



Quick Scan of Uganda's Forage Sub-Sector

Netherlands East African Dairy Partnership (NEADAP)

Working Paper Supplement: Survey Diagrams and Questionnaire



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This Supplement is part of the Uganda Forage Sub-Sector Quick Scan or Working Paper and includes the Survey Diagrams and the Questionnaire. The Working Paper describes Uganda's forage sub-sector and looks at the current situation of available forage species and their quality, seasonality, preservation, forage seeds and planting material, fertilizer use, mechanisation, inputs and services, the forage market, education and training, innovations, environmentally sustainable forage production and policies and regulations affecting the forage sub-sector. The Working Paper identifies gaps and gives recommendations to enhance availability of quality forages. It is a reference document for the development of a Strategy Paper or Policy Brief under Theme 2: Forages and nutrition of dairy cows, of the Netherlands East African Dairy Partnership project (NEADAP). NEADAP is an initiative by the Netherlands government for learning and sharing amongst different dairy sectors and projects in East Africa.

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DAIRY PARTNERSHIP



Milk
Quality



Forage &
Nutrition



Inclusive
Business Models



Networking
& Influencing



Innovation



Survey Diagrams

1. General Constraints

Figure 1.1. Question 2 “Select the five most important constraints that prevent an increase in forage production and preservation in Uganda”. Awareness, knowledge and skills is the biggest hindrance to improved forage production (16%), followed by mechanization (14%), availability of forage seeds or plant material (13%) absence of a milk market (12%) and financial constraints (9%) (Survey Diagrams; Figure 1.1).

Figure 1.1. “Select the five most important constraints that prevent an increase in forage production and preservation in Uganda” (Q2)

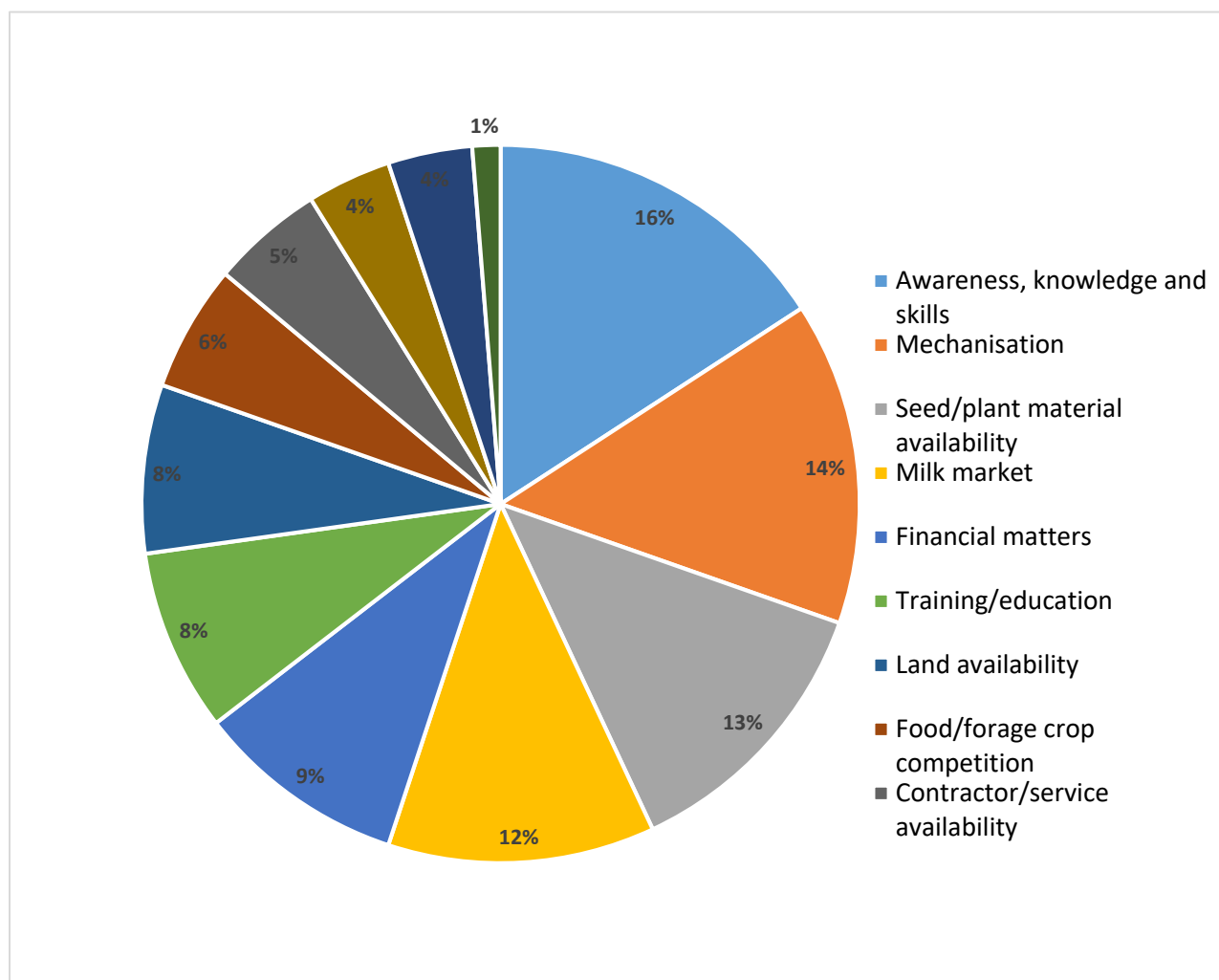
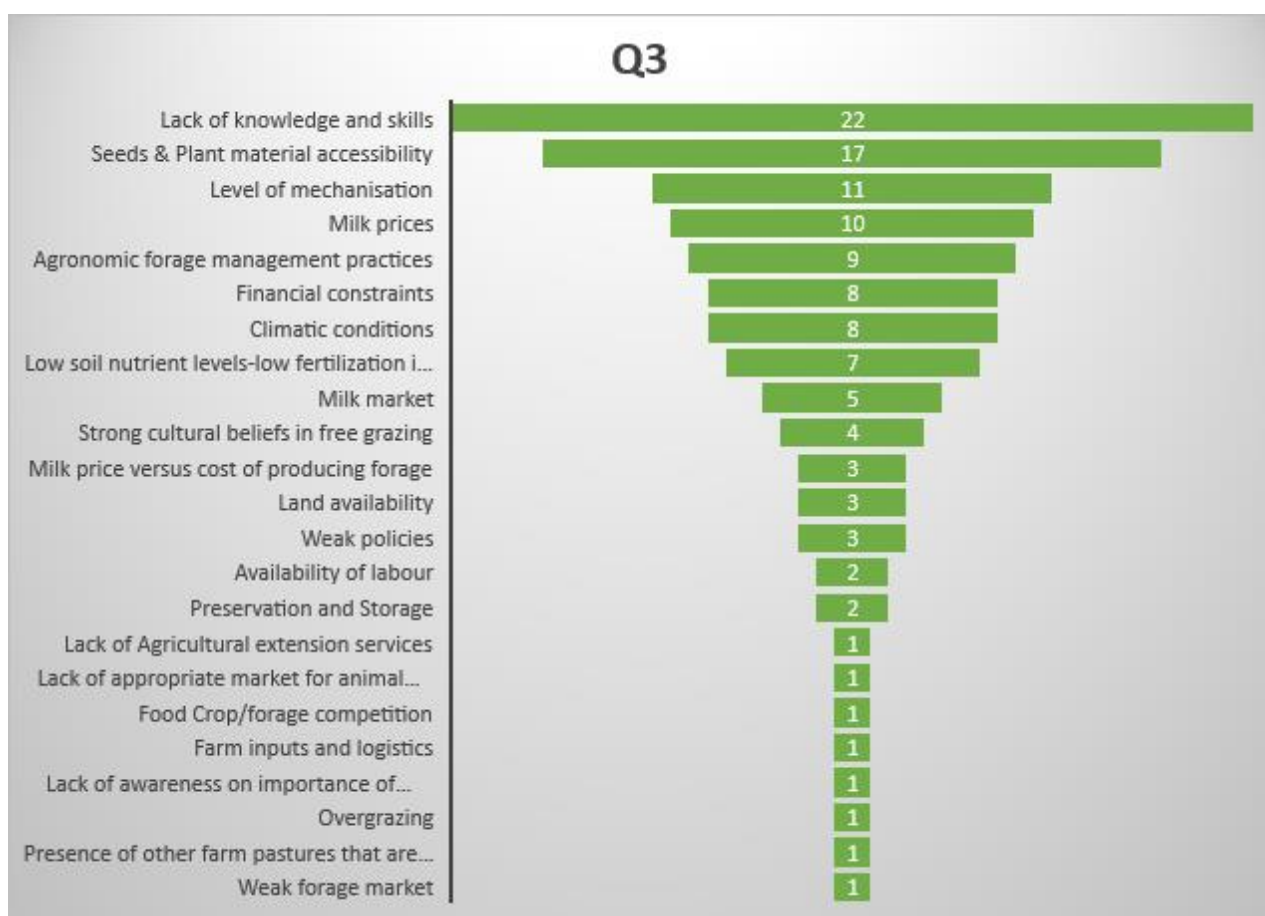


Figure 1.2. Question 3. “List at least three important reasons why in Uganda production of quality forages (high nutritive value) is still deficient”. Likewise, 22% of the respondents mentioned Lack of knowledge and skills as the root cause along with lack of accessibility of seeds and planting material (17%). Low level of mechanisation (11%) comes before low milk prices (10%) it can be mentioned that those respondents who answered lack of milk market (5%) also had low milk prices in mind. , Agronomic forage management practices (9%) and financial constraints (8%) of the farmers.

Figure 1.2. “List at least three important reasons why in Uganda production of quality forages (high nutritive value) is still deficient”. (Q3)



2. Forage species and research

Figure 2.1, 2.2, 2.3. Question 4. “What are the three most common forage species used by dairy farmers in different farming system?” Based on the response in the questionnaire in the intensive farming system Napier grass (*Pennisetum purpureum*) Maize (*Zea maize*) and Rhodes grass (*Chloris gayana*) respectively 31.8%, 19.7% and 10.6% are the most commonly used forages. In the system with grazing in fenced paddocks with improved pastures (semi-intensive farming system) Rhodes grass is the most used (26.9%) followed by *Brachiaria ssp*, Napier grass (*Pennisetum purpureum*) and Natural grasses and legumes respectively 14.9%, 11.9% and 10.4%. In the Free Range-Natural grassland system (extensive farming systems) Rhodes grass (*Chloris gayana*), Natural grasses and Brachiaria (*Brachiaria ssp*) 16.4%, 11.5% and 9.8% are the most commented

Figure 2.1. Intensive farming system (Q4.1)

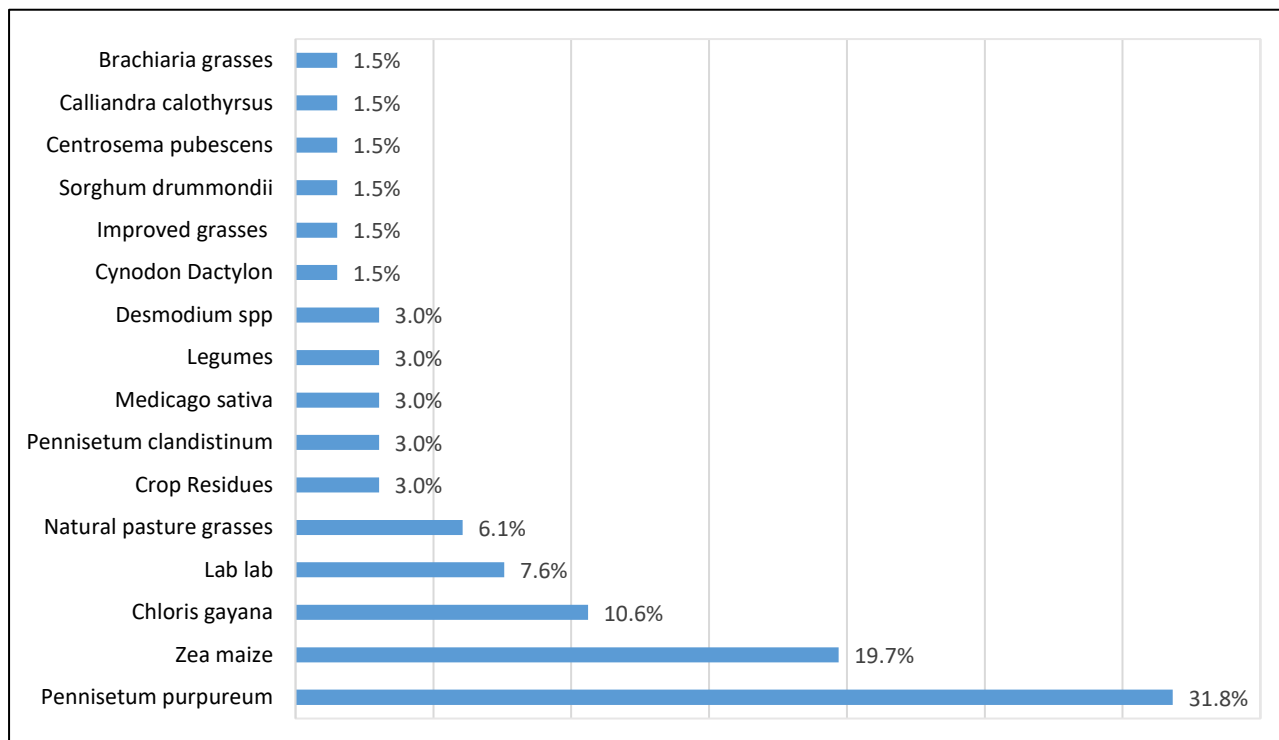


Figure 2.2. Semi – intensive farming system (Q4.2)

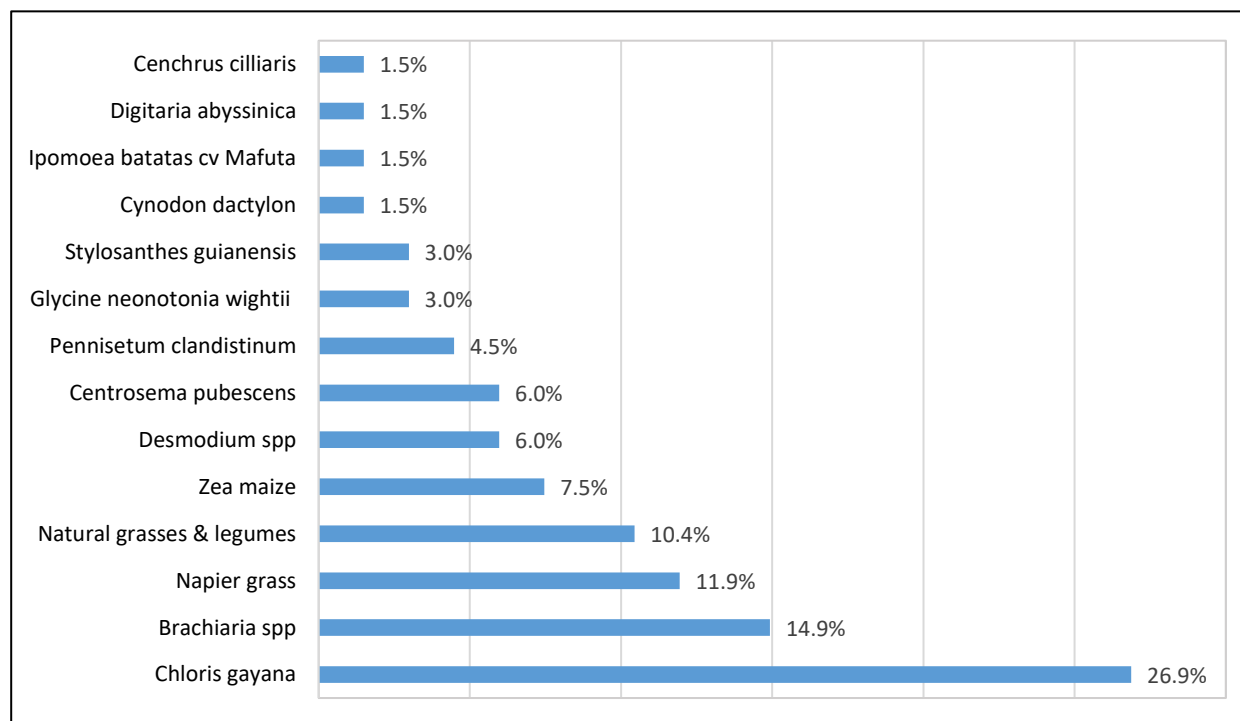


Figure 2.3. Extensive farming system (Q4.3)

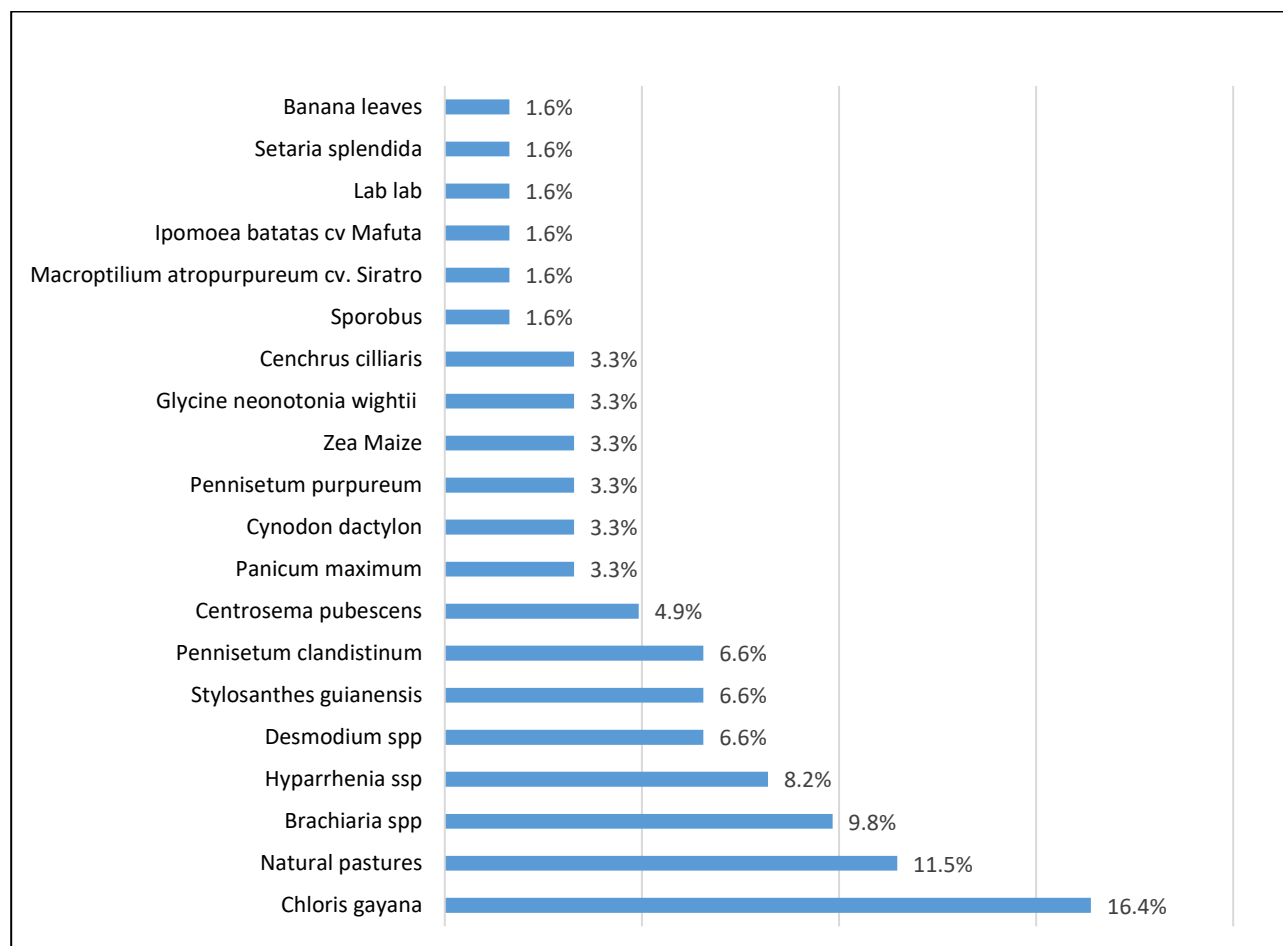


Figure 2.4, 2.5, 2.6, 2.7. Question 5. “Which forage species, in order of importance, do you think give the best return for the dairy farmer in the different farming systems?”

Based on the responses given to the questionnaire (Survey Diagrams; Figure 2.4) Napier grass gives the best returns according to 25% of the respondents. Maize (*Zea mays*) is gaining in popularity (15.8%) as a forage crop in intensive farming systems. In Uganda the maize varieties used are the same as those used for human consumption due to the absence of forage maize varieties in the local market. In semi-intensive farming systems, responses to the questionnaire indicate that Rhodes grass (23.7%) gives the best returns for the farmers, followed by Brachiaria (15.3%), Napier grass (13.6%) and Desmodium (10.2%). (Survey Diagrams; Figure 2.5). In the extensive farming system Rhodes grass (30.6%) gives the best return for farmers followed by Brachiaria (16.3%) and Natural grass and legumes (12.2%). The Brachiaria species referred to are those occurring naturally in the pasture's contrary to Kenya where Brachiaria is only referred to as hybrids or cultivars.

Figure 2.4. Intensive farming (Q5.1).

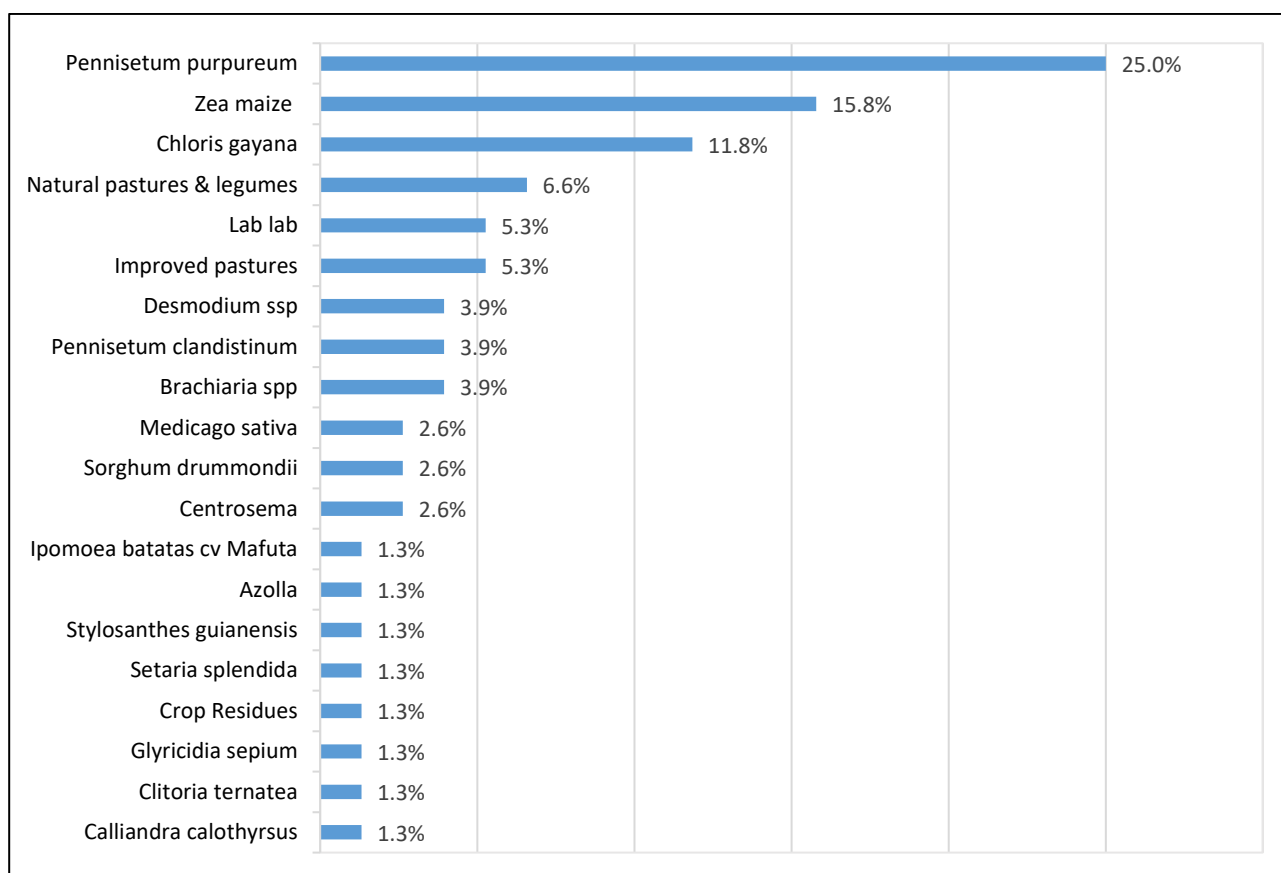


Figure 2.5. Semi-intensive farming systems (Q5.2).

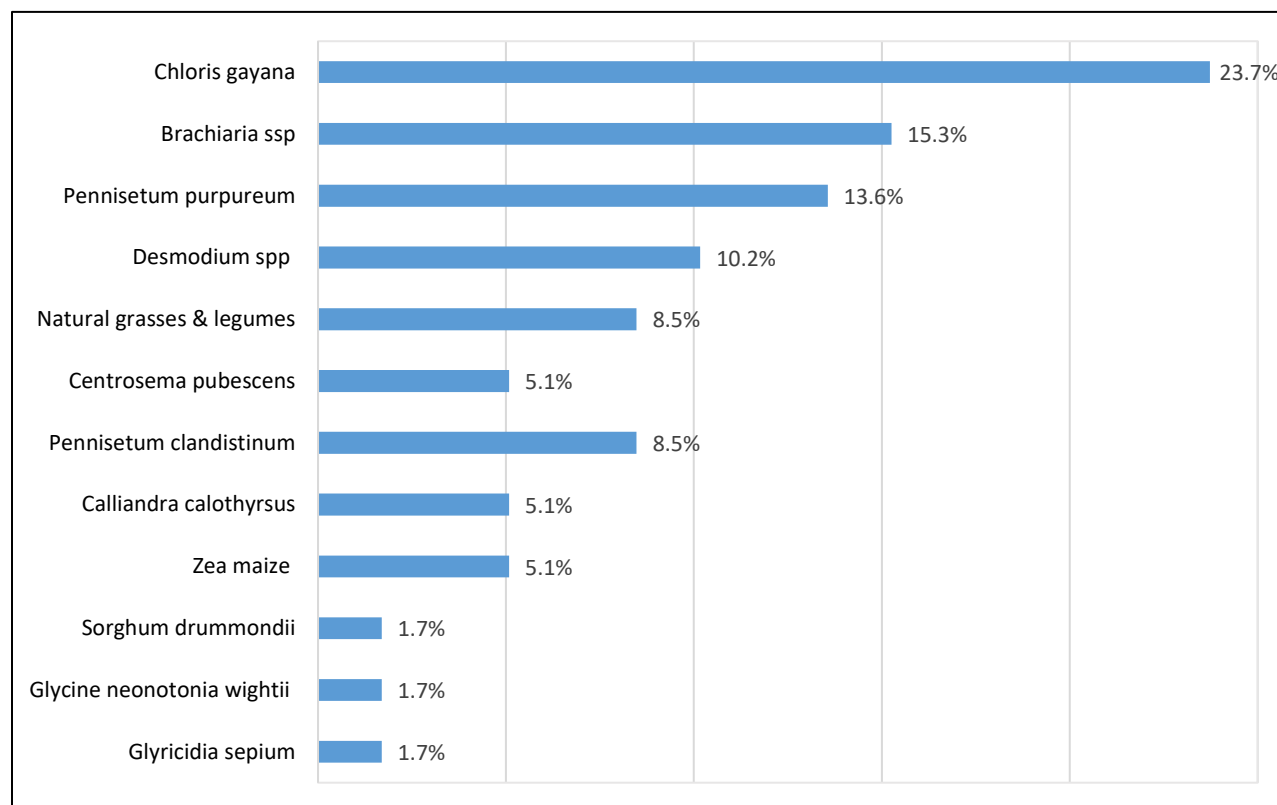


Figure 2.6. Extensive farming systems (Q5.3).

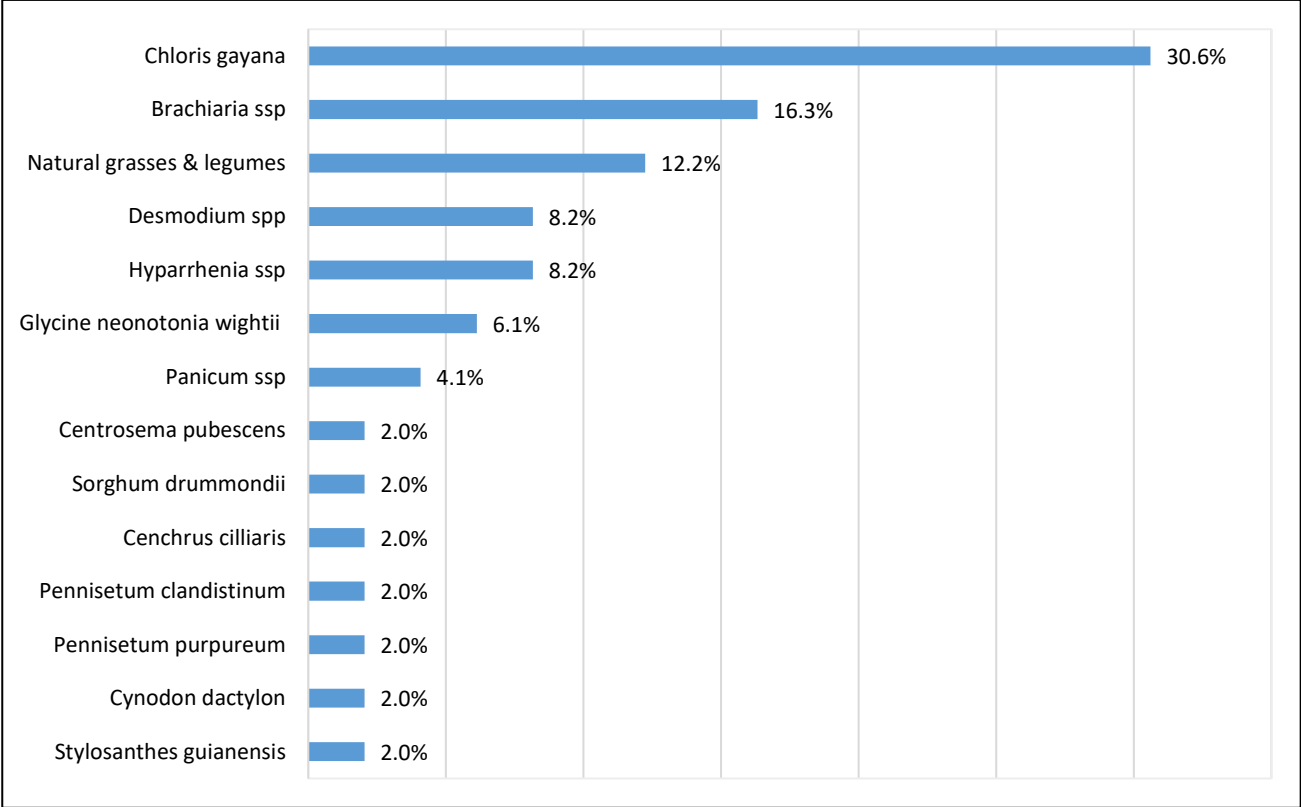


Figure 2.7a. The 3 farming systems combined (Q 5.4).

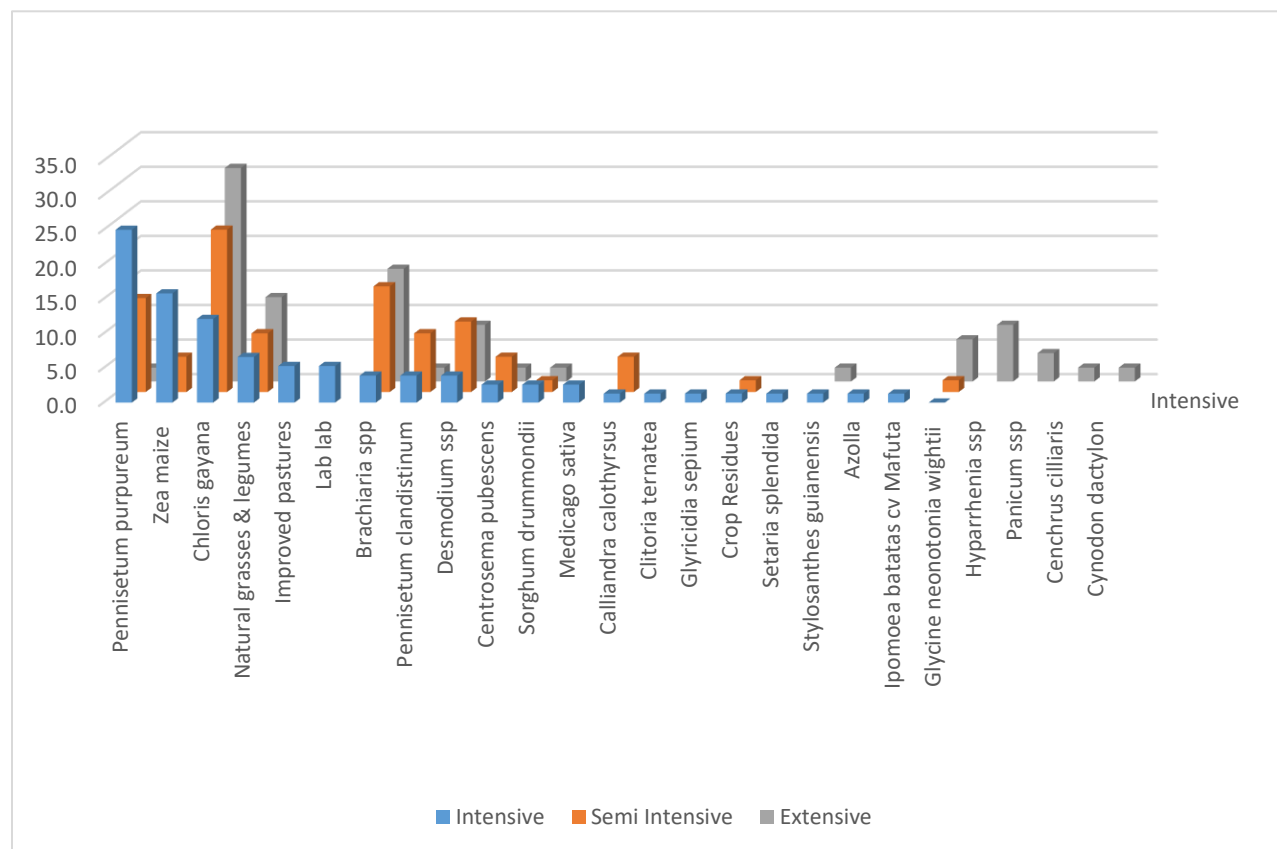


Figure 2.8, 2.9, 2.10, 2.11. Question 6. “What are the main constraints for forage production in the dairy farming systems and for commercial forage producers?”

In the intensive farming system, land availability (17.1%) and high cost of production/financial constraints (17.1%) are major constraint for forage production in Uganda. Mechanization is also perceived as a constraint (11.4%) (Fig.2.8). In semi-intensive farming systems, knowledge and skills, mechanization and availability, accessibility and affordability of forage seeds are equally (17.1%) seen as a major constraint. Followed by land availability (11.4%) In extensive farming systems, high cost of production/financial constraints (19.4%), mechanization (16.7%), knowledge and skills (16.7%), and availability, accessibility and affordability of forage seeds (16.7%) are all considered to be constraints (Figure 2.9, Figure 2.10). For commercial forage producers, according to the results of the questionnaire, the major constraint for forage production is seen as the market being inadequate, not ready, for commercially produced forages as well as the low level of mechanization in the sector (respectively 24.3% and 24.3%) followed by availability, accessibility and affordability of forage seeds (13.5%) (Figure 2.11)

Fig.2.8. Intensive farming system (Q6.1).

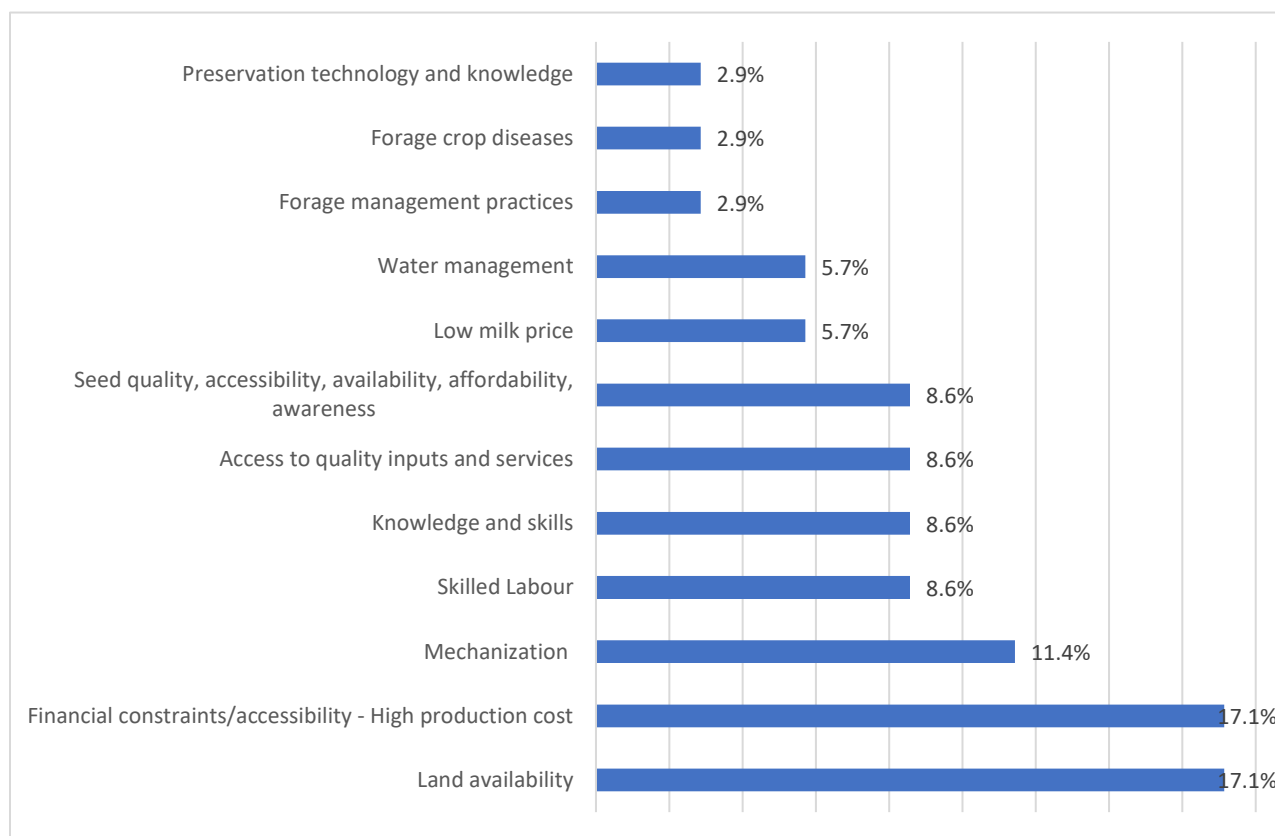


Figure 2.9. Semi-intensive farming systems (Q6.2).

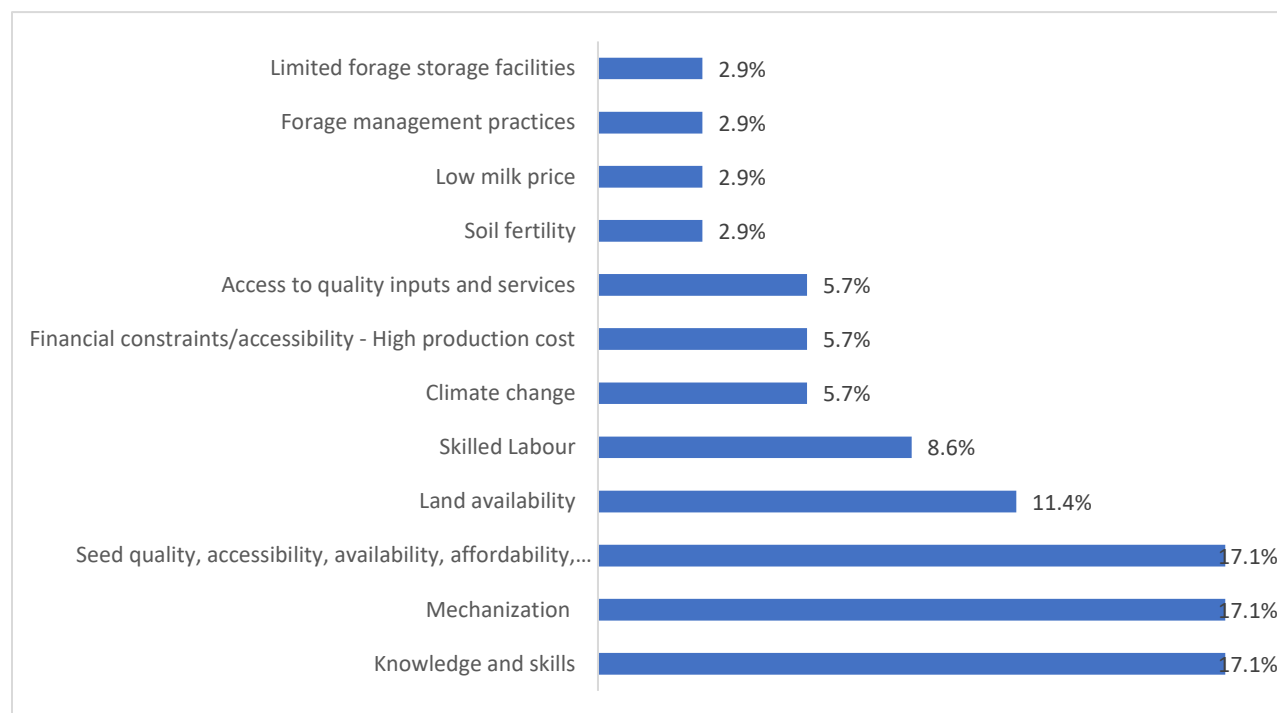


Figure 2.10. Extensive farming systems (Q6.3).

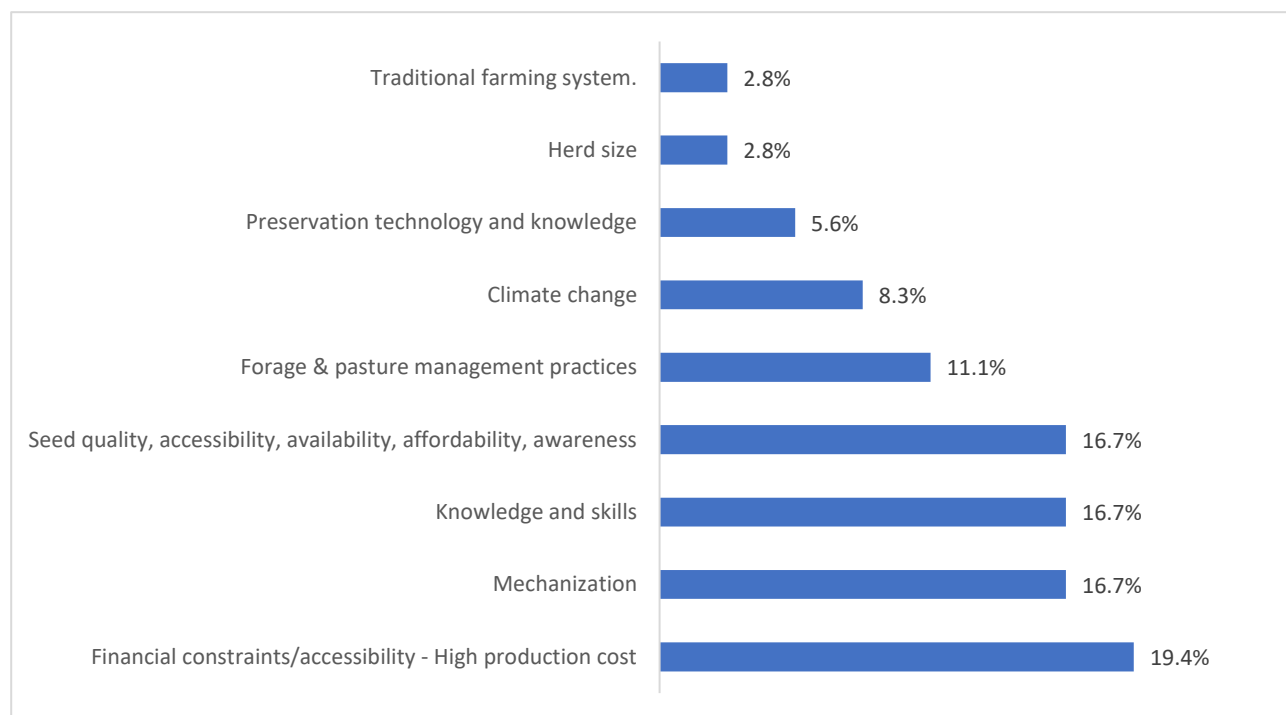


Figure 2.11. Commercial Forage Producers (Q6.4).

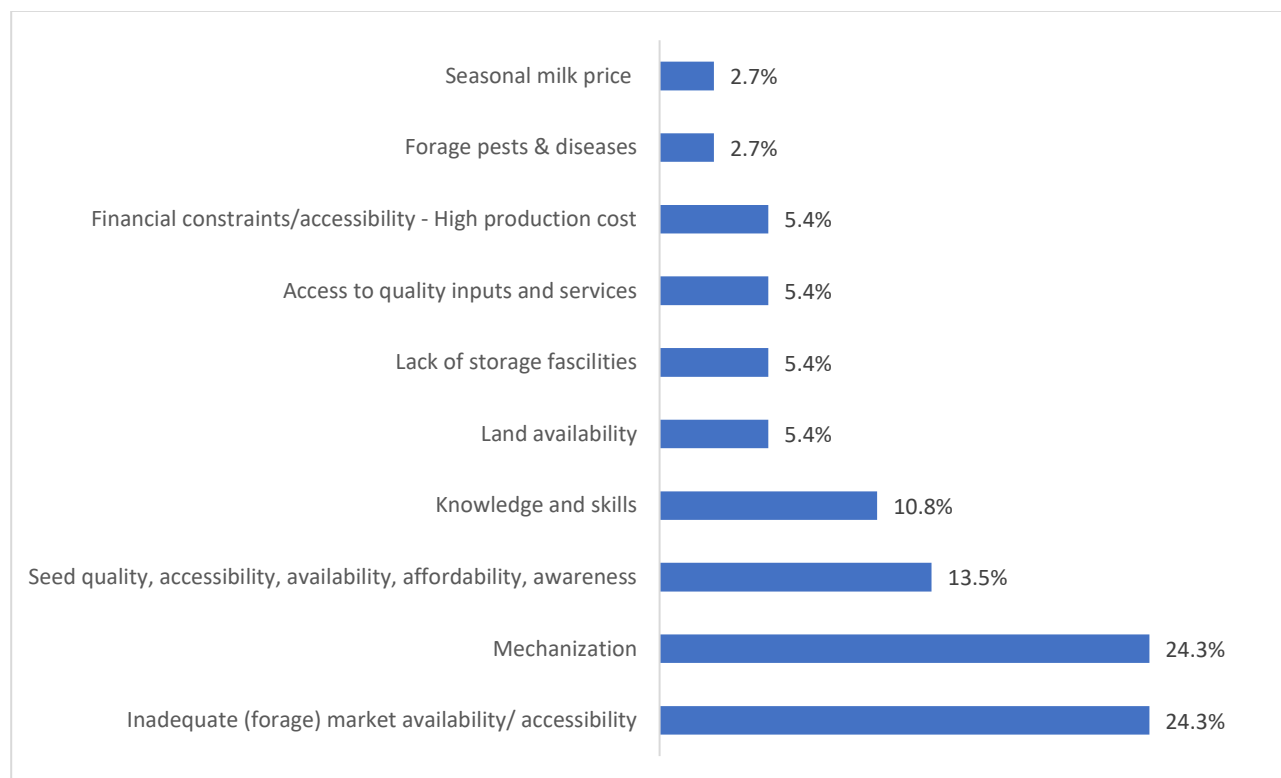


Figure 2.12, 2.13, 2.14, 2.15. Question 7. " What new forage species (energy/protein rich) do you think can be introduced in the dairy farming systems?"

Figure 2.15 (Survey Diagrams) provides an overview of the three farming systems (intensive, semi-intensive and extensive) and the species the respondents found promising. The Figure shows that in intensive farming systems Calliandra (19.4%) and Lucerne, Maize and Lab lab all at (12.9%) are promising forage crops. Lucerne is seen as a crop with potential in intensive farming systems as well despite often discouraging results in practical situations. In the semi-intensive and extensive farming systems Desmodium (10.3% & 10.8%) *Brachiaria* (10.8 & 5.1%) , Rhodes (12.8% & 8.1%) and Natural grass and legumes (12.8% & 10.8%) are the most promising forage crop in these 2 systems.

Figure 2.12. Intensive farming systems (Q7.1).

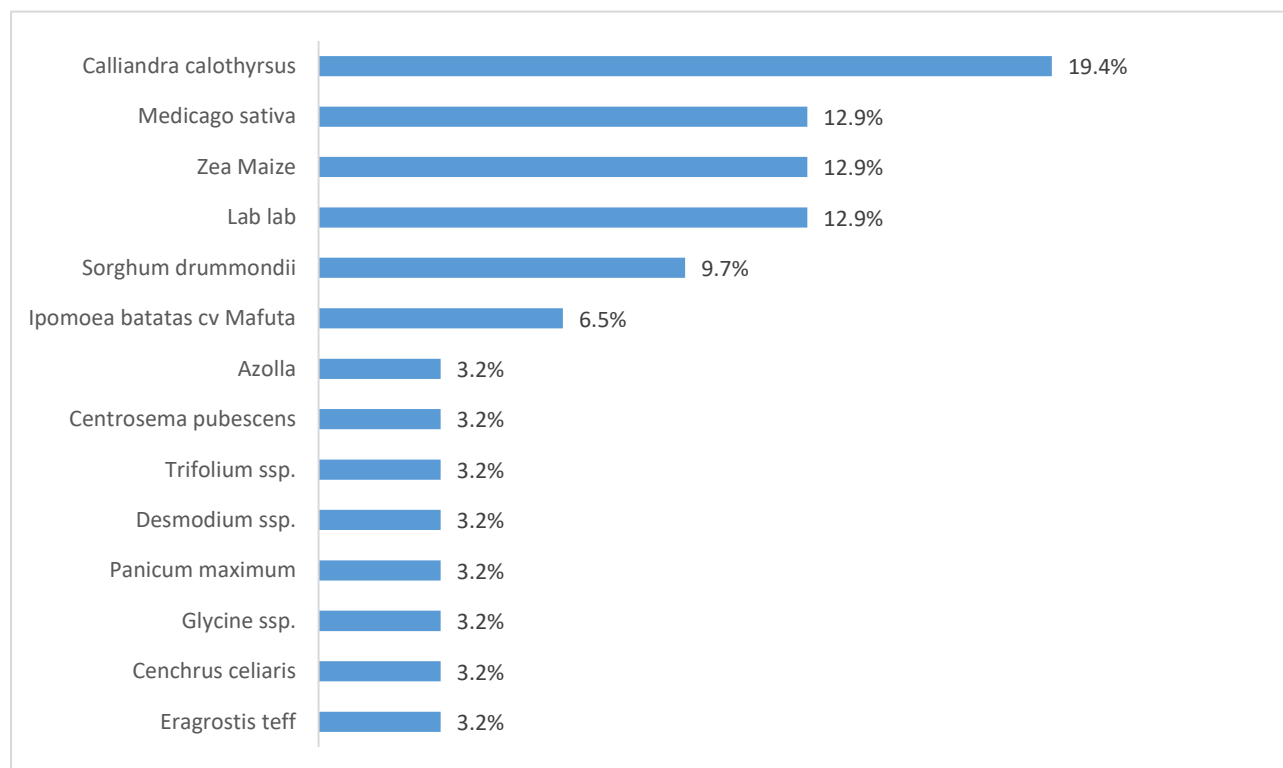


Figure 2.13. Semi-intensive farming systems (Q7.2).

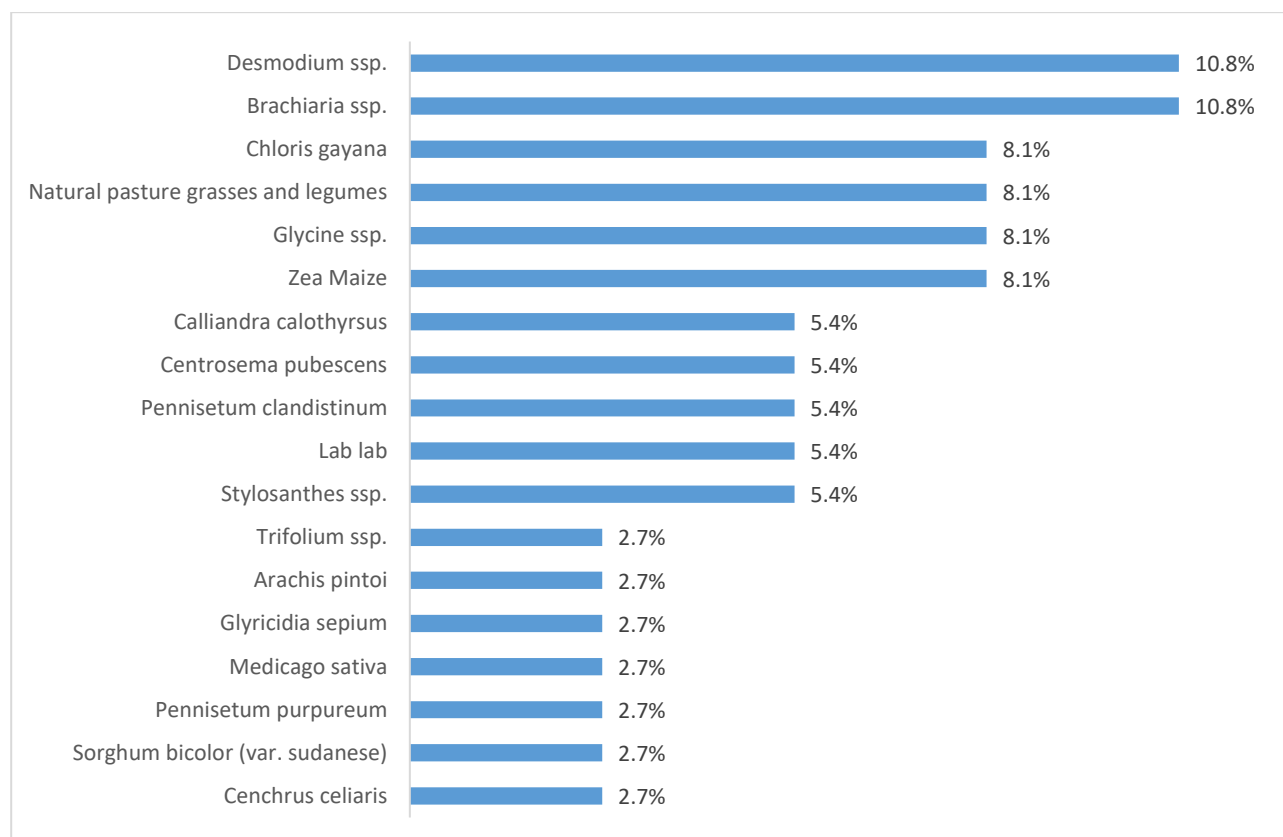


Figure 2.14. Extensive farming systems (Q7.3).

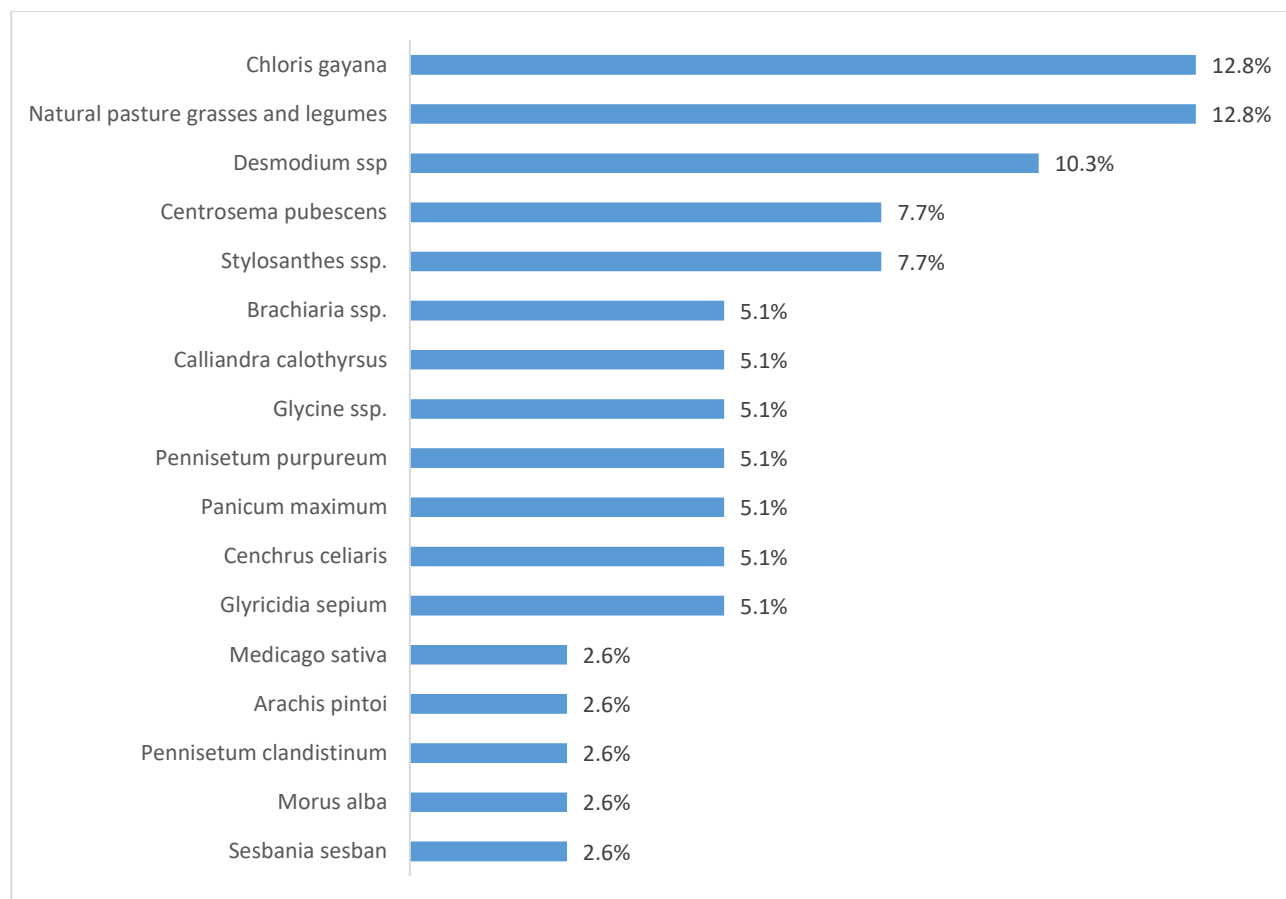


Figure 2.15. Overall of 3 farming systems (Q7.4).

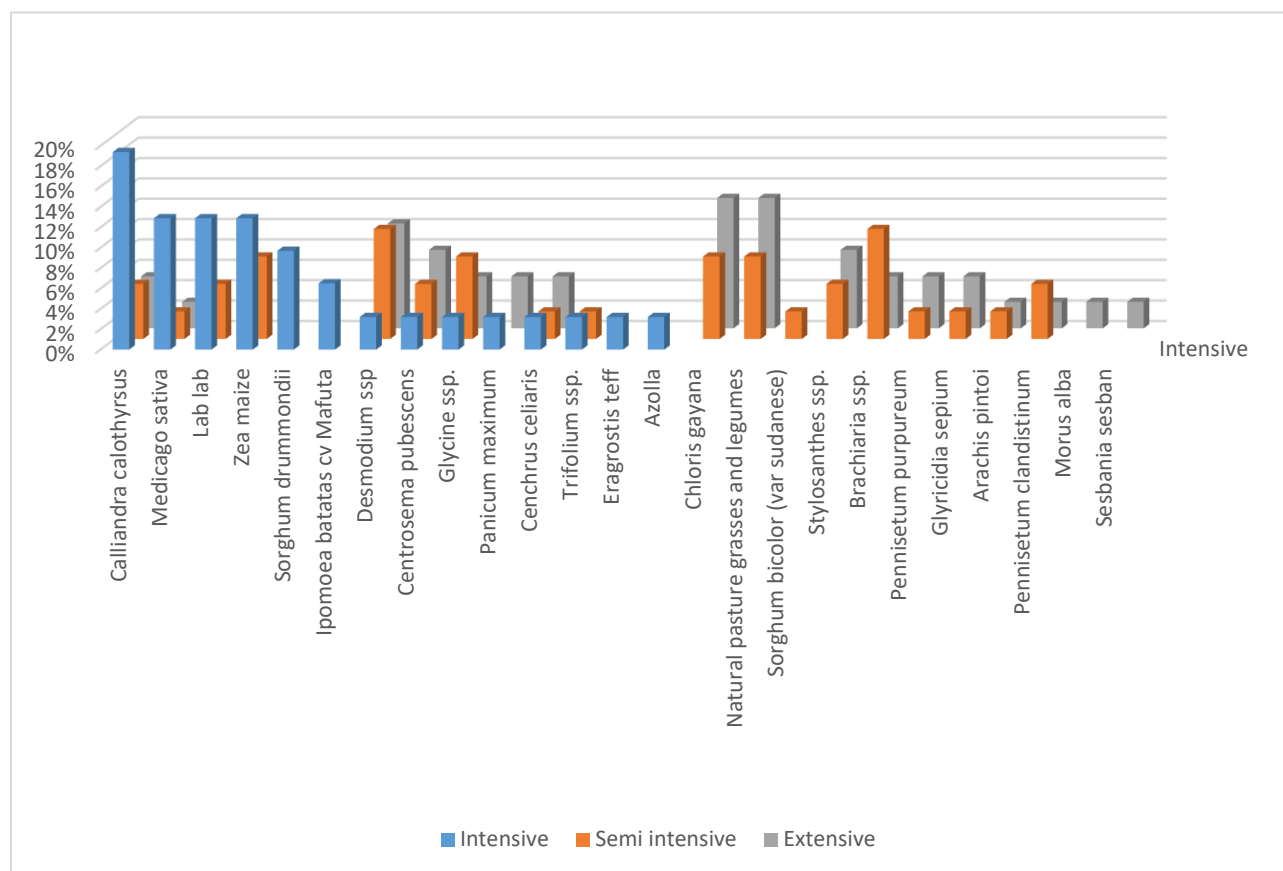
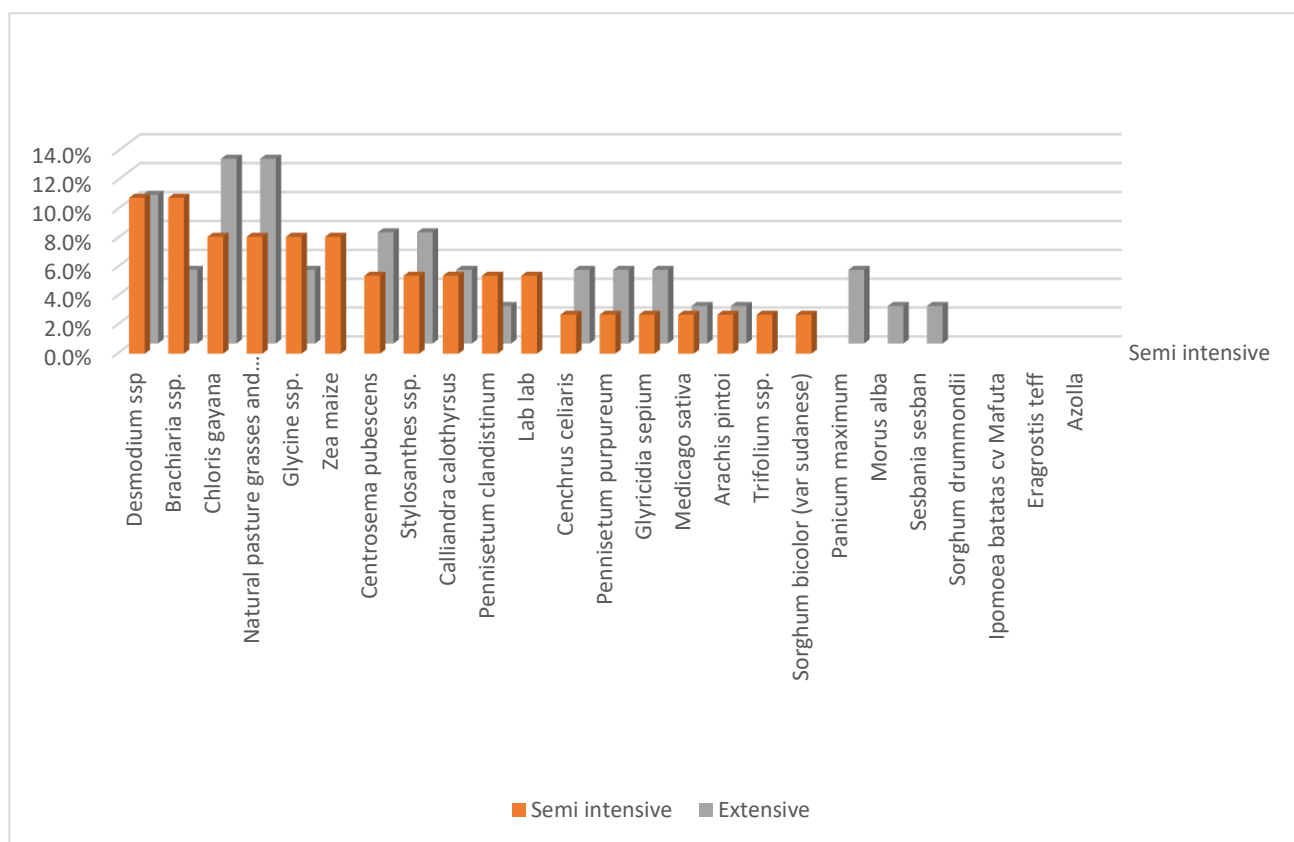


Figure 2.15. Overall of semi-intensive and extensive farming systems (Q7.4a).



5. Preservation of forage crops

Figure 5.1, 5.2, 5.3, 5.4. Question 8. “What are the three most common forage preservation methods used in the dairy farming systems and by commercial forage producers?”

The response to the question shows that, overall in the 3 farming systems and commercial fodder production, hay making is the most common way of forage preservation while ensiling is increasingly important in intensive (45%) and semi-intensive (39%). Standing hay is used in grazing systems as an intervention to overcome with periods of scarcity.

Figure 5.1. Intensive farming systems (Q8.1)

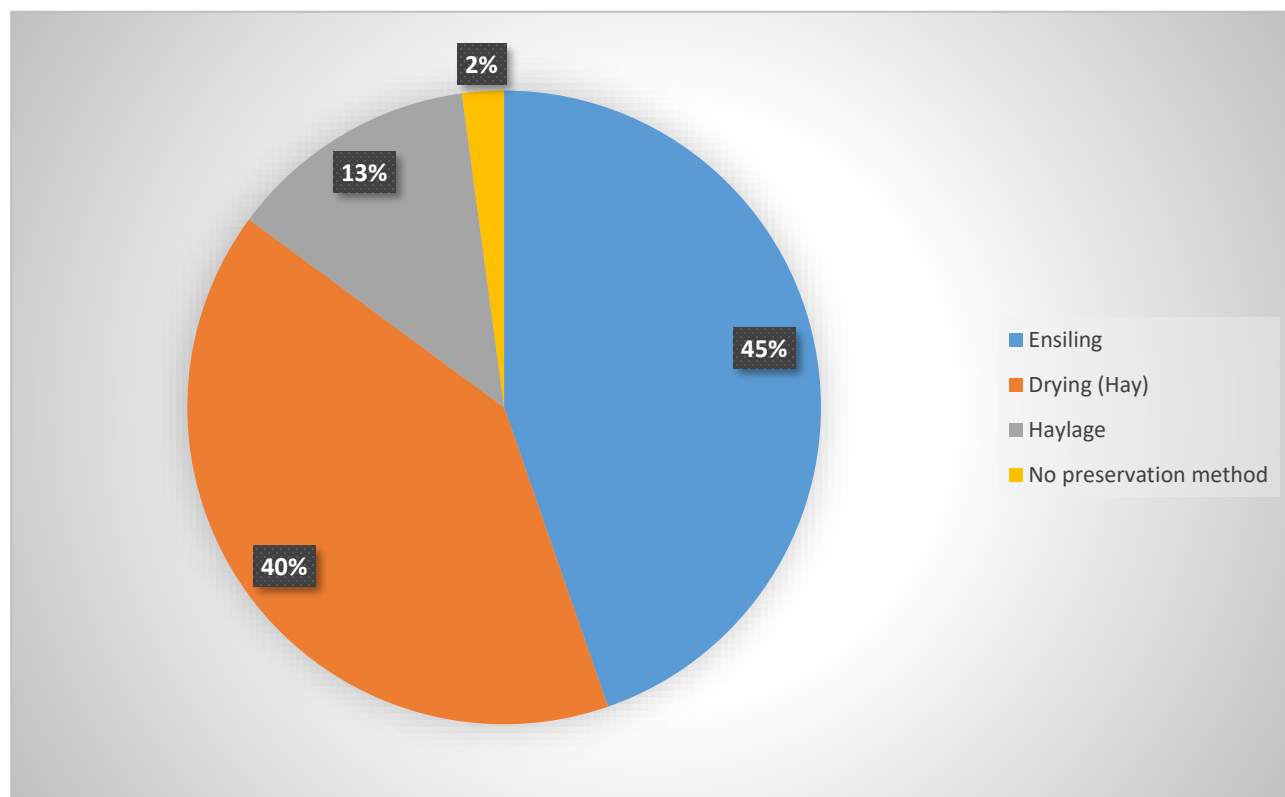


Figure 5.2. Semi-intensive farming systems (Q8.2)

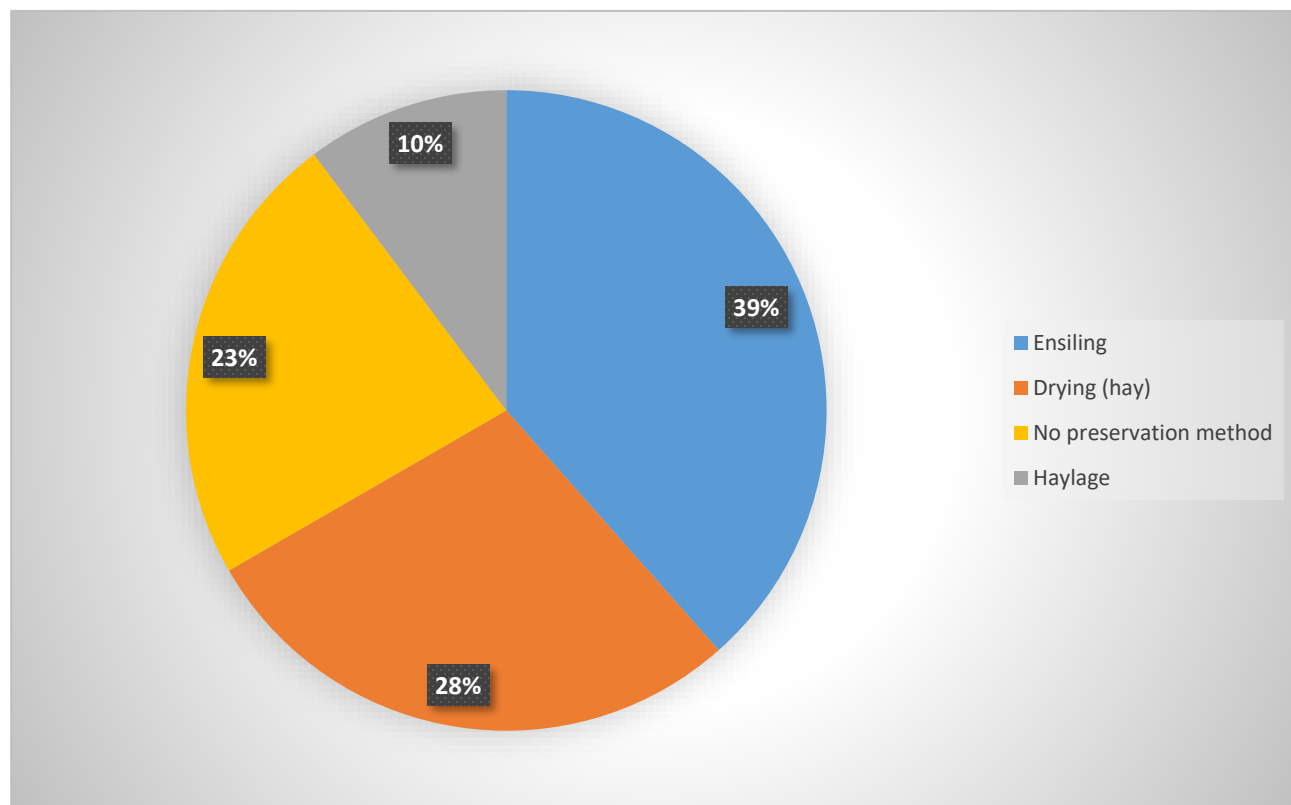


Figure 5.3. Extensive farming systems (Q8.3)

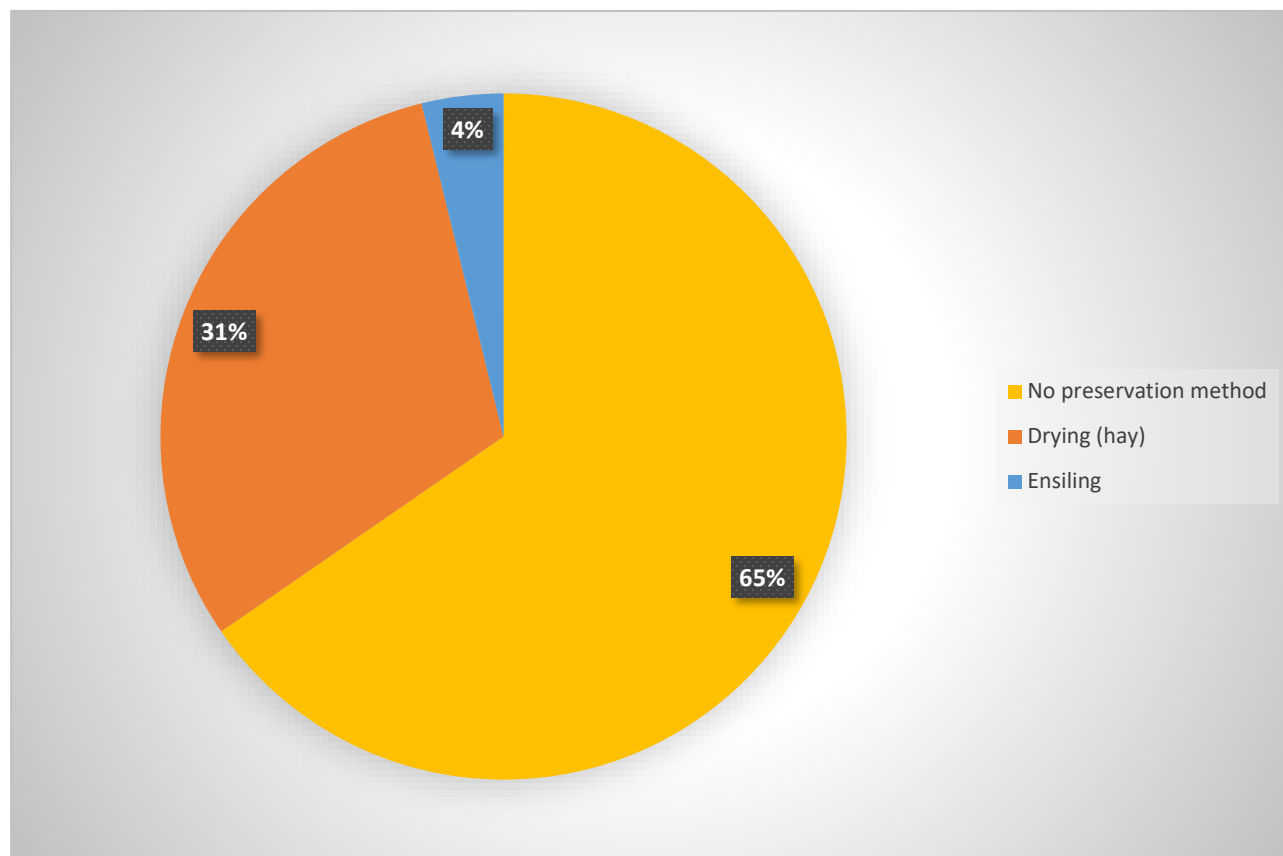


Figure 5.4. Commercial Forage Producers (Q8.4).

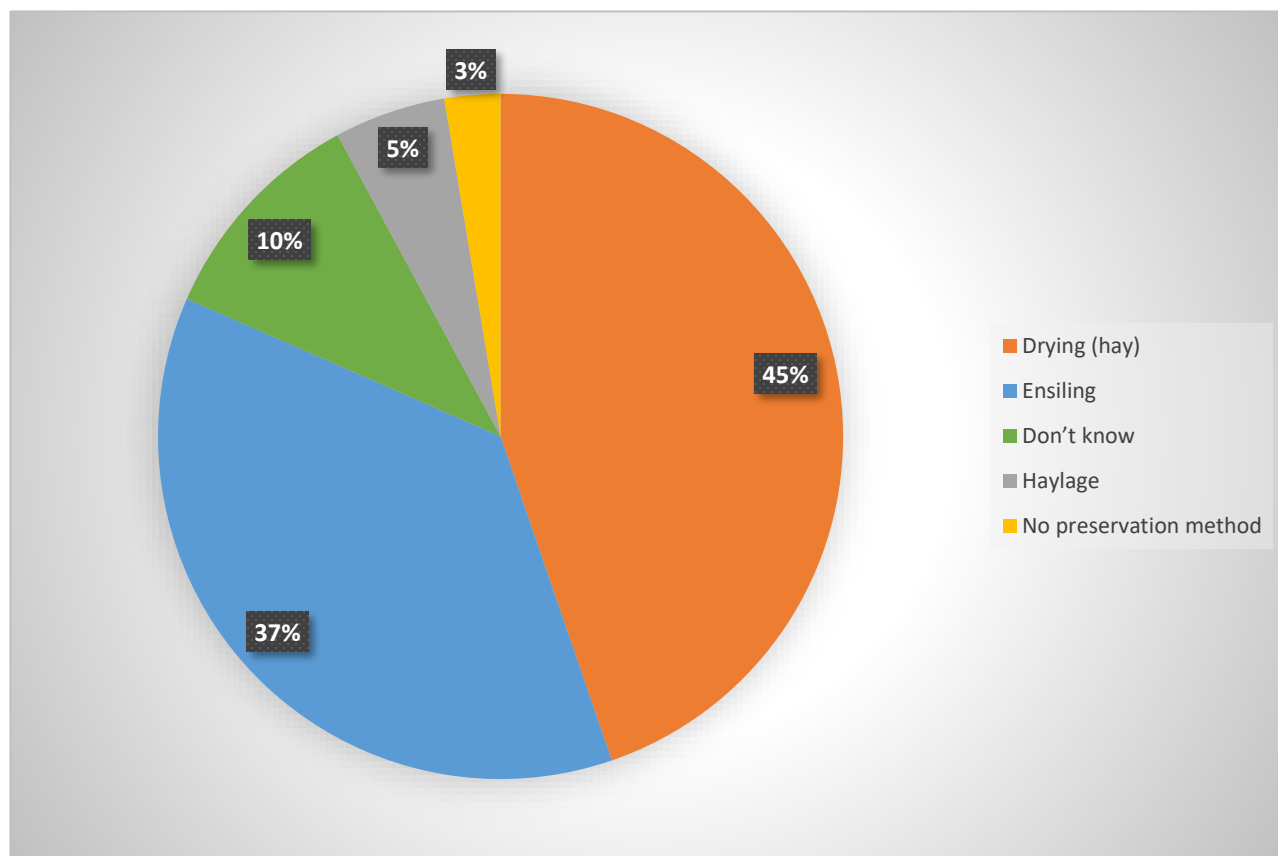


Figure 5.5. Question 9. “List at least three most common causes for post-harvest losses in the forage production and preservation chain?”

According to the respondents poor storage of hay (dry place) and silage bunkers (21%), lack of good agricultural practices during crop production causes major post-harvest losses (20%) and fermentation (16%) (Anaerobic conditions for silage) are the other important causes of losses (Fig. 5.5).

Figure 5.5. Question 9. “List at least three most common causes for post-harvest losses in the forage production and preservation chain?”

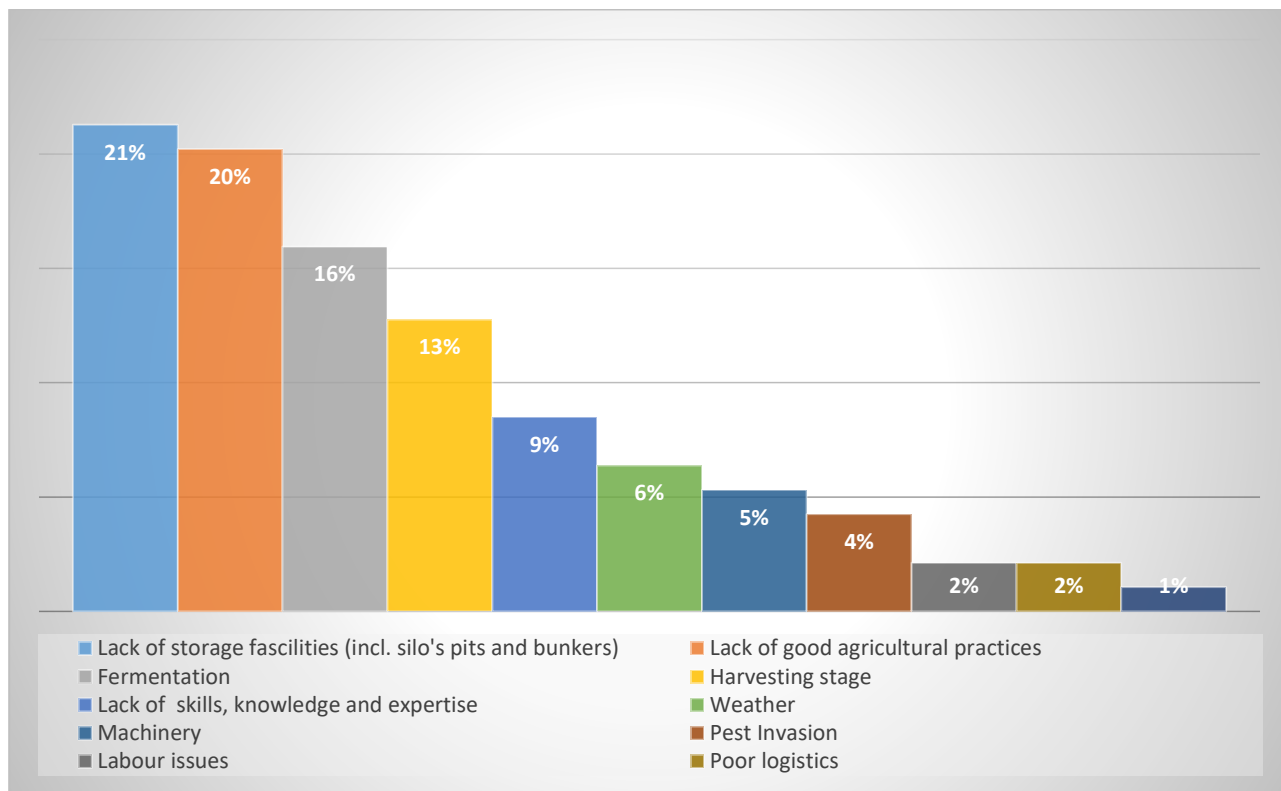


Figure 5.6. Question 10. “What farming practices can dairy farmers adopt to prevent or reduce harvest and post harvesting losses?”

The respondents rated right harvesting stage (26%), applying good practices during crop management (24%) and better storage (21%) as the key factors to reduce post-harvest losses (Figure 5.6).

Figure 5.6. Question 10. “What farming practices can dairy farmers adopt to prevent or reduce harvest and post harvesting losses?”

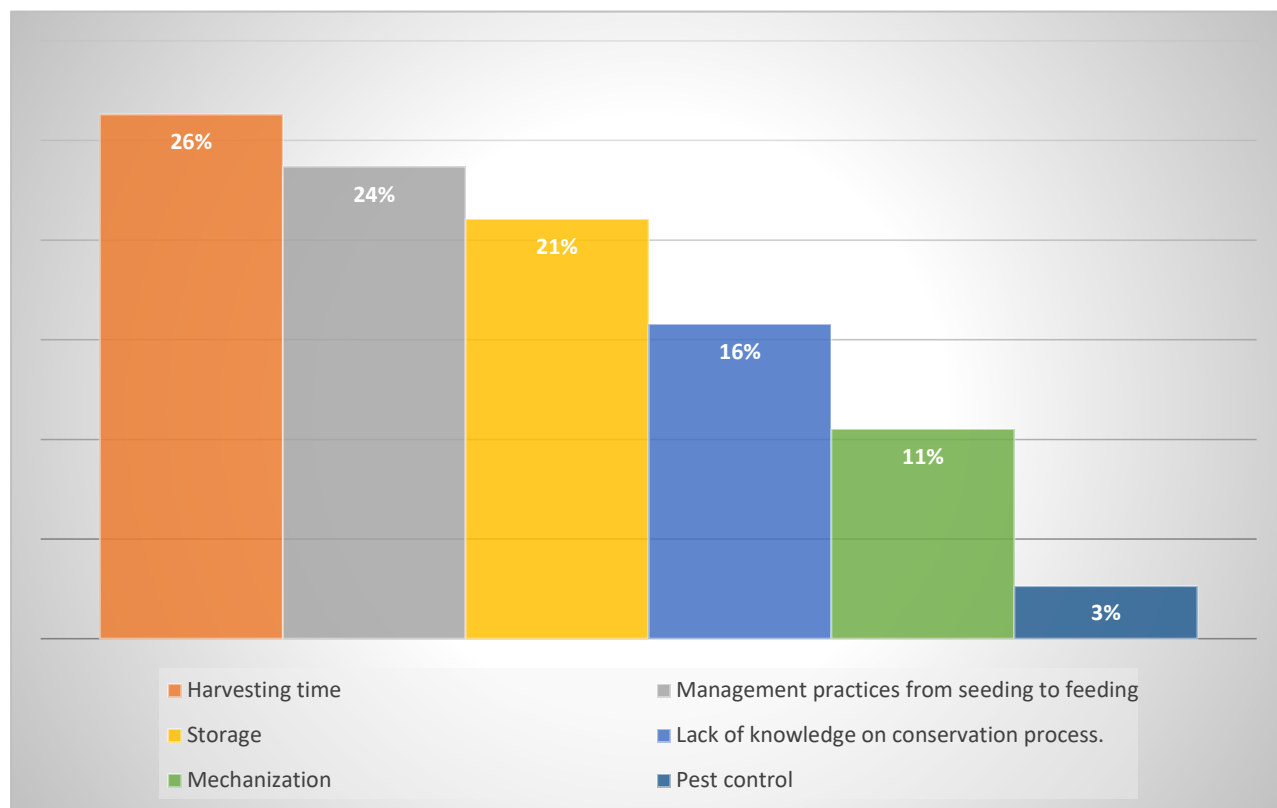


Figure 5.7, 5.8, 5.9, 5.10. Question 11. “Which other conservation methods or technologies do you think could be introduced in the current dairy farming systems?”

Silage making is particularly seen as a potential method to improve intensive farming systems (44%). For more extensive farming systems, grass management is an important option (55)% for extensive farming systems and (18%) for semi-intensive farming systems. For commercial forage producers, silage making (50%) and hay (30%) are the preferred options (Fig. 5.7-5.10).

Figure 5.7. Intensive farming systems (Q11.1).

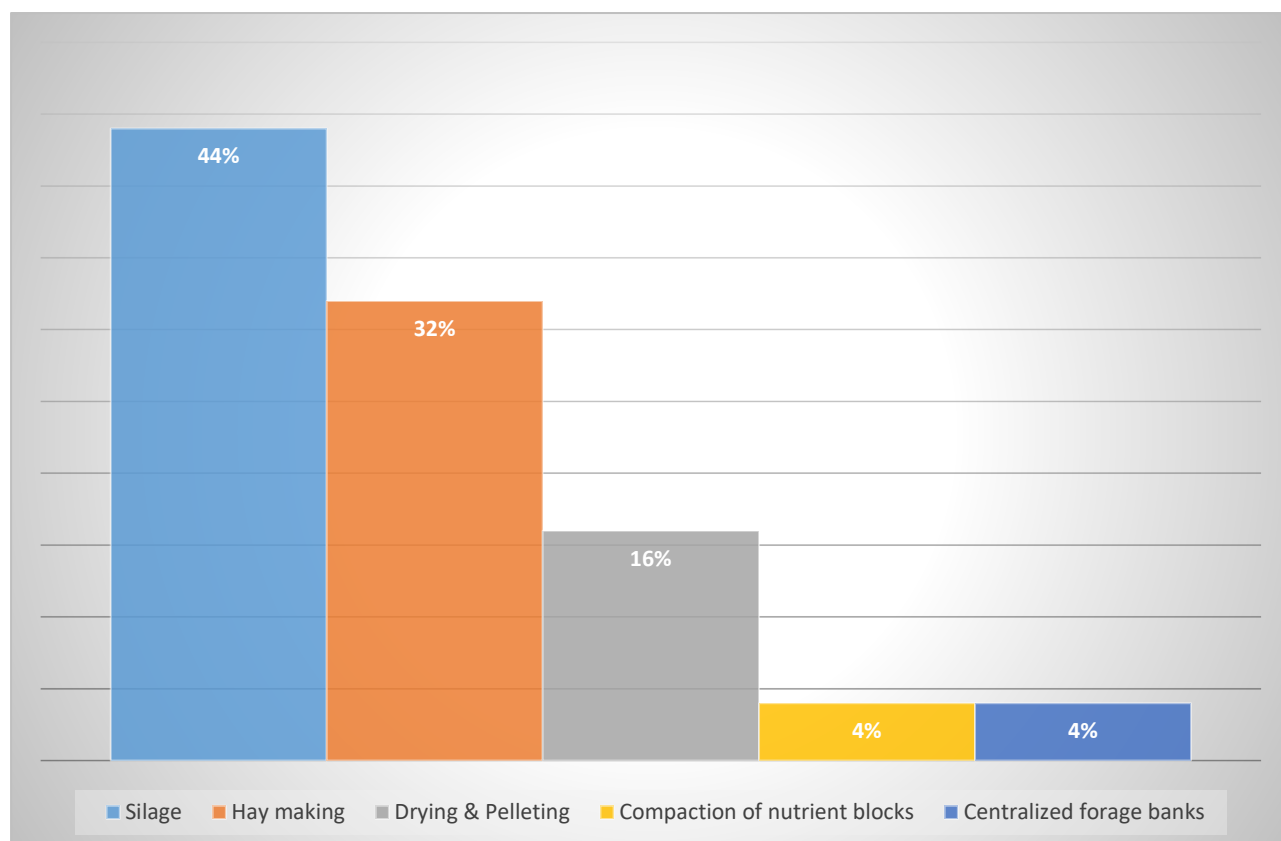


Figure 5.8. Semi-intensive farming systems (Q11.2).

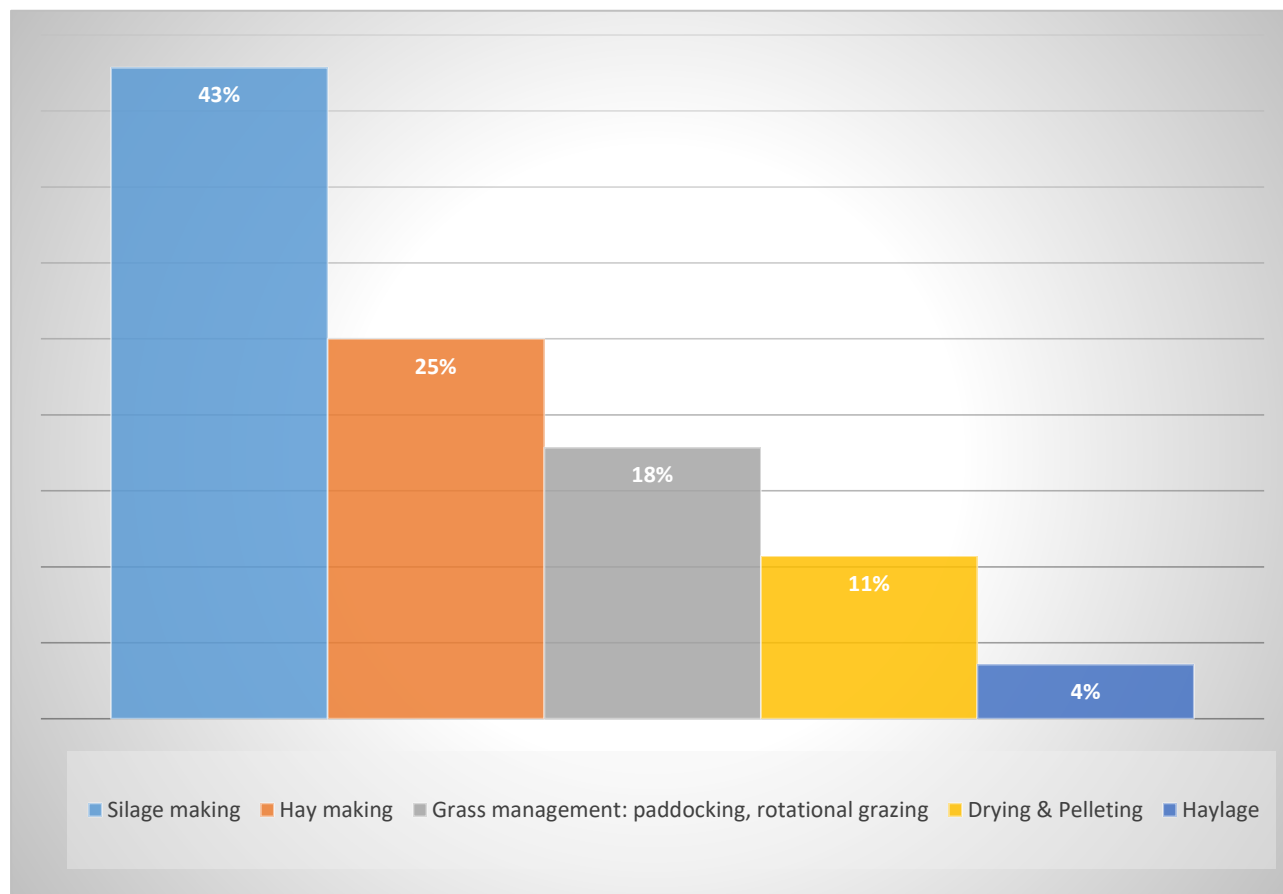


Figure 5.9. Extensive farming systems (Q11.3).

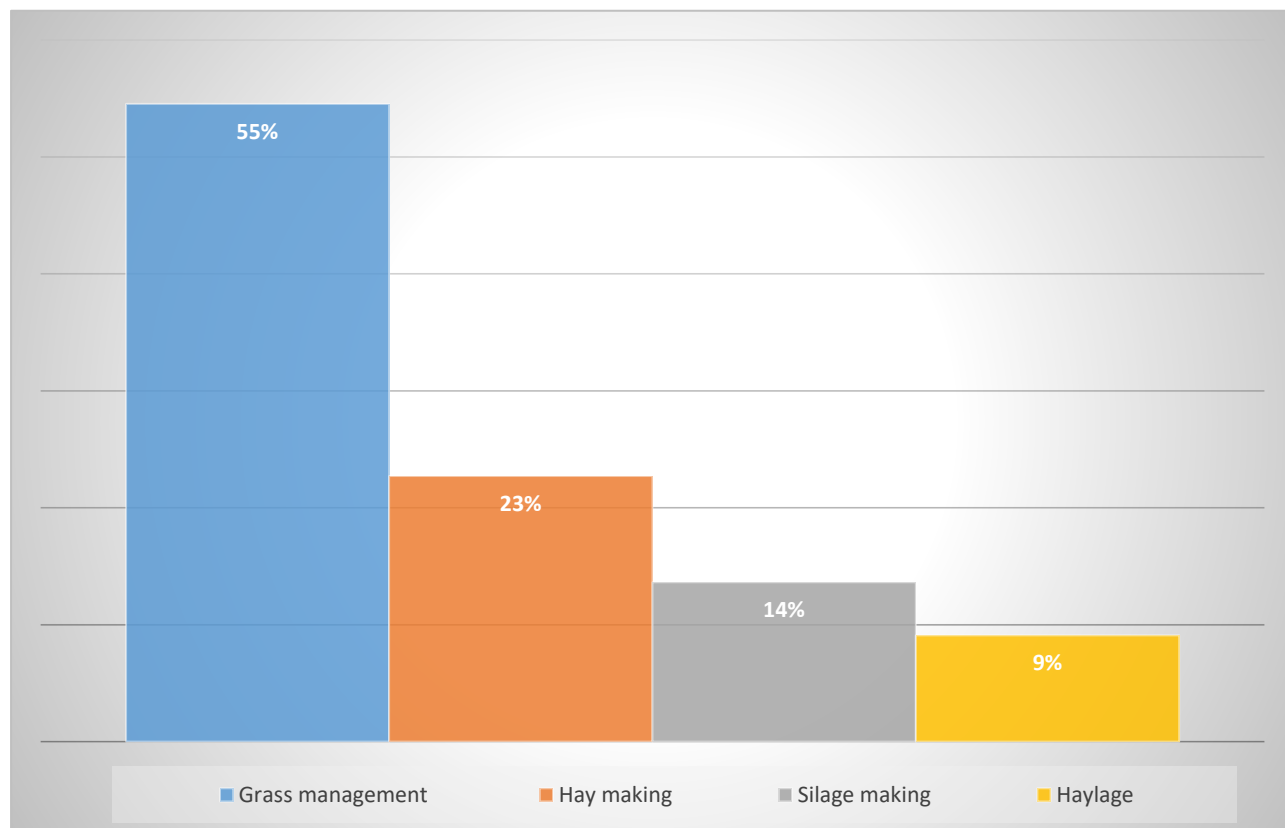


Figure 5.10. Commercial Forage Producers (Q11.4).

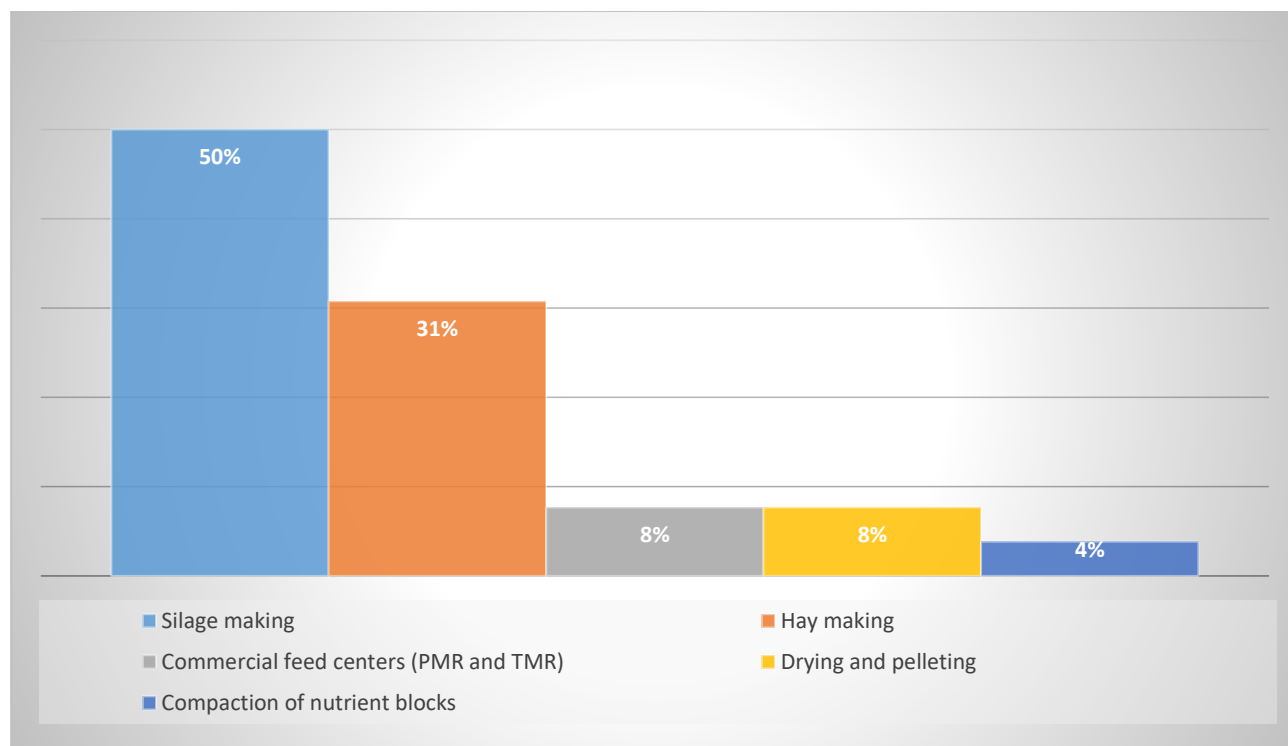


Figure 5.11a, 5.11b, 5.12a, 5.12b, 5.13a, 5.13b. Question 12. “Which forage crops and preservation technologies are best suited to reduce the problem of seasonality?”

In intensive farming systems, Napier, maize and Brachiaria are the preferred forage crops (29%, 26%, 13%). Silage making is the preferred preservation method (67%) and hay coming second (28%). Hay is the preferred option for Rhodes grass and other natural pasture grasses incl. legumes. In semi-intensive grazing systems, Napier, Rhodes, legumes and maize (23%, 17%, 14%, 14%) are the preferred forage crops. Silage making is also here the preferred way of preservation 52% and hay (43%). In extensive systems Rhodes grass, Brachiaria and mixed pastures (23%, 14%, 14%) are the preferred forage crops. Haymaking (29%), Rotational grazing (24%) and standing hay (23%) ways to manage seasonality

Figure 5.11a. Intensive farming systems (Q12.1)

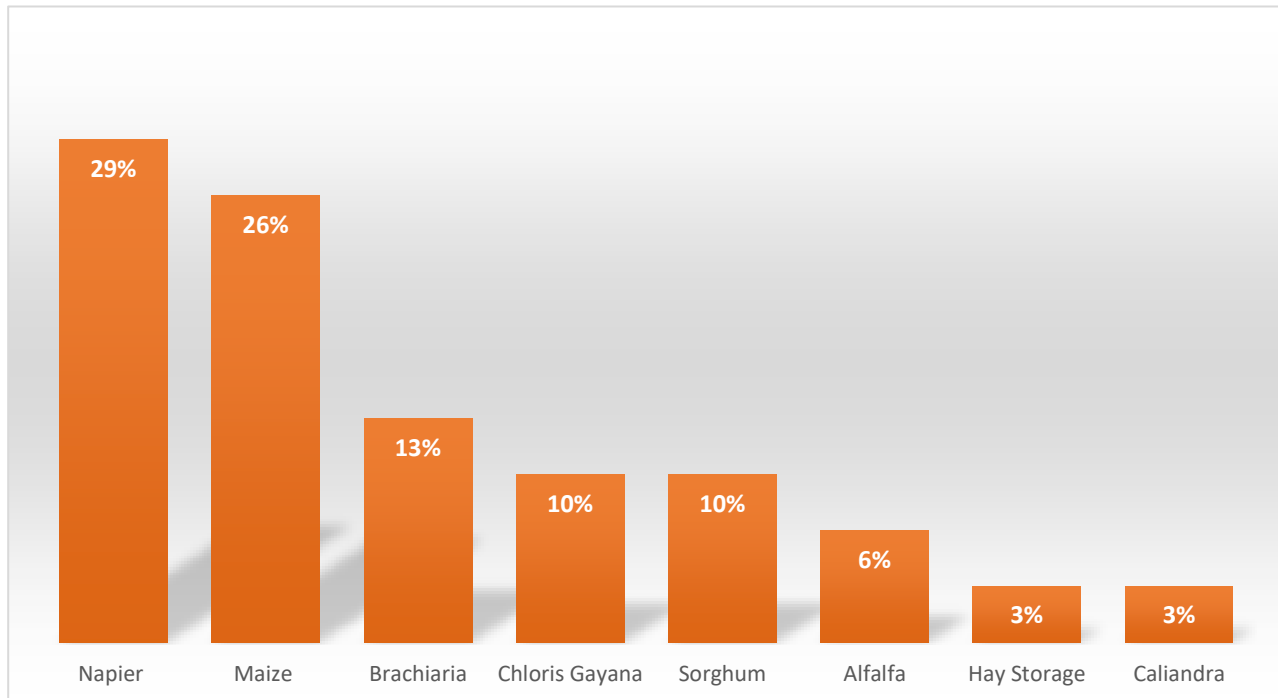


Figure 5.11b. Intensive farming systems (Q12.1)

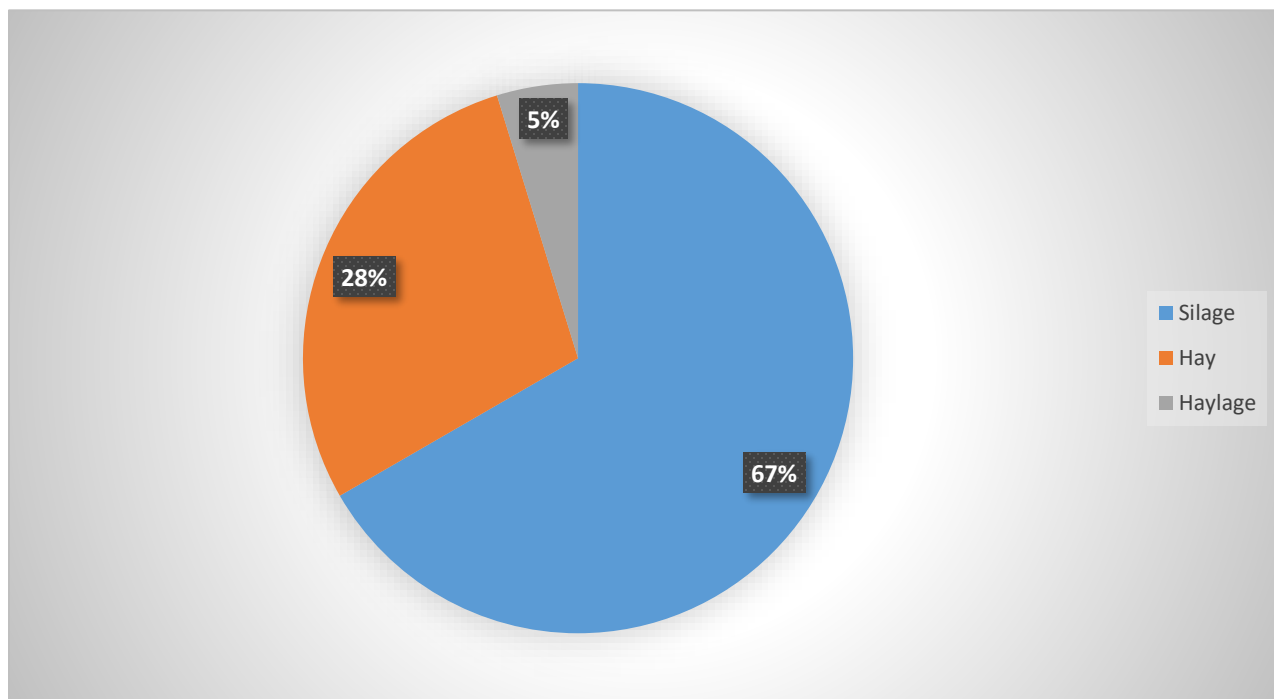


Figure 5.12a. Semi-intensive farming systems (Q12.2).

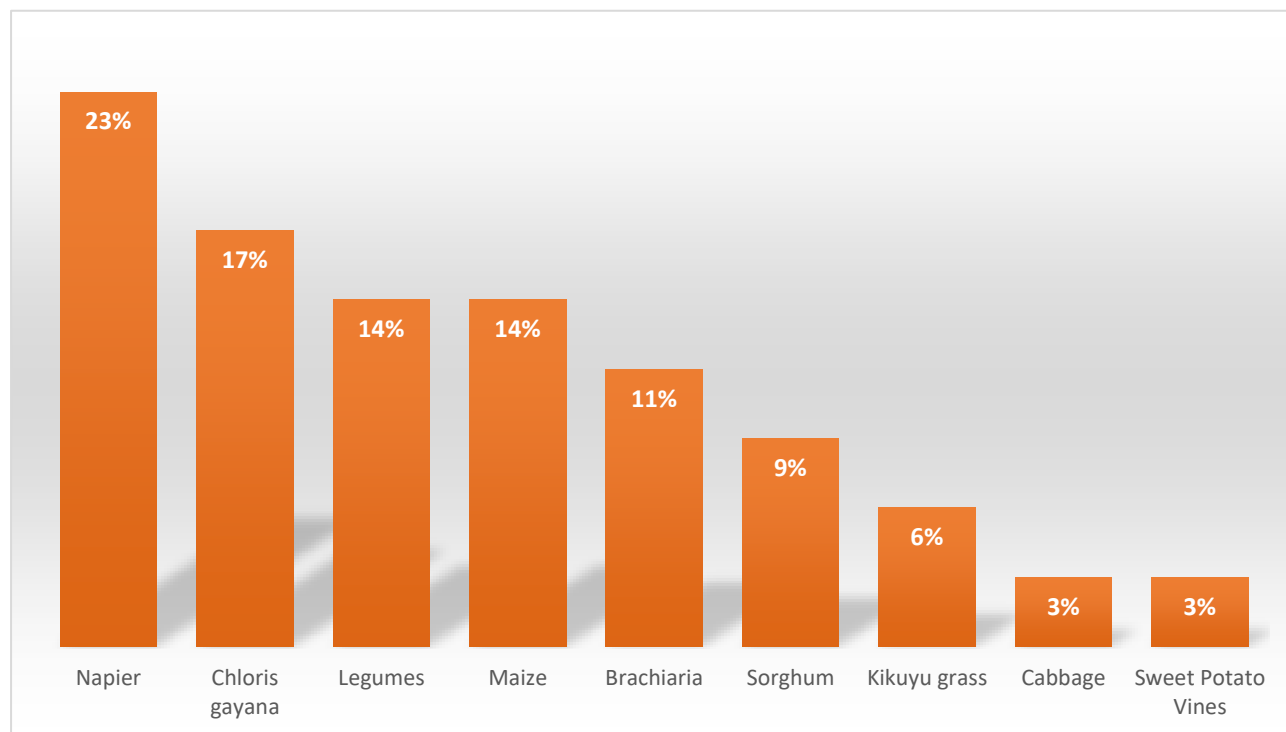


Figure 5.12b. Semi intensive farming systems (Q12.2).

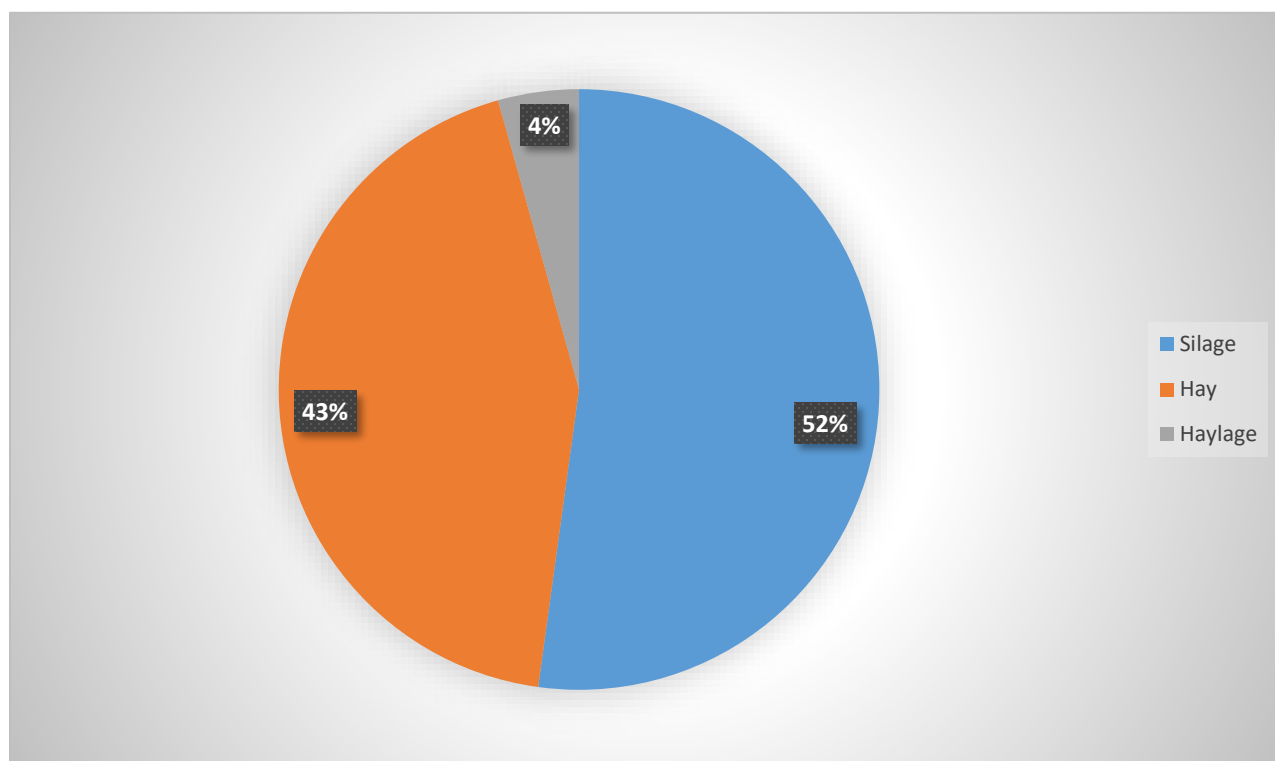


Figure 5.13a. Extensive farming systems (Q12.3).

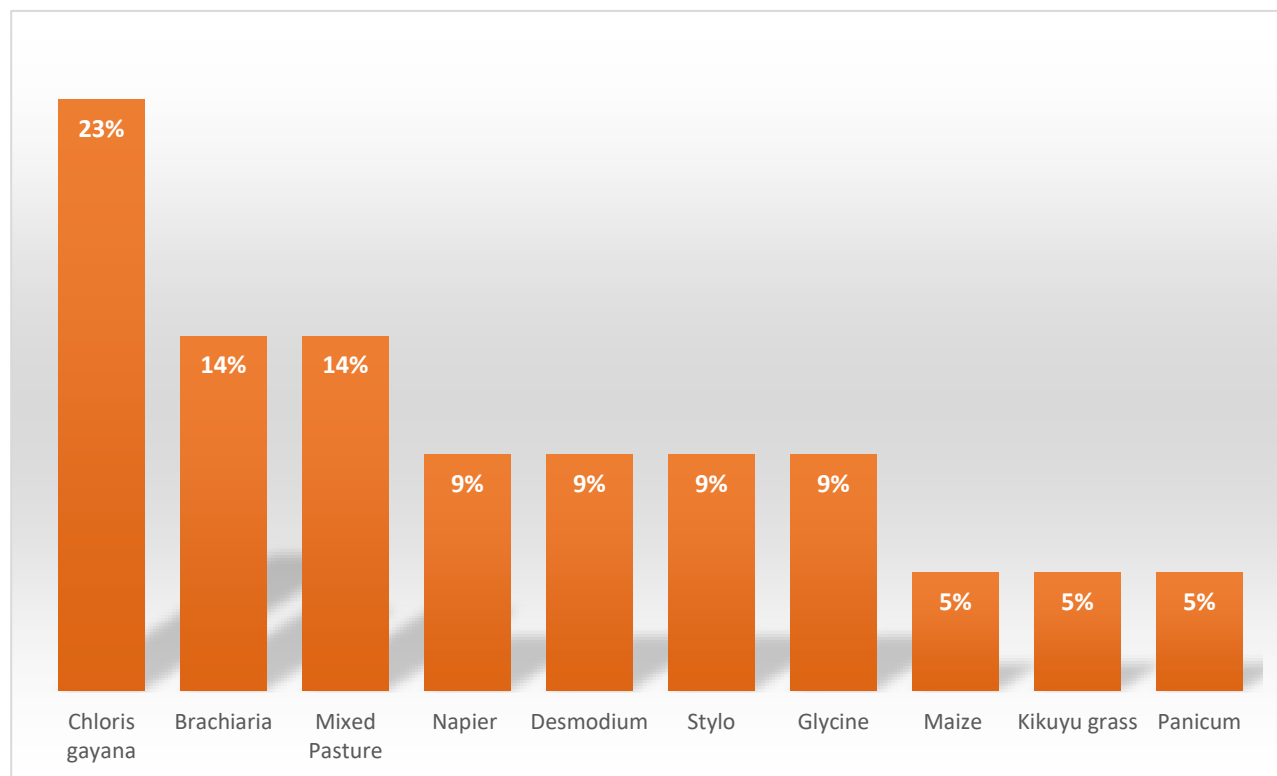


Figure 5.13b. Extensive farming systems (Q12.3).

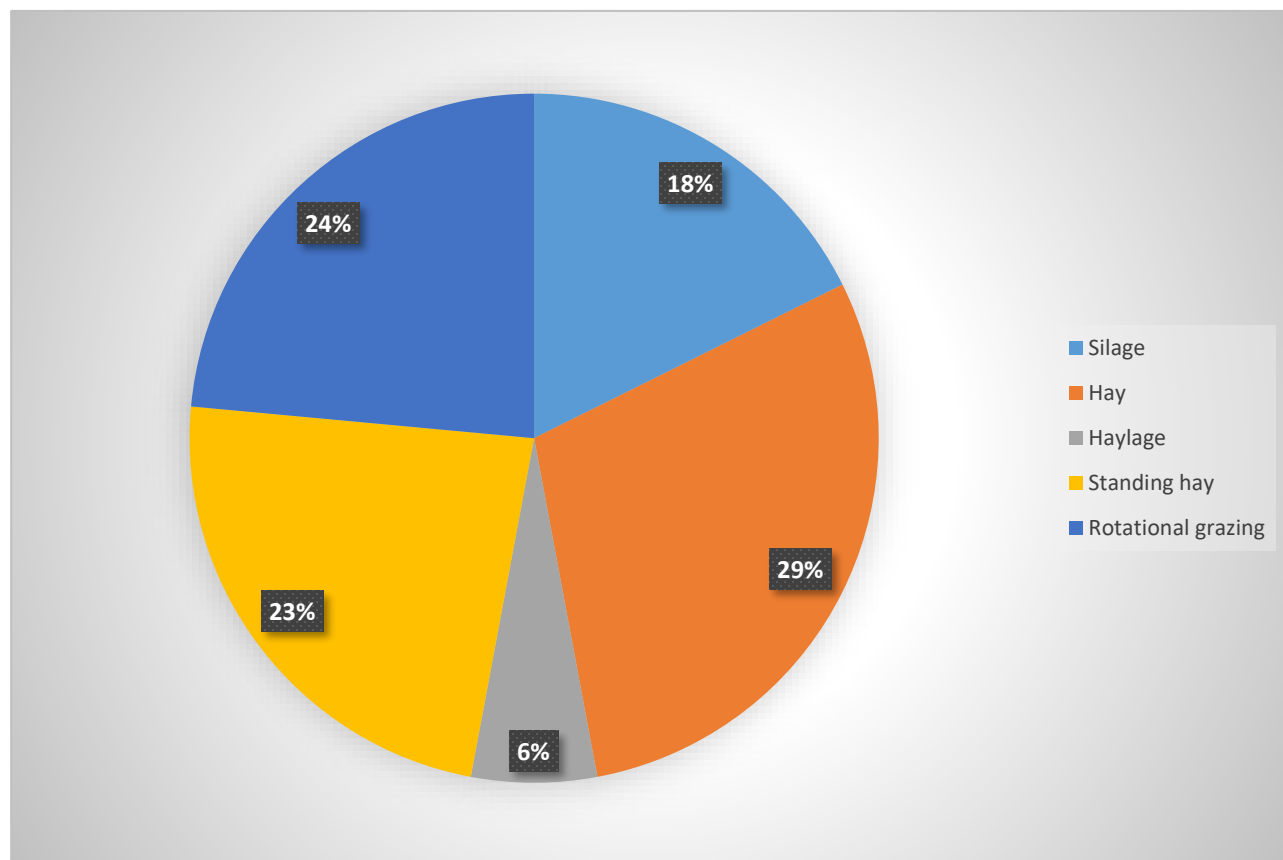


Figure 5.14. Question 13.” Where do you think commercial forage production will be developed in the future?”

The respondents indicated that forage production is likely to develop in South-Western and Mid-Western parts of Uganda (15.7%) and Central (8.7%). The Northern and Eastern regions were less favored for forage crops (7.0%). In the urban and peri urban areas, commercial forage production is not expected to develop in the future due to the land pressure in these areas (Figure 5.14).

Figure 5.14. Future development of commercial fodder production (Q13).

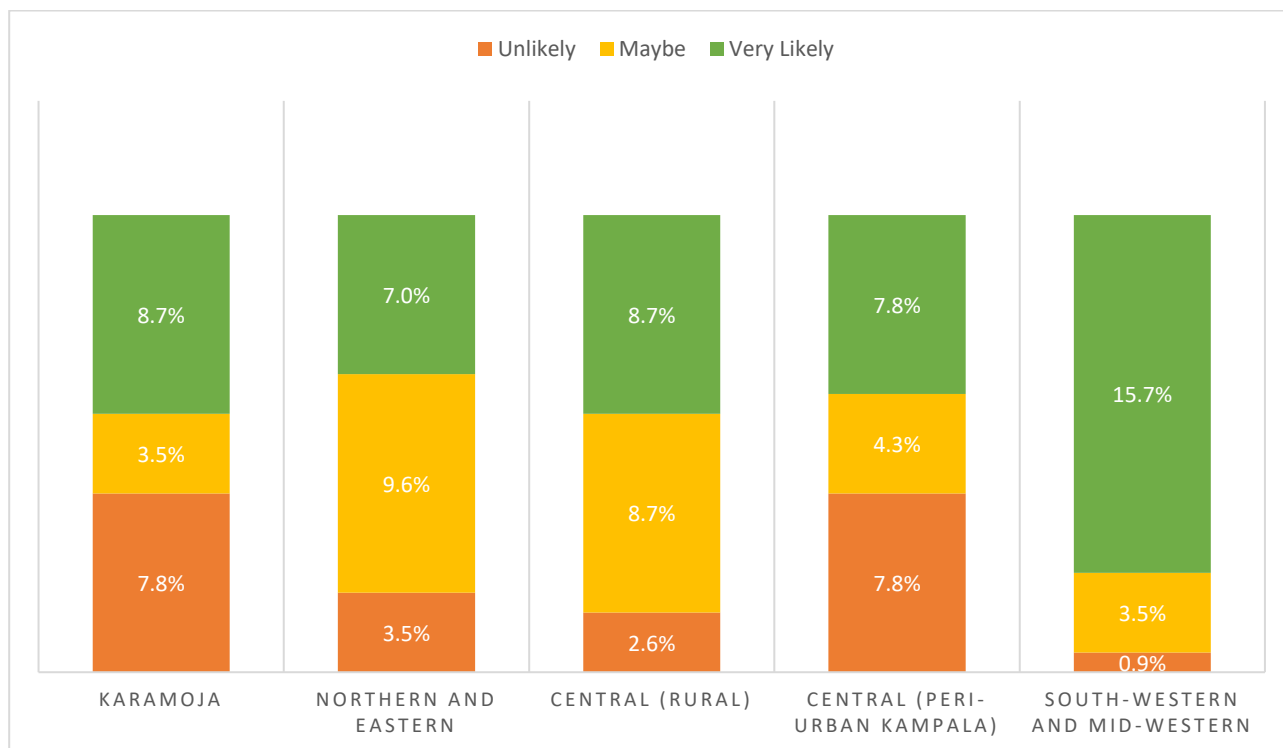


Figure 5.15. Question 14. “Where do you think commercial milk production will be developed in the future?”

The respondents indicated that in 3 areas, South Western and Mid Western, Central and Peri-Urban Kampala (16.5%, 13.0% and 9.6%), commercial milk production will continue to grow or develop in the future.

Figure 5.15. Future development of commercial milk production (Q14)

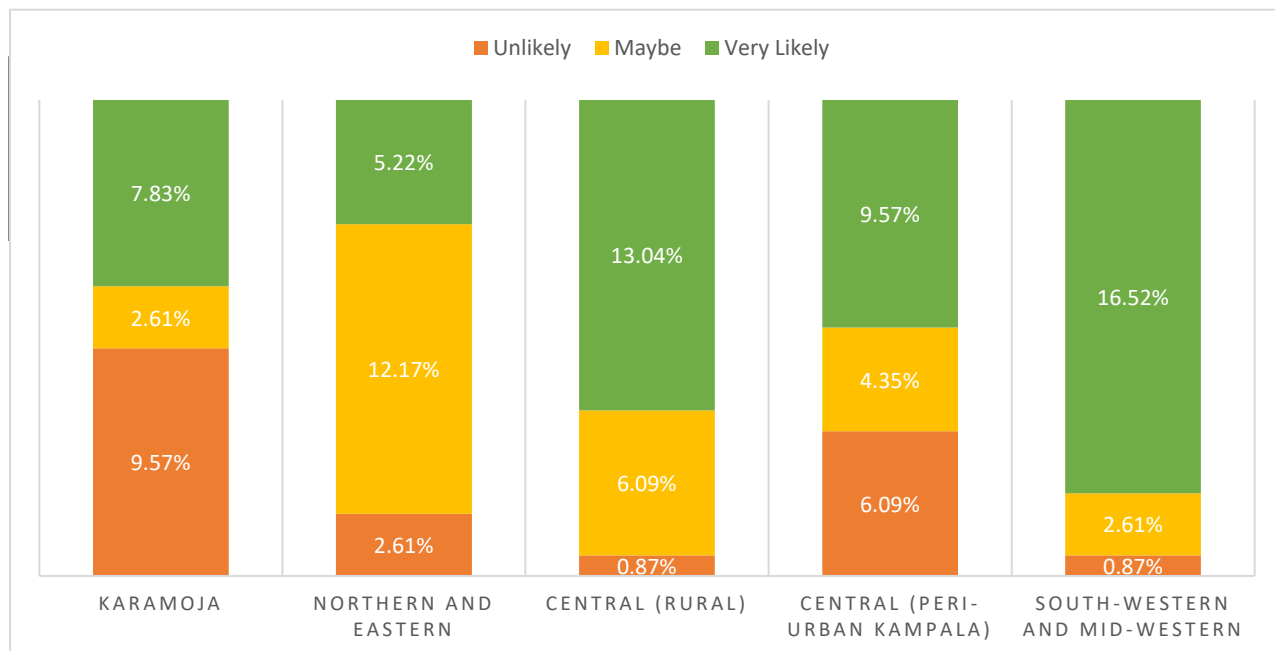
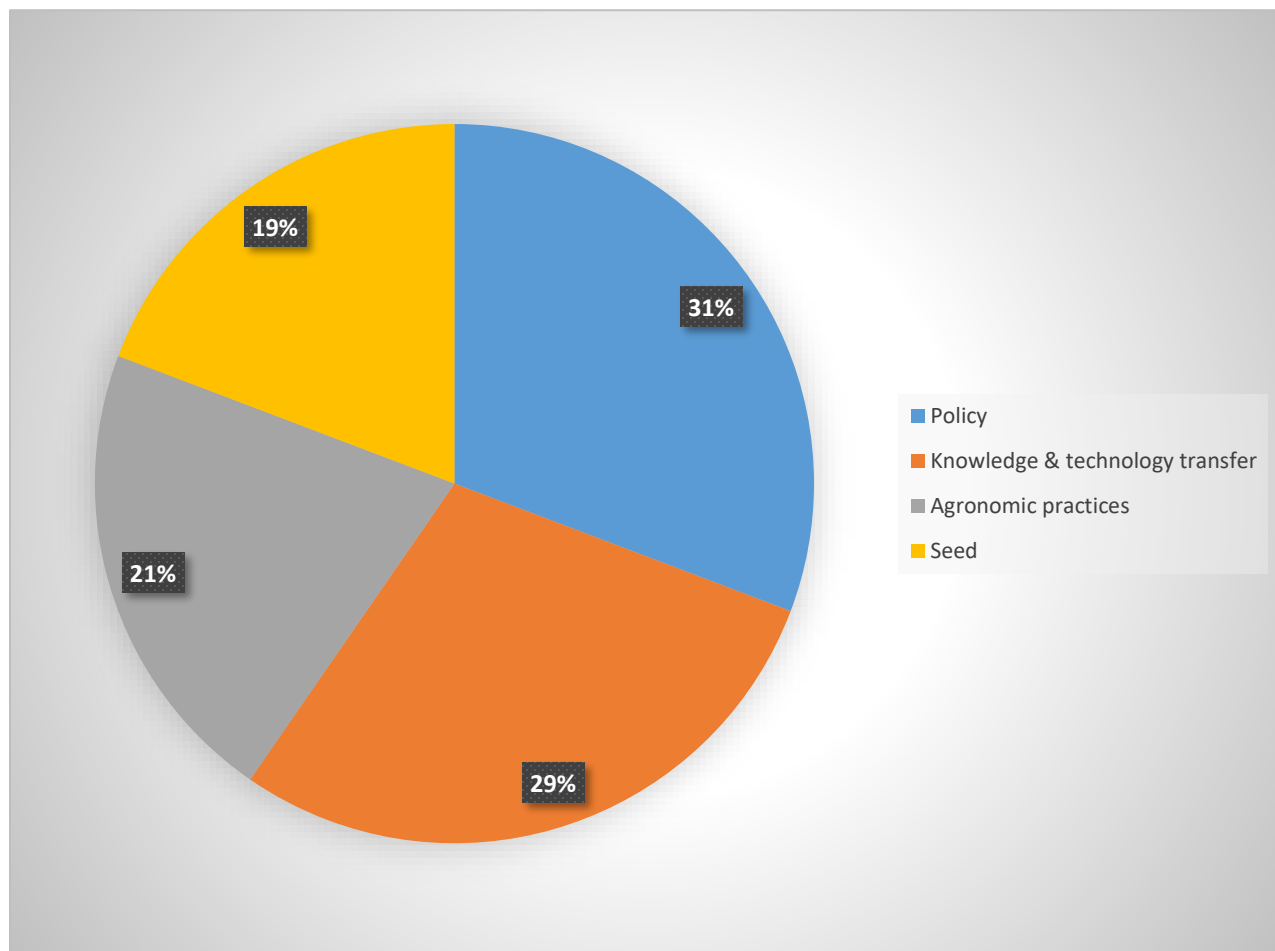


Figure 5.16. Question 15. "Which measures need to be taken to improve the quality of forages?"

The respondents indicated that measures need to be taken at policy level (31%), knowledge and technology transfer (29%), agronomic practices (21%) and forage seed 19 (%) Fig 5.16

Figure 5.16. Which measures need to be taken to improve the quality of forages (Q15)



6. Seeds, planting material and fertilizer use.

Figure 6.1. Question 16. “In your opinion, what is the availability of the listed seeds/plant material in the market? ”

The respondents of the questionnaire have a general low opinion about the availability of forage seeds varieties. The planting material/seeds most easily accessible are Napier grass (planting material), maize, Brachiaria, and Desmodium varieties. With Rhodes grass and Calliandra seeds being perceived as fairly (medium) available. Availability of forage crops seeds is low (64%), with less than 10% of the respondents mentioning forage crop seeds/planting material being easily available and accessible. (Figure 6.1).

Figure 6.1. In your opinion, what is the availability of the listed seeds/plant material in the market (Q16)

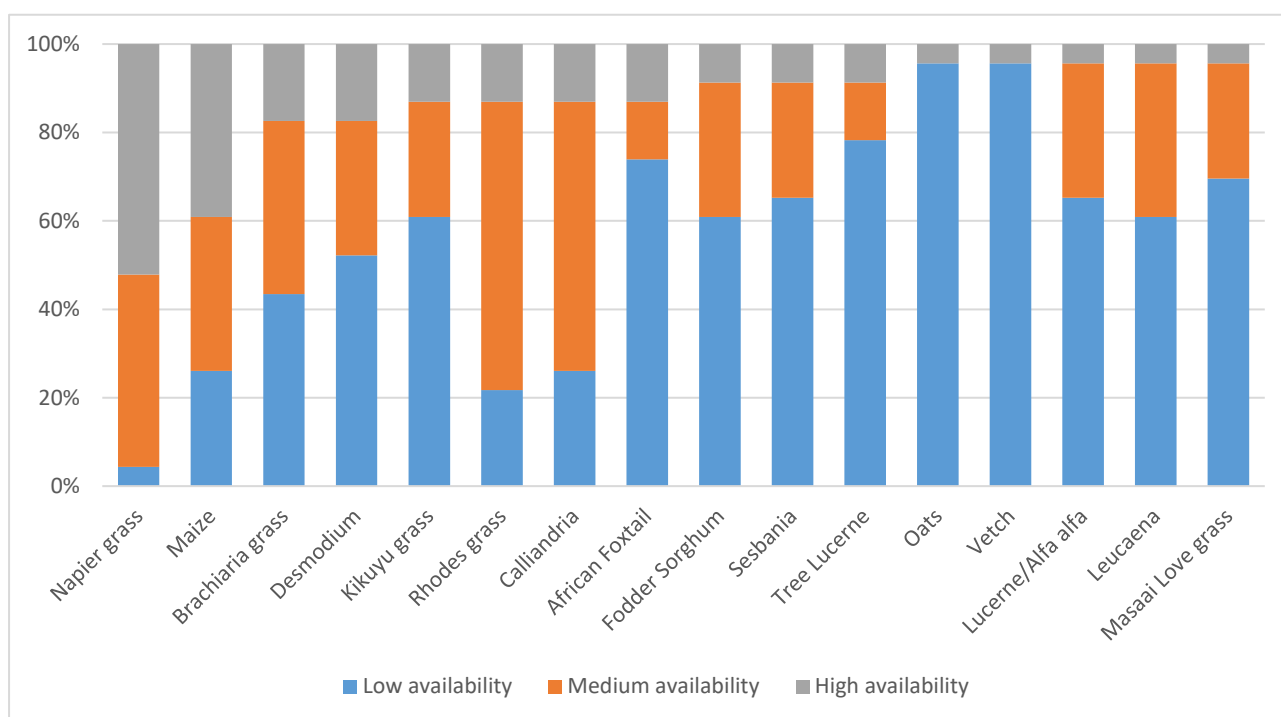


Figure 6.2. Question 17.” What are reasons for low availability of seeds in the market (incl. new varieties or species not yet registered in Uganda)?”

The reasons the respondents of the questionnaire gave for the low availability of seeds are (i) lack of knowledge and awareness of the farmer about the benefit of forage crops (31%), (ii) absence of seed production and multiplication companies in Uganda (25%), and (iii) high cost of improved forage seeds (13%) (Figure 6.2).

Figure 6.2. What are the reasons for low availability of seeds in the market (Q17)

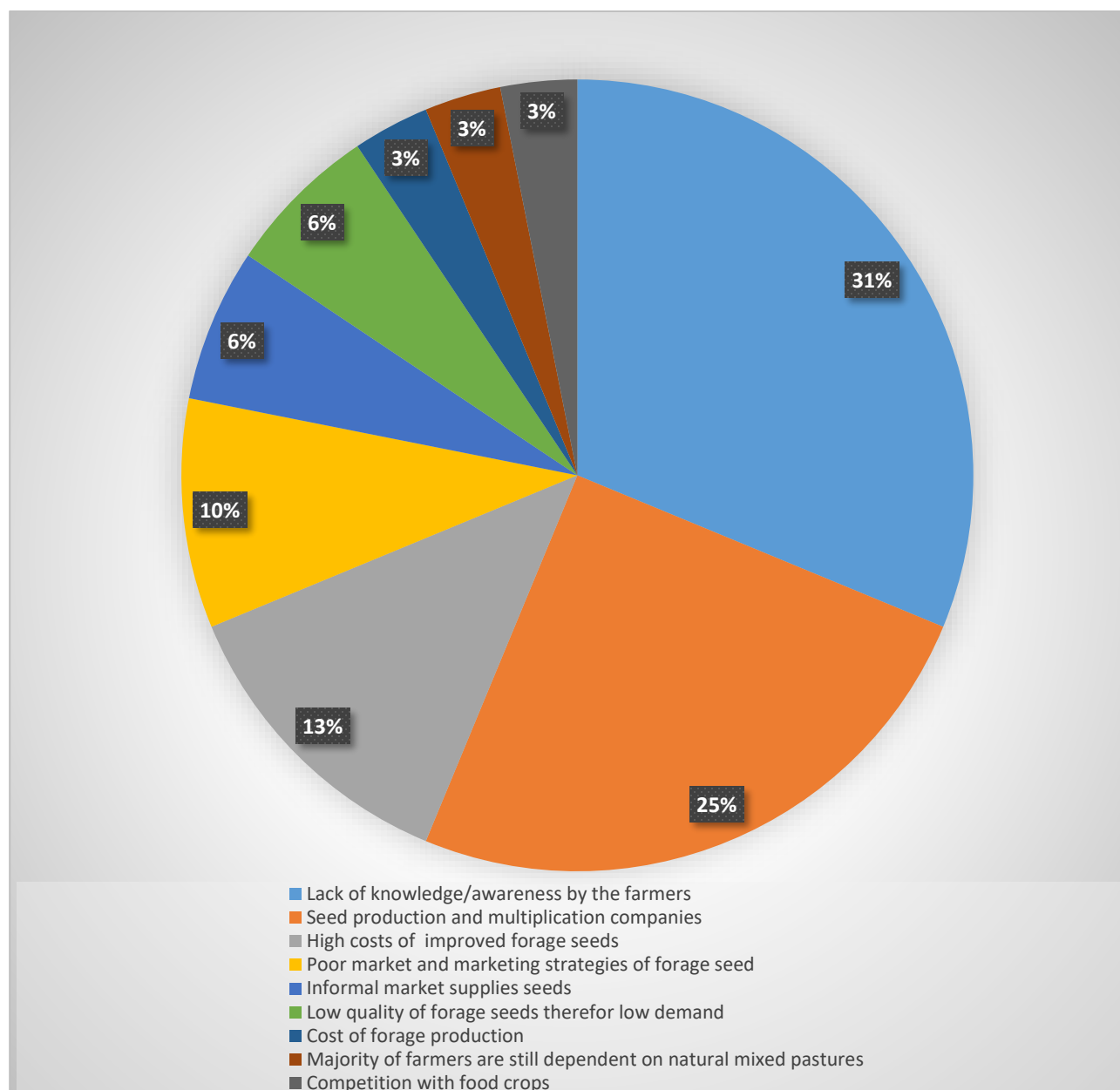


Figure 6.3. Question 18.” How would you increase the availability of seed/plant material?”

Based on the survey, the most needed action is (i) changing the government policies and regulations on forage seeds and planting material, e.g. simplify the importation, testing and registration processes (39%), (ii) encouragement of international seed producers to enter the Ugandan market with forage seeds (31%) and (iii) increase awareness and knowledge among farmers about the value of forage seeds and planting material (19%) (Figure 6.3).

Figure 6.3. How would you increase the availability of seed/plant material (Q18)

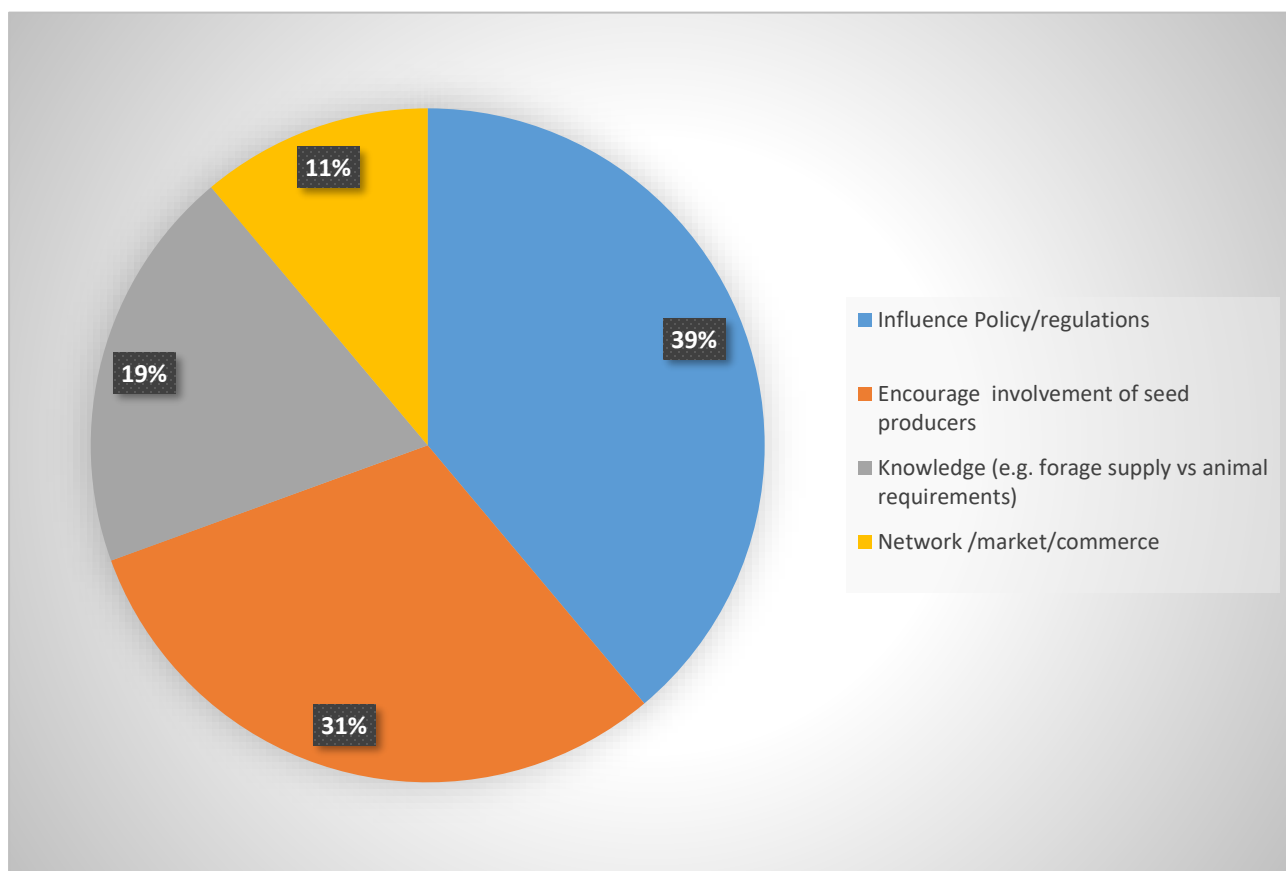


Figure 6.4, Question 19. “How would you engage dairy farmers to use improved forage seeds/plant material for planting?”

To encourage farmers to use the improved forage seeds in the future, respondents agreed that training of farmers in all farming systems (respectively 92%, 61%, 52%) will be necessary to reap the benefits of improved seeds/plant material (Figure 6.4).

Figure 6.4. How would you engage dairy farmers to use improved forage seeds/plant material for planting (Q19).

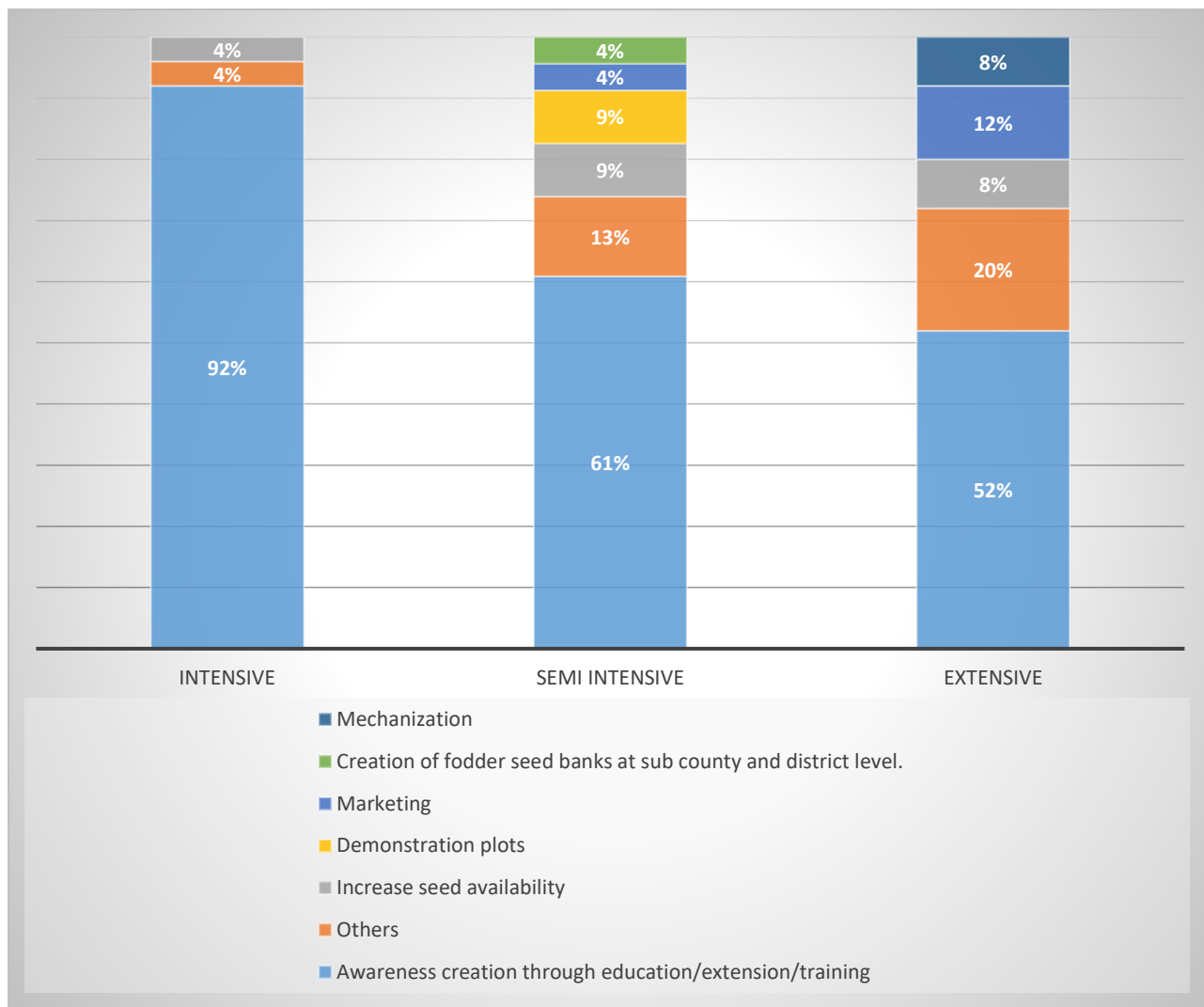
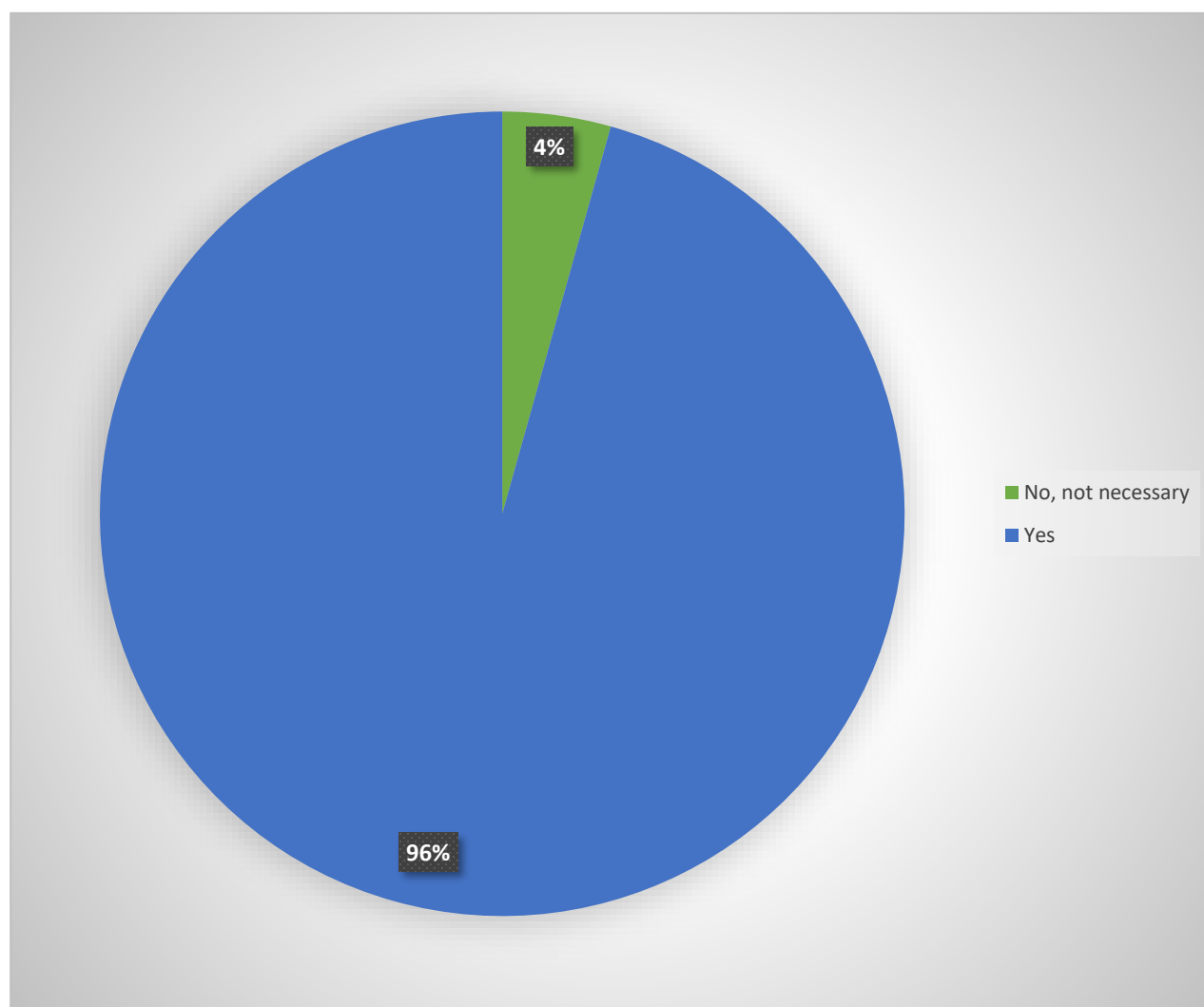


Figure 6.5, Question 20.” When improved forage seeds/plant material are available to benefit farmers, do farmers need to improve agricultural practices at the same time? If so list agricultural practices that are limiting quality forage production.”

The figure 6.5 shows 96% of all respondents answered that agricultural practices need to be improved for forage production. Respondents mentioned in general that agronomic practices needed to improve and more specific soil testing, soil and water conservation, land preparation, manure application, planting, weeding, fertilizer application, cutting stage, mechanization and storage facilities all needed improvement

Figure 6.5. Which measures need to be taken to improve the quality of forages (Q20)



7. Mechanisation

Figure 7.1. Question 21. What is the mechanisation level for forage production and preservation for the intensive farming systems?

Respondents indicated that the mechanization level with the small holder farmers is low irrespective of the forage crop the farmers are growing.

Figure 7.1. What is the mechanisation level for forage production and preservation in intensive farming systems (Q21)

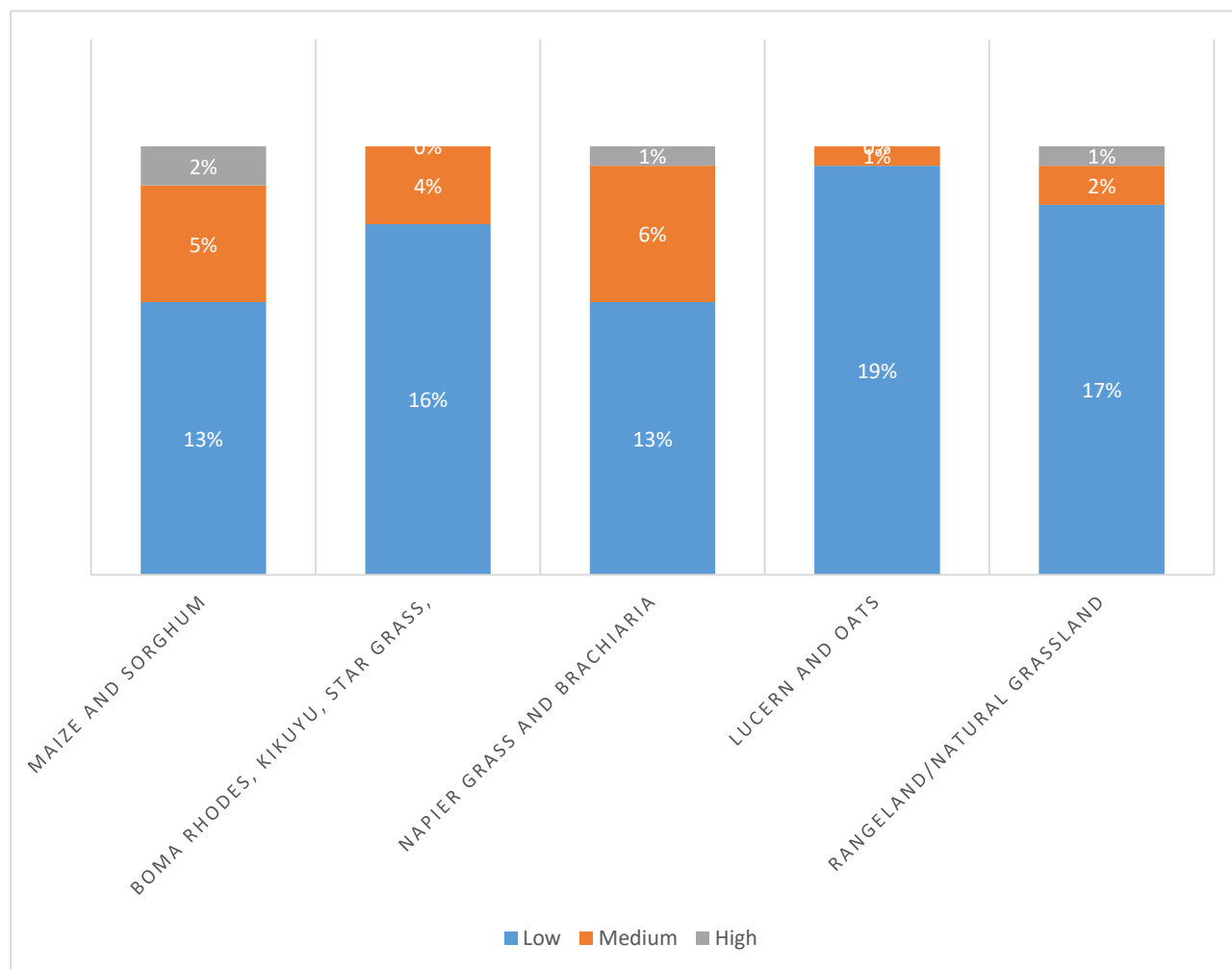


Figure 7.2. Question 22. What is the mechanisation level for forage production and preservation for the medium and large scale dairy farmers?

The mechanisation level on medium and large-scale farms is considered very low irrespective of the crops grown as the overall picture.

Figure 7.2. What is the mechanisation level for forage production and preservation for rural dairy farmers (Q22).

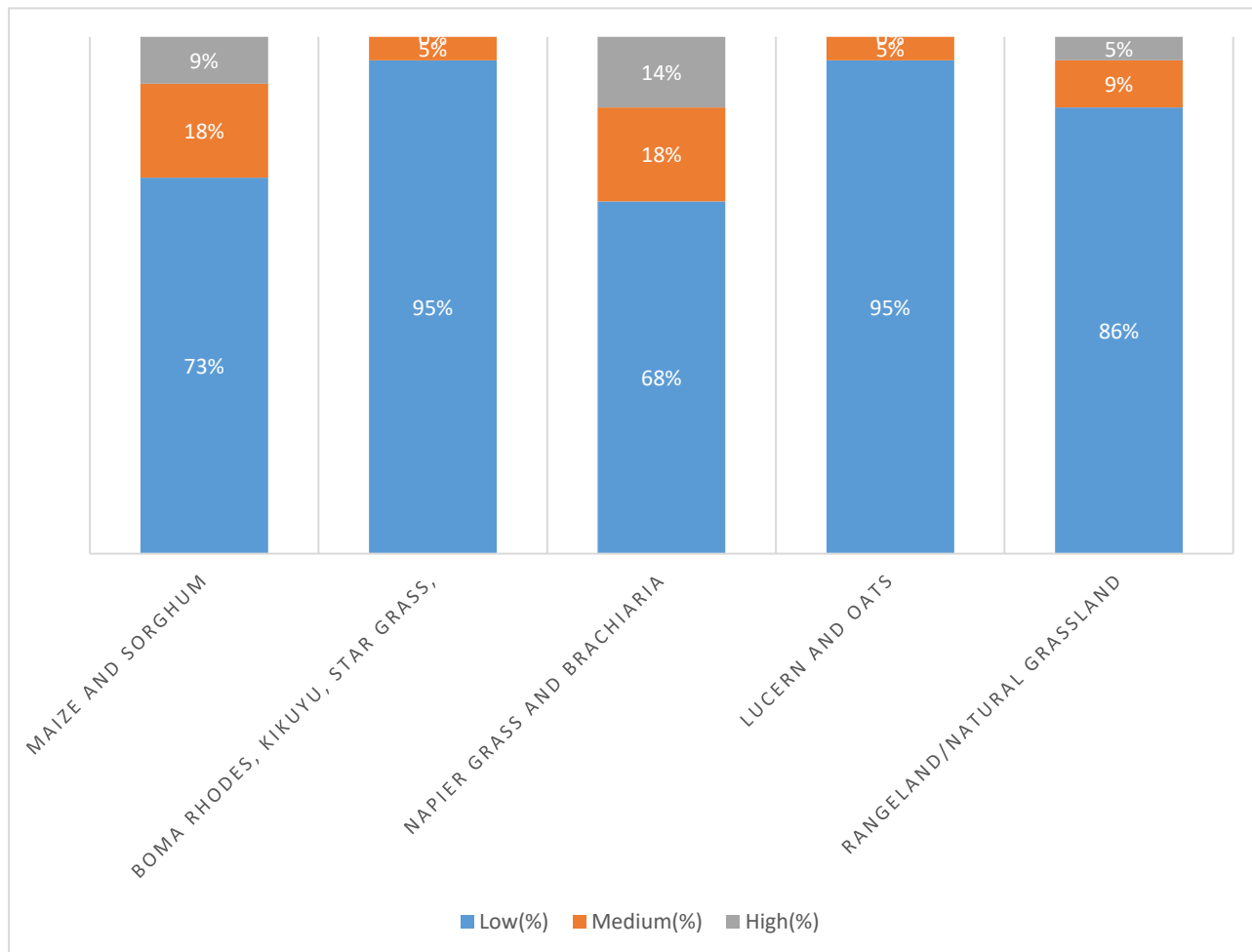


Figure 7.4. Question 23. “What do you think is the main mechanisation problem that is currently hindering the production, quality and utilization of forages on dairy farms?”

According to the survey, lack of appropriate machinery in terms of type and scale is seen by the respondents as the largest constraint for intensive mechanisation (from planting to harvesting to feeding out) (more then 42%). Cost of mechanisation is rated second for all farming systems (> 10.0%). (Figure 7.4).

Figure 7.4. What do you think is the main mechanisation problem that is currently hindering the production, quality and utilization of forages on dairy farms (Q23)

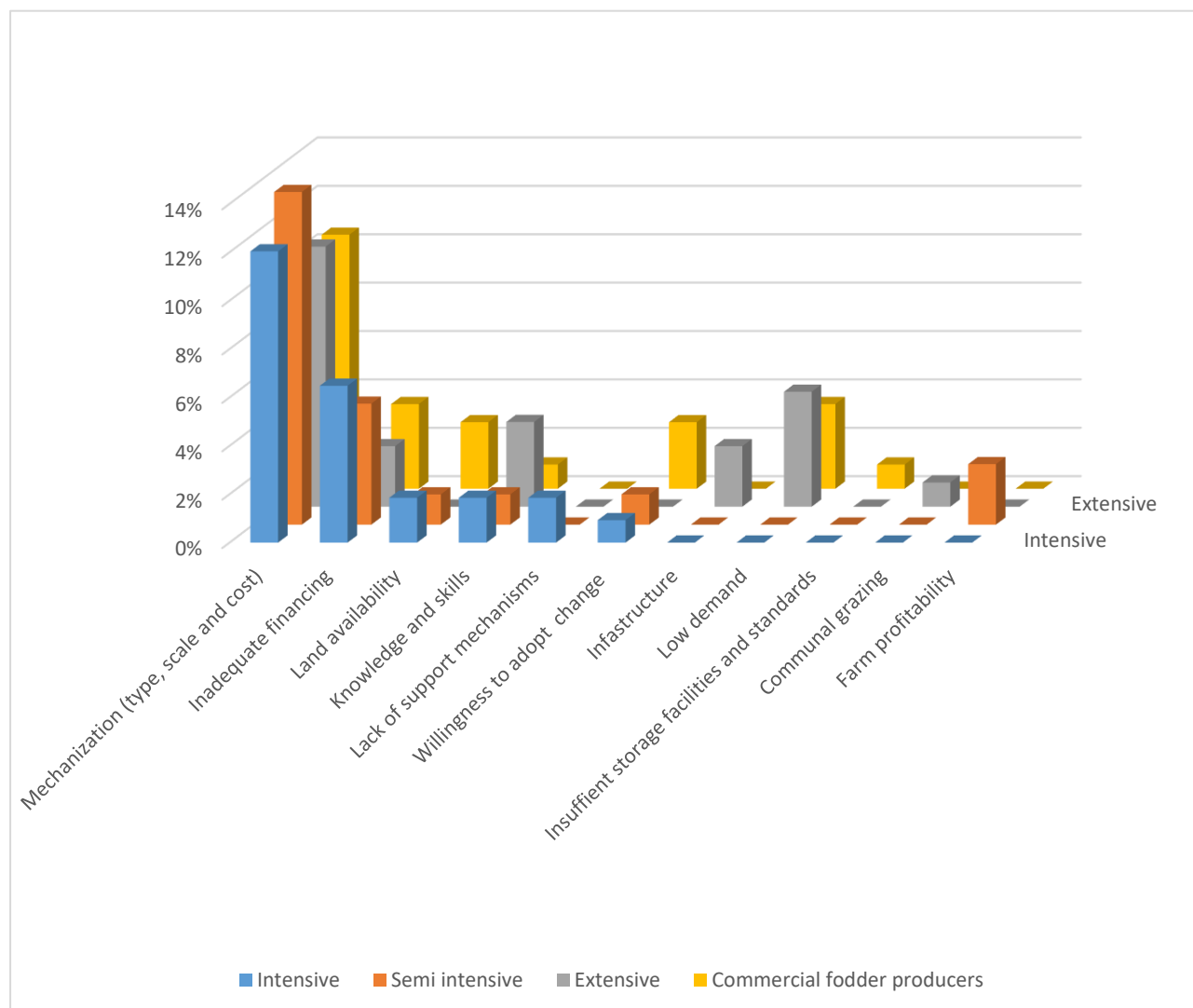


Figure 7.5. Question 24.” Would you prefer to promote on-farm mechanisation or use of skilled contractors with appropriate machinery in different dairy systems?”

While there is a demand for skilled contractors, on-farm mechanisation is also seen as a future solution to reduce the burden of an often-heavy workload on the farms and shortage of labour. (Figure 7.5).

Figure 7.5. Would you prefer to promote on-farm mechanisation or use of skilled contractors with appropriate machinery in different dairy systems (Q24).

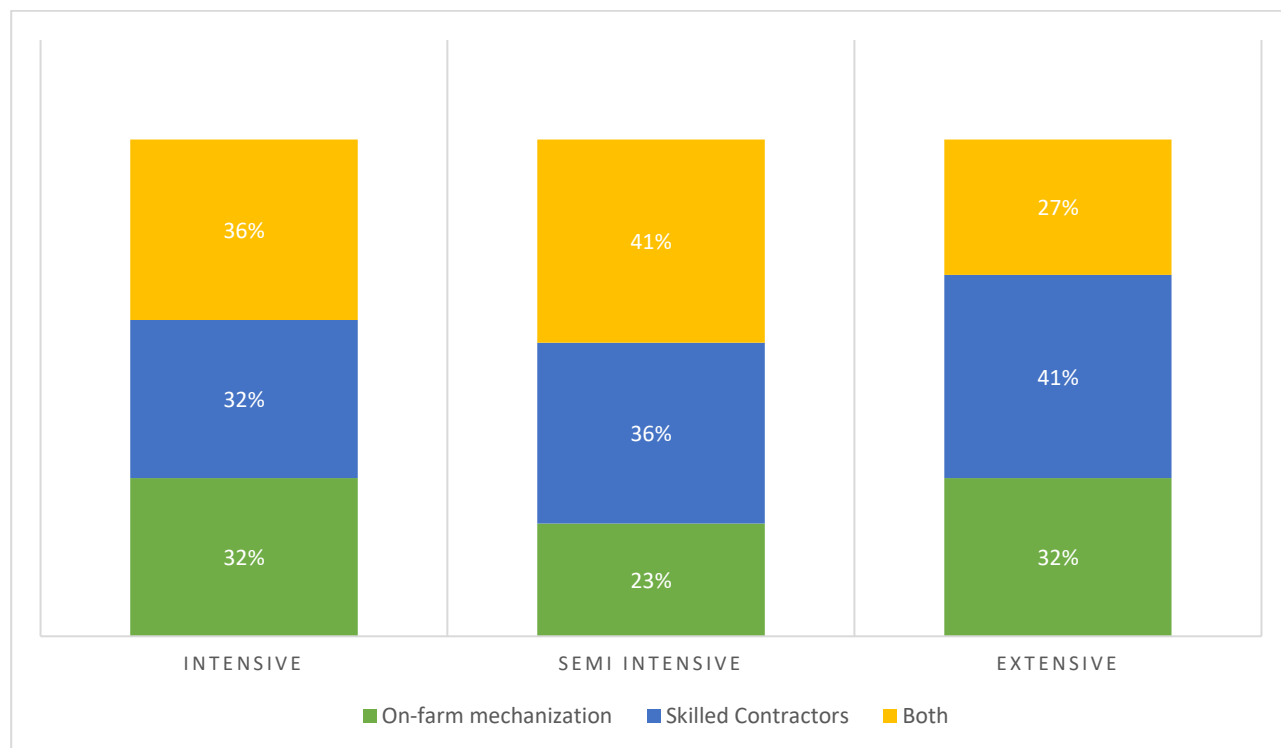
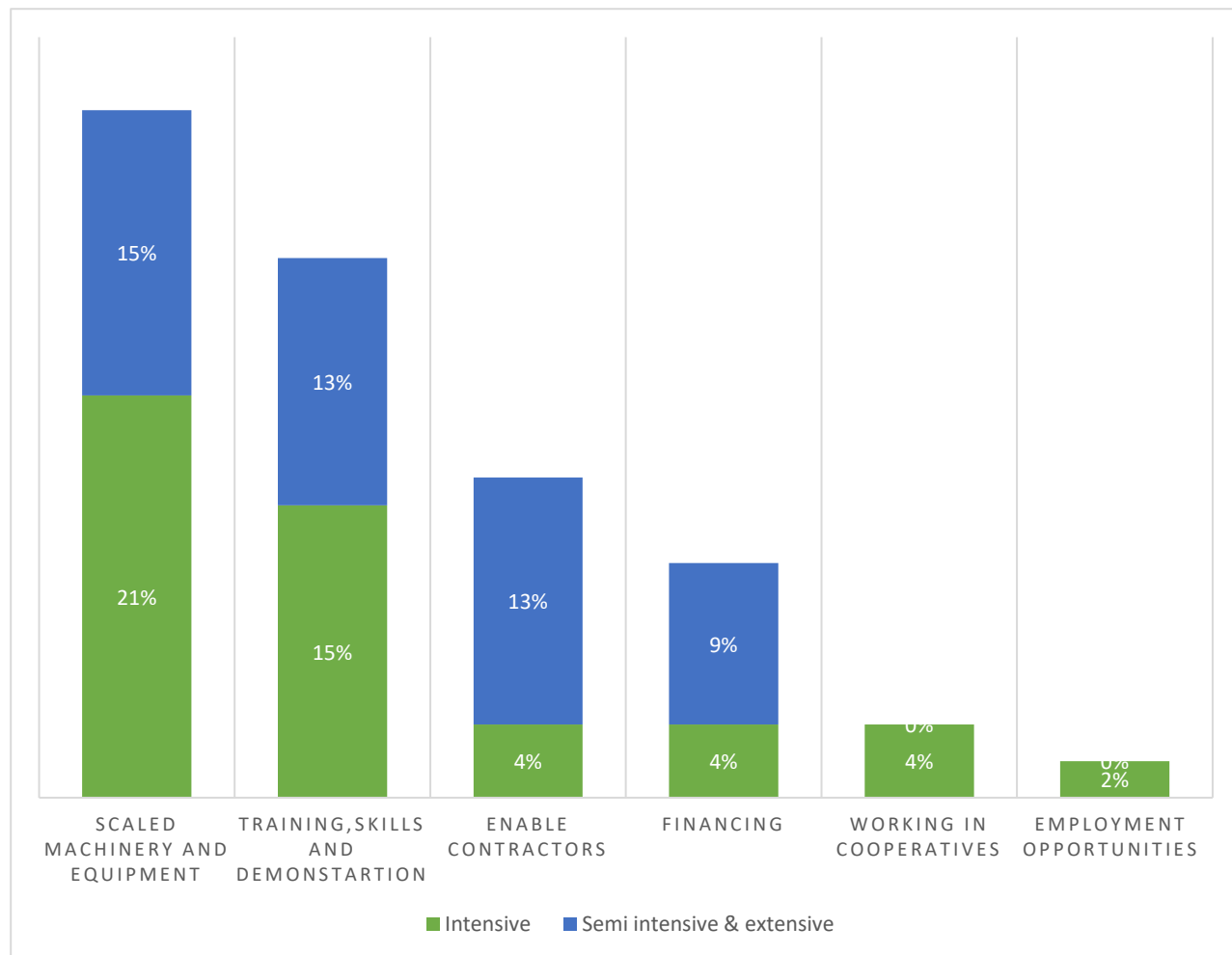


Figure 7.6. Question 25. "What solutions do you suggest for enhanced mechanisation of forage production and preservation in small holder, medium and large scale dairy farms?"

The respondents rated the option of scaled the machinery as another solution to enhanced forage production in Uganda (21% for SHF and 15% for M&LHF). Training and skills development is nearly the same 15% for SH and 13% for M&LHF. The importance and need of skilled contractors in small holder systems lower (4%) than in medium and large farms (13%) (Figure 7.6).

Figure 7.6. What solutions do you suggest for enhanced mechanization of forage production and preservation in small holder, medium and large-scale dairy farms (Q25).



8. Inputs and services

Figure 8.1. Question 26.”” What is your perception of the quality of the input suppliers and service providers in relation to forages, on a scale of 1 - 5 (1 = poor, 5 = excellent)?”

The perception of the quality of the input suppliers and service providers ranges from poor to below average. Services like supply of mechanization, agricultural contractors and feed laboratories are perceived as either low or not existing. Supply of seeds, training and inputs for silage making is perceived as below average to average. (Figure 8.1).

Fig 8.1. What is your perception of the quality of the input suppliers and service providers in relation to forages? (Q26)

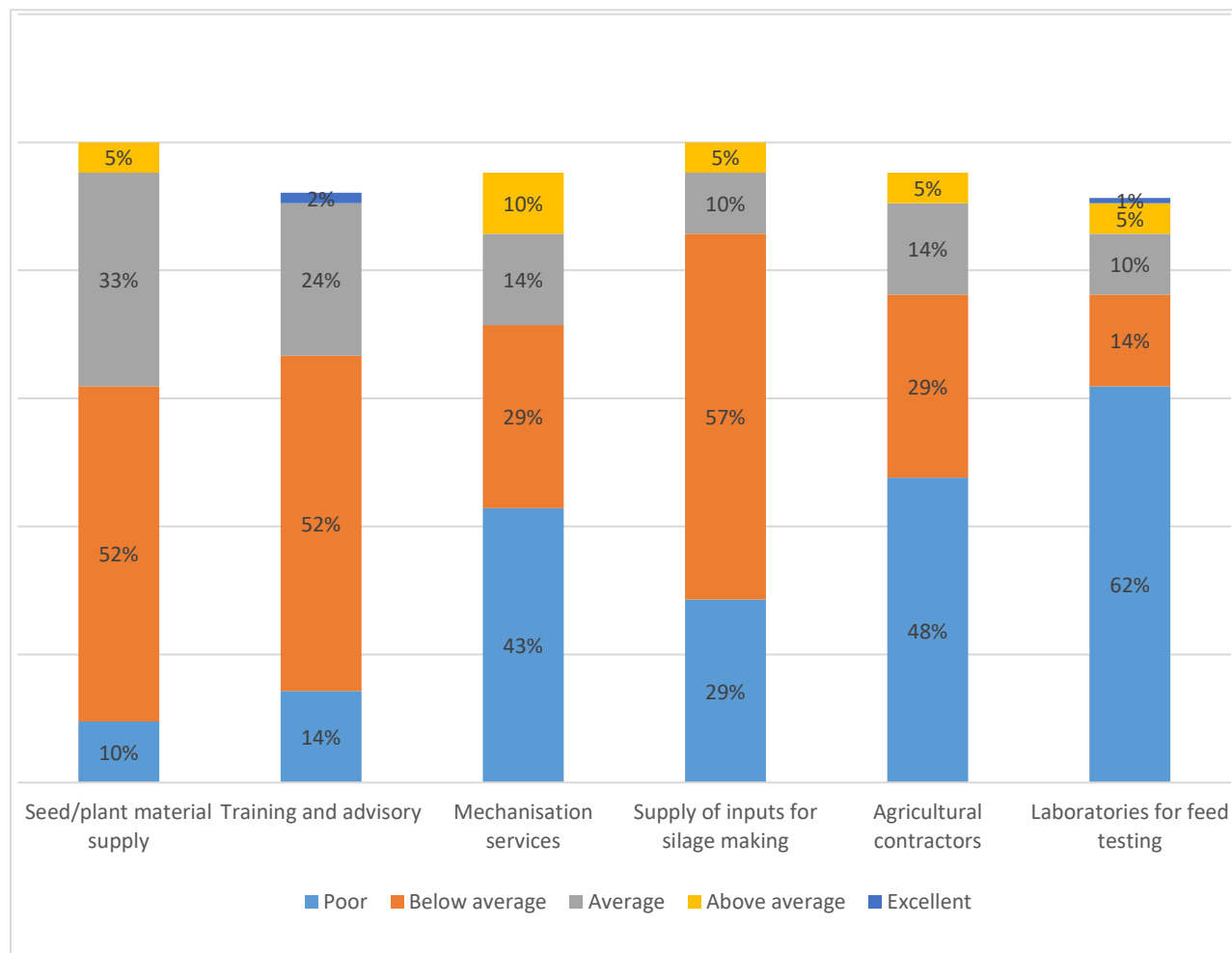


Figure 8.2. Question 27 "Which services, according to you, are missing in the Ugandan forage market?"

Inadequate education/training and extension service was mentioned by (31%) of te respondents as missing in the Uganda forage market followed by lack of a quality feed lab and of feed standards (22%), Mechanisation services (19%), quality inputs and quality service providers (13%), regulations by government (6%).

Fig. 8.2. Which services, according to you, are missing in the Uganda forage market? (Q27)

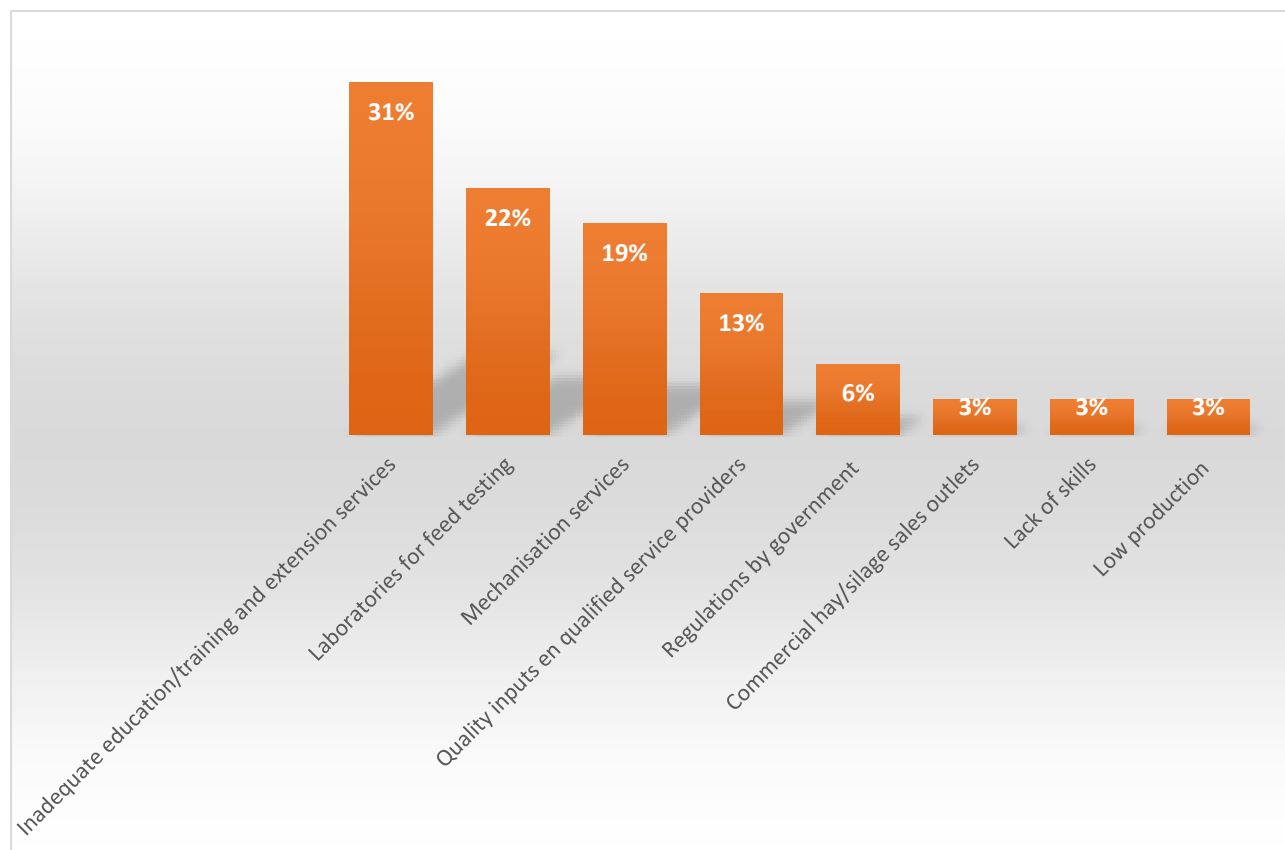


Figure 8.3. Question 28 “What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages?” To improve seed and plant material supply 50% of the respondents believe a seed certification system for forage seeds need to be put in place. Better accessibility and handling/ storage followed with 14% of the respondents giving these as required improvements.

Fig 8.3. What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages? (Q28)

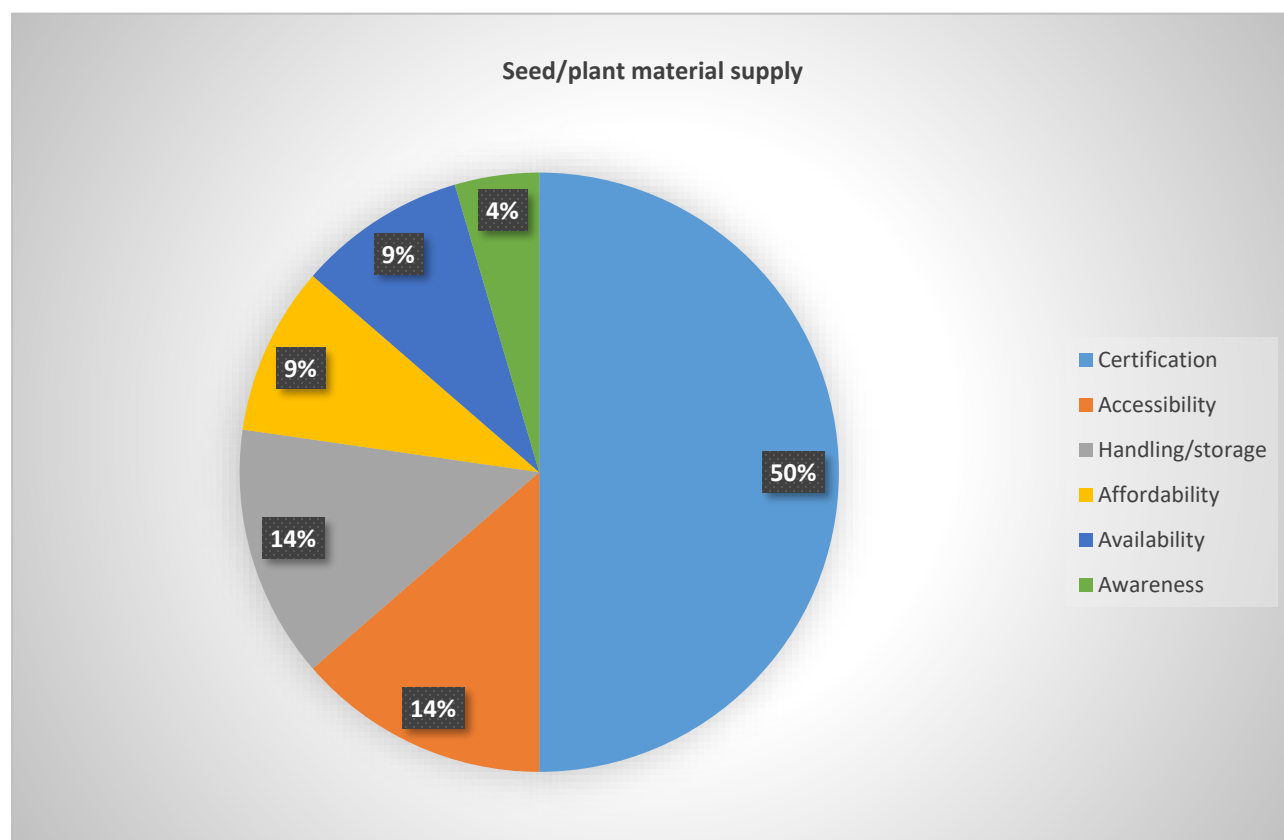


Figure 8.4. Question 28 “What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages?” To improve training and advisory 58% of the respondents answered extention service to the farmers needs improvement so there will be continueity in training. . Better linkages followed with 21% and farmers organisations with 16% of the respondents giving these as required improvements. (Fig 8.4)

Fig 8.4. What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages? (Q28)

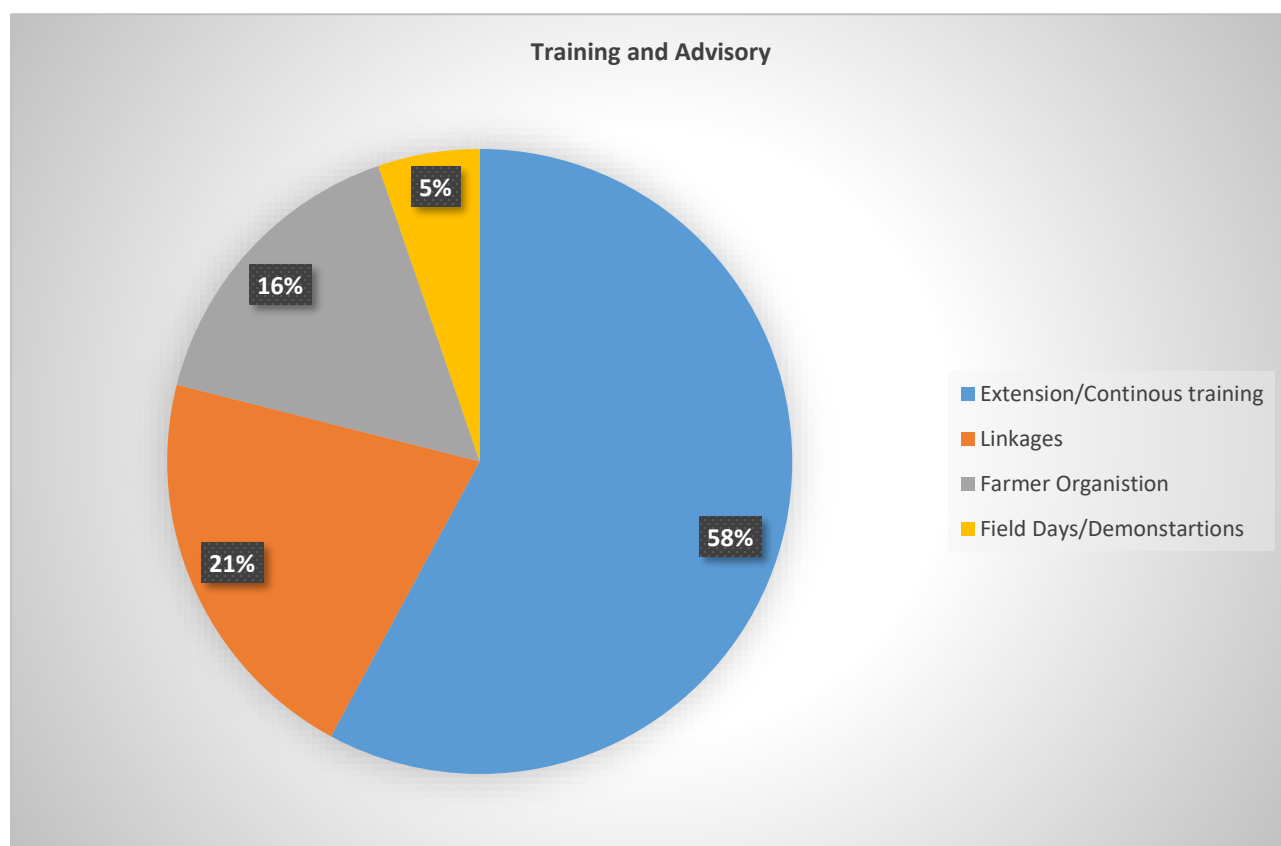


Figure 8.5. Question 28 “What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages?” To improve mechanisation services 24% answered contract services need to be available. Affordability (24%) and condition of machinery and Building local expertise followed with 19% of the respondents giving these as required improvements.(Figure 8.5)

Fig 8.5. What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages? (Q28)

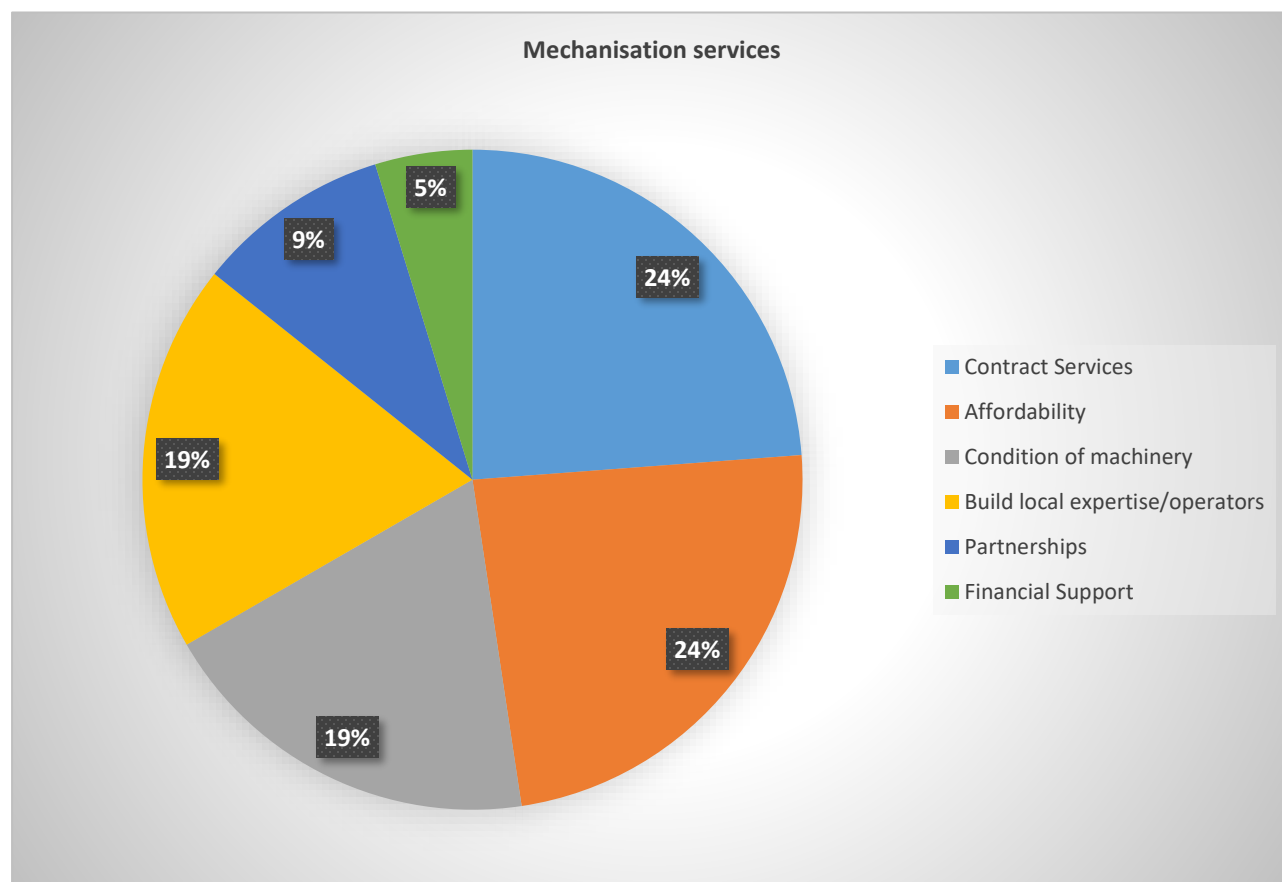


Figure 8.6. Question 28 “What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages?” To improve input supply 35% answered availability has of farm inputs needs to be better. While the inputs need to be standardized mentioned (22%) and 18% answered that the inputs need to be affordable. Followed by mechanisation 13%. (Fig 8.6)

Fig 8.6. What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages? (Q28)

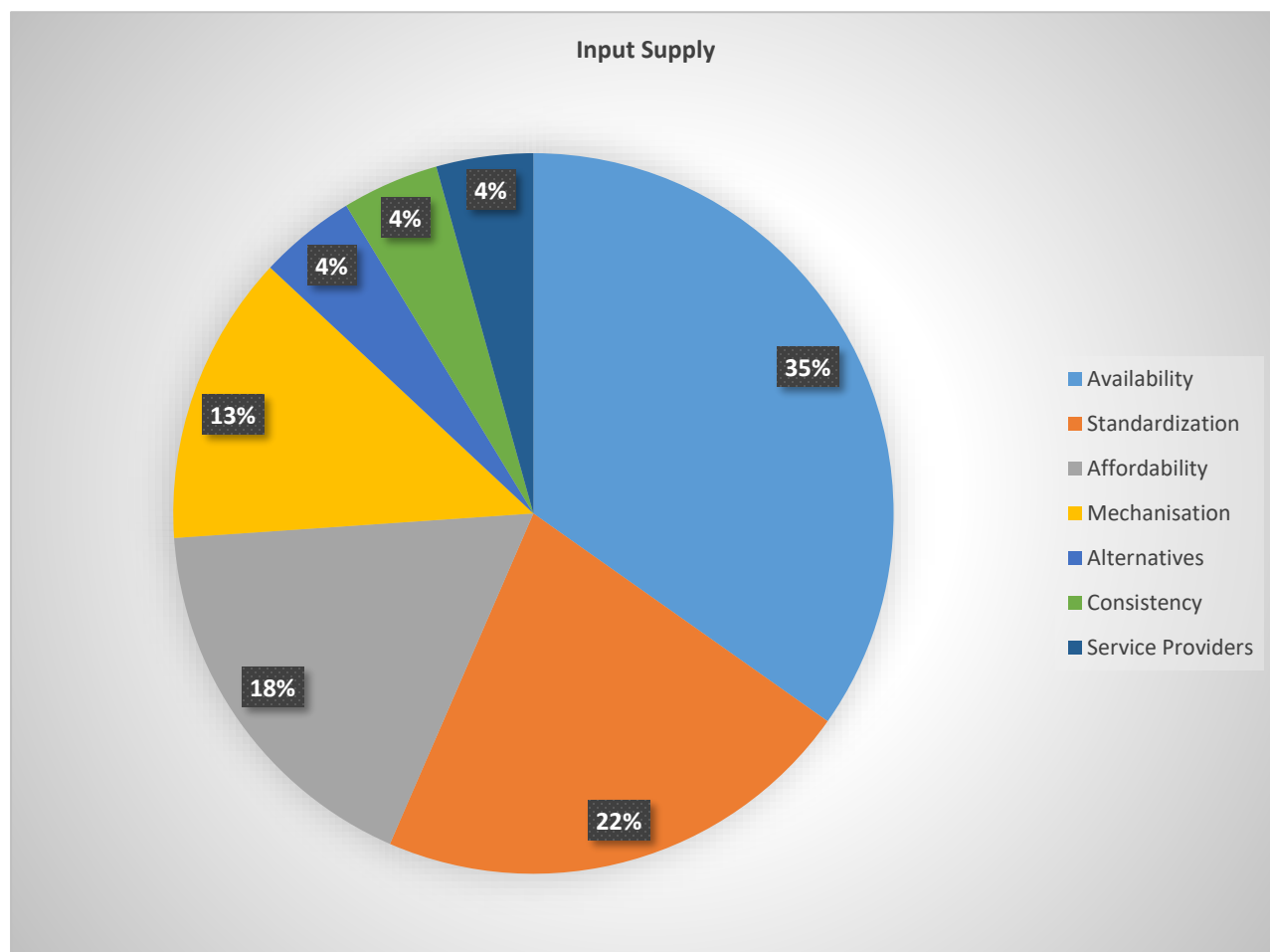


Figure 8.7. Question 28 “What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages?” To improve contracting services 34% answered technical skills are required. While (22%) mentioned the contracting services need to be available and the same 22% mentioned registration of contracting services, recognising the services as an official business. (Fig 8.7)

Fig 8.7. What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages? (Q28)

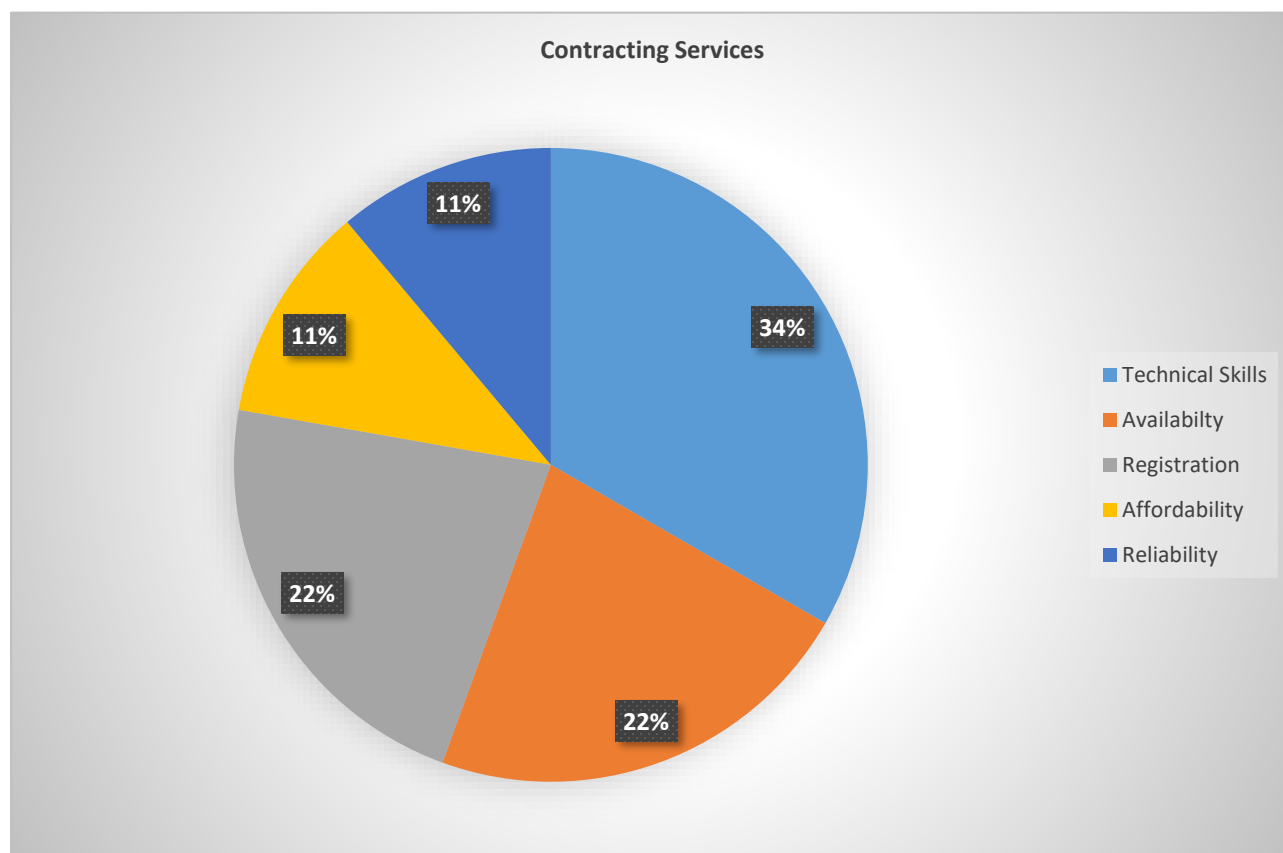
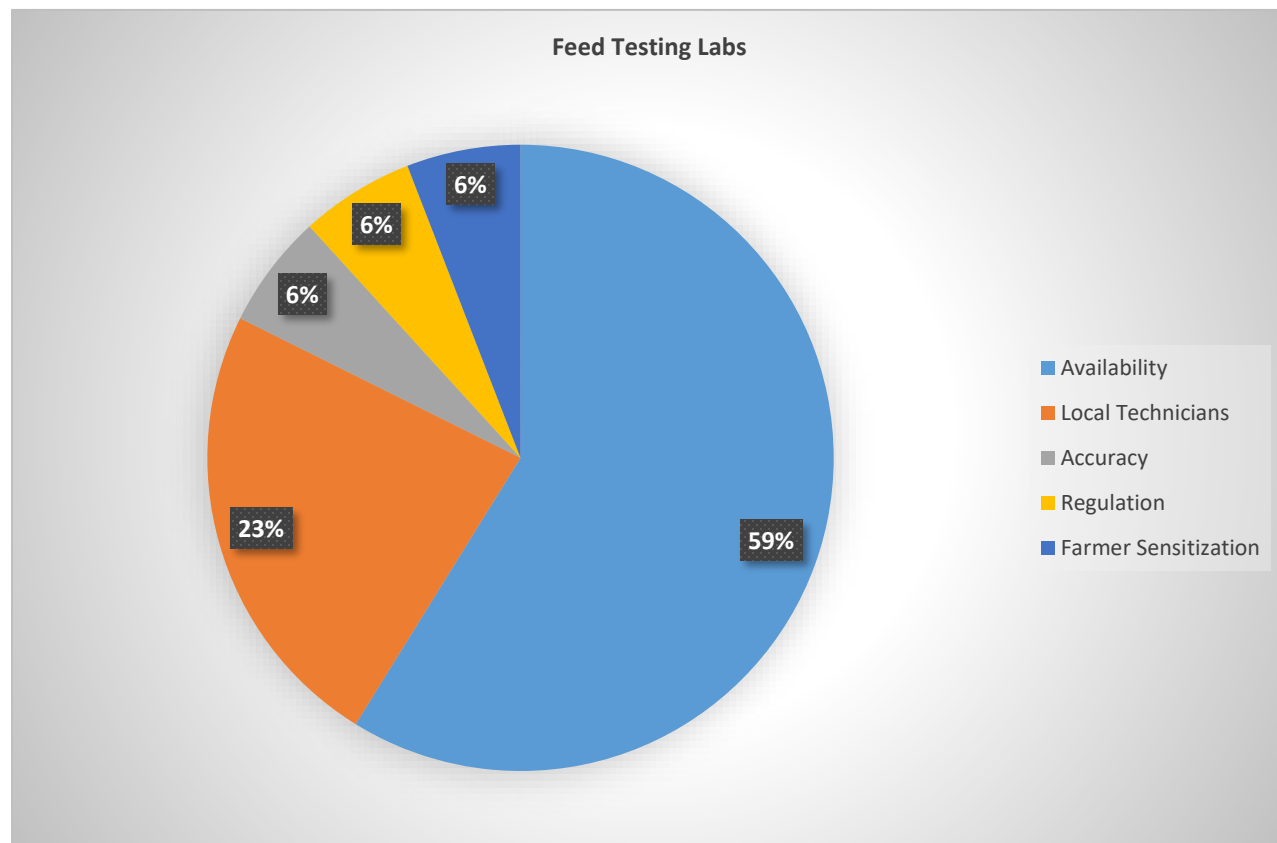


Figure 8.8. Question 28 “What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages?” To improve feed testing 59% answered availability as the concern. (23%) mentioned local technicians need to be trained. (Fig. 8.8)

Fig 8.8. What improvements (maximum three) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages? (Q28)



9. Forage market

Figure 9.1. Question 29.” What kind of forages can you find nowadays being offered for sale in the market (e.g. fresh/green forages, imported forages, grass hay, wheat straw, silage, etc.)?”

According to the respondents of the questionnaire, hay (46%) is the main product in the market, followed by silage (26%) and fresh cut forages (14%). (Fig. 9.1).

Fig 9.1. What kind of forages can you find nowadays being offered for sale in the market ? (Q29)

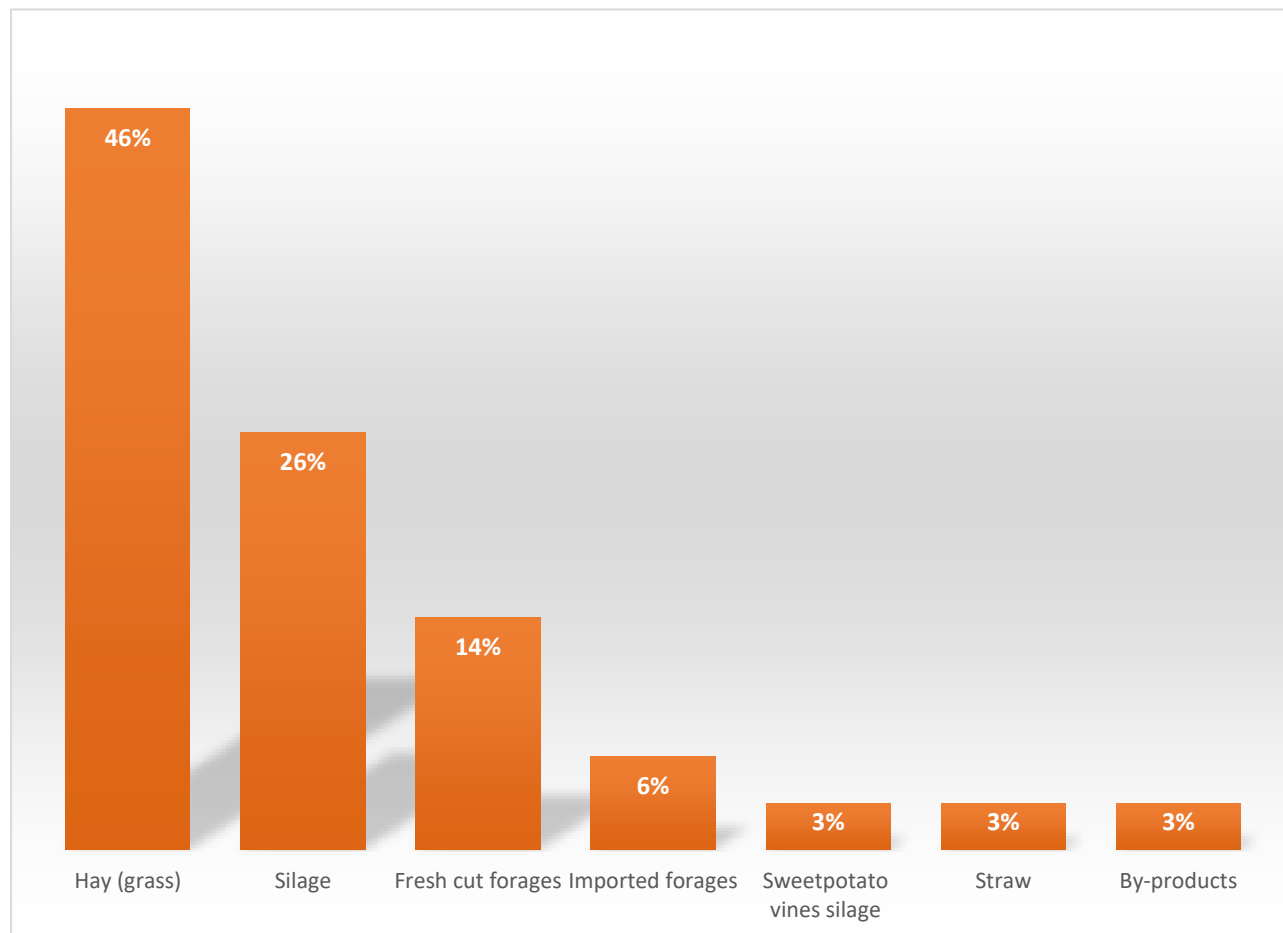


Figure 9.2. Question 30.” How would you define the actual forage market (e.g. seasonal, opportunistic, formal/informal, quality control, standards, etc.)?”

Forage trading is carried out through mainly informal channels. The informal channel includes farmers and small traders who directly buy from small producers – even the localized trading of fresh forage (e.g. Napier grass and grass cut along the roadside) between one farmer and another – and it is the dominant channel of forage trade. The formal channel comprises traders, and agro vets that purchase forage from medium- and large-scale producers and directly deliver the forage to dairy farmers. The respondents in the questionnaire defined the Ugandan forage market mainly as seasonal (57%) and informal (24%) (Figure 9.2).

Figure 9.2. How would you define the actual forage market? (Q30)

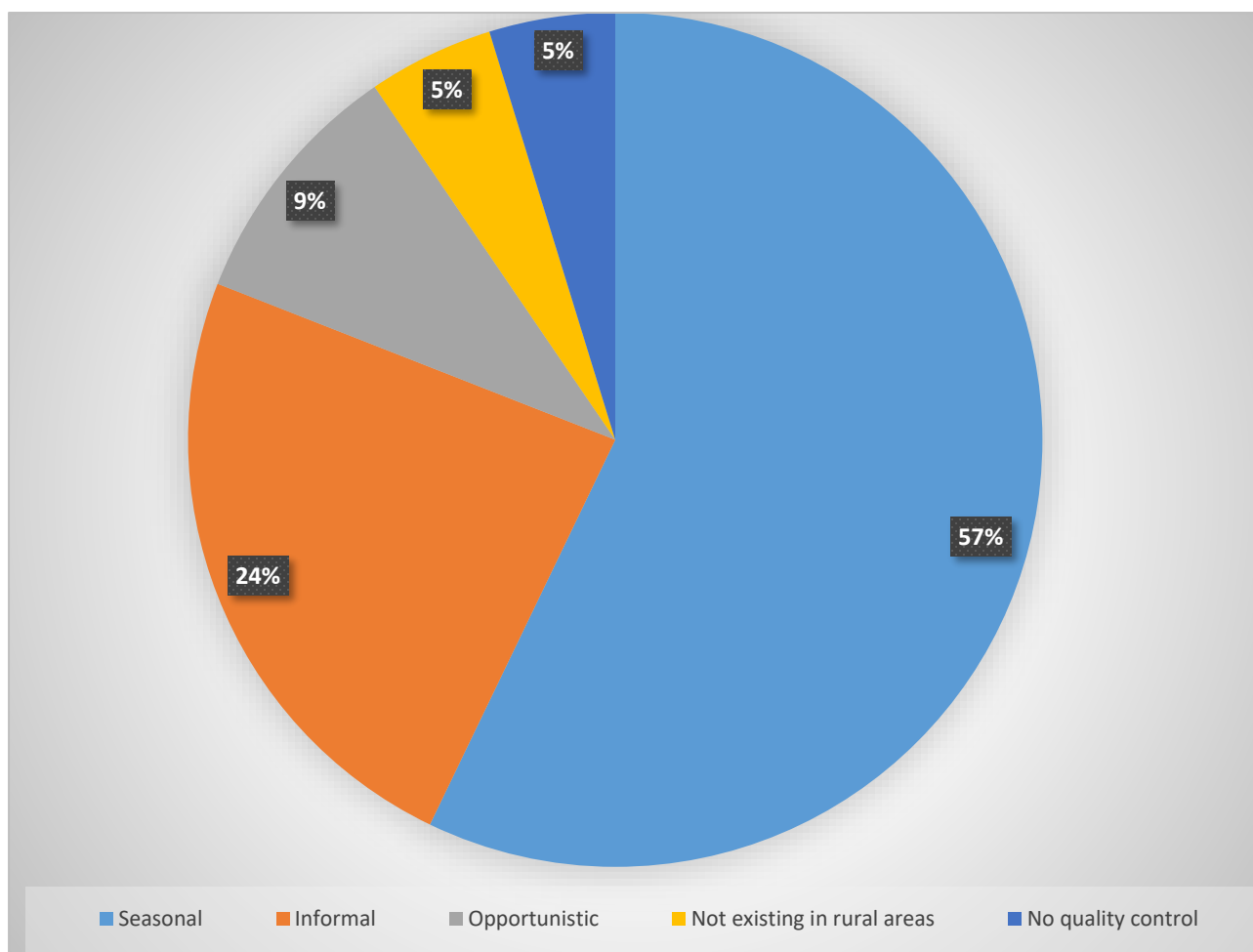


Figure 9.3, Question 31.1. " What opportunities and bottlenecks are there in the commercialization of forages? (List at least three in order of importance) The biggest opportunity the respondents see is the readily available and growing forage market (47%) while 17% of the respondents mentioned that there are good opportunities for commercial forage contractors and seasonality and climate change is mentioned by (10%) as an opportunity.

Figure 9.3. What opportunities are there in the commercialization of forages? (Q31.1)

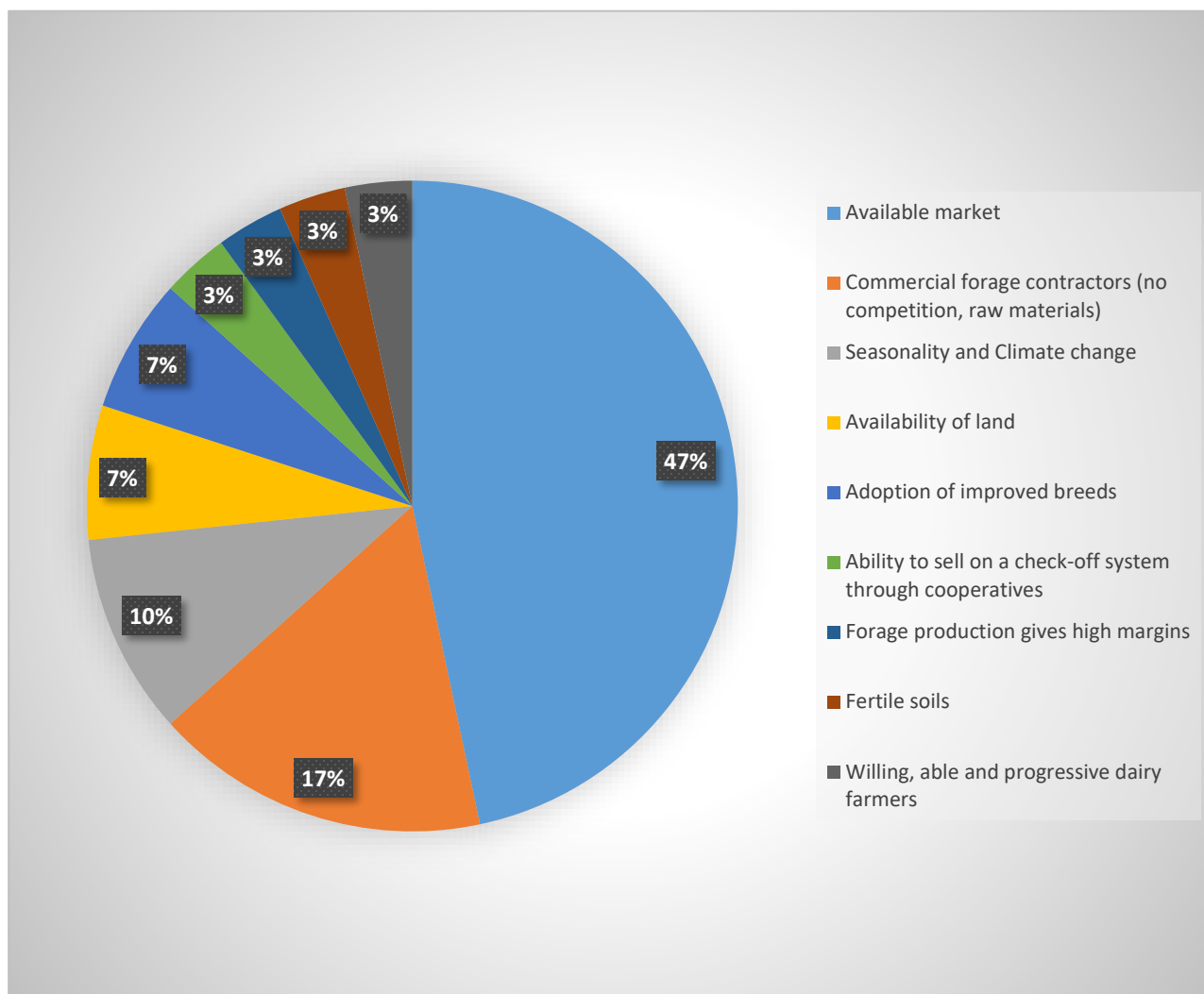


Figure 9.4. Question 31.2 "What bottlenecks are there in the commercialization of forages? (List at least three in order of importance)".

The biggest bottleneck the respondents see in the commercialization of forages is the availability, cost and quality of mechanization of forage production (34%). Lack of knowledge and skills in entioned and the seasonality of the forage market are mentioned by (13%) of respondents.

Figure 9.4. What bottlenecks are there in the commercialization of forages? (Q31.2)

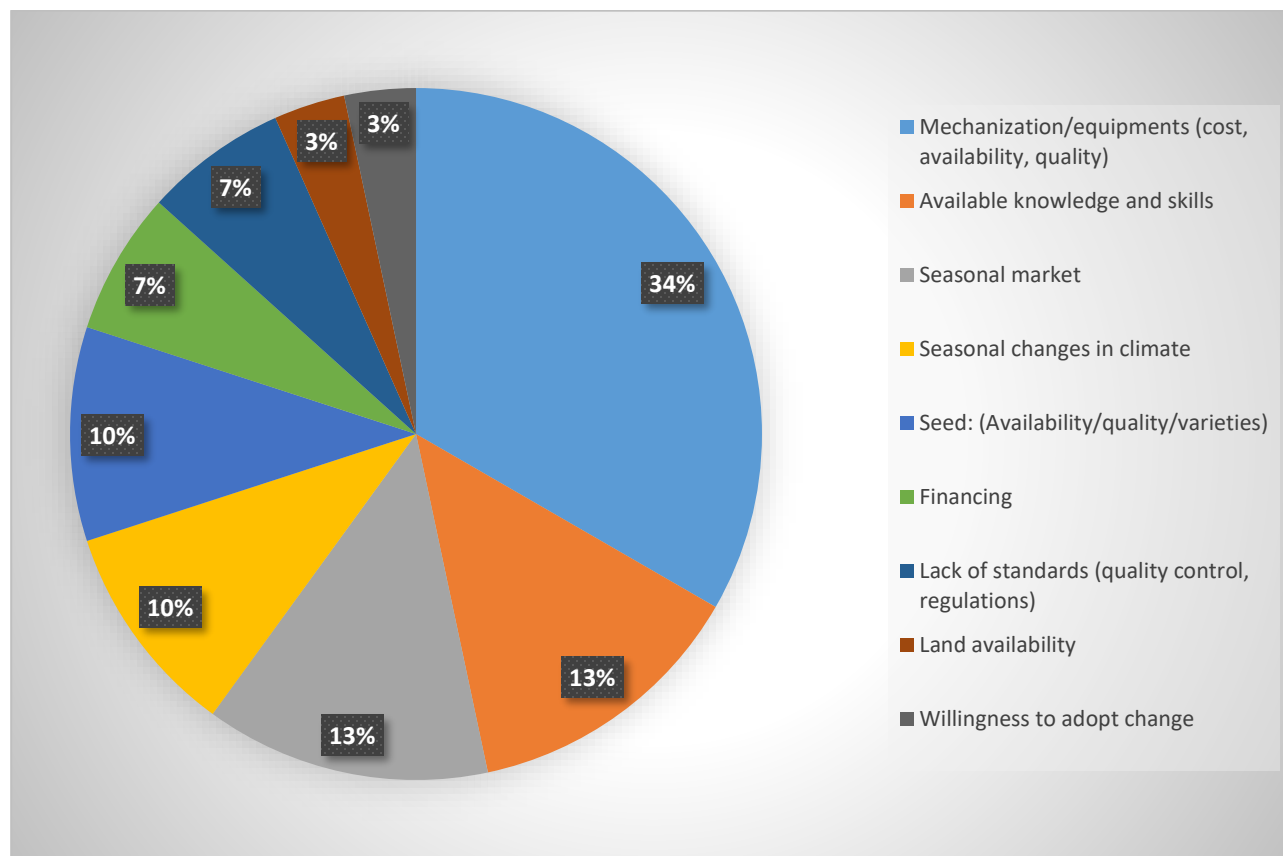


Figure 9.5, 9.6. Question 32. "What improvements and changes need to be made by commercial forage producers to improve forage production in terms of yield and quality?"

Q 32 and 33 which are presented at the end of the questionnaire, are presented here under the heading forage quality.

According to the survey, the most effective improvements to increase forage yield are related with better management practices (29%), use of improved forage varieties (25%) and adopting new technologies to prepare silage and hay (21%) (Survey Diagrams; Figure 9.5). Forage quality is seen by the respondents as an important point to be addressed. This can be achieved through introduction of new forage species and varieties, but if not well managed it will not be effective. Equally better management of current forages in the market will be effective as well. The respondents to the questionnaire indicated that to improve forage quality, commercial forage producers need to implement better forage crop management practices (38%), followed better soil testing and feed standard facilities (25%) and feed by the use of improved/new varieties (21%). When a new species is introduced, this may require an extra investment if different machinery is required for planting and/or harvesting of particular forage crop (Figure 9.6).

Figure 9.5. Yield (Q32.1)

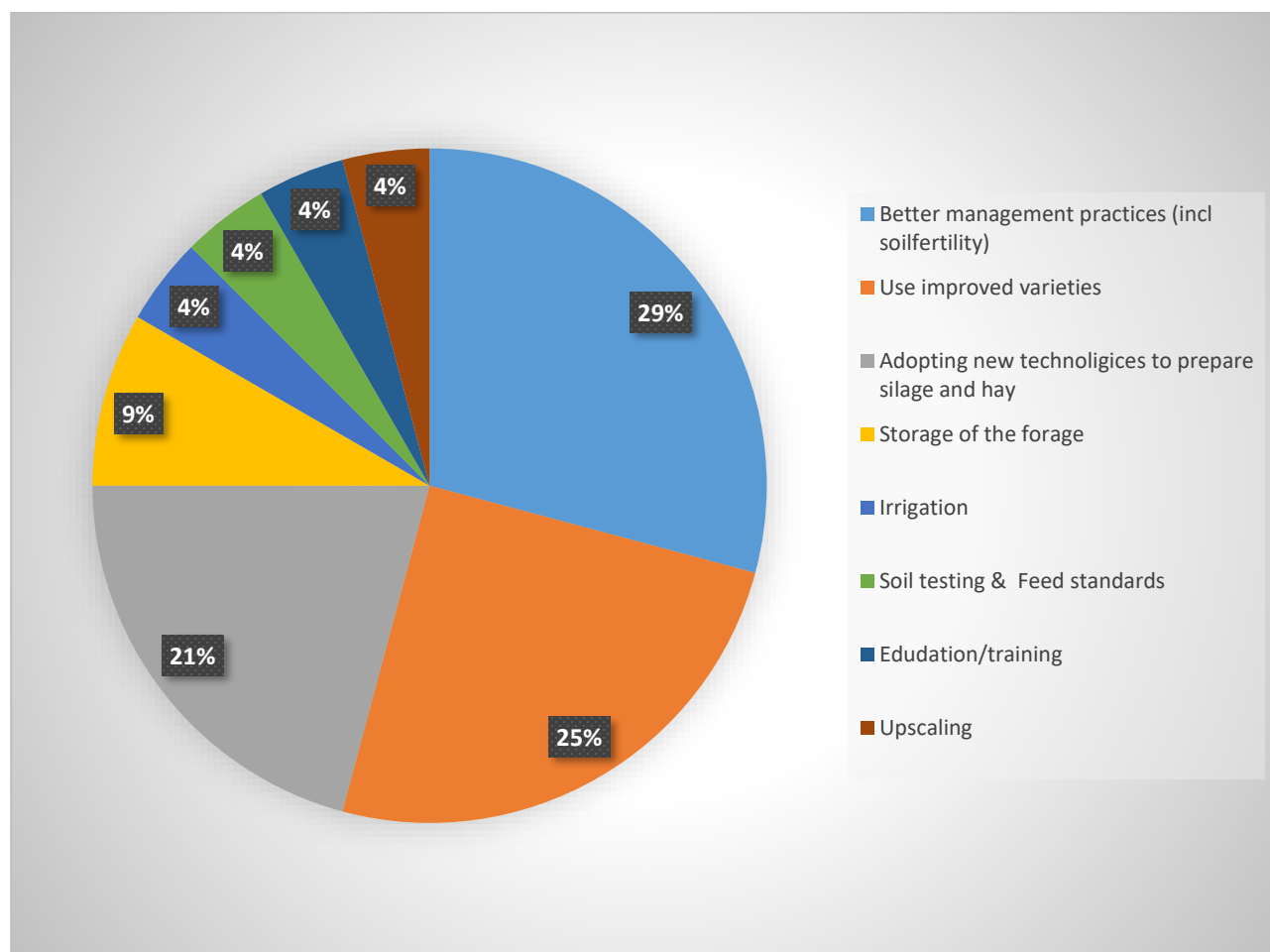


Figure 9.6. Quality (Q31.2)

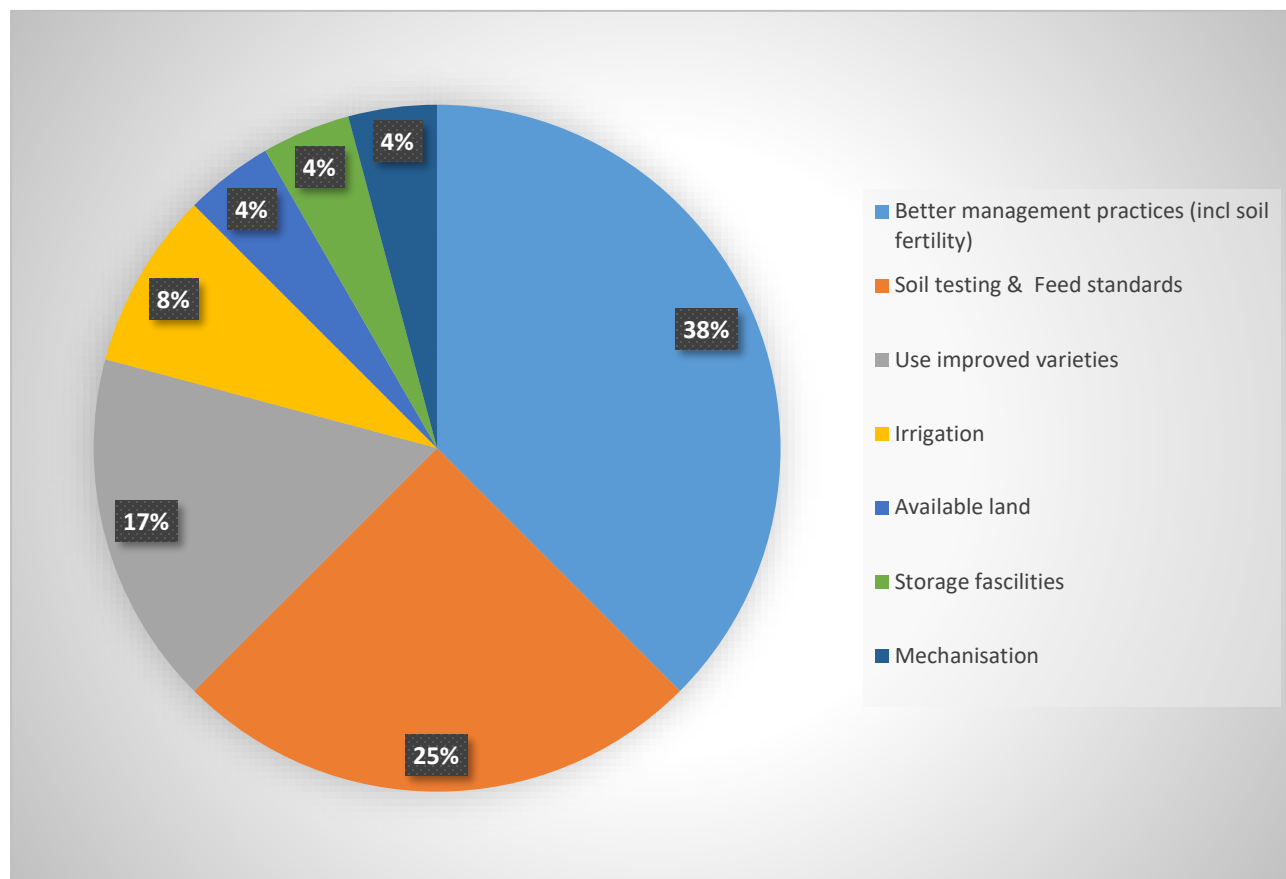


Figure 9.7, Question 33.” What affects production levels and cost price of raw milk mostly: the quality of forages or of compounded feeds (please explain)?” Give three examples of good quality forage crops

Fifty six percent of the respondents indicated that forages in the ration of dairy cows affect production level and cost of production the most. The influence on production level and costs of production of climate change and compounded feeds (each 13%) was considerable smaller. As examples the respondents gave maize (24%), Rhodes grass (21%) Fodder Sorghum and Napier grass (each 10%) (Figure 9.7a 9.7b).

Figure 9.7a. What affects production levels and cost price of raw milk mostly: the quality of forages or of compounded feeds? (Q33)

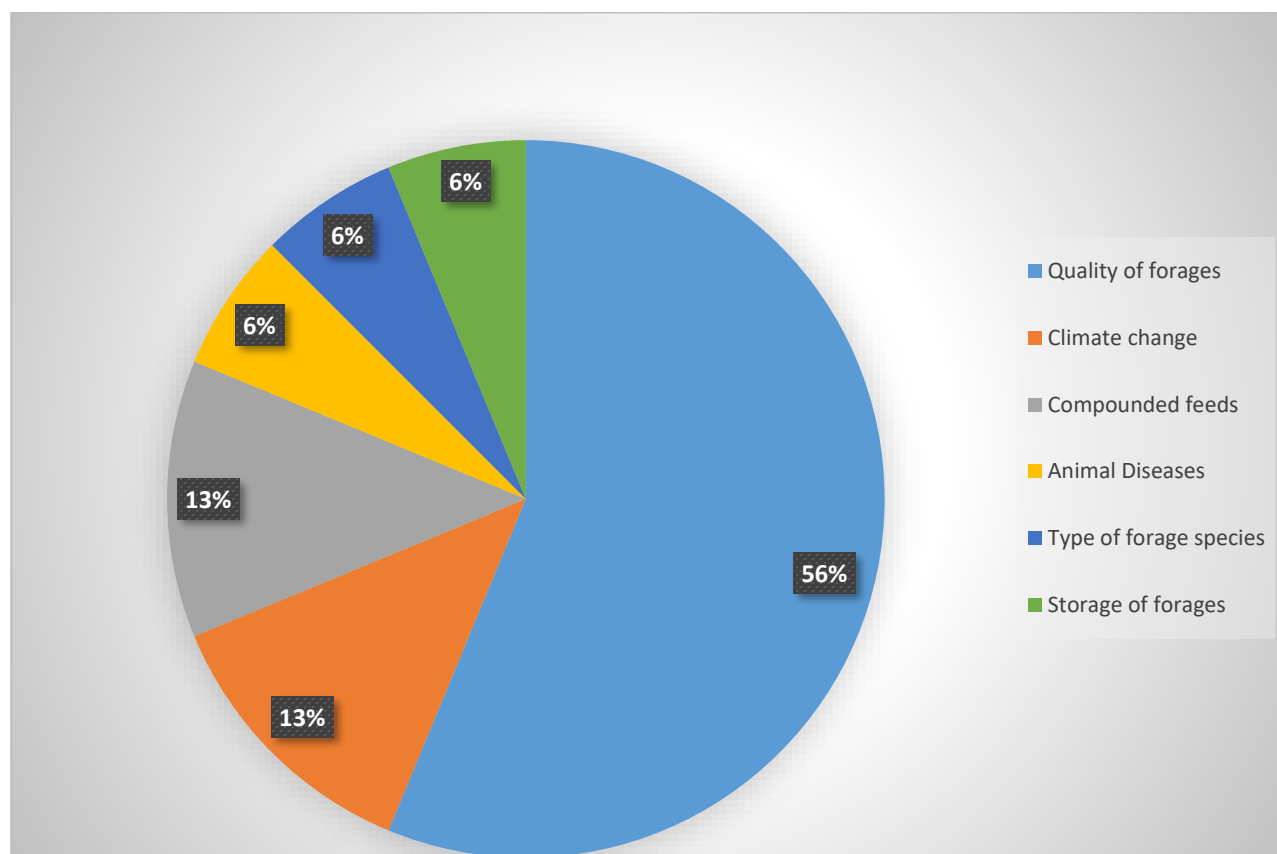


Figure 9.7b. Give three examples of good quality forage crops (Q33)

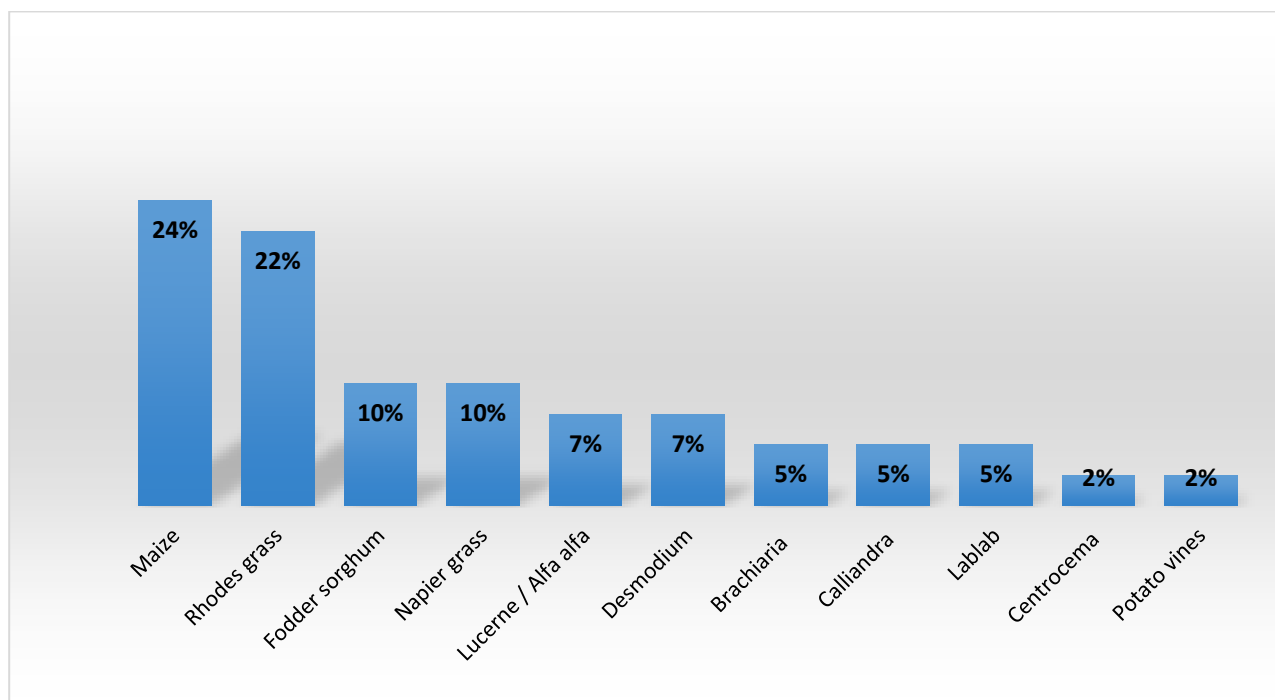


Figure 9.8, Question 34.1. “What is your opinion on the opportunity of on farm forage production in agro-forestry systems?” 88% of the respondents see opportunities (65% good and 23% some) for forage production on farm in combination with agro forestry systems.

Figure 9.8. The opportunity of on farm forage production in agro-forestry systems? (Q34.1)

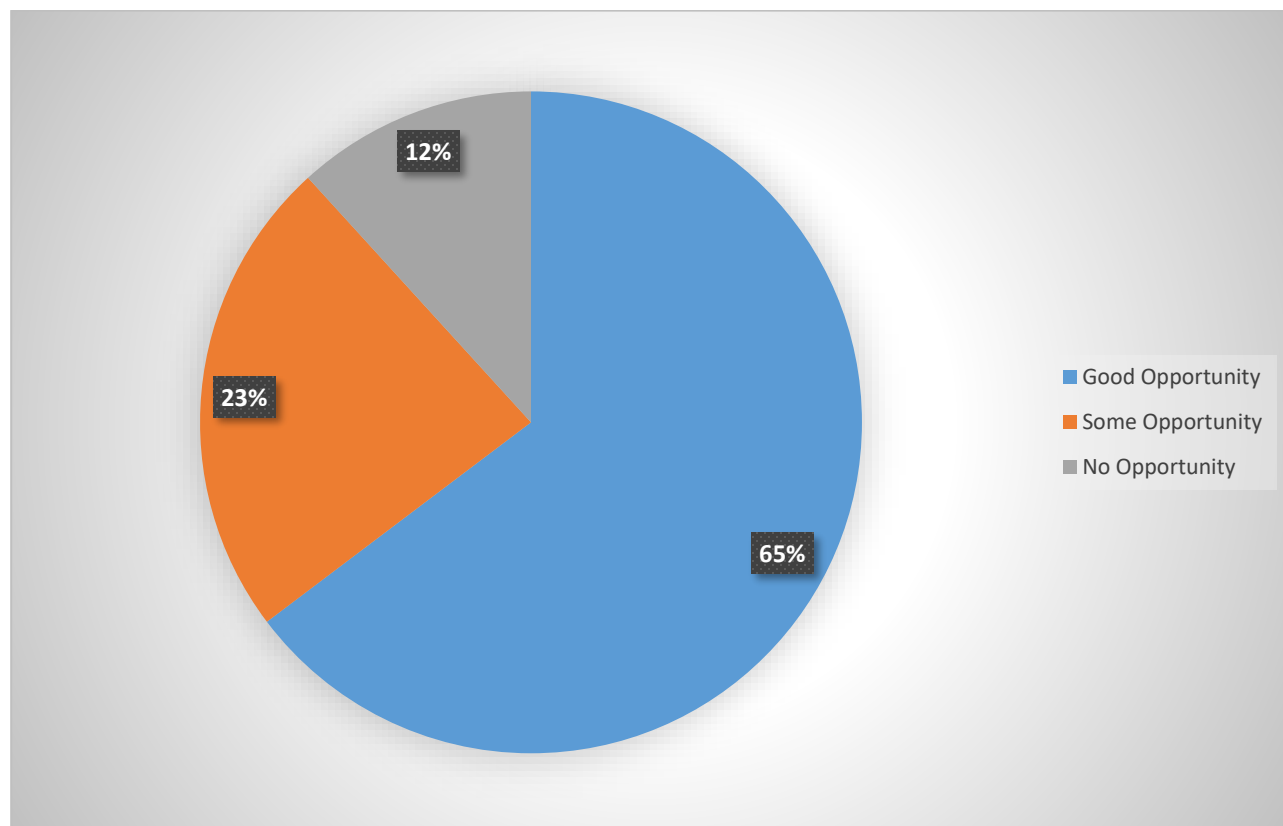
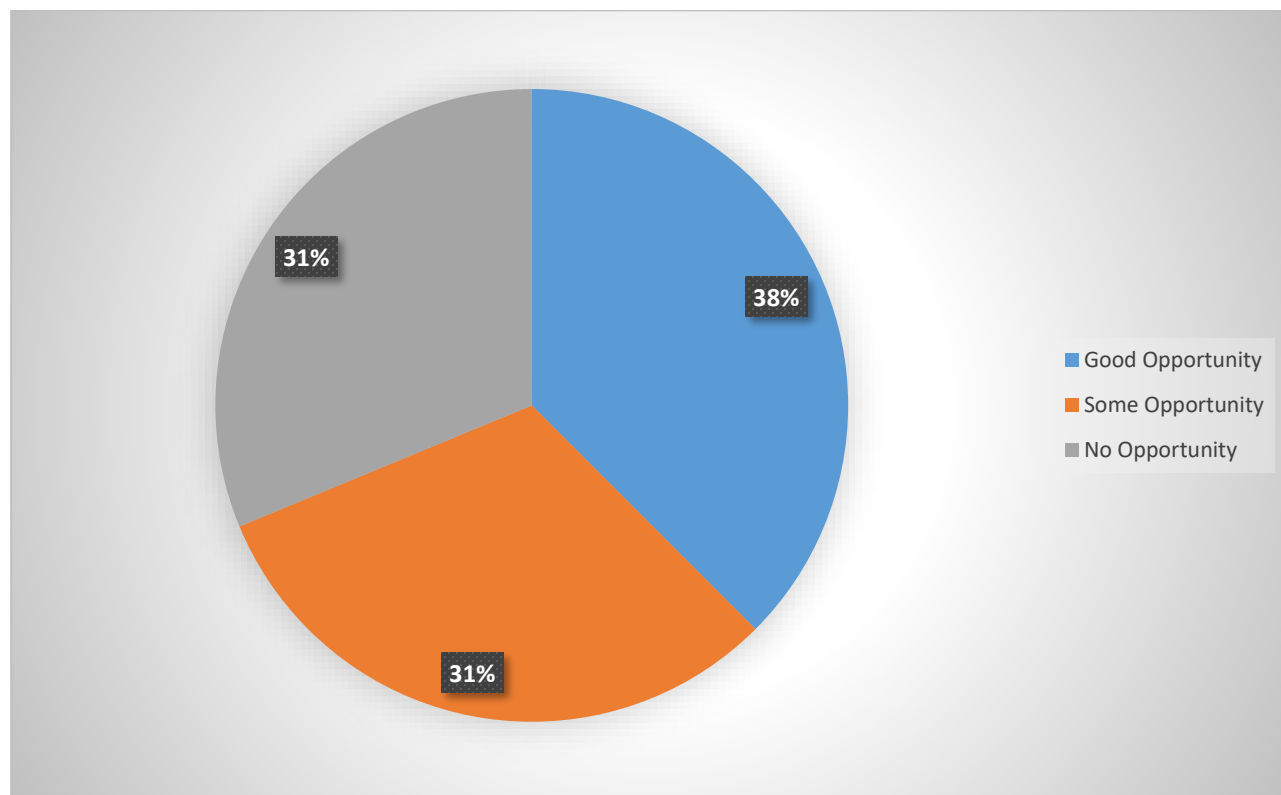


Figure 9.9, Question 34.2. “What is your opinion on the opportunity of commercial forage crop production in agro-forestry systems? 69% of the respondents believe that forage production in agro-forestry systems can be commercialized. 38% responded that this is well possible while 31% responded it will somehow be possible.

Figure 9.9. The opportunity of commercial forage crop production in agro-forestry systems? (Q34.2)



10. Education and training

Figure 10.1. Question 35.” What is the availability and quality of education and training on forage production, preservation and inclusion of dairy cow ration formulation in the country?”

Among the respondents of the questionnaire, (i) 42% answered that availability of training is limited, (ii) 42% described the availability as very low to low (iii) Only 16% described the availability of the training as good. (Figure 10.1).

Figure 10.1. What is the availability and quality of education and training on forage production, preservation and inclusion of dairy cow ration formulation in the country? (Q35)

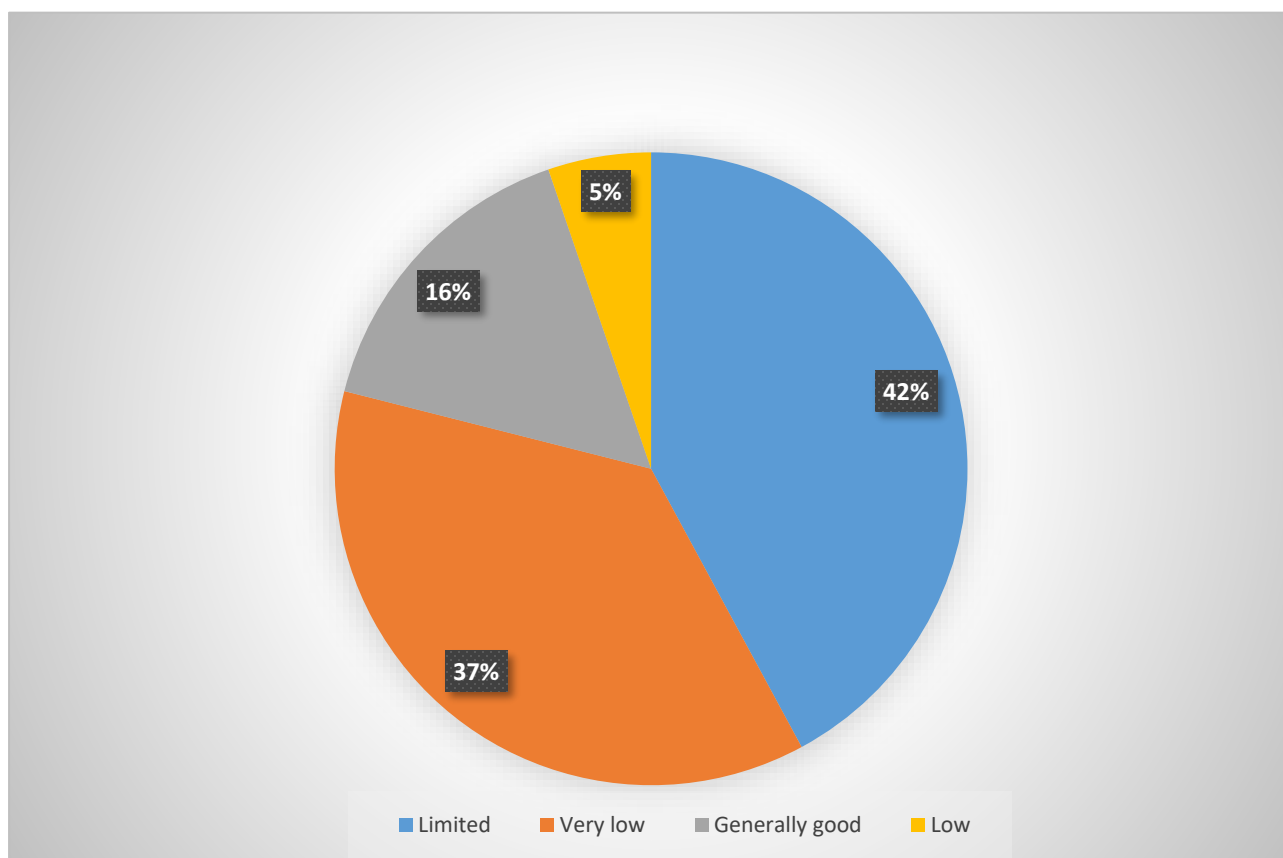


Figure 10.2. Question 36.” What knowledge and skills are lacking in regard to forage production and preservation?”

Agricultural skills and best farming practices (from seed to feed incl. mechanization) is considered by 44% of the respondents as the key missing skill causing the gap in forage production and preservation in Uganda; 20% indicated that there is lack of

Figure 10.2. What knowledge and skills are lacking in regard to forage production and preservation? (Q36)

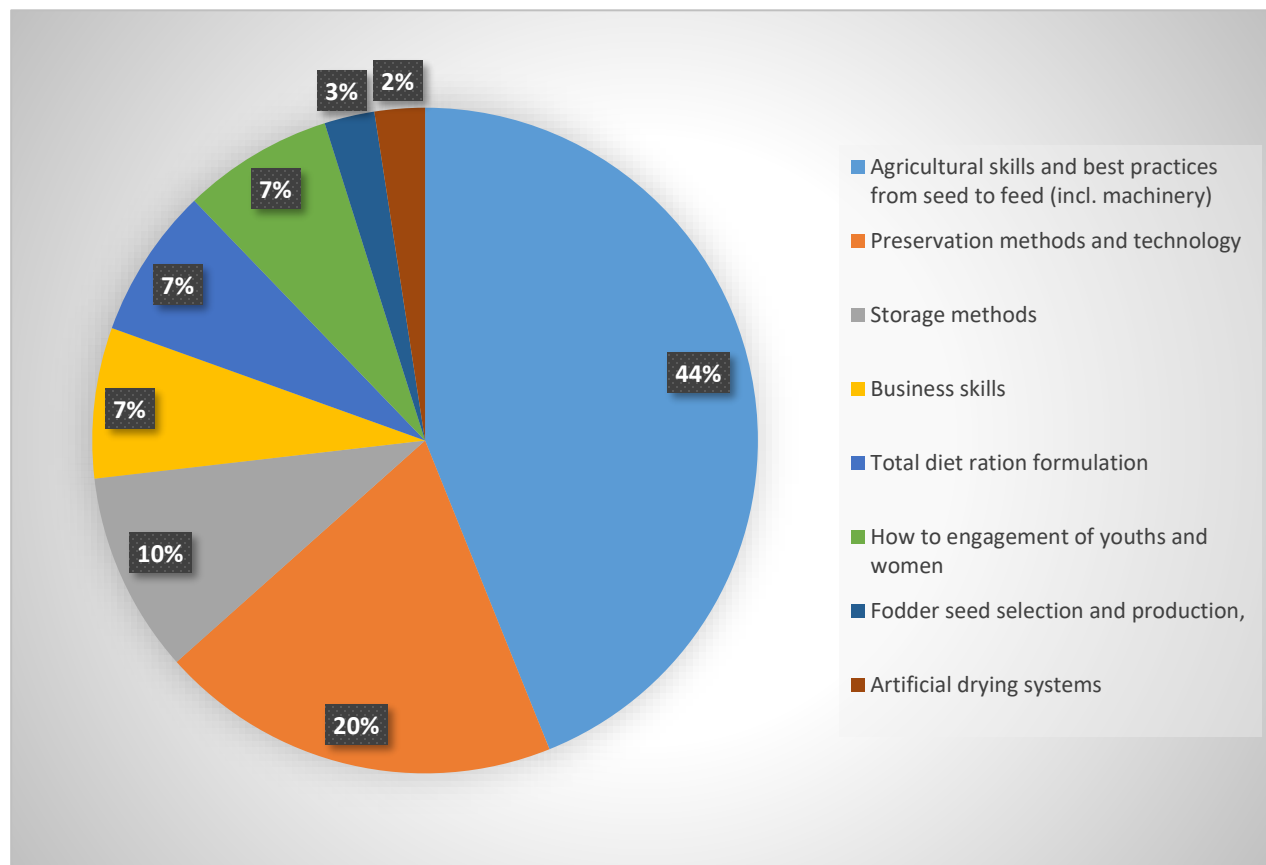


Figure 10.3. Question 37.” Who should provide this training?”

According to the survey, this training should be provided by either (i) government extension workers (41%), (ii) Non-governmental organizations (20%), or (iii) private sector players (9%), (Figure 10.3).

Figure 10.3. Who should provide this training? (Q37)

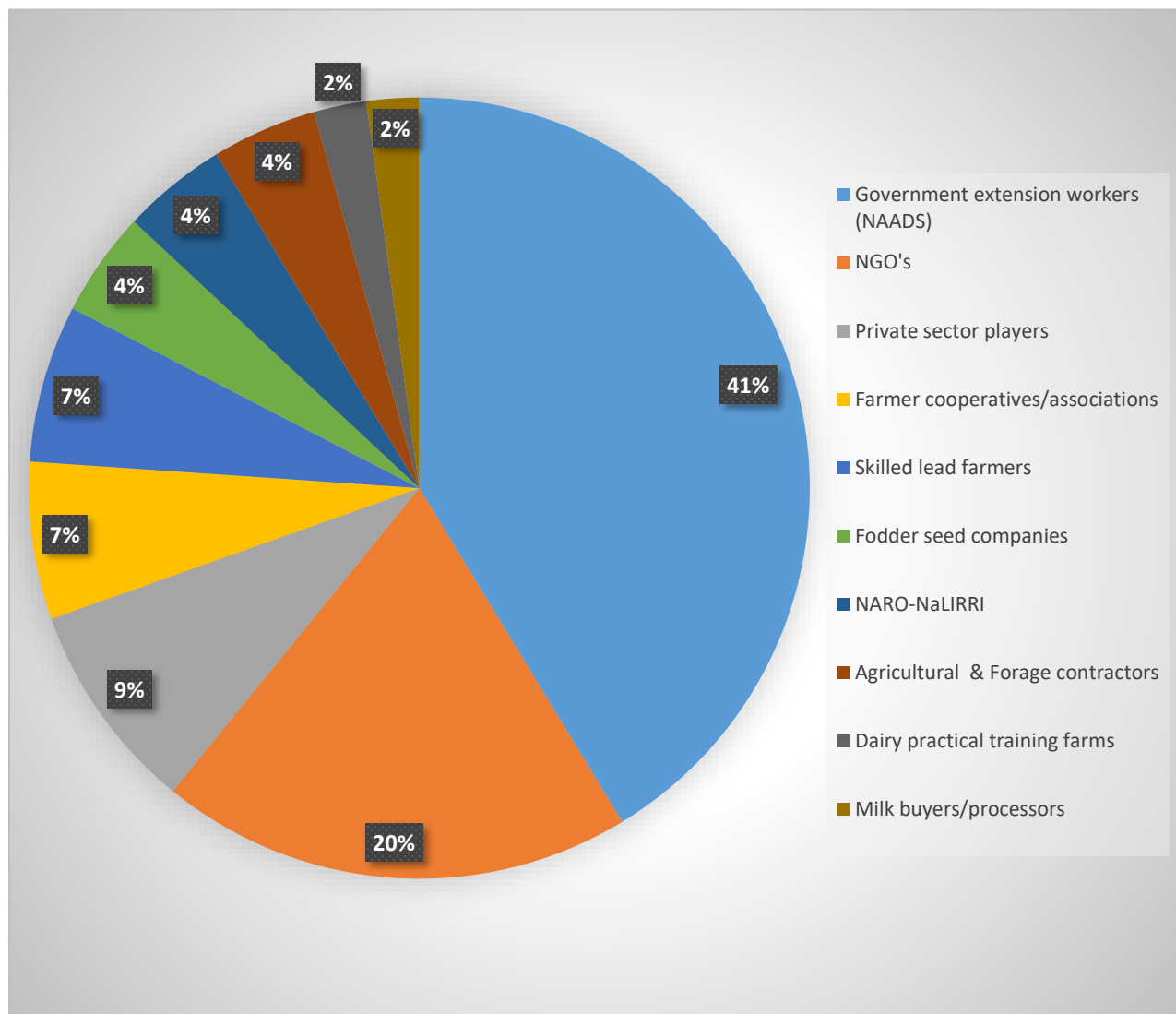
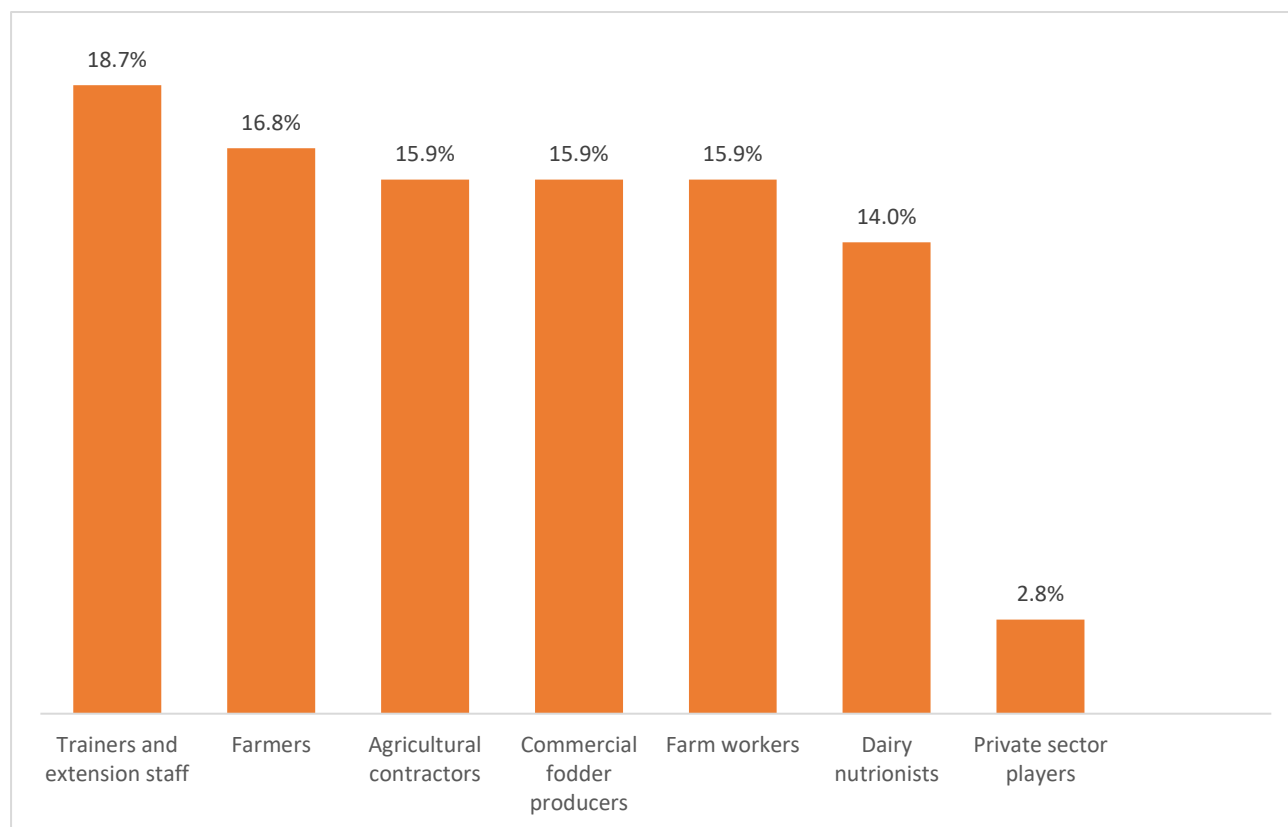


Figure 10.4. Question 38.” Who should be trained?”

According to the survey, all the stakeholders involved in forage production need to be trained. These were rated as follows: (i)) training and extension staff (18.7%), (ii) farmers (16.8%), (iii) agricultural contractors, commercial forage producers and farm workers (15.9%), (iv) dairy nutritionists (14.0%). (Figure 10.4).

Figure 10.4. Who should be trained? (Q38)



11. Environmentally sustainable forage production

Figure 11.1. Question 39” How do you rate the effect on the environment of current agricultural practices as regards forage production and preservation?

Respondents consider that the effect of current practices of forage production and preservation on the environment is either neutral (35%), negative (35%) and positive (30%) (Figure 11.1).

Fig 11.1. How do you rate the effect on the environment of current agricultural practices as regards forage production and preservation? (Q39)

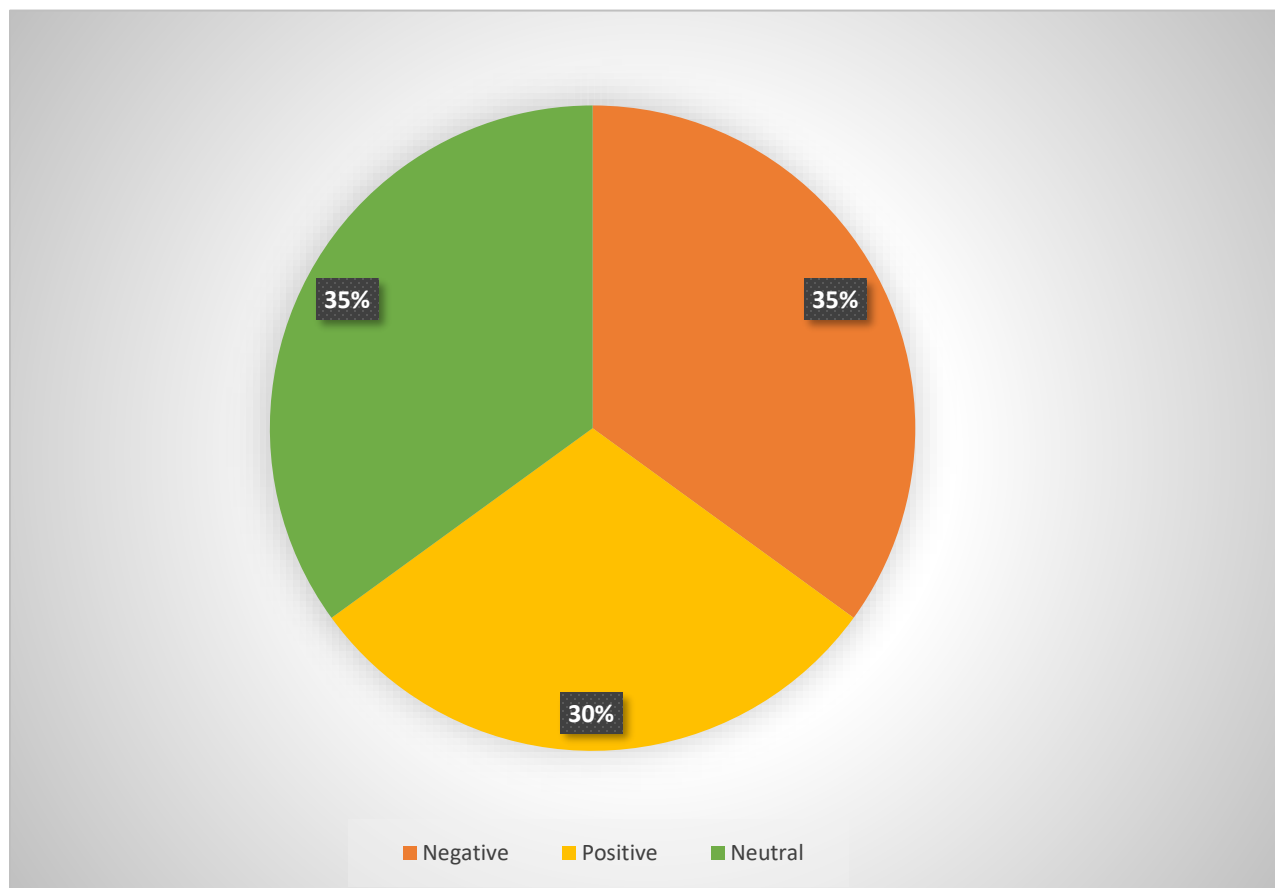


Figure 11.2. Question 40.” What is in your opinion the contribution of current forage production and preservation towards an environmentally sustainable dairy industry?”

According to the respondents 35% the contribution of current forage production practices as neutral, whereas 55% consider that current practices contribute positively towards a sustainable dairy industry (Figure 11.2).

Fig. 11.2. What is in your opinion the contribution of current forage production and preservation towards an environmentally sustainable dairy industry? (Q40)

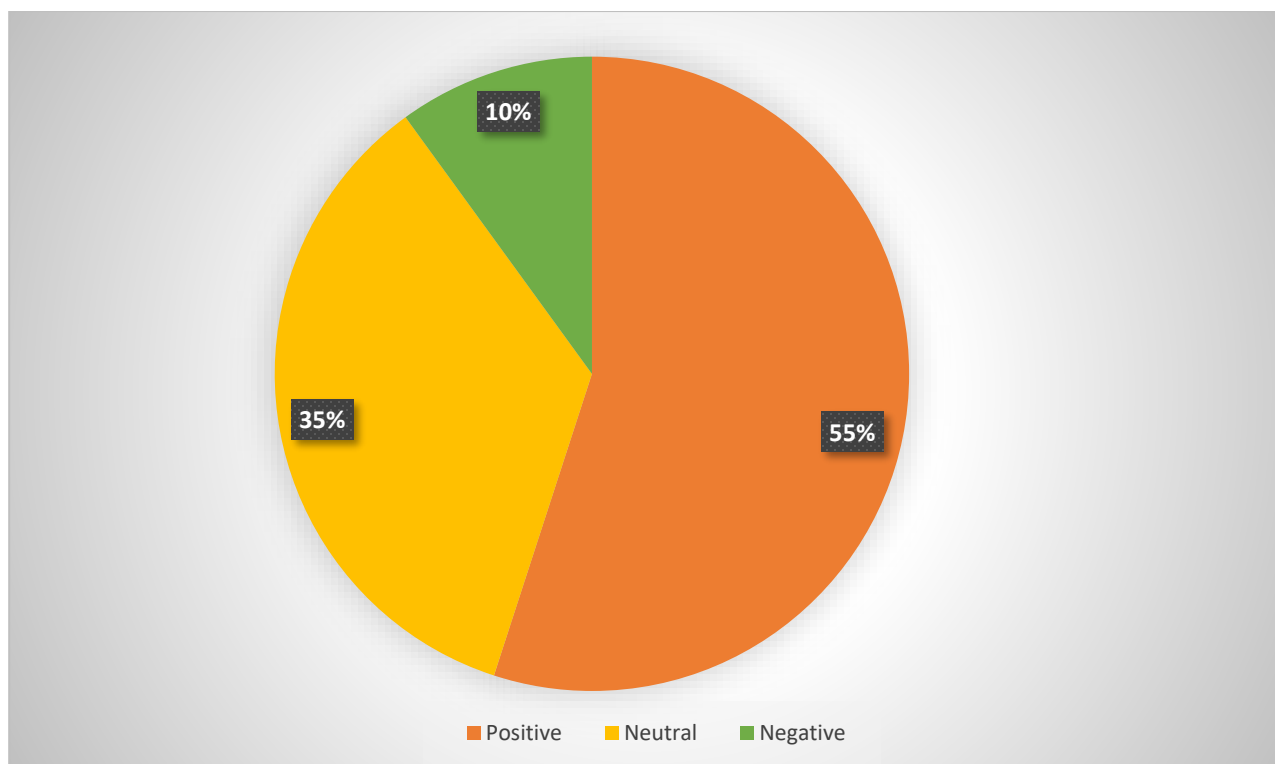


Figure 11.3. Question 41 Which good practices, interventions would you recommend as regards the forage sub-sector to reduce the (negative) impact on the environment?

The use of high quality forages was the option chosen by 28% of the responders, followed by improved manure management and grazing management (16%) (Figure 11.3).

Fig. 11.3 Which good practices, interventions would you recommend as regards the forage sub-sector to reduce the (negative) impact on the environment? (Q41)

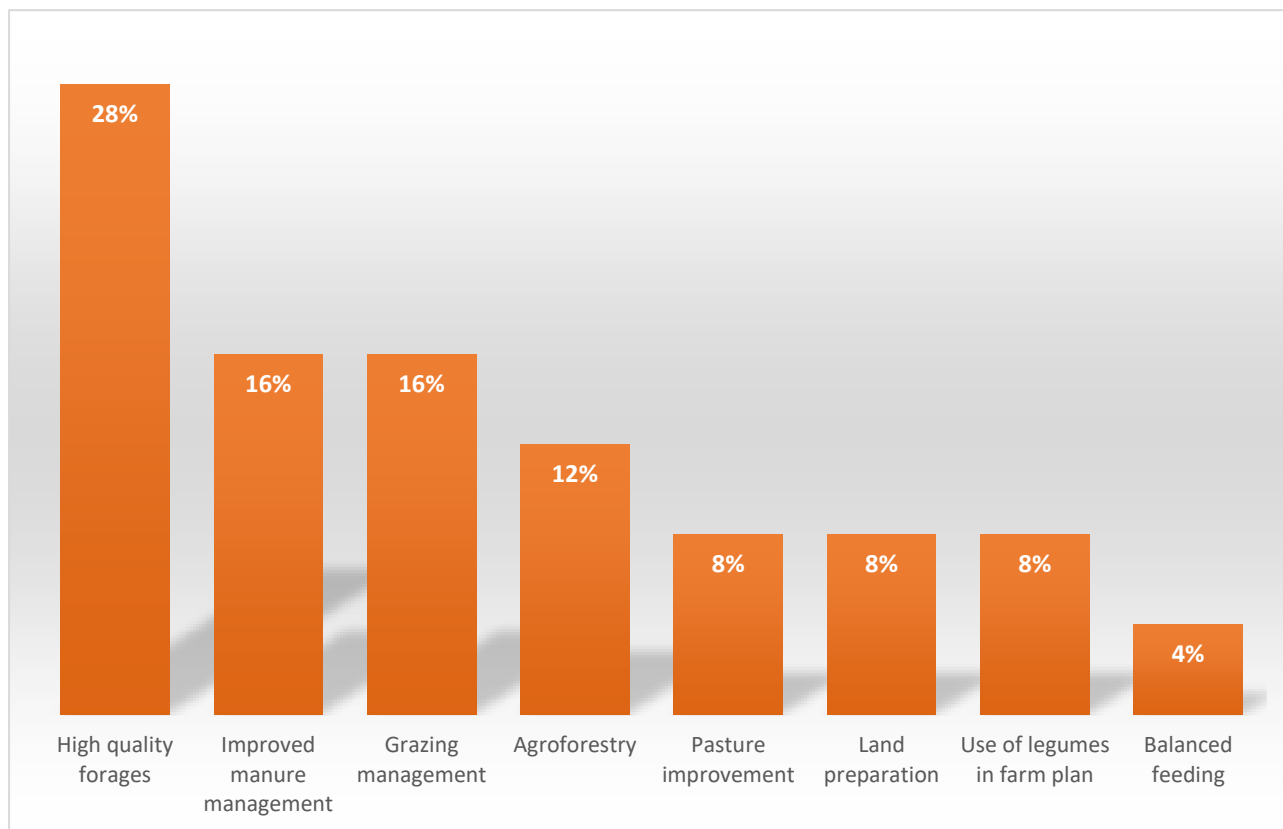


Figure 11.4. Question 42.” What other recommendation do you have – beyond forage production and preservation - for reduced environmental footprint for the Ugandan dairy industry?”

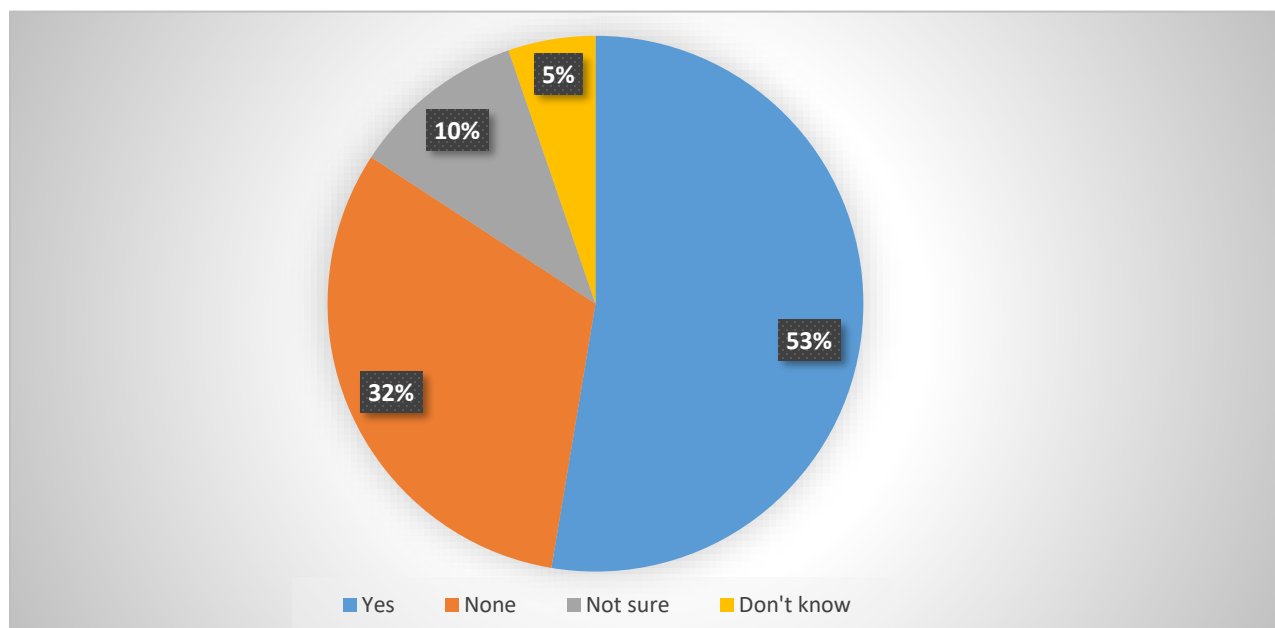
The three main recommendations the respondents gave to reduce the environmental footprint of the dairy industry in Uganda were (i) Encourage tree planting and afforestation (21.7%), (ii) installing and producing biogas at the farm level (21.7%), and (iii) recycle waste more effectively (8.7%) (Figure 11.4).

Fig 11.4 What other recommendation do you have – beyond forage production and preservation - for reduced environmental footprint of the Ugandan dairy industry? (Q42)	#
Afforestation & Incorporation of trees in forage production systems	5
Use of Biogas & manure management and decomposition	5
Establishe closed circular dairy systems to effectively recycle waste.	2
A strict breeding policy..... a proper rearing-fertility approach at dairy farms	1
Adopting intensive zero grazing practices	1
Creation of awareness amongst various stakeholders about climate change.	1
Dairy cooperatives should be supported financially.	1
Good perservation methods that produce quality silage for quality dairy products	1
Improving dairy cattle feed utilisation efficiency	1
Introduce new forage varieties	1
Manage stocking cattle rates on farms	1
Policies governing environment should be put in place	1
Forage improvement loans be introduced to dairy farmers.	1
Protocols on animal health& use antibiotics/medicines	1

Figure 11.5. Question 43.” Are there any regulations/policy requirements in place that you are aware of to reduce the environmental impact of livestock production systems (national or County level)?”

The majority of the respondents (53%) mention that there are regulations/policy requirements in place to reduce the environmental impact of livestock production systems on either regional or at national level (Figure 11.5).

Fig. 11.5. Are there any regulations/policy requirements in place that you are aware of to reduce the environmental impact of livestock production systems? (Q43)

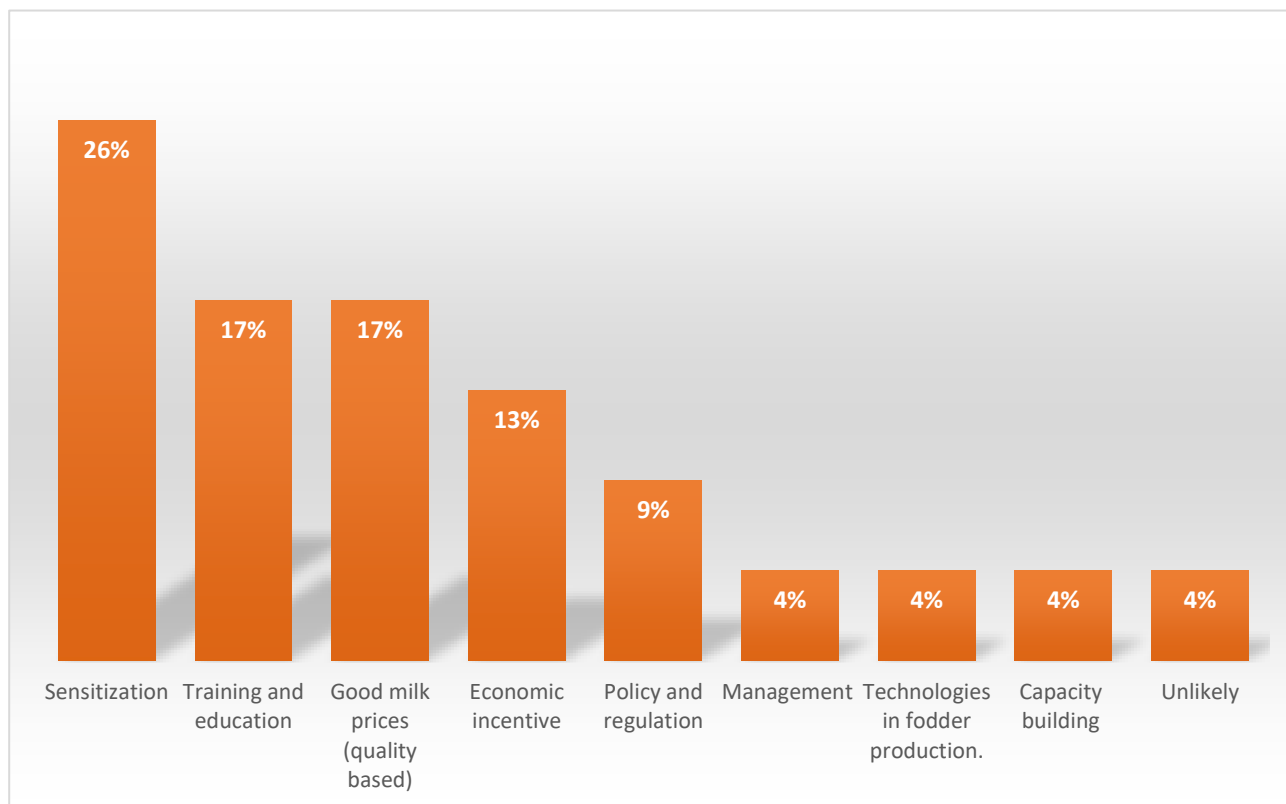


Regulations in place
National Environmental Management Act
Environment Impact Assessment Regulation.
Uganda national climate change policy,carbon footprint policy
Regulations at regional level
United Nations Convention on climate change(UNCCC)

Figure 11.6. Question 44.” In your opinion, how likely do you think farmers/commercial forage producers will adopt practices that will contribute to a better environment, but may require an investment? What will trigger them?”

For farmers to adopt and implement practices that will contribute to a better environment the respondents believe that farmers would do so if they are being sensitized about the subject (26%). Other considerations included (i) increasing awareness by training and educating farmers (17.4%), good milk prices (17.4%) and economic incentives (13%) (Figure 11.6).

Fig. 11.6. Question 44. In your opinion, how likely do you think farmers/commercial forage producers will adopt practices that will contribute to a better environment, but may require an investment? What will trigger them? (Q44)



12. Innovations

Figure 12.1. Question 45. "During the past 5 years, you may have observed some of the innovations that are listed below. Please confirm by rating their impact (high, low, or not observed)".

A total of 16 different innovative activities were listed in the questionnaire and the respondents were asked to rate the impact of each innovation. Those considered as having a high impact were the following: (i) introduction of baled/packed silage (> 60%), (ii) improved silage practices (>60%) and (iii) new fodder maize/sorghum varieties (>60%), (iv) use of conservation agriculture (50%) hay production (50%), (v) improved hay production (50%). (Figure 12.1).

Fig. 12.1. During the past 5 years, you may have observed some of the innovations that are listed below. Please confirm by rating their impact (Q45).

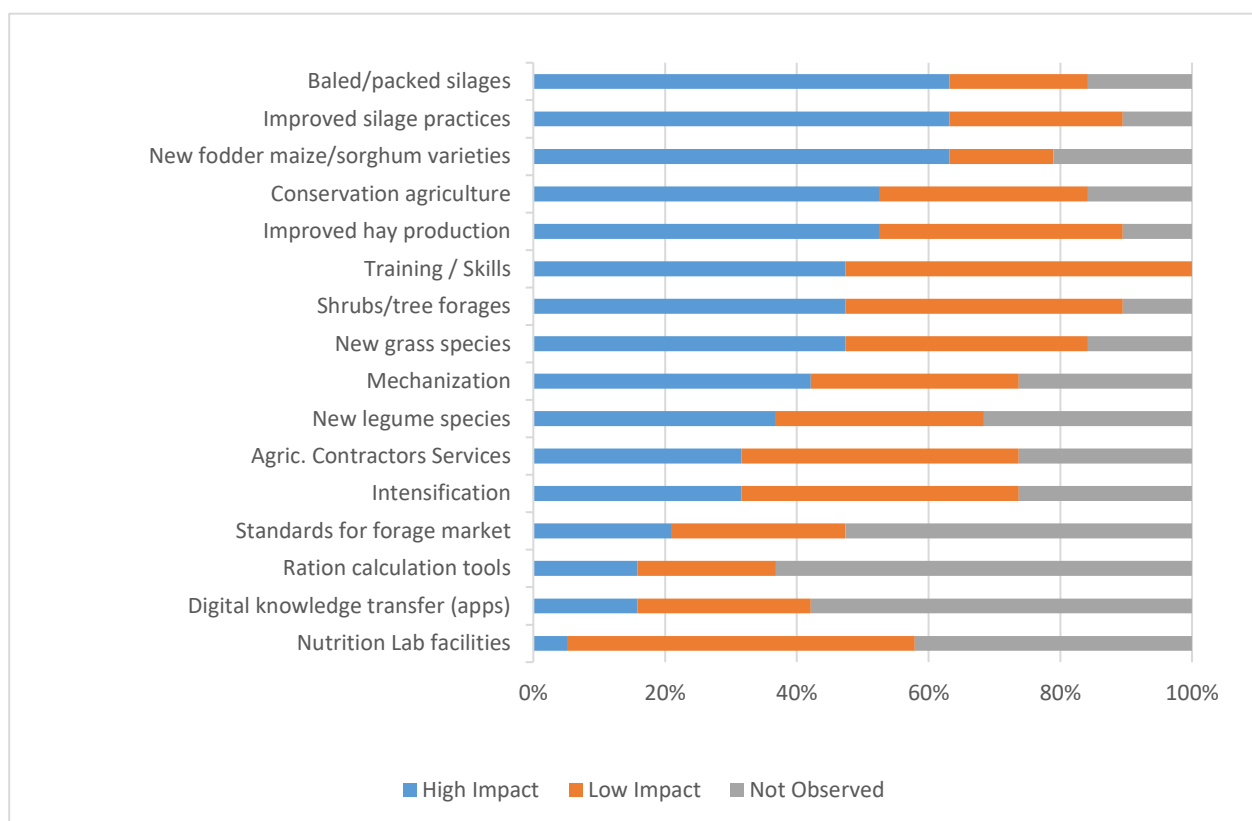


Figure 12.2. Question 46. "Which other innovations would you like to add Please indicate their impact (high/low)."

The respondents consider that the production and use of compounded feeds with maize grain or the agro-industrial by-products of maize processing would have a high impact on the dairy sector. Others mentioned increase the use of agroforestry trees and training farmers in permaculture and sustainable agricultural practices would have a high impact (Figure 12.2).

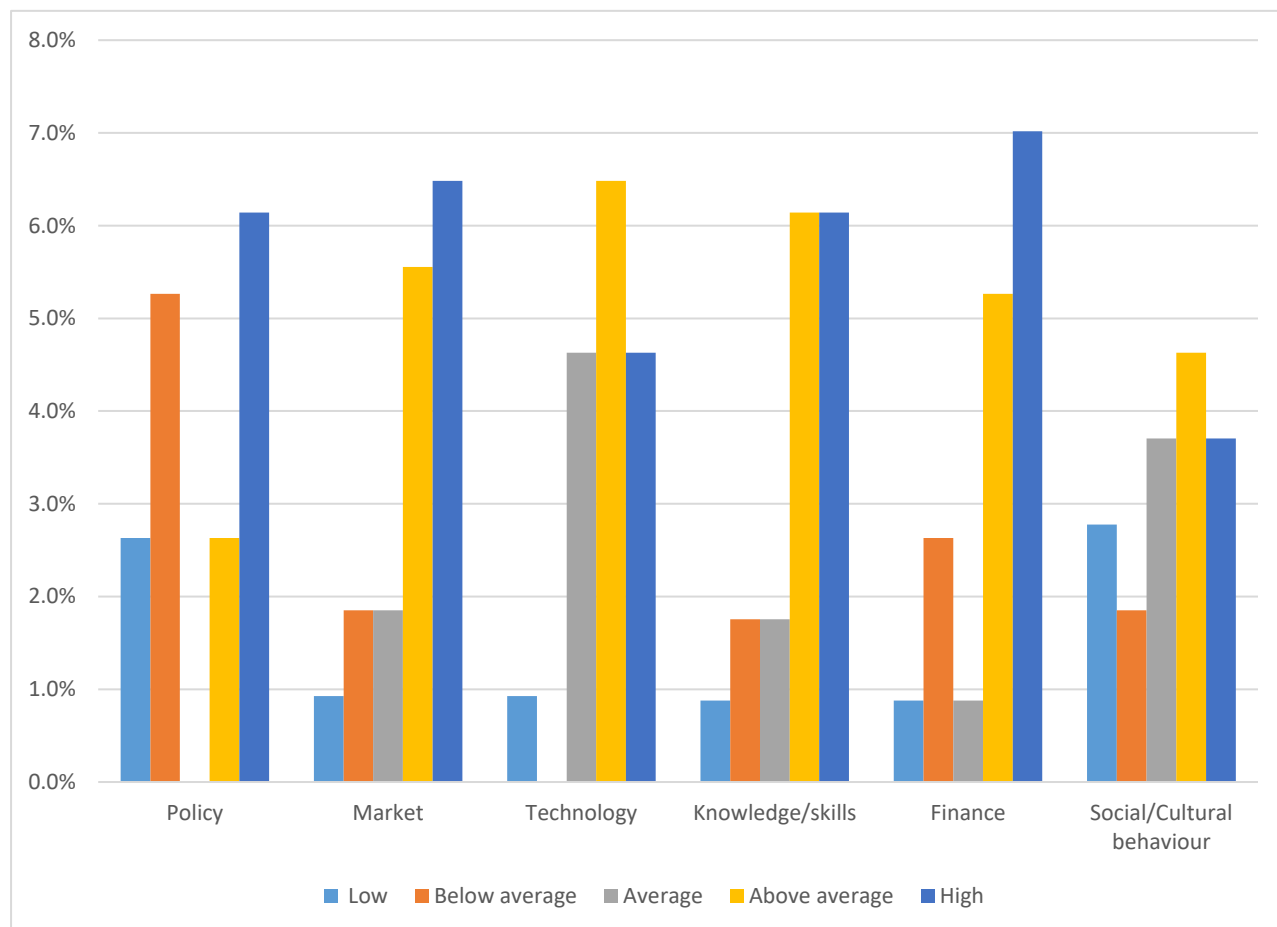
Fig. 12.2. Which other innovations would you like to add Please indicate their impact (high/low) (Q46)

Compounded feeds with maize grains or their agro-industrial by-products as the main ingredient	High
Increase in agroforestry trees	High
Total diet ration balancing	Low
Soft loans to adapt to climate change	Low
Farm mapping and paddocking	Low
Protein extraction from forage	Low
Training in permaculture and sustainable agriculture	High

Figure 12.3. Question 48.” What aspects need to be considered before a new intervention is introduced or put into action? Please rate from 1 - 5 and explain (1 = low importance, 5 = high importance)

According to the survey, all proposed aspects (policy, market, technology, knowledge and skills, finance, social/cultural behavior) need to be considered, especially with attention to finance, knowledge and markets (Fig 12.3).

Fig. 12.3. What aspects need to be considered before a new intervention is introduced or put into action? Please rate from 1 - 5 and explain (1 = low importance, 5 = high importance) (Q48).



Questionnaire

Introduction

This questionnaire is one of the tools that is used for the (dairy) Forage Quick Scans for Kenya, Uganda and Ethiopia, referred to in the covering letter. This is a project under the Netherlands East African Dairy Partnership (NEADAP) that includes Ethiopia, Kenya and Uganda.

In Uganda it is administered by SNV's The Inclusive Dairy Enterprise (TIDE). TIDE is funded by the Netherlands Embassy in Uganda. The questionnaire focuses on the current status of forage crops availability, production and preservation practices, technologies, and innovations. This includes forages produced and preserved by the farmer, by commercial forage producers and agricultural contractors.

The questionnaire further deliberates on relevant aspects that impact on the forage sub-sector, such as knowledge and skills level, market needs and demands by different farming systems, agro-ecology, availability of land and appropriate seeds, mechanization level/needs, and other factors that impact on the performance of the forage sub-sector and – through it – on the dairy sector.

The questionnaire is designed for administration in Kenya, Ethiopia and Uganda. Please provide the following information as requested in the pages below for Uganda only. The questionnaire, if so desired, allows you to answer part of the questions, exit and continue later from where you left.

The answers to the questionnaire do not need to reflect the policies of the company/organization you work for and will be treated confidential.

The farming systems used in the questionnaire are based on different forage crops, grasses and how these forage crops are managed, used and/or fed in the different dairy farming systems. Other forage crops, like sorghum, maize or lucerne may be used across the 3 systems as a cut and carry crop or in a fully mechanized system.

The first farming system is the intensive/crop-livestock system (like zero grazing and semi-zero grazing). This system – irrespective of farm size – is based on cut and carry fresh or preserved fodder crops, grown by the farmers themselves.

The second system is semi intensive (grazing)- improved pasture is a system where particularly pasture grasses are used as forage crops either in a stall-fed system or a paddock system with cows grazing day and night or part of the day.

The third system: extensive grazing (e.g ranching and pastoral) is contrary to the other 2 systems making use of the natural vegetation. This system is an extensive livestock management system characterized by a small number (<1) of Livestock Units (LU) per ha.

For further explanation: Intensive and semi intensive are crop-livestock based system while extensive are livestock based systems.

For any questions and submission of any other relevant reports or documents that you wish to share with us to consider for the Quick Scan, please contact:

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1. Please enter your email address

Email Address

General

2. Select the **five** most important constraints that prevent an increase in forage production and preservation in Uganda.

- ☐ Forage policies
- ☐ Land tenure systems
- ☐ Land availability
- ☐ Milk market
- ☐ Seed/plant material availability
- ☐ Awareness, knowledge and skills
- ☐ Training/education
- ☐ Mechanisation
- ☐ Food/forage crop competition
- ☐ Contractor/service availability
- ☐ Financial matters
- ☐ Logistic-transportation-infrastructure

3. List at least **three** important reasons why in Uganda production of quality Forages (high nutritive value) is deficient.

1

2

3

Other

Forage Species

4. What are the **three** most common forage species used by dairy farmers in different farming systems (Intensive, Semi intensive and Extensive)?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

5. Which forage species, in order of importance, do you think give the best return for the dairy farmer in the different farming systems?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

6. What are the main constraints for forage production in the dairy farming systems and for commercial forage producers?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

Commercial Forage Producers

7. What new forage species (energy/protein rich) do you think can be introduced in the dairy farming systems?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

Forage Preservation

8. What are the **three** most common forage preservation methods used in the dairy farming systems and by commercial fodder producers?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

Commercial Forage Producers

9. List at least **three** most common causes for post-harvest losses in the forage production and preservation chain?

1.

2.

Others

10. What farming practices can dairy farmers adopt to prevent or reduce harvest and post harvesting losses?

11. Which other conservation methods or technologies do you think could be introduced in the current dairy farming systems?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

Commercial Forage Producers

12. Which forage crops (mention **three**) and preservation technologies (mention **three**) are best suited to reduce the problem of seasonality?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

13. Where do you think commercial forage production will be developed in the Future?

	Unlikely	Maybe	Very Likely
Karamoja Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Northern and Eastern Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Central (Rural) Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Central (Peri-Urban Kampala) Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
South-Western and Mid-Western Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Where do you think commercial milk production will be developed in the future?

	Unlikely	Maybe	Very Likely
Karamoja Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Northern and Eastern Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Central (Rural) Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Central (Peri-Urban Kampala) Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
South-Western and Mid-Western Why <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Which measures need to be taken - at various levels e.g. farm, policy, seed supply, mechanization- to improve the quality of forages?EADAP

Forage-Seeds or Plant Material

16. In your opinion, what is the availability of the listed seeds/plant material in the market?

	Low availability	Medium availability	High availability
Kikuyu grass	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Napier grass	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Boma Rhodes grass	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Brachiaria grass	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fodder Sorghum	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Fodder Maize	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oats	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Vetch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lucerne	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Sesbania	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calliandra	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Leucaena	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tree Lucerne	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Desmodium	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
African Foxtail	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Masaai Love grass	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Others (please indicate the availability(low, high or medium))

17. What are reasons for low availability of seeds in the market (incl. new varieties or species not yet registered in Uganda)? If different per forage crops as listed in Q.16, please explain.

18. How would you increase the availability of seed/plant material? If different per forage crops as listed in Q.16, please explain.

19. How would you engage dairy farmers to use improved forage seeds/plant material for planting?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

20. When improved forage seeds/plant material are available to benefit farmers, do farmers need to improve agricultural practices at the same time? If so list agricultural practices that are limiting quality forage production.

- No, not necessary
- If Yes, what other practices (name three) on the farm do you think should be improved when seed/plan material is improved

Mechanization of Forage Production

The following questions refer to the scale of dairy farms in relation to the level of mechanization.

21. What is the mechanisation level for forage production and preservation for the **urban and peri-urban** dairy farmers?

	Low	Medium	High
Maize and Sorghum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		
Boma Rhodes, Kikuyu, Star grass,	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		
Napier grass and Brachiaria	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		
Lucern and Oats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		
Rangeland/Natural grassland	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		

22. What is the mechanisation level for forage production and preservation for the **rural-based** dairy farmers?

	Low	Medium	High
Maize and Sorghum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		
Boma Rhodes, Kikuyu, Star grass,	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		
Napier grass and Brachiaria	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		
Lucern and Oats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		
Rangeland/Natural grassland	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Why	<input type="text"/>		

23. What do you think is the main mechanization problem that is currently hindering the production, quality and utilization of forages on dairy farms?

Intensive (Zero Grazing/Semi zero grazing)

Semi Intensive (Grazing on improved fenced pastures)

Extensive (Rangeland/Natural grassland)

Commercial fodder producers

24. Would you prefer to promote on-farm mechanization or use of skilled contractors with appropriate machinery in different dairy systems?

	On-farm mechanization	Skilled Contractors	Both
Intensive (Zero grazing/semi zero Grazing)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Semi Intensive (Grazing on improved fenced pastures)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Extensive (Range land/Natural grassland)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. What solutions do you suggest for enhanced mechanization of forage production and preservation in small holder, medium and large scale dairy farms?

Small holder dairy farms

Medium and large scale dairy farms

Service Providers and Input Suppliers

26. What is your perception of the quality of the input suppliers and service providers in relation to forages, on a scale of 1 - 5 (1 = poor, 5 = excellent)?

	1	2	3	4	5
Seed/plant material supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training and advisory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mechanisation services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supply of inputs for silage making (plastic, inoculant, others)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Agricultural Contractors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Laboratories for feed testing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. Which services, according to you, are missing in the Ugandan forage market?

28. What improvements (maximum **three**) are required at the level of input suppliers and service providers to achieve improved availability and quality of forages?

Seed/plant material supply

Training and advisory

Mechanisation services

Supply of inputs for silage making (plastic, inoculant, others)

Agricultural contractors

Laboratories for feed testing

Forage Market.

29. What kind of forages can you find nowadays being offered for sale in the market (e.g. fresh/green forages, imported forages, grass hay, wheat straw, silage, etc.)?

30. How would you define the actual forage market (e.g. seasonal, opportunistic, formal/informal, quality control, standards, etc.)?

31. What opportunities and bottlenecks are there in the commercialisation of forages?(List at least three in order of importance)

Opportunities

Bottlenecks

32. What improvements and changes need to be made by commercial forage producers to improve forage production in terms of yield and quality?

Quality

Yield

33. What affects production levels and cost price of raw milk mostly: the quality of forages or of compounded feeds? Give **three** examples of good quality forage crops available.

34. What is your opinion on the opportunity of forage production in agro-forestry systems? (e.g collection of biomasses, drying and pelleting)

On-farm (Give three examples)

As a forage crop for commercialisation (Give three examples)

Education and Training

35. What is the availability of education and training on forage and quality of production, preservation and inclusion of dairy cow ration formulation in the country

36. What knowledge and skills are lacking in regards to forage production and preservation? (Mention **three**)

37. Who should provide this training? (Mention **three**)

38. Who should be trained?

- | | |
|-------------------------------------------------------|------------------------------------------------------|
| <input type="checkbox"/> Farmers | <input type="checkbox"/> Commercial fodder producers |
| <input type="checkbox"/> Training and extension staff | <input type="checkbox"/> Farm workers |
| <input type="checkbox"/> Agricultural contractors | <input type="checkbox"/> Dairy nutritionists |
| <input type="checkbox"/> Other (please specify) | |

Environmental Footprint

39. How do you rate the effect on the environment of current agricultural practices as regards forage production and preservation?

Positive

☐

Neutral

☐

Negative

☐

40. Are you aware of greenhouse gas emissions on farms?

☐ No

☐ If yes, name three types of greenhouse gases.

41. What is in your opinion the contribution of current forage production and preservation towards an environmentally sustainable dairy industry?

Positive

☐

Neutral

☐

Negative

☐

42. Which good practices, interventions would you recommend as regards the forage sub-sector to reduce the (negative) impact of greenhouse gases on the environment?

43. What other recommendation do you have – beyond forage production and preservation - for reduced environmental footprint of the Ugandan dairy industry?

44. Are there any regulations/policy requirements in place that you are aware of to reduce the environmental impact particularly of greenhouse gases of livestock production systems (National or Regional level)?

45. In your opinion, how likely do you think farmers/commercial fodder producers will adopt practices that will contribute to a better environment, e.g. reduce Greenhouse gas emission, but may require an investment? What will trigger them?

Innovations

46. During the past 5 years you may have observed some of the innovations that are listed below. Please confirm by rating their impact (high, low, or not observed)

	High Impact	Low Impact	Not Observed
New legume species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
New grass species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
New fodder maize/sorghum varieties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shrubs/tree forages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved silage practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved hay production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baled/packed silages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standards for forage market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intensification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mechanization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutrition Lab facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agric. Contractors Services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Digital knowledge transfer (apps)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ration calculation tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training / Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conservation agriculture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

47. Which other innovations would you like to add? Please indicate their impact (high or low).

48. What aspects need to be considered before a new intervention is introduced or put into action? Please rate from 1 - 5 and explain (1 = low importance, 5 = high importance)

	1	2	3	4	5
Policy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please explain	<input type="text"/>				
Market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please explain	<input type="text"/>				
Technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please explain	<input type="text"/>				
Knowledge/skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please explain	<input type="text"/>				
Finance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please explain	<input type="text"/>				
Social/Cultural behaviour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please explain	<input type="text"/>				



NEADAP

NETHERLANDS EAST AFRICAN
DAIRY PARTNERSHIP



Milk
Quality



Forage &
Nutrition



Inclusive
Business Models



Networking
& Influencing



Innovation

