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Review.

Factors affecting the adoption of grasscutter (*Thryonomys swinderianus*) farming in Sunyani Municipality, Brong Ahafo Region, Ghana

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There have been efforts by the Government of Ghana and non-governmental organizations to train farmers in grasscutter farming. Some of the farmers after their training do not go into production. This study was aimed at investigating the factors affecting the adoption of grasscutter farming in Sunyani municipality. A total of 42 farmers made up of two focus groups (adopters and non-adopters) trained in grasscutter rearing were identified and interviewed. The study was based on Rogers' and Pantanali's models of adoption, taking into account the characteristics of farmers, land ownership and occupation as factors influencing adoption. Pearson Correlation was used to determine the relationship between adoption and the variables studied. Pair-wise ranking was used to rank the constraints to grasscutter farming. Farmers' decision to adopt grasscutter farming was positively affected by marital status and land ownership and negatively affected by age. Sex, family size, occupation, and educational status had no influence on adoption. Theft of animals and lack of capital to buy breeding stock were found as constraints. It was concluded that the characteristics of farmers should be taken into consideration when designing grasscutter training programmes. Collaboration between the government, non-governmental organizations and local communities in finding sustainable methods of exploitation of wildlife species either for direct consumption or stock rearing and the enforcement of bye-laws on closed-season hunting were recommended.

Key Words: Adoption, constraints, correlation, grasscutter, wildlife domestication

INTRODUCTION

Domestication of wild animal species for meat production to meet the protein requirements of Ghanaians is not a new practice. Among the different wildlife species in Ghana, the grasscutter (cane rat), *Thryonomys swinderianus* has become a preferred choice of animal for domestication for various reasons. The meat is a delicacy and the most preferred choice of bush meat in Ghana and other African countries (Clottey 1981; Akinola 2008; Annor and Kusi 2008).

The grasscutter has desirable attributes for domestication and there is an ever present demand for its meat in both rural and urban centres of Ghana (Annor and Kusi 2008; Karikari and Nyameasem 2009).

Grasscutter rearing is a useful economic venture and an important income source for farmers. Feasibility studies indicate the long term profitability of grasscutter farming in Ghana. Financial analysis by Tutu et al (1996) indicates that small scale grasscutter farming in Ghana shows the best returns followed by poultry and rabbit. The adoption of grasscutter farming in the country is, however, not without some challenges. Problems such as lack of technical support on proper management practices, housing design, dry season feeding, sex determination and the acquisition of foundation stock are some of the factors militating against the adoption of grasscutter farming by farmers in Ghana (Adu et al 1999). Added to these drawbacks are the unsatisfactory methods used in poaching the grasscutter which include hunting, trapping, baiting with chemical poisons and bush burning. According to Karikari and Nyameasem (2009), the high demand for grasscutter meat and the economic benefits accruing from its sale has resulted in an aggressive hunting for the animal.

The rapid and unsustainable rate of exploitation of the grasscutter in the wild has called for conservation methods and sustainable exploitation of the species in the

wild to prevent extinction of this valuable resource (Opara, 2010). A minimal but sustainable harvest for purposes of direct consumption (since the meat is a delicacy) or utilization as breeding stock for adopters is required to protect the grasscutter population in Ghana. Noss (1997) stated that local residents were not concerned at overexploitation of wildlife, because they assumed that they will be able to switch to other resources in the future. The author further pointed out that, because short-term financial benefits from illegal poaching outweigh financial gain from resource management schemes, residents were unwilling to bear conservation costs.

Captive rearing of grasscutters ensures that productivity can be controlled and improved. It also ensures that breeding stock for expansion is readily available. Furthermore, it reduces the reliance on and over-exploitation of the wild stock and bushfire threats which grasscutter hunting poses to the environment (Opara, 2010).

According to Annor and Kusi (2008), pioneering work on captive rearing of grasscutter in Ghana started in the 1970s. The Game and Wildlife, now Wildlife Department provided interested farmers with breeding stock with technical assistance from trained extension staff. The aim was to ensure that both rural and urban households would rear grasscutter in their farms either as a backyard activity to supplement household income and protein supply or as a large scale commercial activity. Unfortunately, farmers failed to adopt the initiative. According to Annor et al (2008), the government of Ghana and some Non Governmental Organizations (NGOs) have within the last eight years been implementing projects to promote grasscutter production in poor communities in the country. This is aimed at providing alternative source of income for farmers and increasing their access to and utilization of animal protein for dietary needs.

The Sunyani municipality is one area where grasscutter production has been promoted for close to a decade now. The objective of the study was to find out the factors affecting the adoption of grasscutter rearing in the Sunyani metropolis in Brong Ahafo Region of Ghana.

MATERIALS AND METHODS

The study was conducted in the Sunyani municipality to investigate factors affecting the adoption of grasscutter (*Thryonomys swinderianus*) farming. Sunyani is the regional capital of the Brong Ahafo region, situated in the middle zone of Ghana. It is enriched with natural resources such as wildlife, forest and water bodies. It has two distinct seasons, April to July being the major rainy season and September to November being the minor season. This is followed by a dry season from December to March. The annual rainfall is above 1200mm and temperature varies between 22^{o}C and 35^{o}C. The main occupation of the people is farming.

Purposive sampling was used to identify farmers in the study area who had received training in grasscutter farming. Participants were selected from three communities (Fiapre, Odumasi and Yawhima) with the help of Ministry of Food and Agriculture (MOFA) staff. Random sampling technique was used to select 42 respondents made up of two focus groups (adopters and non-adopters). The respondents comprised thirty (30) practising farmers (adopters) and 12 former farmers (non-adopters). Twenty four (24) were males and eighteen (18) females. Questionnaires were administered to each respondent. Focus group discussions were also held with the farmers. Pearson Correlation was used to determine the relationship between adoption and the variables studied while pair-wise ranking was used to rank the constraints.

RESULTS

Sex:
The total number of male adopters was two times more than the number of female adopters (Table 1). The correlation between sex and adoption was positive (+0.23) but not significant (P>0.05), hence farmers' decision to adopt grasscutter rearing was not influenced by sex of respondent.

Table 1: Sex of respondents

Focus group	Male	% of Total	Female	% of Total
Adopters	20	66.7	10	33.3
Non-adopters	5	41.7	7	58.3
Total	25	59.5	17	40.5

Age:
Age was categorized into aged, adults and youth. Most of the farmers who adopted grasscutter rearing were the aged, followed by the adults, and then the youth (Table 2). For the non-adopters, the youth formed the highest number. The correlation between age and adoption was negative (-0.43) and statistically significant (P<0.01) showing that farmers' decision to adopt grasscutter rearing was negatively influenced by age of respondent.

Table 2: Age of respondents (years)

Focus group	Youth (18-45)	% of Total	Adult (45-60)	% of Total	Aged (>60)	% of Total
Adopters	5	16.7	12	40.0	13	43.3
Non-adopters	8	66.7	2	16.7	2	16.7
Total	13	31.0	14	33.3	15	35.7

Marital status:
Majority of the adopters of grasscutter farming were married followed by the widowed as shown in Table 3. For the non-adopters, the married group dominated, followed by the unmarried. The correlation between marital status and adoption was positive (+0.38) and statistically significant (P<0.05). The decision to adopt grasscutter rearing was therefore positively influenced by marital status of the respondents.

Table 3: Marital status of respondents

Focus group	Married	% of Total	Single	% of Total	Widowed	% of Total	Divorced	% of Total
Adopters	27	90.0	0	0.0	3	10.0	0	0.0
Non-adopters	7	58.3	4	33.3	0	0.0	1	8.3
Total	34	81.0	4	9.5	3	7.1	1	2.4

Family size:
There were more adopters with family size of 5-9 children, followed by those with family size of more than 9 children (Table 4). The non adopter category was also dominated by those with family size of 1-4 children followed by those without children. The correlation between family size and adoption was positive (+0.25) but not significant (P>0.05) showing that the decision to adoption grasscutter rearing was not influenced by family size of respondents.

Table 4: Family size of respondents

Focus group	Zero	% of Total	1 – 4	% of Total	5 – 9	% of Total	9+	% of Total
Adopters	0	0.0	6	20.0	17	56.7	7	23.3
Non-adopters	4	33.3	5	41.7	3	25.0	0	0.0
Total	4	9.5	11	26.2	20	47.6	7	16.7

Occupation:
Farmers were the highest adopters, followed by retired workers, traders and civil servants. Traders dominated in the non-adopter category followed by civil servants (Table 5). The correlation between occupation and adoption was positive (+0.11) but not significant (P>0.05) indicating that the type of occupation had no influence on adoption of grasscutter rearing.

Table 5: Occupational distribution of respondents

Focus group	Farming	% of Total	Trading	% of Total	Civil servant	% of Total	Retired workers	% of Total
Adopters	11	36.7	8	26.7	2	6.7	9	30.0
Non-adopters	2	16.7	5	41.7	4	33.3	1	8.3
Total	13	31.0	13	31.0	6	14.3	10	23.8

Educational status:
There were more adopters with secondary education followed by tertiary education as shown in Table 6. Basic education was the least in both the adopter and non-adopter categories. The correlation between educational status and adoption was positive (+0.23) but statistically insignificant (P>0.05). The educational status of respondents therefore did not influence the adoption of grasscutter rearing in the study area.

Table 6: Educational status of respondents

Focus group	Illiterate	% of Total	Basic School	% of Total	Secondary	% of Total	Tertiary	% of Total
Adopters	5	16.7	1	3.3	15	50.0	9	30.0
Non-adopters	0	0.0	1	8.3	6	50.0	5	41.7
Total	5	11.9	2	4.8	21	50.0	14	33.3

Land ownership:
Eighty (80) percent of land/house owners were adopters as against 20% for non land/house owners. Ninety two (92) percent of non land/house owners were non-adopters (Table 7). The correlation between land ownership and adoption was positive (+0.66) and statistically significant (P<0.01), hence a determinant of adoption of grasscutter rearing.

Table 7: Land ownership status of respondents

Focus group	Own house	% of Total	Rented house	% of Total
Adopters	24	80.0	6	20.0
Non-adopters	1	8.3	11	91.7
Total	25	59.5	17	40.5

Constraints to grasscutter farming
Farmers were made to identify and rank the constraints they face in grasscutter farming. The constraints were ranked by the focus group using pair-wise ranking (Table 8).

Table 8: Pair-wise ranking of constraints to grasscutter farming

	DI	FE	FI	MG	MK	MO	PR	TH	TOTAL	RANK
DI	X								0	8th
FE	FE	X							3	5th
FI	FI	FI	X						6	2nd
MG	MG	MG	FI	X					4	4th
MK	MK	MK	FI	MK	X				5	3rd
MO	MO	FE	FI	MG	MK	X			1	7th
PR	PR	FE	FI	MG	MK	PR	X		2	6th
TH	TH	TH	TH	TH	TH	TH	TH	X	7	1st

Legend:
DI = Disease FE = Feeding FI = Finance MG = Management
MK = Marketing MO = Mortality PR = Pricing TH = Theft

The major constraints identified were related to theft of animals, financing, marketing, management and feeding. Pricing, mortality and diseases were also identified as minor problems affecting grasscutter rearing in the Sunyani municipality.

DISCUSSION

Factors affecting adoption of grasscutter rearing

Sex correlated positively with adoption but did not have a significant effect on adoption. According to Teklewold et al (2006), male household heads are potential adopters of exotic poultry breed compared to female farmers. Doss and Morris (2001) also found that gender of the farmer is not significant in determining the adoption of improved varieties of maize and fertilizer.

Farmers' decision to adopt grasscutter rearing was found to be negatively influenced by age of respondent. This result agrees with Annor and Kusi (2008) but at variance with Teklewold et al (2006), who showed that farmers' decision to adopt exotic poultry breed was positively influenced by age of household head.

The reason for the high adoption by the aged and adults compared to the youth may be due to the fact that male adults are the decision-makers in most farming communities (Pantanali, 1987). The control of family property such as land and houses by family heads who are usually male adults (Annor and Kusi 2008) may also pose a problem to younger farmers who will want to adopt grasscutter farming.

Marital status was found to be a determinant of grasscutter rearing in the study area. This result agrees with Annor and Kusi (2008). Grasscutter farming is labour intensive and the need for labour could explain the high adoption by farmers who are married. Since labour intensive technologies are unlikely to be adopted (Pantanali 1987), potential adopters of grasscutter farming may want to depend on family labour to reduce their production cost.

Family size correlated positively with adoption but did not have a significant effect on the decision to adoption grasscutter rearing in the study area. Teklewold et al (2006) indicated that, as a good source of labour for poultry management, households with larger family sizes are more likely to be adopters than families with smaller family size.

The occupation of respondents also correlated positively with adoption but did not have a significant effect on adoption. As expected, farmers were the highest adopters, and traders the least adopters. Traders spend most of the time away from the home and seem to have little time to invest into grasscutter rearing.

The correlation between educational status and adoption was positive but statistically insignificant. The result agrees with Ntege-Nanyeenya et al (1997) that there is a positive correlation between the level of education of farmers and the rate at which they adopt maize production technologies. The result is however at variance with Annor and Kusi (2008) who indicated that adoption of grasscutter rearing was negatively influenced by level of education. They indicated that their results are difficult to explain, given the fact that adoption rate of basic school leavers was the highest among the group, and as high as 73% of the total non-adopters had below secondary education.

Land ownership was found to be a determinant of adoption of grasscutter rearing in the study area. The security of land tenure is therefore a critical factor in determining the adoption of grasscutter rearing. Those living in rented houses usually encounter problems trying to put up cages to rear animals in rented premises.

Constraints to grasscutter farming

Grasscutter farming in the Sunyani municipality is faced with several constraints. The major constraints identified were related to theft of animals, financing, marketing, management and feeding. Farmers reported the stealing of their animals which was partly due to the poor security features of the cages. Inadequate finance also affected farmers' ability to acquire inputs, especially the start up cost. Competition with hunters was identified as a marketing challenge while the management challenges included inadequate technical know-how and the fact that grasscutter rearing is labour-intensive and time-consuming. In the dry season, farmers found it difficult to feed their animals because of inadequate fodder. Awotwi et al (2007) reported that grasscutter feeding, especially in the dry season, poses a major challenge to producers in Ghana.Competition with hunters also tends to depress the price of the animal. Mortality and diseases were among the minor problems identified.

CONCLUSION

Farmers' decision to adopt grasscutter farming was positively affected by marital status and land ownership and negatively affected by age. Sex, family size, occupation, and educational status had no influence on adoption. Theft of animals and lack of capital to buy breeding stock were found to be constraints. Thus the most important characteristics of farmers that should be taken into consideration when designing grasscutter training programmes should be marital status of the farmer and land ownership. Those living in rented premises find it difficult to get space to put up cages for grasscutter rearing. Even though young people are often targeted for grasscutter training programmes, the adoption rate of the youth was found to be low.

For grasscutter production to become attractive to farmers, solutions must be found to the problems of theft of animals and lack of capital to buy breeding stock. Security of land tenure will also improve grasscutter rearing especially in peri-urban areas where land is scarce.

RECOMMENDATIONS

1. There is the need for the involvement of a variety of stakeholders – government, non-governmental organisations and local communities – in finding sustainable methods of exploitation of species in the wild either for direct consumption or stock rearing by adopters. These conservation methods must be based on sustainable use of the wildlife resource coupled with enforced protection for vulnerable species including the grasscutter.

2. The Wildlife Department with support from the government and District Assemblies must enforce the bye-laws on close-season hunting and illegal poaching of wildlife to ensure that poaching is curtailed especially during the breeding season. This will ensure a minimal but sustainable exploitation for purposes of direct consumption or utilization as breeding stock by adopters.

3. The government and NGOs should support the grasscutter farmers' association to access and provide credit to its members, especially new farmers to acquire breeding stock and cages which represent huge start-up costs in grasscutter farming. The provision of credit will also enable farmers to build securer cages to provide adequate security against theft.

4. The government and non-governmental organisations interested in grasscutter production should establish grasscutter breeding stations to provide breeding stock at affordable prices to farmers.

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