

2. 7 Garret Ranking

The Henry Garrett ranking techniques were used to identify and rank the constraints farmers face when adopting conservation agricultural practices in the Bawku Municipality. According to a literature review, both the Kendall's and Garrett rankings are used in the analysis and ranking of goods and services. Because of the heterogeneity of variables (Garrett et al., 1973), as cited by Shafiwu, Donkoh, and Alhassan, this ranking technique was chosen over Kendall's (2018). The process of operationalizing the ranking procedure begins with respondents ranking the identified problems in order of priority from most urgent to least urgent. The problems were given numerical weights, with 1 being the most pressing, 2 being the second most pressing, and so on, in that order, to the problem representing the least pressing to the respondent (Garrett and Woolworth, 1969), The farmer ranking orders represent the assigned ranks and were converted into percentages using the formula:

$$100\left(\frac{R_{ij} - 0.5}{N_{ij}}\right)$$

Where: R_{ij} is the rank given for the factor by the individual from $-j$ and N_{ij} is the number of factors ranked by the individual.

The Garrett conversion score table was used to convert the percentage position of each rank obtained into scores. The scores for each constraint were totaled, and the average score was calculated by totaling the scores for each constraint and dividing the totaled scores by the total number of people who met that constraint. The order of the constraints was determined by the average and mean scores. The constraint with the highest (lowest) mean score was considered the most (least) pressing, while the constraint with the lowest (highest) mean score was considered the least (most) pressing (Garrett and Woolworth, 1969). The following constraint

was set and ranked: The cost of conservation agriculture practice; a lack of adequate conservation agriculture information; a lack of trust in the method used; and cultural barriers

3.0 Methodology:

The study took place in Bawku Municipality, Ghana. It used a survey research design. It was decided that the Bawku Municipality was the main area where agricultural conservation practices occurred in the Upper East. The study selected forty (40) respondents from each of the ten (10) communities in the Municipality using simple random sampling. The study's target population was Bawku's maize farmers. The study interviewed 358 people in total. The data were analyzed using SPSS (SPSS). Frequencies, percentages, and means were computed.

4.0 Results And Discussions

4.0 Introduction

The study was conducted with the main objective of investigating the constraints farmers face in adopting CA practices adoption and Ranking of the constraints according to priorities by Smallholder farmers in the Bawku Municipality of Ghana.

The calculation of garret value and ranking of the constraint smallholder farmers in Bawku Municipality of Ghana in practising conservation agriculture adoption are shown in table 4.1 and table 4.2.

Table 4.1: Percent Position and Garret Value

SI. No	$100 (R_{ij} - 0.5) / N_j$	Calculated Value	Garret Value
1	$100 (1 - 0.5) / 5$	10.06	75
2	$100 (2 - 0.5) / 5$	30.61	60
3	$100 (3 - 0.5) / 5$	50	50
4	$100 (4 - 0.5) / 5$	71.14	39

5	$100(5 - 0.5)/5$	90.83	24
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Table 4.2: Calculation of Garret Value and Ranking

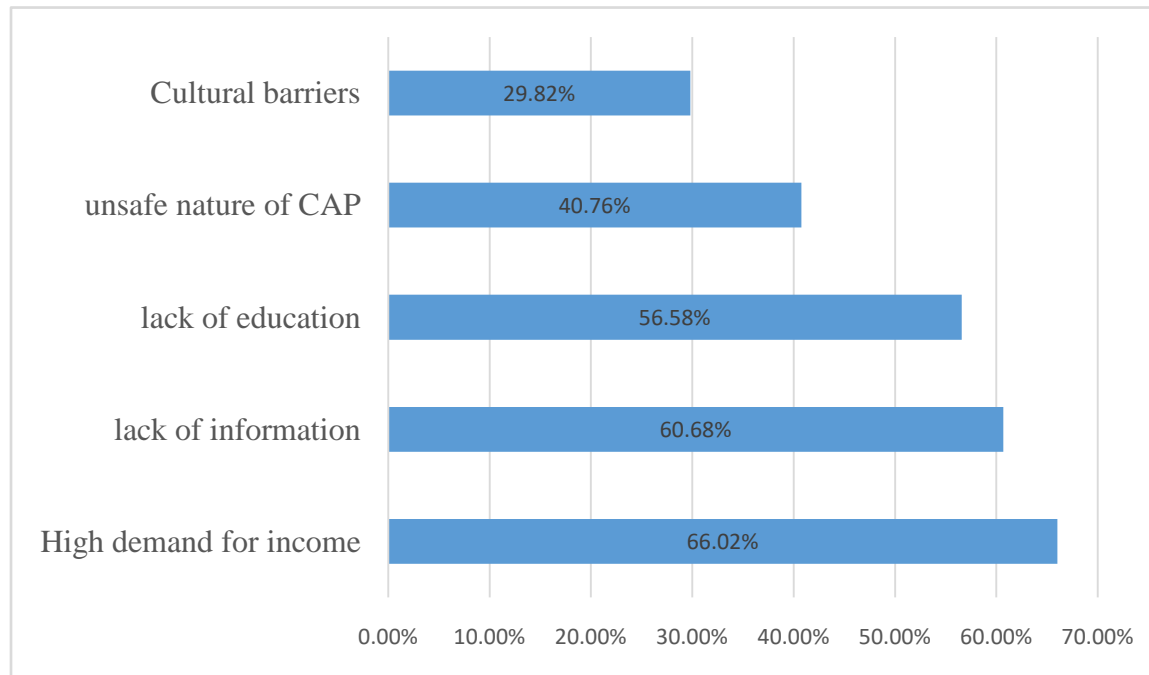
SI. No	Description	Rank Given by the Respondents					Total	%	Rank
		1 st	2 nd	3 th	4 th	5 th			
1	Household Income/ Access to credit	14475	6240	2600	273	48	23636	66.02	1 st
2	Access to information	6675	11100	3400	429	120	21724	60.68	2 nd
3	Education	5550	7620	5200	1599	288	20257	56.58	3 rd
4	Unsafe nature of the conservation/Potential Benefit.	1275	1620	1600	8658	1440	14593	40.76	4 th
5	Cultural barriers	75	300	300	4407	5592	10674	29.82	5 th

Table 4.2 shows all the constraints ranked by the respondents.

The ranks were obtained with the help of the Garret ranking method.

The study found that high demand for Household Income/ Access to credit was ranked the most pressing priority or the 1st rank, followed by Lack of adequate information, lack of farmer education, unsafe nature of the CA and cultural barriers with the ranks 2nd, 3rd, 4th, and 5th respectively. This finding agrees with Udimal et al. (2017) who found income demand in the form of credit as a major constrain to agricultural technology adoption.

Figure 4.2: Constraint Ranks



Conclusion

The study concludes that high-income demand is the highest constraint faced by farmers in the adoption of conservation agricultural practices and cultural barriers were ranked as the least constraint in the adoption of conservation agriculture. This finding implies that Access to income is a critical determinant in CA Adoption while the cultural barrier in the form of farmers' perception about CA and land tenure system was the list constraints. There is evidence that an increase in the level of personal income and access to credit has a positive and significant correlation to CA adoption.

Recommendation

The study recommends that Promoters/researchers on CA adoption e.g NGOs, MoFA and Government should first all work on activities that will increase the level of small householder farmers' incomes or access to credit before engaging in adoption promotional activities in the study area.

Significant Statement/Contribution

Climate change is worsening the plight of farmers in northern Ghana's Bawku municipal area. Floods and long dry spells of drought are being caused by global warming and variability in rainfall patterns, resulting in reduced food crop productivity, soil erosion soil fertility decline and livestock production. CA has thus been identified in the Bawku Municipal area as a viable alternative to conventional agriculture for long-term agricultural productivity and to mitigate the effects of climate change. In investigating the constraints smallholder face faced in adoption CA The study found that high demand for Household Income/ Access to credit was ranked the most pressing priority or the 1st rank and cultural barriers was the list in rank.

Conflict of Interest Statement

All the authors do not have any possible conflicts of interest.

Data Availability Statement

Data used to generate the results in this manuscript is not available.

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