.27)
Cattle (n)	3.38 (3.98)	5.83 (4.10)	1.23 (2.08)
Goats and sheep (n)	3.99 (3.99)	5.51 (4.14)	2.57 (2.40)
Poultry (n)	8.22 (6.89)	11.75 (11.57)	3.29 (3.03)
Livestock sold (TLU/year)	0.42 (2.57)	0.33 (0.75)	0.05 (0.23)
Fertilizer applied (kg)	118.78 (71.68)	168.94 (107.92)	90.85 (71.83)
Organic amendment (kg)	462.82 (430.68)	1,382.14 (1,559.88)	380.55 (692.87)
Consumed animal products in past 24 hours	92%	69%	25%
Equipment value (USD)	273.01 (287.09)	441.26 (317.58)	87.14 (154.14)
Livestock as main source of income	12%	3.6%	2.2%
Crop as main source of income	55%	80%	49%
Off-farm activities as main source of income	33%	17%	48%

[1] Mean (SD); %

Figure 32–35. Structural, functional, crop and livestock practice variables by farm types in Mutoko District.



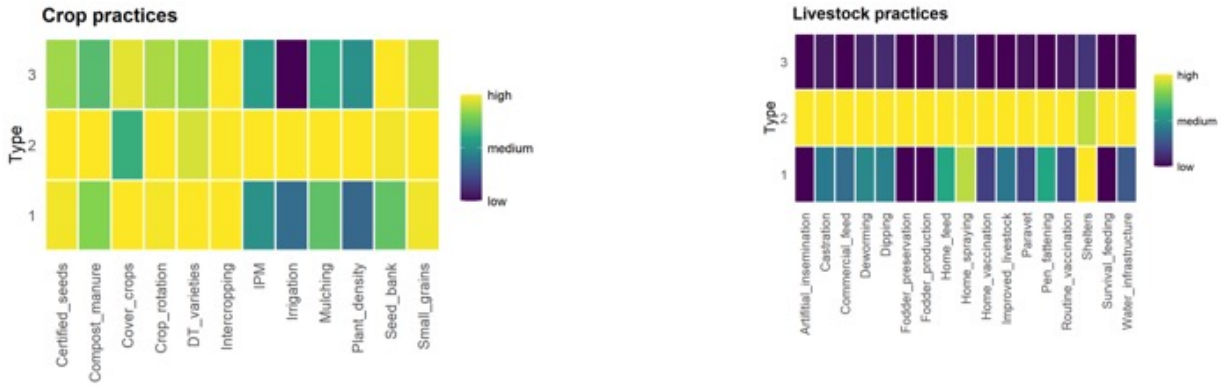


Figure 36. Total cereal produced in 2019/20 as a function of cropped area for Type 1 farms, Type 2 farms and Type 3 farms in Mutoko, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

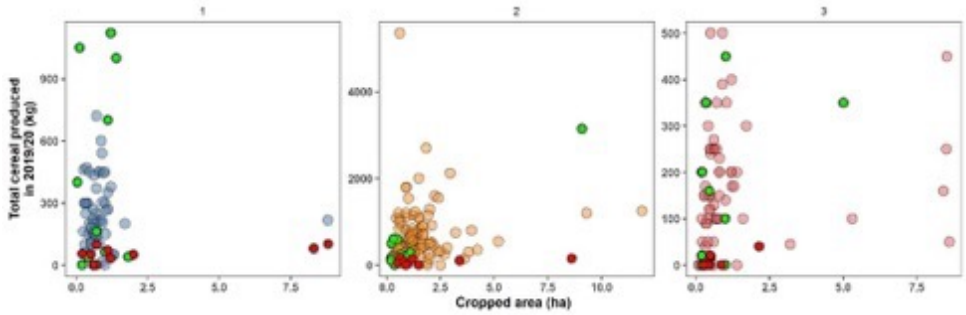


Figure 37. Livestock offtake as a function of livestock ownership for Type 1 farms, Type 2 farms and Type 3 farms in Mutoko, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

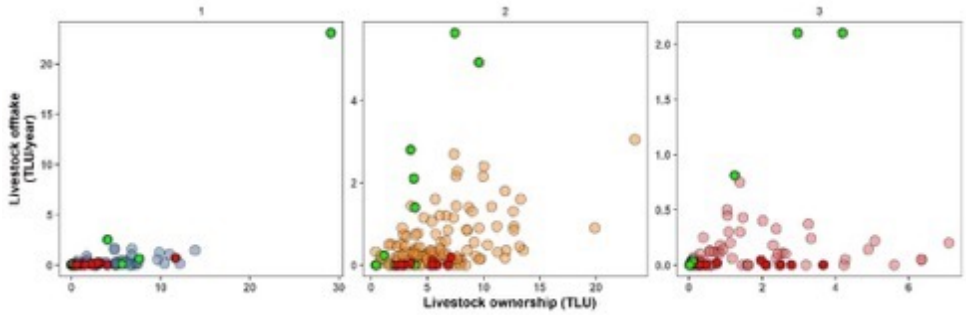


Table 10. Priority entry points for Mutoko District with more crop-oriented farming

	Farm type 1: Focus on crops	Farm type 2: Mixed crop–livestock	Farm type 3: Off farm income
Technology development	Drought tolerant, dual purpose maize (e.g. quality protein maize, QPM623), small grain, legume varieties Crop, water and soil fertility management (CA, spacing, weeding, compost, intercropping) Integrated pest management Mechanized planting and processing Feed and fodder conservation and processing technologies, feed formulation for goats and other small stocks	Drought tolerant, dual purpose maize (e.g. QPM623), small grain, legume varieties Drought tolerant dual purpose and forage legumes and grass, integrated with cropping systems Crop, water and soil fertility management (CA, spacing, weeding, compost, crop rotation, intercropping) Crop mechanization to release cattle from ploughing Feed and fodder production, conservation and processing technologies, feed formulation for cattle Mechanized planting and processing Bull/steer exchange programs, improved breeds Veterinary health control Improved water infrastructure	Drought tolerant, dual purpose maize (e.g. QPM623), small grain, legumes, perennial fodder Crop, water and soil fertility management (CA, spacing, weeding, compost, crop rotation, intercropping) Mechanized planting and processing Small stocks like chickens and goats, feeding strategies integrated with dryland cropping
Market development	Goat marketing facilities Improved goat grading and carcass classification to improve product quality Profitable feed and fodder markets Contractual arrangements for forage seeds with private sector	Cattle permit sales or auctions and infrastructure Joint livestock marketing initiatives, with institutional alignment Livestock value addition activities locally Local meat processing, abattoir Contract pen feeding and fattening Negotiating appropriate taxes and levies	Developing forage seed multiplication, feed and fodder markets Fodder processing, labour services Inclusiveness in access to and support of legume and livestock markets Aggregating labour/business services around feed and fodder processing
Social capital, networks, SMEs	Organizing farmers e.g. goat marketing groups, forage seed and feed producers Farmer field schools on agricultural business, forage seed multiplication, feed and fodder production and sale	Organizing farmers into commodity/ business associations, interest groups, e.g. cattle marketing groups, feed producers Farmer field schools on agricultural business, forage seed multiplication, feed and fodder production and sale	Gender sensitive approaches, strengthening women and youth initiatives Crop, livestock and natural resources value addition Nutrition sensitive programs that improve access to livestock based protein Strengthening requisite social cohesion

3.3.6 Buhera District: More crop-oriented farming

Context

Buhera District also cuts across agro-ecological regions III to IV. Levels of off farm income are also high, due to high human population densities and limited availability of land for agriculture. Focus is more on crop farming, with a wide range of diversified crop farming activities, including maize, wheat, small grains and legumes. Livestock plays an important role, though herd sizes are relatively small, depending largely on extensive grazing, with dry season feed shortages due to expanding human settlements. Small-scale irrigation and gardening for market are common, as farmers grow vegetables in low lying areas with better access to water. They market their produce in Murambinda, Chivu and other centres such as Harare and Marondera Centre.

Farm types

Farm type 1, Mixed crop–livestock farmers: Crops are the main source of income. Although these farmers keep livestock, income from livestock is secondary. These farmers practice a range of improved crop and livestock management technologies. With higher levels of manure and inorganic fertilizer application they achieve higher levels of crop production. Uptake of improved feeding of livestock could improve farm productivity.

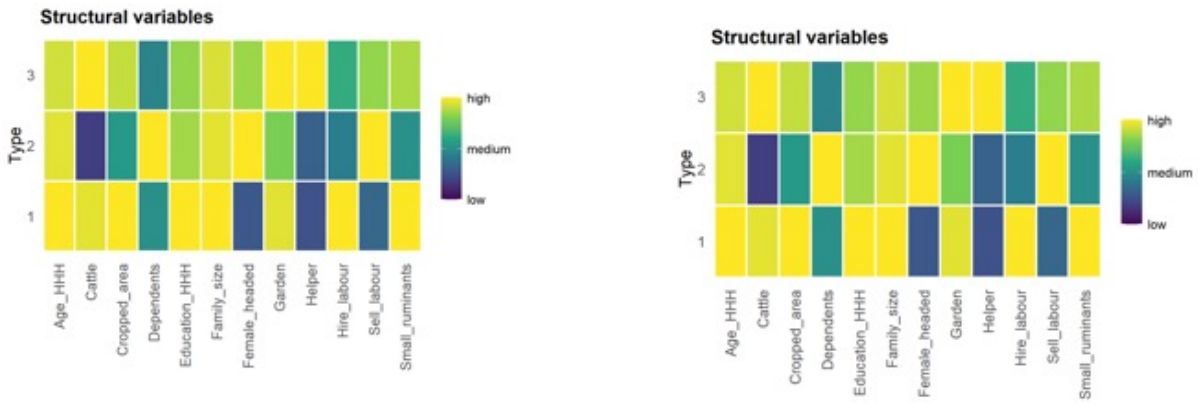
- **Farm type 2, Resource poor, crops and off farm labour**: This is the largest group, where almost half of the households are female headed. They are more resource constrained and derive their income from crops and from off farm income. Improving labour use efficiency will be critical, as they already take up improved crop management.
- **Farm type 3, Farming and off farm income**: Off farm income is the most important source of income for these farmers. They have similar sizes of cropland and livestock numbers as compared to Farm type 1. Levels of crop and livestock production are however lower, as they do not take up some of the improved management practices, perhaps reflecting labour and financial constraints. Gender sensitive approaches, access to capital, skills and markets, improving labour use efficiency will be critical, so that they can benefit more from integrated crop–livestock management.

Table 11. Farm type characteristics for Buhera District

Characteristic	1, N = 82[1]	2, N = 142[1]	3, N = 72[1]
Age of head of the household (years)	57.71 (13.73)	55.11 (13.99)	53.56 (13.58)
Female-headed households	12%	44%	38%
Education (higher than primary)	68%	58%	57%
Helping others	7.3%	9.2%	29%
Being helped	11%	22%	9.7%
Hiring labor	13%	5.6%	8.3%
Selling labor	26%	77%	64%
Family size (n)	6.90 (3.70)	6.64 (3.76)	6.49 (4.13)
Owning a garden	94%	78%	99%
Total cropped area (ha)	2.84 (4.11)	1.52 (1.64)	2.58 (3.08)
Proportion of non-cereal crop (%)	0.34 (0.17)	0.28 (0.18)	0.34 (0.20)
Cereal produced in 2019/20 (kg)	470.77 (650.11)	136.64 (209.09)	240.95 (222.63)
Cattle (n)	5.24 (4.77)	1.00 (2.32)	5.47 (11.46)
Goats and sheep (n)	6.26 (6.01)	3.13 (5.65)	5.44 (5.43)
Poultry (n)	16.87 (21.06)	8.51 (7.98)	13.19 (17.29)
Livestock sold (TLU/year)	0.33 (1.40)	0.10 (0.54)	0.21 (0.62)
Fertilizer applied (kg)	147.93 (128.76)	78.96 (76.43)	96.74 (74.90)
Organic amendment (kg)	1,188.62 (1,486.45)	440.35 (666.88)	815.81 (1,924.97)
Consumed animal products in past 24 hours	77%	64%	99%
Equipment value (USD)	518.84 (292.42)	218.66 (249.64)	388.33 (291.20)
Livestock as main source of income	17%	3.5%	2.8%
Crop as main source of income	71%	52%	44%
Off-farm activities as main source of income	12%	44%	53%

[1] Mean (SD); %

Figure 38-41. Structural, functional, crop and livestock practice variables by farm types in Buhera District.



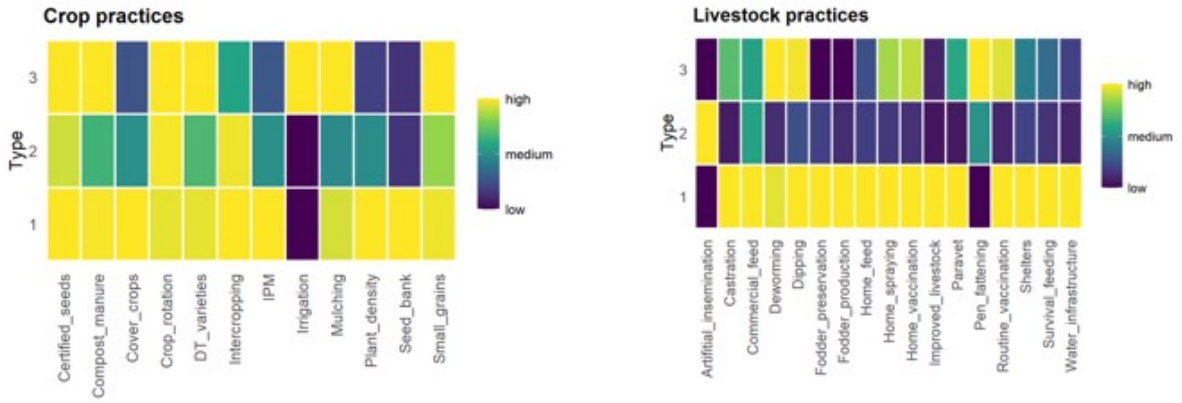


Figure 42. Total cereal produced in 2019/20 as a function of cropped area for Type 1 farms, Type 2 farms and Type 3 farms in Buhera, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

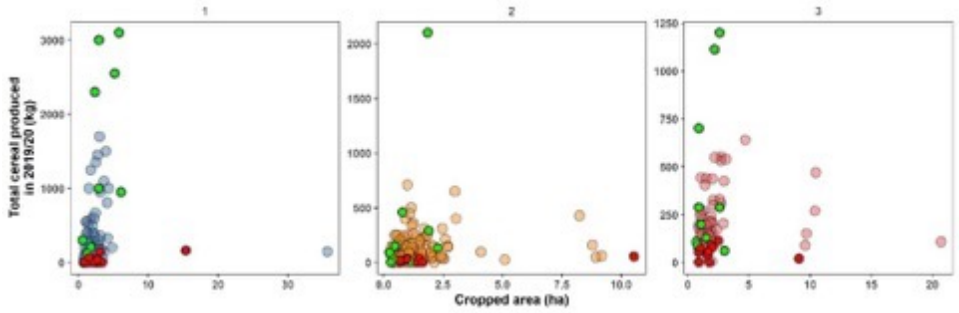


Figure 43. Livestock offtake as a function of livestock ownership for Type 1 farms, Type 2 farms and Type 3 farms in Buhera, with overperforming farms (10 per type) in green and underperforming farms (10 per type) in red.

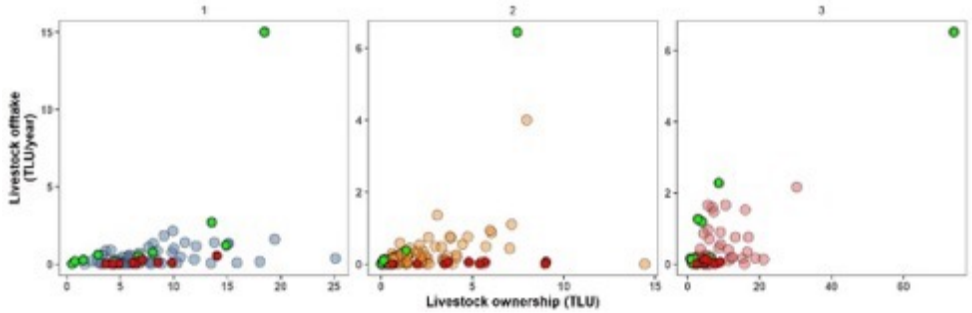


Table 12. Priority entry points for Buhera District with more crop-oriented farming

	Farm type 1: Mixed crop–livestock	Farm type 2: Off farm income	Farm type 3: Farm and off farm income
Technology development	Drought tolerant, dual purpose maize (e.g. QPM623), small grain, legume varieties Drought tolerant dual purpose and forage legumes and grass, integrated with cropping systems Water harvesting technologies and efficient irrigation systems (e.g. drip technologies) Crop, water and soil fertility management (CA, spacing, weeding, compost, crop rotation, intercropping) Feed and fodder production, conservation and processing technologies, feed formulation for cattle Bull/steer exchange programs Improved shelter for livestock Mechanized planting and processing	Drought tolerant, dual purpose maize (e.g. QPM623), small grain, legume varieties Crop, water and soil fertility management (CA, spacing, weeding, compost, intercropping) Water harvesting technologies and efficient irrigation systems (e.g. drip technologies) Mechanized planting and processing Small stocks like chickens and goats, feeding strategies integrated with dryland cropping	Drought tolerant, dual purpose maize (e.g. QPM623), small grain, legume varieties Crop, water and soil fertility management (CA, spacing, weeding, compost, manure, intercropping) Mechanized planting and processing Feed and fodder conservation and processing technologies, feed formulation for goats and other small stocks Improved shelter for livestock Veterinary health control
Market development	Cattle permit sales or auctions and infrastructure Joint livestock marketing initiatives, with institutional alignment Livestock value addition activities locally Local meat processing, abattoir Contract pen feeding and fattening Negotiating appropriate taxes and levies	Developing forage seed multiplication, feed and fodder markets Fodder processing, labour services Inclusiveness in access to and support of legume and livestock markets Aggregating labour/business services around feed and fodder processing	Goat marketing facilities Improved goat grading and carcass classification to improve product quality Profitable feed and fodder markets Contractual arrangements for forage seeds with private sector
Social capital, networks, SMEs	Organizing farmers into commodity/business associations and interest groups, e.g. cattle marketing groups, feed producers Farmer field schools on agricultural business, forage seed multiplication, feed and fodder production and sale	Crop, livestock and natural resources value addition Nutrition sensitive programs that improve access to livestock based protein Strengthening women and youth initiatives Strengthening requisite social cohesion	Organizing farmers e.g. goat marketing groups, forage seed and feed producers Farmer field schools on agricultural business, forage seed multiplication, feed and fodder production and sale

4. Ways forward

The integrated systems approach captures local heterogeneity and the distribution of Farm types and requirements for participatory context specific technology development.

The typologies illustrate that farmers intensifying crop and livestock production differ distinctively from those more resource constrained farmers that depend mostly on off farm income. Cash and labour constrained, these farmers allocate fewer time and investments in their own crop and livestock production activities. This is clear evidence for the need to codesign mechanisms for integrating crop–livestock, developing market and support services in the context and revising the investments regularly.

As a next step, the typologies will be verified at district level multi stakeholder meetings, where farmers will refine the type specific recommendations, part of participatory technology development and planning processes.

Overperforming farms (‘positive deviants’) and underperforming farms identified for each type and each district will be investigated in details (including resource flow mapping, etc.), in particular to understand what makes positive deviants overperform compared to the rest of the farms belonging to the same type and the same district. Tracking their progress and outcomes, through narratives on their motivation, changes and observations will inform the interlinkages between technology, market-oriented and social network related interventions.

References

Baudron, F., Chakoma, I. and Matangi, D. 2021. *Adoption and scaling up of improved livestock production systems in Zimbabwe (LIPS-Zim) Baseline Survey Report*. Nairobi, Kenya: ILRI.

Annexes

Annex 1. Distributing farm types, specified for each district

Figure 32. Farm types in Gwanda District.

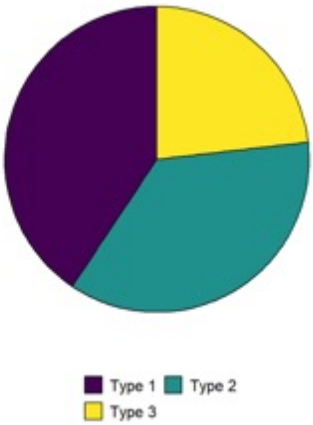


Figure 33. Farm types in Beitbridge District.

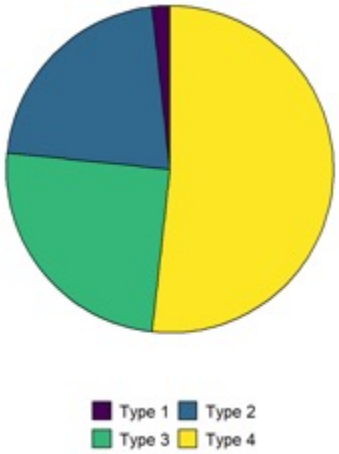


Figure 34. Farm types in Nkayi District.

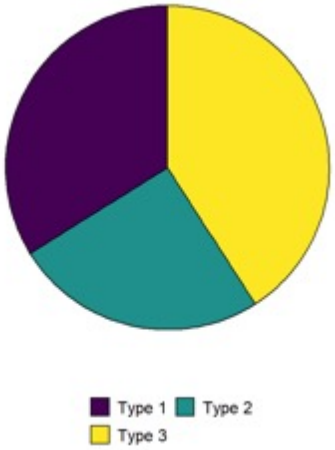


Figure 35. Farm types in Chiredzi District.

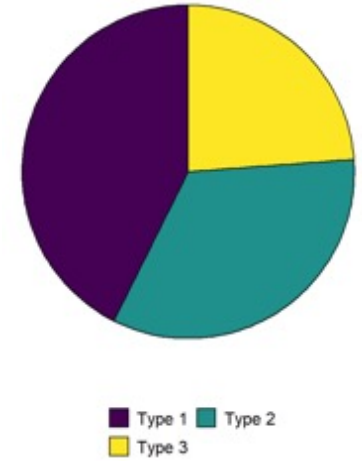


Figure 36. Farm types in Mutoko District.

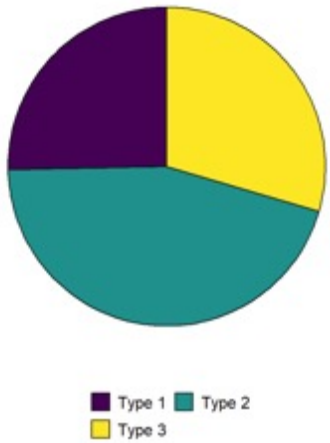
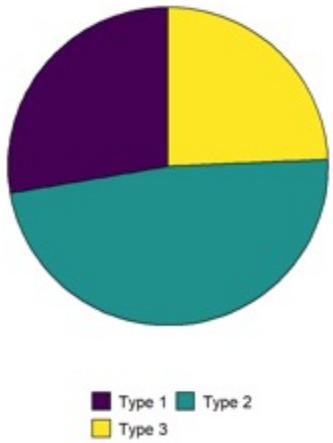


Figure 37. Farm types in Buhera District.



LIPS SURVEY TOOL FINAL

Consent

* You are being requested to participate in a survey aiming at understanding livestock production, under a project led by the Internaltional Livestock Research Institute, in partnership with the International Maize and Wheat Improvement Centre. The enumerator will offer answers or clarifications to all your questions and concerns, before deciding whether or not you can participate. Your participation in this study will not whatsoever expose you, your household or those associated with you to any risks. Participation in this study is voluntary. You have the right to refuse to participate in this study. If you choose to participate, you have the right to stop the interview at any stage or not to answer certain questions. If you refuse or stop your participation at any time, there will be no consequences. All information solicited from you, your household or your associates will be kept strictly confidential. We shall not in any way disclose you, your household or your associates personally in resultant documents, or data sharing processes. Do you agree to participate?

- ◯ OK

General information

District

- ◯ Beitbridge
- ◯ Buhera
- ◯ Mutoko
- ◯ Nkayi
- ◯ Gwanda
- ◯ Chiredzi

Ward

Village

_____

Surname

_____

Firstname

_____

Enter a date and time

yyyy-mm-dd _____ hh:mm _____

Record your current location

latitude (x.y °)

longitude (x.y °)

altitude (m)

accuracy (m)

Demographics

How old is the head of the household?

What is the sex of the head of the household?

- Male
- Female

What is the marital status of the head of the household?

- Married
- Widow or widower
- Divorced
- Single

What is the education level of the head of the household?

- Primary level
- Secondary level
- Tertiary level
- Vocational school

Household composition

Total number of adult males (of age 18 and above)

_____

Total number of adult females (of age 18 and above)

_____

Total number of teens of age 12 to 17

_____

Total number of children of age 3 to 11

_____

Total number of infant of age 0 to 2

_____

Are there relatives outside the household who help financially?

- ◯ No
- ◯ Yes

Are there relatives outside the household who depend on it financially (e.g., elderly, sick)?

- ◯ No
- ◯ Yes

Did your household hire labour in during the past 12 months?

- ◯ No
- ◯ Yes

Did your household sell labour out during the past 12 months?

- ◯ No
- ◯ Yes

Capital

Number of tractors?

_____

Number of ploughs?

_____

Number of cultivators?

_____

Number of scotchcarts?

_____

Number of wheelbarrows?

_____

Number of knapsack sprayers?

_____

Land allocation during this season (2020 - 2021)

Area of the farm that has not been cleared (ha)?

_____

Garden area (ha)

_____

Area of the farm fallow this season 2020-21 (ha)?

_____

Area cropped in maize this season 2020-21 (ha)?

_____

Area cropped in sorghum this season 2020-21 (ha)?

_____

Area cropped in pearl millet this season 2020-21 (ha)?

_____

Area cropped in finger millet this season 2020-21 (ha)?

_____

Area cropped in sugar bean this season 2020-21 (ha)?

_____

Area cropped in groundnut this season 2020-21 (ha)?

_____

Area cropped in cowpea this season 2020-21 (ha)?

_____

Area cropped in sesame this season 2020-21 (ha)?

_____

Area cropped in cotton this season 2020-21 (ha)?

_____

Area cropped in tobacco this season 2020-21 (ha)?

_____

Area cropped in forage this season 2020-21 (ha)?

_____

Area cropped in other crops this season 2020-21 (ha)?

_____

Name(s) of other crop(s)

_____

Land allocation during the last season (2019 - 2020)

Area cropped in maize during the last 2019-20 season (ha)?

_____

Area cropped in sorghum during the last 2019-20 season (ha)?

_____

Area cropped in pearl millet during the last 2019-20 season (ha)?

_____

Area cropped in finger millet during the last 2019-20 season (ha)?

_____

Area cropped in sugar bean during the last 2019-20 season (ha)?

_____

Area cropped in groundnut during the last 2019-20 season (ha)?

_____

Area cropped in cowpea during the last 2019-20 season (ha)?

_____

Area cropped in sesame during the last 2019-20 season (ha)?

_____

Area cropped in cotton during the last 2019-20 season (ha)?

_____

Area cropped in tobacco during the last 2019-20 season (ha)?

_____

Area cropped in forage during the last 2019-20 season (ha)?

_____

Area cropped in other crops during the last 2019-20 season (ha)?

_____

Name(s) of other crop(s)

_____

Crop production during the last season (2019 - 2020)

Total production of maize during the last 2019-20 season (kg)?

_____

Total production of sorghum during the last 2019-20 season (kg)?

_____

Total production of pearl millet during the last 2019-20 season (kg)?

_____

Total production of finger millet during the last 2019-20 season (kg)?

_____

Total production of sugar bean during the last 2019-20 season (kg)?

_____

Total production of groundnut during the last 2019-20 season (kg)?

_____

Total production of cowpea during the last 2019-20 season (kg?

_____

Total production of sesame during the last 2019-20 season (kg)?

_____

Total production of cotton during the last 2019-20 season (kg)?

_____

Total production of tobacco during the last 2019-20 season (kg)?

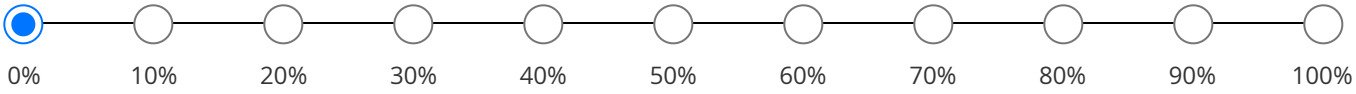
_____

Total production of forage during the last 2019-20 season (kg)?

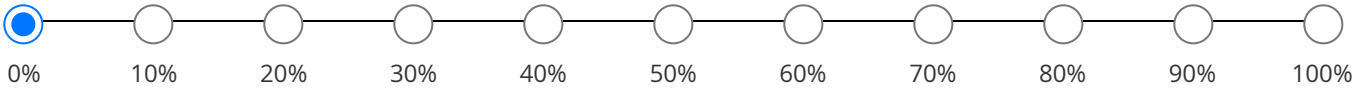
_____

Use (%) of grain harvested during the last (2019 - 20) season

Self-consumption

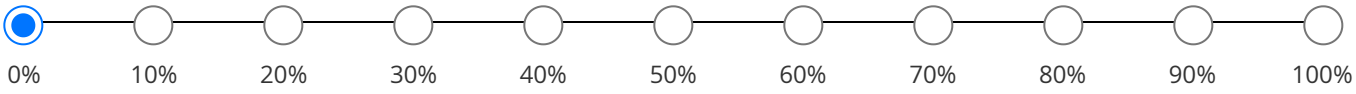


Sold

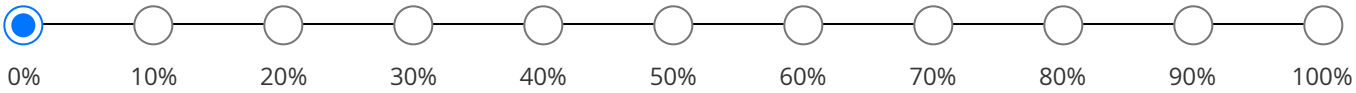


Given to relatives and friends

Bartered



Fed to livestock



Livestock numbers

Number of improved adult (> 3yr) cattle?

_____

Number of indigenous adult (> 3yr) cattle?

_____

Number of improved juvenile (< 3yr) cattle?

_____

Number of indigenous juvenile (< 3yr) cattle?

_____

Number of oxen?

_____

Number of donkeys?

_____

Number of improved goats?

Number of indigenous goats?

Number of sheep?

Number of pigs?

Number of chicken?

Number of turkey?

Number of guinea fowls?

Livestock sales in the past 12 months

Number of improved adult (> 3yr) cattle sold in the past 12 months?

0

Number of indigenous adult (> 3yr) cattle sold in the past 12 months?

0

Number of improved juvenile (< 3yr) cattle sold in the past 12 months?

0

Number of indigenous juvenile (< 3yr) cattle sold in the past 12 months?

0

Number of oxen sold in the past 12 months?

0

Number of donkeys sold in the past 12 months?

0

Number of improved goats sold in the past 12 months?

0

Number of indigenous goats sold in the past 12 months?

0

Number of sheep sold in the past 12 months?

0

Number of pigs sold in the past 12 months?

0

Number of chicken sold in the past 12 months?

0

Number of turkey sold in the past 12 months?

0

Number of guinea fowls sold in the past 12 months?

0

Livestock slaughtered in the past 12 months

Number of improved adult (> 3yr) cattle slaughtered in the past 12 months?

0

Number of indigenous adult (> 3yr) cattle slaughtered in the past 12 months?

0

Number of improved juvenile (< 3yr) cattle slaughtered in the past 12 months?

0

Number of indigenous juvenile (< 3yr) cattle slaughtered in the past 12 months?

0

Number of oxen slaughtered in the past 12 months?

0

Number of improved goats slaughtered in the past 12 months?

0

Number of indigenous goats slaughtered in the past 12 months?

0

Number of sheep slaughtered in the past 12 months?

0

Number of pigs slaughtered in the past 12 months?

0

Number of chicken slaughtered in the past 12 months?

0

Number of turkey slaughtered in the past 12 months?

0

Number of guinea fowls slaughtered in the past 12 months?

0

Livestock mortality in the past 12 months

Number of improved adult (> 3yr) cattle dying in the past 12 months?

0

Number of indigenous adult (> 3yr) cattle dying in the past 12 months?

0

Number of improved juvenile (< 3yr) cattle dying in the past 12 months?

0

Number of indigenous juvenile (< 3yr) cattle dying in the past 12 months?

0

Number of oxen dying in the past 12 months?

0

Number of donkeys dying in the past 12 months?

0

Number of improved goats dying in the past 12 months?

0

Number of indigenous goats dying in the past 12 months?

0

Number of sheep dying in the past 12 months?

0

Number of pigs dying in the past 12 months?

0

Number of chicken dying in the past 12 months?

0

Number of turkey dying in the past 12 months?

0

Number of guinea fowls dying in the past 12 months?

0

Livestock theft in the past 12 months

Number of cattle stolen in the past 12 months?

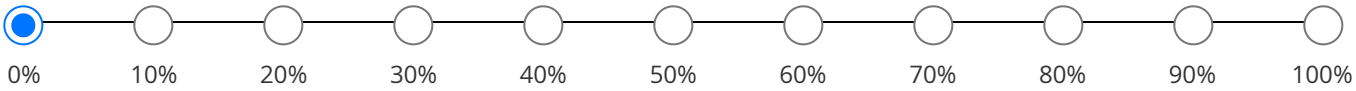
0

Number of goats stolen in the past 12 months?

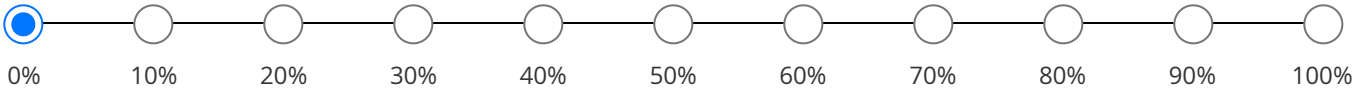
0

Cattle feed composition (% weight) in December - May

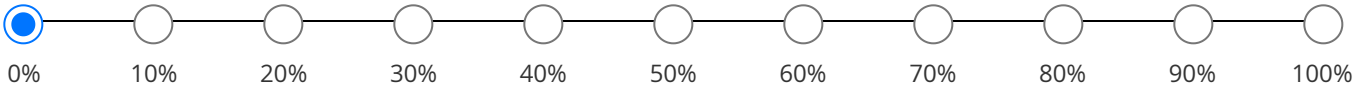
Grazing



Cut and carry wild grass

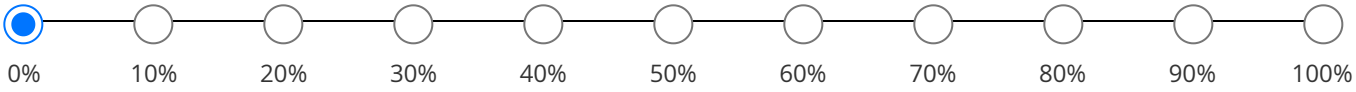


Hay

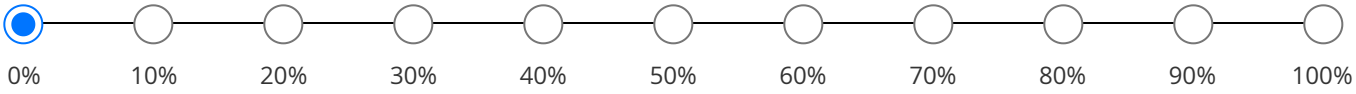


Pods

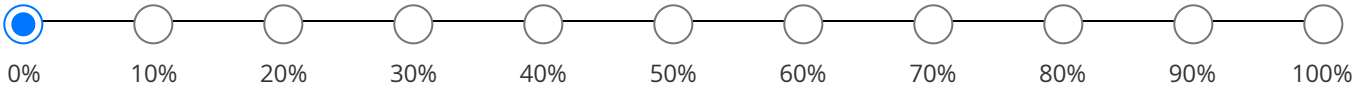
Cereal residues



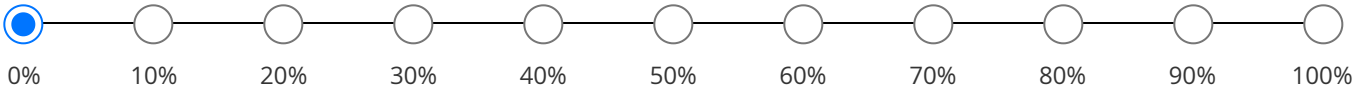
Cultivated grass forage



Cultivated legume forage

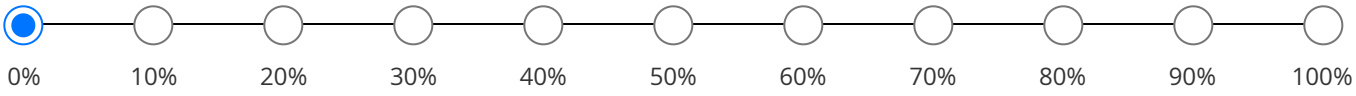


Commercial feed

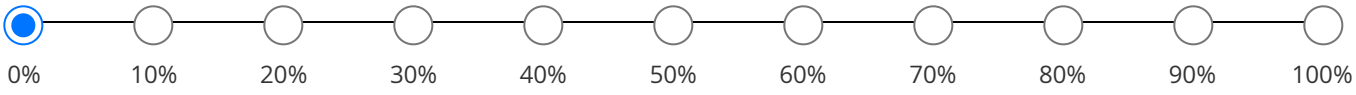


Cattle feed composition (% weight) in June - November

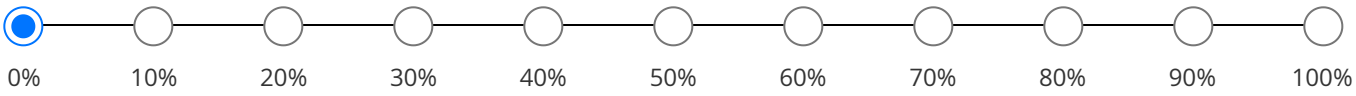
Grazing



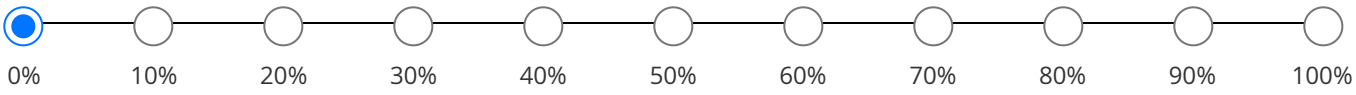
Cut and carry wild grass



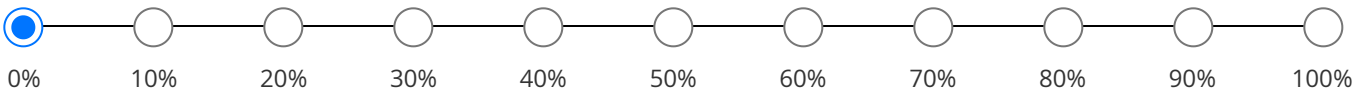
Hay



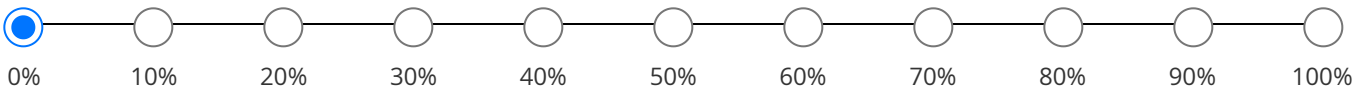
Pods



Cereal residues

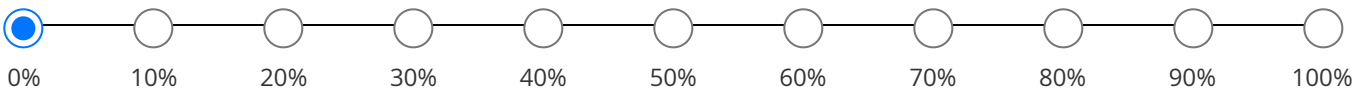


Cultivated grass forage



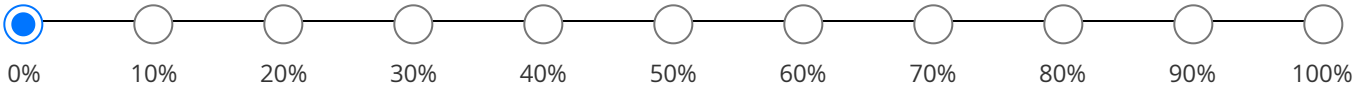
Cultivated legume forage

Commercial feed

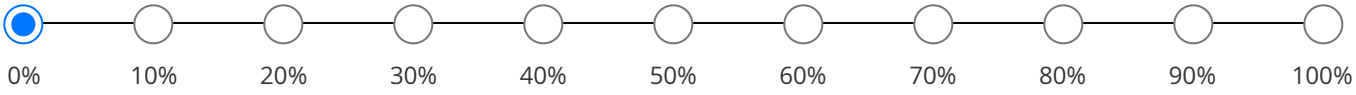


Small ruminant feed composition (% weight) in December - May

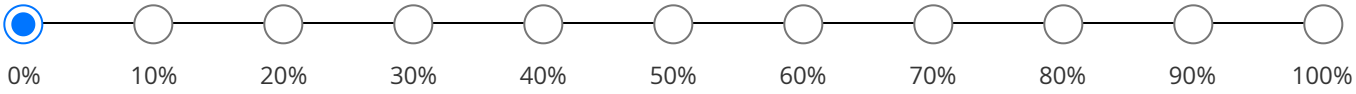
Grazing



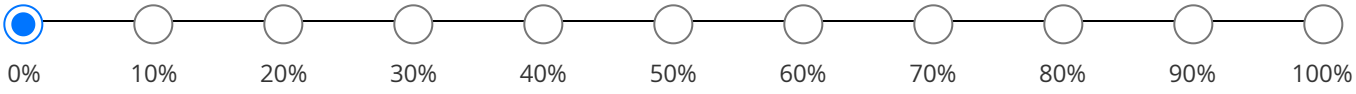
Cut and carry wild grass



Hay

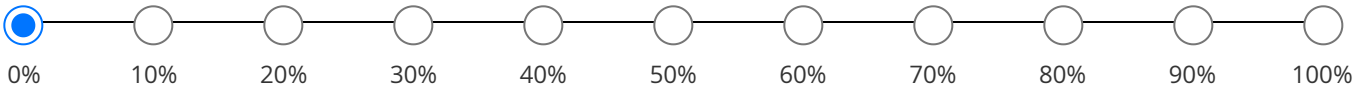


Pods

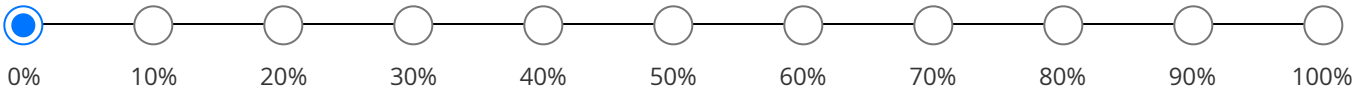


Cereal residues

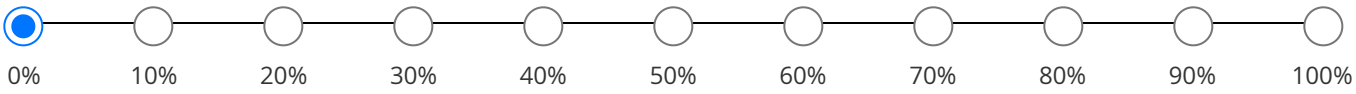
Cultivated grass forage



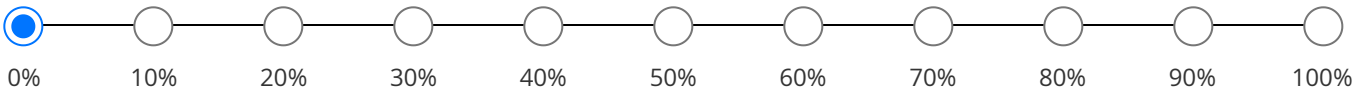
Cultivated legume forage



Commercial feed

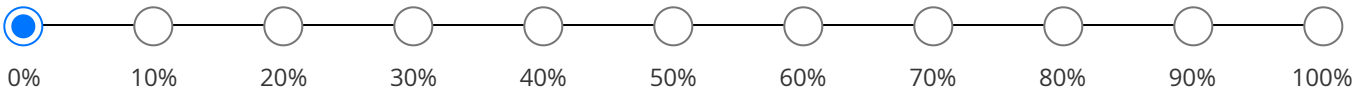


Household/kitchen wastes

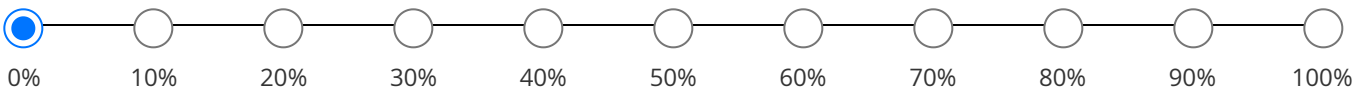


Small ruminnant feed composition (% weight) in June - November

Grazing

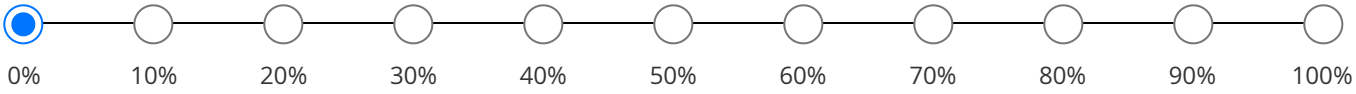


Cut and carry wild grass

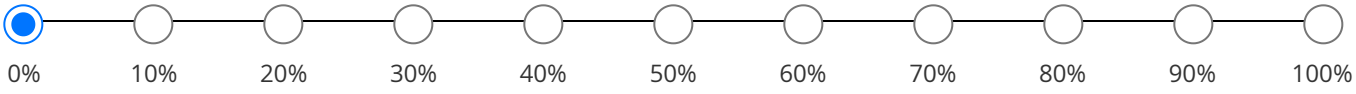


Hay

Pods

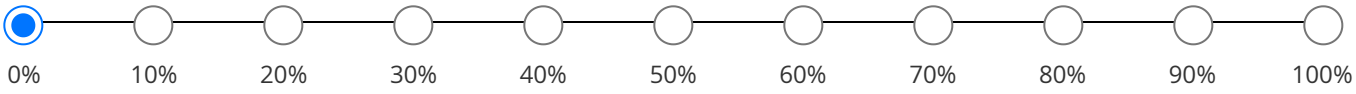


Cereal residues

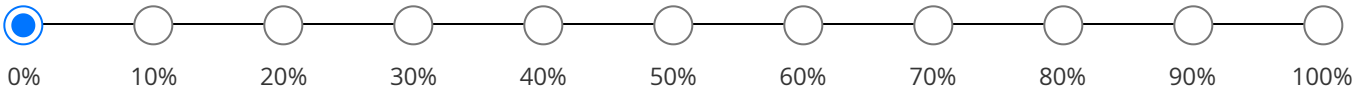


Cultivated grass forage

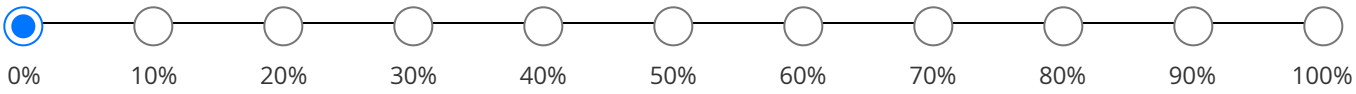
Cultivated legume forage



Commercial feed

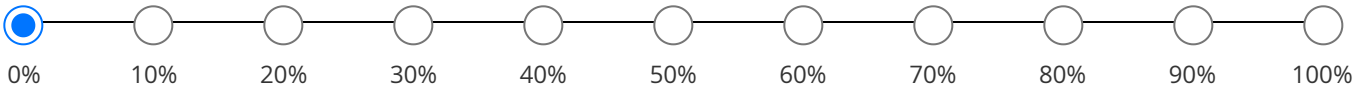


Household/kitchen wastes

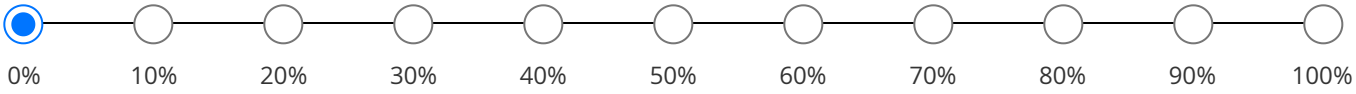


Poultry feed composition (% weight) in December - May

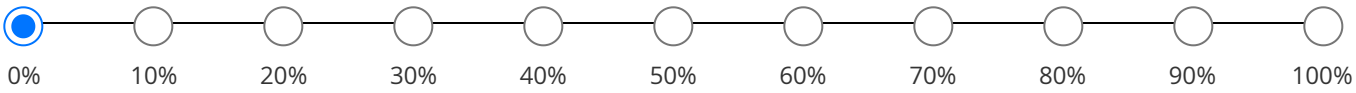
Free ranging



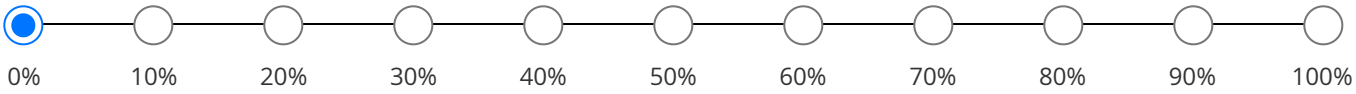
Maize produced on-farm



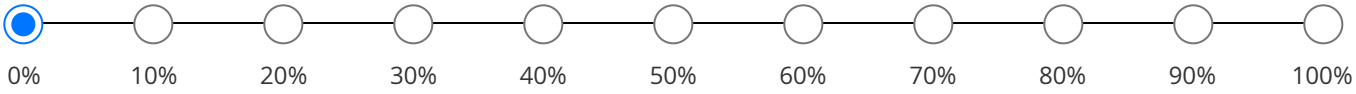
Sorghum produced on-farm



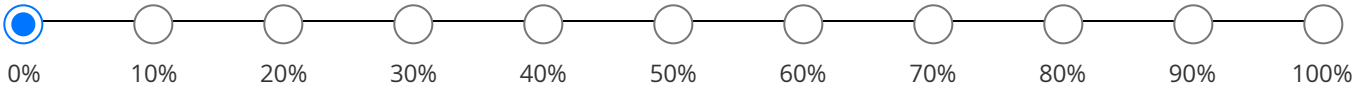
Pearl millet produced on-farm



Finger millet produced on-farm



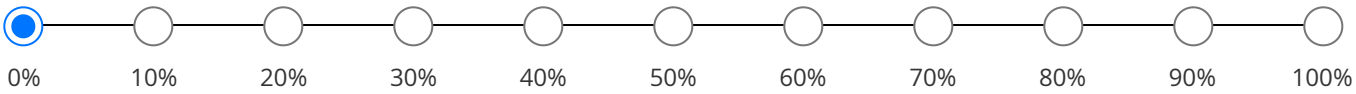
Commercial feed



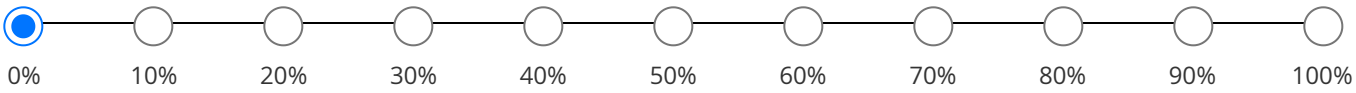
Household/kitchen wastes

Poultry feed composition (% weight) in June - November

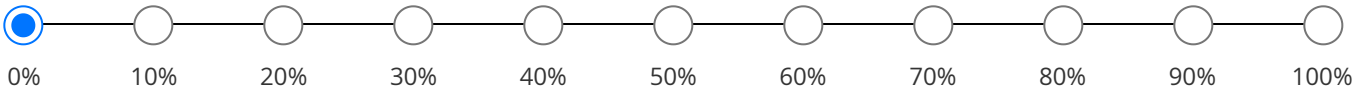
Free ranging



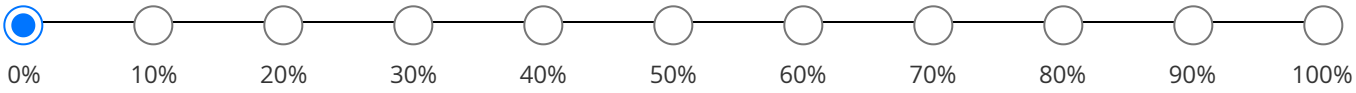
Maize produced on-farm



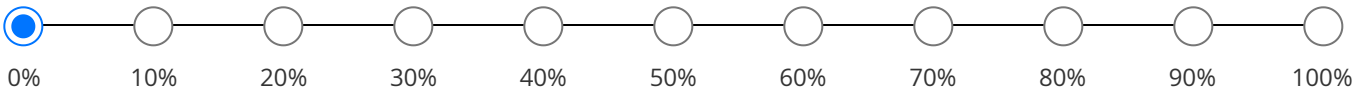
Sorghum produced on-farm



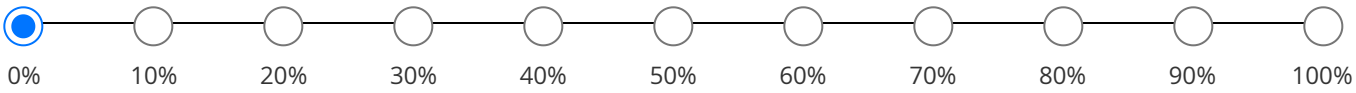
Pearl millet produced on-farm



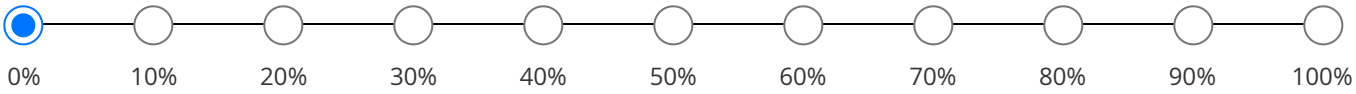
Finger millet produced on-farm



Commercial feed



Household/kitchen wastes



Have you used the following climate-smart agriculture practices in the past 12 months?

Practices:	No	Yes
Quality certified seeds (i.e., trusted source, guaranted minimum germination rate)	◯	◯
Community seed banks	◯	◯
Drought-tolerant varieties	◯	◯
Small grains	◯	◯
Crop rotation	◯	◯
Intercropping	◯	◯
Cover crops (i.e., crops planted specifically to control erosion and/or increase soil fertility)	◯	◯
Mulching	◯	◯
Integrated pest management (i.e., scouting and use of several control methods in addition to pesticides)	◯	◯
Compost/Manure	◯	◯
Drip/Micro irrigation	◯	◯
Optimum plant density (e.g., gap filling, planting at the right density, including through the use of mechanical planters)	◯	◯

Quantity of input (kg) used on the whole farm this season (2020-21)

Basal fertilizer (kg)

_____

Main type of basal fertilizer

- ◯ Compound D
- ◯ DAP
- ◯ Other

Name of basal fertilizer

_____

Top dressing fertilizer (kg)

_____

Main type of top dressing fertilizer

- AN
- Urea
- Other

Name of top dressing fertilizer

_____

Manure (kg)

_____

Compost (kg)

_____

Have you used the following improved livestock practices in the past 12 months?

Practices:	No	Yes
Improved livestock breeds	◯	◯
Improved animal shelters (for goats, poultry or cattle: enough space, good ventilation, protecting from the sun, dry floor)	◯	◯
Water infrastructure for livestock at homestead (e.g. water trough)	◯	◯
Routine vaccinations by Veterinary Officer or Paravet	◯	◯
Home vaccinations (farmer administered vaccinations)	◯	◯
Castration	◯	◯
Deworming	◯	◯
Dipping	◯	◯

How many times do you use the dip tank in the past 12 months?

_____

Spraying livestock at home	◯	◯
Use of services of community animal health worker (Paravet)	◯	◯
Homemade animal feeds made with locally available ingredients (e.g. for poultry)	◯	◯

Fodder production for ruminants (e.g. velvet bean, lablab)	◯	◯
Fodder preservation for ruminants (e.g. Silage making)	◯	◯
Survival feeding (feeding of productive livestock in lean season)	◯	◯
Animal feed supplied by feed companies	◯	◯
Artificial insemination	◯	◯
Pen fattening	◯	◯

Cattle diseases

What is the most important cattle disease you have experienced in the last 12 months?

- ◯ None
- ◯ Anaplasmosis
- ◯ Black leg
- ◯ Rabies
- ◯ Other
- ◯ Theileriosis
- ◯ Trypanosomosis
- ◯ Foot-and-mouth disease
- ◯ Tuberculosis
- ◯ Babesiosis
- ◯ Anthrax
- ◯ Lumpy skin
- ◯ Brucellosis

Specify the name of the cattle disease

_____

Was DVS involved in the disease diagnostic?

- ◯ No
- ◯ Yes

Was DVS involved in the management of the disease?

- ◯ No
- ◯ Yes

What was the main source of drug to control the disease?

- ◯ None
- ◯ DVS
- ◯ Local shop
- ◯ Vet drug distributor

How many cattle died of the disease in the last 12 months?

_____

What is the second most important cattle disease you have experienced in the last 12 months?

- ◯ None
- ◯ Anaplasmosis
- ◯ Black leg
- ◯ Rabies
- ◯ Other
- ◯ Theileriosis
- ◯ Trypanosomosis
- ◯ Foot-and-mouth disease
- ◯ Tuberculosis
- ◯ Babesiosis
- ◯ Anthrax
- ◯ Lumpy skin
- ◯ Brucellosis

Specify the name of the cattle disease

_____

What is the third most important cattle disease you have experienced in the last 12 months?

- ◯ None
- ◯ Anaplasmosis
- ◯ Black leg
- ◯ Rabies
- ◯ Other
- ◯ Theileriosis
- ◯ Trypanosomosis
- ◯ Foot-and-mouth disease
- ◯ Tuberculosis
- ◯ Babesiosis
- ◯ Anthrax
- ◯ Lumpy skin
- ◯ Brucellosis

Specify the name of the cattle disease

_____

Sheep and goat diseases

What is the most important sheep and goat disease you have experienced in the last 12 moths?

- ◯ None
- ◯ Mange
- ◯ Tuberculosis
- ◯ Rinderpest
- ◯ Anthrax
- ◯ Other
- ◯ Pulpy kidney
- ◯ Brucellosis

Specify the name of the small ruminant disease

_____

Was DVS involved in the disease diagnostic?

- ◯ No
- ◯ Yes

Was DVS involved in the management of the disease?

- ◯ No
- ◯ Yes

What was the main source of drug to control the disease?

- ◯ None
- ◯ DVS
- ◯ Local shop
- ◯ Vet drug distributor

How many sheep and goats died of the disease in the last 12 months?

_____

What is the second most important sheep and goat disease you have experienced in the last 12 moths?

- ◯ None
- ◯ Mange
- ◯ Tuberculosis
- ◯ Rinderpest
- ◯ Anthrax
- ◯ Other
- ◯ Pulpy kidney
- ◯ Brucellosis

Specify the name of the small ruminant disease

_____

What is the third most important sheep and goat disease you have experienced in the last 12 moths?

- ◯ None
- ◯ Mange
- ◯ Tuberculosis
- ◯ Rinderpest
- ◯ Anthrax
- ◯ Other
- ◯ Pulpy kidney
- ◯ Brucellosis

Specify the name of the small ruminant disease

_____

Poultry diseases

What is the most important poultry disease you have experienced in the last 12 months?

- ◯ None
- ◯ Fowl pox
- ◯ Coryza
- ◯ Other
- ◯ Newcastle

Specify the name of the poultry disease

_____

Was DVS involved in the disease diagnostic?

- ◯ No
- ◯ Yes

Was DVS involved in the management of the disease?

- ◯ No
- ◯ Yes

What was the main source of drug to control the disease?

- ◯ None
- ◯ DVS
- ◯ Local shop
- ◯ Vet drug distributor

How many birds died of the disease in the last 12 months?

_____

What is the second most important poultry disease you have experienced in the last 12 months?

- ◯ None
- ◯ Coryza
- ◯ Newcastle
- ◯ Fowl pox
- ◯ Other

Specify the name of the poultry disease

_____

What is the third most important poultry disease you have experienced in the last 12 months?

- ◯ None
- ◯ Coryza
- ◯ Newcastle
- ◯ Fowl pox
- ◯ Other

Specify the name of the poultry disease

_____

Disease surveillance

Are they still disease surveillance at the diptank?

- ◯ No
- ◯ Yes

Are you still using the green card?

- ◯ No
- ◯ Yes

Food sources

Most important food sources

1st choice

- ◯ Own production
- ◯ Barter
- ◯ Purchase from cash transfer
- ◯ Cash purchase from income
- ◯ Remittances
- ◯ Casual labour for food
- ◯ Food aid

2nd choice

- ◯ Own production
- ◯ Barter
- ◯ Purchase from cash transfer
- ◯ Cash purchase from income
- ◯ Remittances
- ◯ Casual labour for food
- ◯ Food aid

3rd choice

- ◯ Own production
- ◯ Barter
- ◯ Purchase from cash transfer
- ◯ Cash purchase from income
- ◯ Remittances
- ◯ Casual labour for food
- ◯ Food aid

Income sources

Most important income sources

1st choice

- ◯ Crop sales
- ◯ Remittances
- ◯ Artisan
- ◯ Livestock sales
- ◯ Salary or wages
- ◯ Trade
- ◯ Casual labour
- ◯ Smallscale mining
- ◯ Pension

2nd choice

- ◯ Crop sales
- ◯ Remittances
- ◯ Artisan
- ◯ Livestock sales
- ◯ Salary or wages
- ◯ Trade
- ◯ Casual labour
- ◯ Smallscale mining
- ◯ Pension

3rd choice

- ◯ Crop sales
- ◯ Livestock sales
- ◯ Casual labour
- ◯ Remittances
- ◯ Salary or wages
- ◯ Smallscale mining
- ◯ Artisan
- ◯ Trade
- ◯ Pension

Crop market channels

Most important crop market channels

_____

1st choice

- ◯ None
- ◯ Farm gate
- ◯ Village market
- ◯ Local collection point
- ◯ Local warehouse
- ◯ Local business centre
- ◯ GMB
- ◯ Regional town
- ◯ Other

Specify this other crop market channel

_____

2nd choice

- ◯ None
- ◯ Farm gate
- ◯ Village market
- ◯ Local collection point
- ◯ Local warehouse
- ◯ Local business centre
- ◯ GMB
- ◯ Regional town
- ◯ Other

Specify this other crop market channel

_____

3rd choice

- ◯ None
- ◯ Farm gate
- ◯ Village market
- ◯ Local collection point
- ◯ Local warehouse
- ◯ Local business centre
- ◯ GMB
- ◯ Regional town
- ◯ Other

Specify this other crop market channel

_____

Livestock market channels

Most important livestock market channels

_____

1st choice

- ◯ None
- ◯ Local sale pen
- ◯ Local dip tank
- ◯ Other
- ◯ Farm gate
- ◯ Local collection point
- ◯ Regional auction
- ◯ Village market
- ◯ Local business centre
- ◯ Regional town

Specify this other livestock market channel

_____

2nd choice

- ◯ None
- ◯ Local sale pen
- ◯ Local dip tank
- ◯ Other
- ◯ Farm gate
- ◯ Local collection point
- ◯ Regional auction
- ◯ Village market
- ◯ Local business centre
- ◯ Regional town

Specify this other livestock market channel

_____

3rd choice

- ◯ None
- ◯ Local sale pen
- ◯ Local dip tank
- ◯ Other
- ◯ Farm gate
- ◯ Local collection point
- ◯ Regional auction
- ◯ Village market
- ◯ Local business centre
- ◯ Regional town

Specify this other livestock market channel

_____

24 hour animal-based food group consumption

Were the following food items consumed by the household in the last 24 hours:	No	Yes
Organ meat	◯	◯
Flesh meat	◯	◯
Eggs	◯	◯
Fish and seafood	◯	◯
Milk and milk products	◯	◯

7 day animal-based food group consumption

Number of days the following food items were consumed by the household:

Organ meat

0 1 2 3 4 5 6 7

Flesh meat

0 1 2 3 4 5 6 7

Eggs

0 1 2 3 4 5 6 7

Fish and seafood

0 1 2 3 4 5 6 7

Milk and milk products

0 1 2 3 4 5 6 7

Disruption due to COVID-19 in 2019-20

Most important disruption due to COVID-19 in the past season (2019-20)

1st choice

- None
- Lack of labour for weeding
- Lack of labour for harvesting
- Lack of labour for herding
- Disruption of sales of crop products
- Disruption of sale of livestock products
- Disruption of other income generating activities

2nd choice

- None
- Lack of labour for weeding
- Lack of labour for harvesting
- Lack of labour for herding
- Disruption of sales of crop products
- Disruption of sale of livestock products
- Disruption of other income generating activities

3rd choice

- ◯ None
- ◯ Lack of labour for weeding
- ◯ Lack of labour for harvesting
- ◯ Lack of labour for herding
- ◯ Disruption of sales of crop products
- ◯ Disruption of sale of livestock products
- ◯ Disruption of other income generating activities

Disruption due to COVID-19 in 2020-21 so far

Most important disruption due to COVID-19 expected in the upcoming season (2020-21)

1st choice

- ◯ None
- ◯ Lack of seed on the market
- ◯ Lack of fertilizer on the market
- ◯ High seed cost
- ◯ High fertilizer cost
- ◯ Lack of labour for crop establishment
- ◯ Lack of labour for weeding
- ◯ Lack of labour for herding
- ◯ Lack of labour for harvesting
- ◯ Disruption of sales of crop products
- ◯ Disruption of sale of livestock products
- ◯ Disruption of other income generating activities

2nd choice

- ◯ None
- ◯ Lack of seed on the market
- ◯ Lack of fertilizer on the market
- ◯ High seed cost
- ◯ High fertilizer cost
- ◯ Lack of labour for crop establishment
- ◯ Lack of labour for weeding
- ◯ Lack of labour for herding
- ◯ Lack of labour for harvesting
- ◯ Disruption of sales of crop products
- ◯ Disruption of sale of livestock products
- ◯ Disruption of other income generating activities

3rd choice

- ◯ None
- ◯ Lack of seed on the market
- ◯ Lack of fertilizer on the market
- ◯ High seed cost
- ◯ High fertilizer cost
- ◯ Lack of labour for crop establishment
- ◯ Lack of labour for weeding
- ◯ Lack of labour for herding
- ◯ Lack of labour for harvesting
- ◯ Disruption of sales of crop products
- ◯ Disruption of sale of livestock products
- ◯ Disruption of other income generating activities

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