JHER Vol. 30, No. 2, December 2023, pp. 56– 69

Grassland Management Employment Opportunities in Kogi State, Nigeria

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Abstract

The study focused on grassland management employment opportunities in Kogi State, Nigeria. Specifically, it determined employment opportunities in grassland management, challenges that could hinder employment in various grassland management opportunities, and ways of ameliorating the challenges that could hinder employment in various grassland management opportunities the state. Survey research design was used. Population was made up of 81 respondents consisting of 42 Agricultural Extension lecturers and 39 Extension agents. Questionnaire was utilized for data collection. It was validated by three experts. Cronbach Alpha reliability coefficient of 0.82 was obtained for the instrument. Data were analyzed using mean and standard deviation and t-test. Finding include 12 employment opportunities available in grassland management such as Grassland Manager ($\overline{X}$= 3.32) and Grazing assistant ($\overline{X}$= 3.62). Also 10 challenges that could hinder employment opportunities in various grassland management opportunities were identified such as climate-related challenges such as droughts ($\overline{X}$= 3.72) and low reputation of various grassland management opportunities ($\overline{X}$= 3.72) 13 ways of ameliorating challenges that could hinder employment opportunities were identified. These include building synergies with NGOs that already provide skills for grassland management ($\overline{X}$= 3.46) and improving access to resources and infrastructure needed in grassland management ($\overline{X}$ = 3.24). Further, there was no significant differences between the mean responses of Agricultural Extension lecturers and Extension Agents on employment opportunities available in grassland management, challenges that could hinder employment opportunities and ways of ameliorating the challenges, all at 0.05 level of significance.

Keywords: Grassland, Management, Employment, Opportunities, Challenges, Extension, Agents

Introduction

Grassland refers to an area in which vegetation is dominated by nearly continuous cover of grasses. According to Derner and Briske (2013), grasslands are characterized by the dominance of grasses and herbaceous plants. They are extensive ecosystems that play a critical role in supporting biodiversity, providing ecosystem services, and contributing to the global carbon cycle. Grasslands occur in environments conducive to the growth of plant-cover, but not that of taller plants, particularly trees and shrubs (Veldman, *et al*, 2015). Grasslands exhibit unique characteristics shaped by environmental factors such as climate, soil conditions, and grazing patterns(Ogbonna & Mshelia, 2018). They demonstrate remarkable adaptability and resilience, supporting a wide range of plant and animal species (Grace, et, al 2016). Grasslands provide essential ecological functions, including soil stabilization, water filtration, carbon sequestration, and forage production for livestock (Milchunas, *et al*, 2017). Grassland provides feed for livestock especially ruminants, reduces the cost of feeding animals especially ruminants and increases infiltration and percolation of water, thereby reducing run off and soil erosion (Iwena, 2012). According to Ejiofor, et al, (2017), grassland also provides adequate nutrients to the soil through legumes which fix nitrogen in the soil as well as source of income to the person managing the grassland. Human activities have however disrupted the natural equilibrium of grasslands, threatening their sustainability. Overgrazing, land conversion for agriculture or urban development, and inadequate land management practices have contributed to grassland degradation (Milchunas *et al.,* 2017). To ensure the long-term viability of grasslands, effective management strategies must be implemented.

Grassland management involves a range of operations aimed at restoring and maintaining the ecological integrity of these ecosystems. It encompasses practices such as grazing management, restoration of degraded areas, control of invasive species, monitoring of biodiversity, and the development of sustainable land management plans (Food and Agricultural Organization (FAO), 2019).Grassland management refers to the manipulation of natural vegetation in order to achieve some predetermined goals(Grassland Conservation Council of British Columbia, 2012). Grassland management keeps grass stands healthy so that they continue to provide long term conservation benefits (Minnesota Department of Agriculture, 2016). Due to the importance of grassland, it is fast becoming a viable area for employment in developed countries (Nwakile, *et al*, 2020).

The management of grasslands presents numerous employment opportunities. Skilled professionals are required to carry out critical tasks in grassland management, including land assessment, monitoring and evaluation,

implementation of management plans, community engagement, research, and policy development (Griffith, *et al*, 2017). These professionals play a vital role in ensuring the sustainable use and conservation of grasslands. According to Zhang, Lü, Isbell and Han (2019), job opportunities in grassland management includes: range manager, grassland conservation officer, restoration scientist, wildlife biologist and agricultural extension agents. Furthermore, controlled burning is often employed as a management tool in grassland ecosystems (DeLonge, *et al*, 2019). It helps control invasive species, rejuvenate grasses, and maintain habitat diversity (Milchunas, *et al*, 2017). Fire management activities include prescribed burning planning, monitoring weather conditions, implementing safe and controlled burns, and assessing post-fire vegetation responses (Nelson, *et al*, 2017).In undertaking a career in grassland management, certain practices are involved. The practices involved in grassland management help to ensure that grassland management is carried out efficiently.

Activities involved in grassland management are crucial for maintaining the health, productivity, and ecological integrity of these ecosystems (Derner, *et al*, 2018). According to Collins, et al (2018), the activities involved in grassland management includes determining appropriate stocking rates, implementing rotational grazing systems, monitoring grazing intensity, and managing livestock distribution. Lacey, *et al* (2021) posited that activities involved in grassland management includes identifying and monitoring invasive species, implementing targeted control methods (such as herbicide application, mechanical removal, or biological control), and implementing restoration activities to promote the recovery of native vegetation. Globally, there is an increasing demand for grassland management professionals, reflecting the growing recognition of the importance of sustainable land management practices (Zhang *et al.*, 2019). The Food and Agriculture Organization (FAO) highlights that grasslands cover approximately 26% of the world's land surface and provide livelihoods for millions of people globally (FAO, 2019). This underscores the significant role that grassland management employment plays in supporting local economies and promoting sustainable development in countries including Nigeria (Ogbonna & Mshelia, 2018).

In Nigeria, grasslands cover substantial portions of the country's land, including Kogi state (Ogbonna & Mshelia, 2018). This shows that Kogi State has the potentials to grassland management employment opportunities. These opportunities are however not explored and investigated through research. This is sad considering that Amedu (2018) reported that the state has one of the highest unemployment and poverty rates in Nigeria. To survive, many individuals have resorted to negative vices such as stealing, kidnapping and prostitution amongst others as a means

of survival (Amedu, 2018). It is therefore necessary to investigate issues relating to the promotion of grassland management employment opportunities in Kogi State.

Employment opportunities that can be generated through grassland management are numerous. Ogbonna and Mshelia (2018), identified job opportunities in grassland management which include; grassland restoration labourer, grazing assistant, pasture maintenance worker, invasive species control crew, livestock herder, wildlife habitat monitor and land rehabilitation labourer. Despite these opportunities, there is need for empirical studies to ascertain if they fit into the characteristics of inhabitants of the area. Furthermore, despite these opportunities in grassland management, certain challenges could hinder individuals in Kogi State from engaging in opportunities in grassland management. According to Sheley, *et, al.,* (2020), factors that could inhibit the utilization of grassland management opportunities include: general lack of extension agents to teach the skills and low reputation of grassland management. Others include inadequate provision of labour market information to students about grassland management and inadequate policy coordination favoring grassland management (Pywell, *et al*, 2020). In spite of the potentials of grassland management employment opportunities in Kogi state, there appears to be no available research findings on the potentials. This is a gap that needs to be closed, hence this study

Purpose of the Study

The study focused on ascertaining grassland management employment opportunities in Kogi state, Nigeria. Specifically, the study determined:

1. Employment opportunities available in grassland management in Kogi State, Nigeria.
2. challenges that could hinder employment in various grassland management opportunities in Kogi State, Nigeria.
3. ways of ameliorating challenges that could hinder employment in grassland management employment opportunities in Kogi State, Nigeria.

Hypotheses (HOs)

There is no significant difference between the mean opinions of Agricultural Extension Lecturers and Extension agents on HO_1 employment opportunities available in grassland management in Kogi State, Nigeria

HO_2 challenges that could hinder employment in various grassland management employment opportunities in Kogi State, Nigeria

HO_3 ways of ameliorating the challenges that could hinder employment in grassland management employment opportunities in Kogi State, Nigeria.

Methodology

***Design of the Study*:** The study adopted a survey research design.

Area of the Study: The study was carried out in Kogi State. Kogi is a state in the North central region of Nigeria.

It is popularly called the Confluence state because of the confluence of River Niger and River Benue at its capital, Lokoja. Kogi state was chosen because of the high level of poverty among families in the area despite having numerous grasslands in the area which would create employment (Amedu, 2018).

Population for the Study: The population for the study was 81respondents consisting of 42Agricultural Extension lecturers and 39 Extension agents in the area. Source of information: (Personnel Office of the various tertiary institutions, 2022) and (Kogi State Ministry of Agriculture, 2022). Agricultural extension lecturers are involved in the training of extension agents while extension agents take information that is needed to farmers and rural areas. No sampling or sampling was carried out due to the manageable size of the population.

Instrument for Data Collection: The instrument for data collection was questionnaire. The questionnaire contained 35 items which were generated based on literature review. It was validated by five experts. The internal consistency of the instrument was determined using Cronbach Alpha reliability coefficient which yielded a coefficient index of 0.82. The items on the questionnaire were divided into clusters I, II and III based on the research questions. Cluster I had 4-point response options of Very Available (VA), Occasionally Available (OA), Rarely Agree (RA), and Not Available (NA) with weights of 4, 3, 2 and 1 respectively. Cluster II had 4-point response options of Very Strong Challenge (VSC), Strong Challenge (SC), Mild Challenge (MC), and Not a Challenge (NC) with weights of 4, 3, 2 and 1 respectively. Cluster III had 4-point response options of Very Strong Way (VSW), Strong Way (SW), Mild Way (MC), and Not a Way (NW) with weights of 4, 3, 2 and 1 respectively.

Data Collection Technique: A total of 81 copies of questionnaire were distributed to respondents. Only 73 copies were properly filled and retrieved from 36 agricultural extension lecturers and 37 extension agents. This gave a return rate of approximately 90.1 percent.

Data Analysis Technique: The data collected were analyzed using mean ($\overline{X}$) and standard deviation (SD) to answer the research questions. Null hypotheses were tested using t-test at 0.05 level of significance. A cut-off mean of 2.50 was used for decision making based on the 4-point scales and the specific purposes of the study. Items that had mean values of 2.50 and above ($\overline{X}$ = ≥ 2.50) were categorized as Available (A), Challenge (C) and Way (W) for clusters I, II and III respectively while items with mean less than 2.50 were categorized as Not Available (NA), Not a Challenge (NC) and Not a Way (NW) for clusters I, II and III respectively.

RESULTS

Table 1: Mean, Standard Deviation and t-test of Responses on employment Opportunities Available in Grassland Management in Kogi State, Nigeria

S/N	Employment Opportunities	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	Df	t-cal	Remarks	
1	Grassland manager	3.38	0.70	3.26	0.76	3.32	0.73	71	0.37	A	NS
2	Grassland restoration labourer	3.20	0.80	3.36	0.68	3.28	0.74	71	0.78	A	NS
3	Restoration scientist	3.30	0.55	3.50	0.57	3.40	0.56	71	0.65	A	NS
4	Grazing assistant	3.62	0.60	3.58	0.68	3.60	0.64	71	0.94	A	NS
5	Agricultural Extension agents	3.16	0.63	3.28	0.57	3.22	0.60	71	0.66	A	NS
6	Pasture maintenance worker	3.40	0.82	3.30	0.86	3.35	0.84	71	0.27	A	NS
7	Land rehabilitation labourer	3.19	0.78	3.13	0.70	3.16	0.74	71	0.74	A	NS
8	Invasive species control crew	3.42	0.60	3.62	0.64	3.52	0.62	71	0.12	A	NS
9	Livestock herder	3.16	0.70	3.12	0.90	3.14	0.80	71	0.80	A	NS
10	Wildlife habitat monitor	3.01	0.83	3.03	0.89	3.02	0.86	71	0.81	A	NS
11	Agroforestry specialist	3.61	0.89	3.68	0.95	3.65	0.92	71	0.72	A	NS
12	Community engagement coordinator	3.40	0.72	3.56	0.80	3.48	0.76	71	0.76	A	NS

Population = 73; $\bar{X}_1$ = Mean of 36 Extension lecturers; $\bar{X}_2$ = Mean of 37 Extension agents $\bar{X}_G$ = Grand Mean; SD_G = Grand standard deviation; A = Available; NA = Not Available; S= Significant; NA = Not Significant; Df = Degree of freedom; t-cal = t-calculated

Table 1 shows that all the 12 items has means ranging from 3.02 – 3.65 ($\bar{X}$ = ≥ 2.50). This implies that the 12 items are available opportunities for employment in grassland management in Kogi State, Nigeria. The standard deviation of all the 12 items ranged from 0.56 – 0.92. Each of the values was below 1.96 indicating that the respondents were near to the mean and to each other in their responses. The Table also shows that all the 12 items had their t-cal values ranging from 0.12 – 0.94 which were greater than 0.05 level of significance. Therefore the null hypothesis of no significant differences was upheld for all the 12 items. This shows that the mean responses of the respondents do not differ significantly in their opinions on the employment opportunities available in grassland management in Kogi State, Nigeria.

Table 2: Mean Ratings, Standard Deviation and t-test of the Responses on Challenges that Could Hinder Employment in Various Grassland Management Opportunities in Kogi State, Nigeria

S/N	Challenges	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	Df	t-cal	Remarks	
1	Low reputation of various grassland management opportunities	3.18	0.58	3.26	0.66	3.22	0.62	71	0.19	C	NS
2	Grassland management training for interested people on various jobs is sometimes only theoretical	3.34	0.60	3.42	0.62	3.38	0.58	71	0.46	C	NS
3	Extension agents are sometimes lacking in practical knowledge of grassland management needed to train those seeking job opportunities in grassland management	3.10	0.50	3.18	0.58	3.14	0.54	71	0.10	C	NS
4	Lack of knowledge among people about grassland management	3.09	0.62	3.11	0.66	3.10	0.64	71	0.59	C	NS
5	Limited resources and infrastructure such as fencing materials, watering systems, and machinery for mowing which poor families may not be able to afford.	3.15	0.72	3.25	0.72	3.20	0.72	71	0.57	C	NS
6	Inadequate access to land and land tenure issues	3.22	0.80	3.28	0.92	3.25	0.86	71	0.81	C	NS
7	Climate-related challenges such as droughts, floods, and extreme weather events can hinder grass production	3.70	0.81	3.74	0.85	3.72	0.83	71	0.68	C	NS
8	Difficulty in accessing markets and establishing value chains	3.08	0.96	3.20	0.92	3.14	0.94	71	0.58	C	NS
9	Inadequate policy coordination favoring grassland management	3.05	0.46	3.15	0.50	3.10	0.48	71	0.39	C	NS

10	Limited extension services hinder the effective implementation of grassland management initiatives among families	2.96	0.70	3.00	0.74	2.98	0.72	71	0.75	C	NS

Population = 73; $\overline{X}_1$ = Mean of 36 Extension lecturers; $\overline{X}_2$ = Mean of 37 Extension agents $\overline{X}_G$ = Grand Mean; SD_G = Grand standard deviation; C = Challenge; NC = Not a Challenge; S= Significant; NA = Not Significant; Df = Degree of freedom; t-cal = t-calculated

Table 2 shows that of all 10 items ranged from 2.98 – 3.74 ($\overline{X}$ = ≥ 2.50). This implies that the 10 items are the challenges that could hinder employment in various grassland management opportunities in Kogi State, Nigeria. The standard deviation of all the 10 items ranged from 0.48 – 0.94. Each of the values was below 1.96 indicating that the respondents were near to the mean and to each other in their responses. The Table also shows that all the items had t-cal values ranging between 0.10 – 0.81. All the items had t-cal values greater than 0.05 indicating that there were no significant differences between the opinions of Agricultural Extension Lecturers and Extension agents on the challenges that could hinder employment in various grassland management employment opportunities in Kogi State, Nigeria.

Table 3: Mean, Standard Deviation and t-test of Responses on the Ways Ameliorating the Challenges that Could Hinder Employment in Various Grassland Management Employment Opportunities in Kogi State, Nigeria

S/N	Possible solutions	$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{X}_g$	SD_g	Df	t-cal	Remarks
1	Government has to make well informed policy decisions favouring grassland management	3.68	0.66	3.76	0.70	3.72	0.68	71	0.66	W NS
2	Providing labour market information to household about grassland management opportunities	3.35	0.80	3.45	0.90	3.40	0.70	71	0.43	W NS
3	providing education and training on grassland management techniques	3.12	0.68	3.16	0.60	3.14	0.64	71	0.71	W NS
4	Continuous business coaching to enable households establish businesses such as grasslands	3.14	0.56	3.22	0.52	3.18	0.54	71	0.78	W NS
5	Grassland management skill training among individuals should be done in work places rather than in classrooms.	3.26	0.51	3.18	0.53	3.22	0.52	71	0.49	W NS

6	Building synergies with NGOs that already provide skills for grassland management	3.40	0.70	3.52	0.84	3.46	0.76	71	0.97	W	NS
7	Provision of funds by government and donors for training/retraining of extension agents in grassland management	3.18	0.84	3.26	0.92	3.22	0.88	71	0.94	W	NS
8	Embedding grassland management practice and teaching within the regulatory framework and within the curriculum.	3.05	0.66	3.15	0.58	3.10	0.62	71	0.71	W	NS
9	Skilling Vocational Education and Training trainers and other teachers to deliver skills in grassland management	3.55	0.86	3.60	0.98	3.50	0.92	71	0.620	W	NS
10	Developing strategies to up skill and retrain household members in skills in grassland management	3.45	0.86	3.35	0.94	3.40	0.90	71	0.29	W	NS
11	Encouraging more research in skills for grassland management	3.18	0.70	3.30	0.78	3.24	0.74	71	0.41	W	NS
12	Improving access to resources and infrastructure needed in grassland management	3.23	0.52	3.25	0.60	3.24	0.56	71	0.78	W	NS
13	Addressing land tenure issues	2.94	0.68	2.98	0.76	2.96	0.72	71	0.16	W	NS

Population = 73; $\overline{X}_1$ = Mean of 36 Extension lecturers; $\overline{X}_2$ = Mean of 37 Extension agents $\overline{X}_G$ = Grand Mean; SD_G = Grand standard deviation; W = Way; NW = Not a Way; S= Significant; NA = Not Significant; Df = Degree of freedom; t-cal = t-calculated

Table 3 reveals that the mean of all 13 items ranged from 2.96 – 3.72 ($\overline{X}$ = ≥ 2.50). This implies that the 13 items were the ways of ameliorating the challenges that could hinder employment in various grassland management opportunities in Kogi State, Nigeria. The standard deviation of all the 13 items ranged from 0.52 – 0.92. Each of the values was below 1.96 indicating that the respondents were near to the mean and to each other in their responses. The Table also shows that all the items had t-cal values ranged 0.16 – 0.94. The t-cal values of all the items were greater than 0.05 indicating that there was no significant differences between the opinions of Agricultural Extension Lecturers and Extension agents on the the ways of ameliorating the challenges that could hinder employment in various grassland management employment opportunities in Kogi State, Nigeria

Discussion of the Findings

The findings of the study reveal 12 employment opportunities available in

grassland management in Kogi State, Nigeria. These includes: grassland Manager ($\overline{X}$ = ≥ 2.50)., Grassland restoration labourer, Restoration Scientist, Grazing assistant, Agricultural Extension Agents, among others. The findings are also in line with Ogbonna and Mshelia (2018) who made similar findings. The findings are in line with Zhang, Lü, Isbell and Han (2019) who found that job opportunities in grassland management includes: range manager, grassland conservation officer, restoration scientist, wildlife biologist and agricultural extension agents. The findings are also in agreement with DeLonge, et al, (2019) who found that opportunities in grassland management includes Environmental Consultant, Policy Analyst, Soil Conservationist The findings also support that of Milchunas, et al, (2017) who found out that job opportunities in grassland management include Agroforestry Specialist and Community Engagement Coordinator. Hence, it implies that the identified items are opportunities for employment in grassland management in Kogi State, Nigeria. The findings also revealed that there was no significant differences between the opinions of Agricultural Extension Lecturers and Extension agents on the employment opportunities available in grassland management in Kogi State, Nigeria. No difference in opinion could be because the respondents have similar educational backgrounds.

The findings of the study on the challenges that could hinder employment in various grassland management opportunities in Kogi State, Nigeria revealed that the challenges are as follows: low reputation of various grassland management opportunities, grassland management training for interested people on various jobs is sometimes only theoretical, extension agents are sometimes lacking in practical knowledge of grassland management needed to train those seeking job opportunities in grassland management, lack of knowledge among people about grassland management, limited resources and infrastructure such as fencing materials, watering systems, and machinery for mowing which poor families may not be able to afford. Others include inadequate access to land and land tenure issues, climate-related challenges such as droughts, floods, and extreme weather events can hinder grass production, difficulty in accessing markets and establishing value chains, inadequate policy coordination favoring grassland management and limited extension services hinder the effective implementation of grassland management initiatives among families. The findings are in agreement with Lacey, et al, (2021) who found that grassland management as a means of employment is hindered by inadequate policy coordination by the government favoring grassland management, extension agents are sometimes lacking in practical knowledge of grassland management needed to train those seeking job opportunities in grassland management and lack of knowledge among people about grassland

management. The findings are in agreement with Ogbonna and Mshelia (2018) who found that the challenges to grassland management include: teachers are sometimes lacking in practical knowledge of grassland management and lack of knowledge and awareness among families about grassland management. The findings are also in agreement with Pywell, et al, (2020) who found out that grassland management doesn't thrive as a means of poverty reduction due to limited resources and infrastructure needed to start the business such as fencing materials and watering systems, amongst others which poor families may not be able to afford. The findings also revealed that there was no significant differences between the opinions of Agricultural Extension Lecturers and Extension agents on the challenges that could hinder employment in various grassland management employment opportunities in Kogi State, Nigeria. No difference in opinion could be because the respondents have similar educational backgrounds.

The findings on ways of ameliorating the challenges militating against the adoption of grassland management among families for poverty reduction in Kogi State revealed that the ways include: Government has to make well informed policy decisions favouring grassland management; providing labour market information to household about grassland management opportunities; providing education and training on grassland management techniques; continuous business coaching to enable households establish green businesses such as grasslands; green skill training among children should be done in work places rather than in classrooms; building synergies with NGOS that already provide skills for grassland management; provision of funds by government and donors for training/retraining of extension agents in grassland management; embedding grassland management practice and teaching within the regulatory framework and within the curriculum; skilling vocational education and training trainers and other teachers to deliver green skills in grassland management; developing strategies to up skill and retrain household members in green skills in grassland management; encouraging more research in green skills for grassland management; improving access to resources and infrastructure; and addressing land tenure issues. The findings are also in line with Derner and Briske(2013) who found that grassland management can reduce poverty levels by building synergies with NGOS that already provide skills for grassland management. The findings are also in agreement with Collins, et al, (2018) who found that Government making informed policy decisions favouring grassland management and providing labour market information to household about grassland management opportunities can mitigate the challenges that hinders employment in grassland management opportunities. The findings are also in agreement with Nelson, et al, (2017) who found that

developing strategies to up skill and retrain household members in skills in grassland management; and encouraging more research in skills for grassland management helps to ensure grassland management is efficiently utilized as a means of job creation. The findings further revealed that there was no significant differences between the opinions of Agricultural Extension Lecturers and Extension agents on the the ways of ameliorating the challenges that could hinder employment in various grassland management employment opportunities in Kogi State, Nigeria. No difference in opinion could be because the respondents have similar educational backgrounds.

Conclusion

Reducing poverty is a challenge faced by many governments due to many families experiencing high level of poverty. To curtail the increasing levels of poverty, job opportunities in grassland management have been found to help reduce unemployment and consequently poverty but there was need to ascertain the grassland management employment opportunities in Kogi state, Nigeria. The study identified 12 opportunities for employment in grassland management, 10 challenges that could hinder employment in various grassland management opportunities and 13 ways of ameliorating the ways of ameliorating the challenges that could hinder employment in various grassland management opportunities in Kogi State, Nigeria. It is concluded that if the ways are adhered to, there would be increase in the number of people employed in various opportunities in grassland management consequently leading to poverty reduction among individuals and families.

Recommendations

Based on the findings of the study, the following recommendations were made;

1. Adequate funds should be provided by the Government for financing research institutions focused on promoting grassland management among families
2. Extension agents should avail themselves to workshop for training/retraining on grassland management/skill requirements to make them more competent in impacting such skills to families.
3. Training in various grassland management opportunities should be practical to ensure skill acquisition among those seeking various opportunities in grassland management.

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