

An Evaluation of Crop Damage Done by Wild Animals in Meegahahena Grama Niladari division

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Introduction

Quantifying crop damage has a fundamental role in determining loss yet does not provide a complete or accurate representation of the impact of crop damage by animals on affected communities (Webber and Hill, 2014). Although there are various programmes to increase local food production such as ‘Waga lanka waga sangramaya’, it is necessary to take immediate action to save crops from the threats of wild animals. Some reports reveal that nearly one third of crops is eaten or destroyed by animals. Although this has become a national issue, sadly there have not been many studies on this issue to identify the gravity of the issue and to come up with possible solutions. Nonetheless this issue is now being discussed at national level on various platforms and the necessity to carrying out a study on this has been identified. Meegahena North Grama Niladari division is one such Division in Galagedara Divisional Secretariat area which has been subjected to threats of wild animals on crops for the last decade or so, and is selected for this study.

Objectives

Objective of this study is to identify the intensity of wild animal threat on crops and to find out a sustainable solution to overcome this issue with the participation of the affected community.

Methodology

The study was done in two stages; a participatory risk assessment group discussion followed by a survey. Initially the group discussion was conducted with the participation of a group of 60 villagers including farmers, housewives and relevant government officials assigned to Grama Niladari divisions.

Participatory Rural Appraisal techniques & tools such as brain storming, pair wise ranking, risk mapping, group discussions, and focused group discussions were adopted to gather data. The pair wise ranking tool which is used to compare a set of issues and find out which is the most important to participants, was used to rank the most problematic animal species based on the severity posed by each animal species as stated by the participating villagers. To come up with solutions to overcome threats posed by wild animals on crops, attributes of current practices adopted by villagers to overcome this issue, other available practices and proposed new practices to overcome this issue were identified and thoroughly discussed with the villagers. As the next step, a kind of choice experiment study was done again using pair wise ranking method to identify the best solution to overcome the issue. Subsequently a door to door survey was conducted with two sets of questionnaires by the Economic Development Officers of the Galagedra divisional secretariat.

All the survey participants were instructed to give a rough estimate of annual crop damages incurred due to wild animals and the annual expected yield of the crop species mainly in their home gardens. Based on this information the annual amount of damages were estimated and based on current average market prices, the values of the crop damages were estimated.

Results and Discussion

As per the results of the study, people consider Monkey as the most deleterious animal that bring the most damages to their crop, followed by Giant Squirrel, Wild Boar, Porcupine, Peacock and Wild Giant Rat respectively. The pair wise ranking methodology was adopted to evaluate the most deleterious animal, comparing each animal with another. Thus the participants were asked to state the animal most destructive, in terms of the damages done to crops. A sample comprising of 60 villagers was asked to state the more deleterious animal among two animals at a time during the comparison.

The more deleterious animal among the two in each comparison was selected based on majority's view. The pair wise ranking matrix was prepared as above stating which animal is more deleterious among a pair by using the respective number given to the particular animal along with the percentage of sample members who stated it as the more deleterious animal among two.

Table 1: Most threatening animals on crop damages

	Monkey = 1	Giant Squirrel = 2	Peacock = 3	Wild Boar = 4	Wild Giant Rat = 5	Porcupine = 6	Score	Rank
Monkey = 1		1 (100%)	1 (100%)	1 (100%)	1 (100%)	1 (100%)	5	1
Giant Squirrel = 2			2 (100%)	2 (58%)	2 (100%)	2 (83%)	4	2
Peacock = 3				4 (100%)	3 (67%)	6 (63%)	1	5
Wild Boar = 4					4 (100%)	4 (100%)	3	3
Wild Giant Rat = 5						6 (92%)	0	6
Porcupine = 6							2	4

Table 2: Most effective ways to protect crops from Wild Animals

Note: H-High M-Medium D-Difficult V- Very High

Attributes			Method	1=Air Rifle	2=Shot Gun	3.= Poisoni ng	4= Solar/Bi o fence	score	Rank
cost	impl acab ility	Effe ctive ness							
H	M	M	Air Rifle = 1		1 (58%)	1 (83%)	4 (63%)	2	2
H	D	H	Shot Gun = 2			2 (55%)	4 (85%)	1	3
L	D	H	Poisoning = 3				4 (92%)	0	4
M	M	V	Solar/Bio fence = 4					3	1

Based on the data collected from the participants; each animal has been ranked from 1 to 6 based on the severity of the crop damage it caused. Thus the animals ranked no.1 monkey and no.6 porcupine, were recognized to be the most and the least deleterious animals respectively. Attributes of each solution was discussed and explained to the participants of the same sample and they were asked to state which solution is more effective when comparing two solutions at a time. As in the above evaluation pair wise ranking method was used to evaluate the best solution.

Table 3: Amount of losses as stated by affected people

Crop	No of trees	Estimated annual yield	Estimated annual damage	Percentage damage	Average unit price	Total Value Rs. Mn
Coconut	1124	115975	63672	35 %	50.00	3.18
Mango	61	14850	11375	43%	30.00	0.34
Plantains	267	8460	4635	35%	100.00	0.46
Jack Fruit	45	1320	760	36%	200.00	0.15
Butter fruit	14	2300	1375	37%	30.00	0.04
Rambutan	148	39360	19900	34%	5.00	0.10
Papaya	53	1640	1125	41%	50.00	0.11
Pineapple	300	300	280	48%	100.00	0.03
Cashew Nuts	8	50	20	23%	400.00	0.01
Cassava	280	1000	700	41%	50.00	0.03
				Average Loss	37%	Total 4.34

In order to obtain the most effective solution, participants were made aware of the attributes of each solution and were required to come out with the best option by comparing each solution with another, adopting pair wise ranking method. Setting up a Solar powered fence was recognised as the most effective way to protect their crop from animals such as wild boar, porcupine. Yet it was discussed that Monkeys and Giant squirrels are capable of avoiding the fence by leaping from one tree to another. Thus a solution was proposed as to cut off the branches of trees or to cut the trees lying on one side of the fence if required, in order to hinder their access across the fence. As this would keep the animals closed in the forest and considering the necessity to have an ecological balance, a bio fence, a fence built up with fruit bearing trees was proposed parallel to the solar power fence on the side of the forest. As per the

data gathered from the door to door survey, annually 37 % of home garden crops, worth Rupees 4.34 million is damaged by wild animals in Meegahena Grama Niladari division. In terms of economic value, the biggest damage is done to coconut, worth about Rs. 3.18 million annually, followed by Pineapple, (Rs. 0.46 Mn.) and Mango (Rs. 0.34 Mn.). In terms of monetary value, nearly 73 % of total economic loss was due to the damages caused to coconut.

Conclusion

This survey revealed that on average annually 37% of crops worth Rs. 4.34 million is damaged by wild animals in Meegahahena Grama Niladari division. There are 14,023 Grama Niladari divisions in Sri Lanka and according to the economic survey done by the Department of Census and Statistics in 2014, crop cultivation is practiced in 11,308 Grama Niladari divisions. If the crop damage by wild animals calculated based on the above statistics happens in those Grama Niladari divisions as well, then the loss would be around Rs 50 billion per annum. Therefore further study on this issue is necessary. Constructing a solar powered electric fence surrounding the village is recommended and clearing of trees or branches of trees on one side of the fence is needed to obstruct the crossing of animals from one side to the other. Along with the electric fence, a bio fence comprised of fruit bearing trees towards the jungle is required to maintain the biodiversity and to prevent animals from reaching the village in search of food. Making artificial water holes inside the forest is recommended to lessen the issue further.

References

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