Detailed farm characterization DRC

48 Households in four sites (Murhesa, Kalehe, Mushinga and Ikoma) were selected from the baseline survey for detailed characterization during the 2011A season. There were four villages per site. Murhesa has good market access and high agro-ecological potential. Ikoma also has good market access, but lower agro-ecological potential. Mushinga on the other hand has high agro-ecological potential, but poor market access. Kalehe has both poor market access and low agro-ecological potential.

Originally, farmers were divided into three resource endowment groups (rich, medium and poor) based on baseline survey data. However, the typology could not be found back and it was impossible to link all farmers to the baseline data, since farm ids did not correspond and often different names were used. Looking at farm size and livestock ownership data from the detailed characterizations, these data were too limited to make a coherent typology. In Ikoma almost all farmers included in the detailed characterizations could be traced back in the baseline database, but then no division based on resource endowment could be made according to the guidelines that were used earlier.

**Cropping patterns**

The majority of farmers in all sites cultivate beans and cassava (Table 1). In Ikoma and Mushinga, some farmers also cultivated climbing beans. Groundnut is cultivated by the majority of farmers in Kalehe, but not at all in the other sites. Only few farmers cultivated soybean, and not in Mushinga. Maize was grown by half of the farmers in Kalehe, the majority of farmers in Murhesa, a few farmers in Mushinga. In Ikoma, farmers did not cultivate maize.

Do not more farmers cultivate banana??

Table 1. % of farmers growing the specific crops per site.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Ikoma | Kalehe | Murhesa | Mushinga |
| maize | 0% | 50% | 83% | 8% |
| sorghum | 8% | 0% | 0% | 0% |
| cassava | 92% | 75% | 100% | 58% |
| taro | 8% | 8% | 0% | 17% |
| sweet potato | 25% | 0% | 8% | 33% |
| haricot | 92% | 67% | 92% | 92% |
| haricot vol | 25% | 0% | 0% | 17% |
| soybean | 8% | 33% | 8% | 0% |
| groundnut | 0% | 92% | 0% | 0% |
| coffee | 0% | 17% | 0% | 0% |
| bananas | 8% | 8% | 8% | 0% |
| onion | 8% | 0% | 0% | 0% |

When asked about cropping patterns over time, a substantial part of farmers in all areas mentioned that they abandoned the cultivation of sorghum, with a variety of reasons, of which the two most important were the low productivity of the crop and the lack of space on their farms. In general, more farmers mentioned more crops that were expanding on their farms than crop that were decreasing. In all areas beans and cassava or sweet potato were the main expanding crops. The main reason to increase the cultivation of these crops was household nutrition. For beans, also the short growing cycle was mentioned.

Farm sizes (cultivated area) are generally small in all four sites (Table 2). However, farmers in Kalehe have larger areas under cultivation than farmers in the other sites.

Table 2. Average cultivated area per farm.

|  |  |
| --- | --- |
| Site | cultivated area (ha) |
| Ikoma | 0,11 |
| Kalehe | 0,27 |
| Murhesa | 0,16 |
| Mushinga | 0,11 |

In all sites, most farmers practice intercropping, mostly cassava (manioc) and/or maize with beans (Figure 1). On a smaller part of the area, another crop (e.g. banana or sweet potato) is added to this combination. In Mushinga and Kalehe, a relatively large share of the area is allocated to sole legumes.

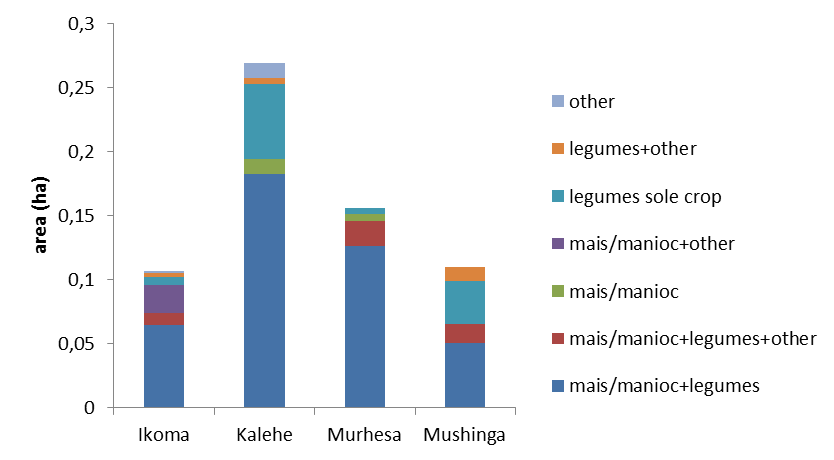


Figure 1. Crop areas, averaged per site. Legumes are mostly beans (sometimes climbing bean in Ikoma and Mushinga), but also include groundnut and soybean. Other crops include coffee, banana, taro, sweet potato and onion. Sorghum is included in maize.

**Legume yields**

Average bush beans yields ranged from 439 kg dry grain ha-1 in Ikoma to 647 kg dry grain ha-1 in Murhesa (Table 3). The lower yields in Ikoma and Kalehe coincides with the lower agro-ecological potential of Ikoma and Kalehe. However, climbing beans in Ikoma yielded more than twice as much than bush beans and groundnut yields in Kalehe were relatively high compared to the other legumes. Soybean yields on the other hand were generally low in all sites.

Table 3. Average legume yields in kg/ha (dry grain yields, field level). Numbers in () indicate sem. Include no. of observations.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Ikoma | | Kalehe | | Murhesa | | Mushinga | |
| Beans | 439 | (66) | 554 | (135) | 647 | (50) | 601 | (91) |
| Climbing beans | 901 |  |  |  |  |  | 650 | (213) |
| Soybean | 111 |  | 280 | (60) | 321 |  |  |  |
| Groundnut |  |  | 852 | (172) |  |  |  |  |

At the start of the characterization, farmers were asked to estimate their (legume?) harvests and the parts they would sell, consume or keep for seed. In all areas, farmers estimated that they would consume most of the (legume?) yield, sell a smaller part and keep only a very small amount for seed. Especially in Ikoma, farmers consumed a very large part and hardly kept any grain for seed. The highest sale percentages were estimated by farmers in Murhesa, which has good market access. However, farmers in Kalehe estimated the second highest sale percentage, whereas Kalehe has poor market access.

Table 4. Average estimated parts of harvest for sale, home consumption or seed.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sold | Consumed | Kept for seed |
| Ikoma | 21% | 76% | 3% |
| Kalehe | 38% | 44% | 18% |
| Murhesa | 47% | 48% | 14% |
| Mushinga | 33% | 63% | 4% |

**Crop management**

*Nutrient inputs*

Only two farmers in the whole sample used inorganic fertilizer. Both farmers were from Ikoma and received 2 kg of NPK from SARCAF, a local NGO, which they allocated to maize and beans in the one case, and to cassava, beans and soybean in the other case. The majority of farmers used compost (Table 5). A smaller part used animal manure, sometimes in combination with compost. The highest percentage of farmers using manure was found in Mushinga, were farmers had more livestock than in the other areas.

Table 5. % of farmers using compost, manure or NPK fertilizer. Some farmers used multiple nutrient sources.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Compost | Manure | NPK fertilizer |
| Ikoma | 42% | 33% | 17% |
| Kalehe | 67% | 8% | 0% |
| Murhesa | 92% | 17% | 0% |
| Mushinga | 58% | 50% | 0% |

Since most crops are grown in intercropping systems, all crops seemed to be targeted with compost or manure equally. The data was not detailed enough to allow for field level analyses. Therefore, average nutrient inputs were calculated on farm level (Table 6). However, this does not necessarily imply that a farmer allocated his or her nutrients equally among different fields. On average, farmers in Ikoma allocated the largest amounts of nutrients to their farms on an area basis, and farmers in Kalehe the lowest amounts. However, farmers in Ikoma in general had the smallest farm sizes, whereas farmers in Kalehe had the largest farm sizes, indicating that the differences between the actual amounts of nutrients applied are smaller.

Table 6. Average (organic) nutrient inputs per farm. (compost: 0,6% N, 0,11% P, 0,72%K; manure: 1% N, 0,51%P, 2,1%K)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | N (kg/ha) | | P (kg/ha) | | K (kg/ha) | |
| Ikoma | 16,4 | (10,6) | 30,0 | (19,5) | 196,7 | (127,4) |
| Kalehe | 2,3 | (0,6) | 4,1 | (1,0) | 27,1 | (6,7) |
| Murhesa | 6,7 | (2,5) | 12,2 | (4,6) | 79,9 | (29,9) |
| Mushinga | 9,1 | (3,1) | 16,7 | (5,7) | 109,5 | (37,2) |

Average total amounts of nutrient applied per farm

|  |  |  |  |
| --- | --- | --- | --- |
|  | Average of Sum of N (kg) | Average of Sum of P (kg) | Average of Sum of K (kg) |
| Ikoma | 0,60 | 0,47 | 1,98 |
| Kalehe | 0,60 | 1,11 | 7,25 |
| Murhesa | 0,62 | 1,13 | 7,43 |
| Mushinga | 0,88 | 0,57 | 2,78 |

*Seed source*

In all four areas, about half of the seeds were purchased and half were saved from the previous season. However, seed for climbing beans seemed to have been purchased more often than that is was saved, especially in Ikoma and Kalehe (Table 7). Sweet potato on the other hand was saved in the majority of the cases. For the other crops, there was no real consistency in seed sources among the different areas.

Table 7. Seed origin.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Ikoma | | Kalehe | | Murhesa | | Mushinga | |
|  | Purchased | Saved | Purchased | Saved | Purchased | Saved | Purchased | Saved |
| Groundnut | |  | 70% | 30% |  |  |  |  |
| Beans | 50% | 50% | 60% | 40% | 58% | 42% | 64% | 36% |
| Climbing beans | 100% | 0% | 60% | 40% |  |  | 50% | 50% |
| Maize |  |  | 30% | 70% | 47% | 53% | 75% | 25% |
| Cassava | 55% | 45% | 33% | 67% | 59% | 41% | 20% | 80% |
| Sweet potato | 0% | 100% |  |  |  |  | 17% | 83% |
| Soybean | 0% | 100% |  |  | 100% | 0% |  |  |

*Residue management*

In case of intercropping, during data collection no difference was made between residue management of the different crops. Therefore, all crops have been aggregated also in the analyses. In all areas most of the crop residues were left in the field. In Murhesa and Mushinga about a quarter of the crop residues was fed to livestock. This percentage was slightly higher in Ikoma and considerably lower in Kalehe.

Table 8. Residue management.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Left in the field | Fed to livestock | Other |
| Ikoma | 67% | 31% | 1% |
| Kalehe | 94% | 4% | 9% |
| Murhesa | 75% | 22% | 1% |
| Mushinga | 74% | 26% | 0% |

**Livestock**

Generally, farmers in Mushinga owned more livestock than farmers in the other sites (Figure 2). Especially in Murhesa, farmers owned very little livestock and no cows (Table 9).

Do farmers in Mushinga own more livestock because more ‘rich’ farmers have been sampled here than in other areas or because in that region farmers generally own more livestock anyway?

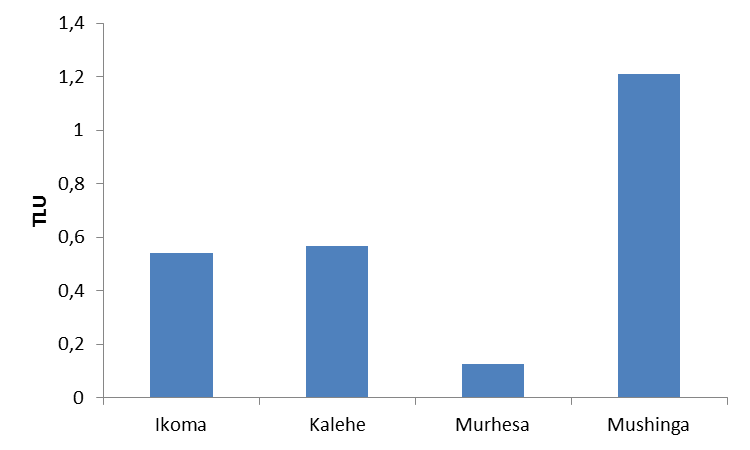


Figure 2. Tropical Livestock Units (TLU) owned per household, averaged per site.

Table 9. Average numbers of livestock species owned by the sampled households.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Livestock | Ikoma | Kalehe | Murhesa | Mushinga |
| Goats | 1,1 | 2,3 | 0,9 | 1,7 |
| Pigs | 0,8 | 0,5 | 0,3 | 1,1 |
| Poultry | 1,6 | 1,0 | 0,7 | 6,8 |
| Guinea Pigs | 1,3 | 0,4 | 1,2 | 3,3 |
| Cows | 0,5 | 0,4 | 0,0 | 1,3 |
| Rabbits | 1,0 | 0,0 | 0,0 | 0,0 |

In 90% of the cases, cows were kept for milk and manure. In addition, some farmers mentioned to keep cows for sale and dowry. Goats were kept mainly for manure, and also for reproduction and sale. The most important use for pigs was reproduction and sales of piglets, followed by manure and home consumption. Chicken were kept mainly for their eggs and were sometimes consumed at home or sold. Guinea pigs were usually consumed at home, but also valued for reproduction and manure. Rabbits were consumed less often than guinea pigs and mainly kept for reproduction and sale, as well as for the production of manure.

*Feed*

Whether livestock grazed on fields or pastures differed per area. In Ikoma and Mushinga, livestock grazed mostly on the fields outside the cropping season. In Kalehe, on the other hand, most farmers let their livestock graze on communal pastures. In Murhesa, a minority of farmers let their livestock graze on pastures and a majority on fields.

In addition to grazing, goats were usually fed banana leaves and a combination of grasses and herbs like *pennisetum*, *setaria, tithonia and commelina diffusa*. Pigs were fed mostly manioc waste, in combination with some of the same grasses and herbs as well as some weeds. Cows were mostly fed the grass *Digitaria vestida*, as well as some banana leaves and some grasses or herbs.

In Ikoma, Kalehe and Murhesa, hardly any farmers bought feed for their livestock. In Mushinga however, almost half of the cattle farmers bought feed. A small part of farmers also bought feed for pigs, goats and chickens.

**Crop sales**

Farmers received relatively constant prices for crops among the different regions. Groundnut and sweet potato (data not shown) fetched the highest prices. Maize generated the lowest prices. Although cassava did not generate high prices just after harvest, its price increased with 57% after storage (in contrast, the price of beans only increased with 17%).

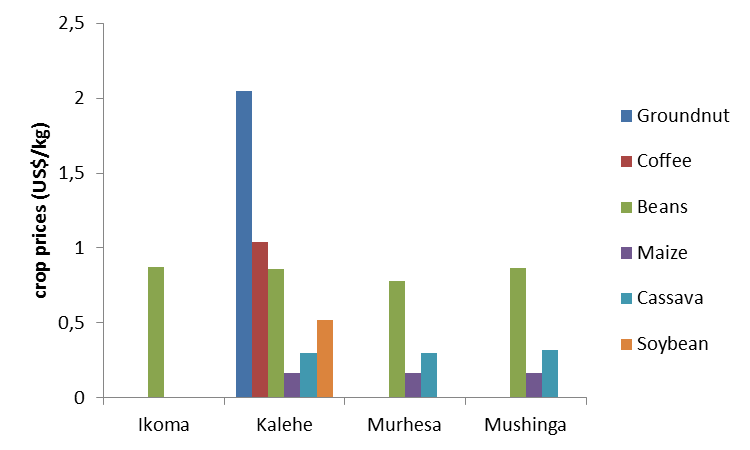
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Figure 3. Average prices after harvest. Prices after storage were between 17% (beans) and 57% (cassava) higher.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | after harvest | | | after storage | | |
|  |  | average | min | max | average | min | max |
| Ikoma | Beans | 0,87 | 0,65 | 1,09 | 0,98 | 0,76 | 1,20 |
|  | Sweet potato | 2,45 | 2,18 | 2,73 | 3,00 | 2,73 | 3,27 |
| Kalehe | Groundnut | 2,05 | 1,64 | 2,73 | 2,82 | 2,73 | 3,49 |
|  | Coffee | 1,04 | 0,87 | 1,20 | 1,96 | 1,20 | 1,64 |
|  | Beans | 0,86 | 0,63 | 1,09 | 1,00 | 0,76 | 1,23 |
|  | Maize | 0,16 | 0,11 | 0,22 | 0,25 | 0,22 | 0,27 |
|  | Cassava | 0,30 | 0,27 | 0,33 | 0,82 | 0,55 | 1,09 |
|  | Soybean | 0,52 | 0,55 | 0,87 | 0,85 | 0,87 | 1,42 |
| Murhesa | Beans | 0,78 | 0,55 | 1,09 | 1,04 | 0,76 | 1,31 |
|  | Maize | 0,16 | 0,11 | 0,22 | 0,25 | 0,22 | 0,27 |
|  | Cassava | 0,30 | 0,27 | 0,33 | 0,82 | 0,55 | 1,09 |
|  | Sweet potato | 2,45 | 2,18 | 2,73 | 3,00 | 2,73 | 3,27 |
| Mushinga | Beans | 0,87 | 0,64 | 1,09 | 0,99 | 0,76 | 1,21 |
|  | Maize | 0,16 | 0,11 | 0,22 | 0,25 | 0,22 | 0,27 |
|  | Cassava | 0,32 | 0,24 | 0,40 | 0,56 | 0,44 | 0,69 |
|  | Sweet potato | 2,45 | 2,18 | 2,73 | 3,00 | 2,73 | 3,27 |

In contrast to prices, amounts sold were only given for 15 households in total. Some households sold very small amounts of just 1 kg, others sold about 50 kg and some sold very high amounts(>1000 kg) of different crops. How is this possible with those small fields? E.g. 1300 kg beans sold????? Or 4000 kg manioc??