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Research Paper

CROP DAMAGE BY MAMMALS IN THE SOME VILLAGES OF WASHIM DISTRICT, MAHARASTRA

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Abstract

In Washim district as indicated earlier, most of the people whose farming activities are often impacted by the presence and abundance of 'problem' wild animal species are the resource poor local subsistence. Various studies has shown that previous research has mainly concentrated on understanding only the socio-economic dynamics of human-wildlife interaction with very limited understanding of the spatial distribution of this conflict. Such an approach has caused considerable difficulties in drawing contextual conflict resolution measures, hence the need to map the extent and severity of this conflict. Participatory GIS, a tool that incorporates local expertise and knowledge with technical expertise, provides an efficient and effective way to map the extent and severity of damage caused by wild animals on agricultural land. This study has shown that crop damage by wildlife seriously affects the livelihoods of the farmers. This can lead to an increased negative human attitude towards wildlife with potentially negative effects for conservation. This study has also shown that the problem has a peak in the dry season (May-August) coinciding with the availability of alternative food (maturation of the crops) and the low quality / scarcity of the forage. Crop damage by wild animals is a severe problem in some parts of district. Field surveys showed that on an average 20% of the crop was damaged by wild animals. Forty-seven species of crops were vulnerable to animal damage. Highly nutritious crop like wheat, were more vulnerable. Field surveys and information collected from the Forest offices showed high incidence of crop damage at Northern regions followed by Southern areas.. The use of a variety of control techniques is essential since the offending species can become accustomed to a single method. Wildlife damage to fruit is a seasonal problem. In many instances, damage will occur only over a short time period of days or weeks. Control methods might be necessary only during those short time periods. damage and trends can reduce the time and money allocated to damage-control techniques.

Key words: Crop Damage, Effect on Farmers, Types Of Damage in villages Of Washim District, Maharashtra.

INTRODUCTION

Agricultural Ecosystem

An ecosystem is a self-sustaining and self-regulating community of living organisms and its non-living environment. Agriculture is the cultivation of land for the selected species including agricultural crops, livestock, tree crops and grazing lands. Agriculture produces much more than

just crops. Agricultural practices have impact on a wide range of ecosystem services, including water quality, pollination, nutrient cycling, soil retention, carbon sequestration, and biodiversity conservation. In turn, ecosystem services affect agricultural productivity. Understanding the contribution of various agricultural practices to the range of ecosystem services would help inform choices about the most beneficial agricultural practices. Agriculture is one of the main drivers of environmental change. It is the source of many changes in land use and the origin of a broad range of pollutants.

Description of Study Area

Washim is globally reputed for richness in biological diversity and for promoting sound conservation policies. However, over the years country has an increase in human wildlife conflicts. In the recent decades, the livelihood of many farming communities in the country has come under threat from the attacks of wild animals on crops. A systematic survey of 160 households in district was conducted to study the extent of crop raiding by wild animals. Almost all respondents (97.5%) reported crop damage by wild animals. Most crop damage was done by deer (91.1%). Farmers mostly used traditional nonlethal measures to secure their crops from wild animals. The most widely used measures were fencing (82.5%), guarding (75%), and scarecrows (71.9%). Farmers felt the need for the government to intervene- by providing permanent fencing materials (27.4%), legalizing killing (26.85%), introducing compensation schemes (18.3%) and investing in electrification of the field perimeters (17.7%).

Need of study

1. Reduced risk to human health and safety.
2. Biodiversity preservation.
3. Reduced economic impacts.
4. More effective and efficient use of public resources.
5. Improve animal welfare.
6. To avoid such massive damage it is dier need to combat against such crop damaging mammals.
7. It is first necessary to understand the temporal and spatial factors that predict crop raiding, and the effectiveness of current guarding strategies.
8. It is also necessary to identify correctly those species that cause the greatest amounts of crop damage, because farmers' perceptions of the most notorious crop pests may be influenced by factors other than crop damage.
9. Large proportion of the human population for their survival on land, coupled with the presence of many species of large mammals leads to many sources of conflict between people and wildlife.
10. Due to destruction of wildlife habitats which leads to competition for food, water, among other forest resources, and increased the food shortage problem within the area.

CROP DAMAGE

Crop damage: The total number of crop damage cases in Target crops and types of damage by wild animals shows commonly targeted crop types by different animal species and the types of damage done. Soybean was the most commonly targeted crop type by wild animals. The stages of growth targeted varied from sowing to early fruiting depending on the type of crops. The most severe damage was the trampling of crops by wild animals.

Types of damage

Most damage to trees arises from either browsing (feeding on buds, shoots and foliage) or removal of bark from main stems or branches. The latter may occur by gnawing (bark-stripping) or rubbing. A particularly common type of rubbing injury (fraying) results when male deer rub new antlers to remove mark territories. Close inspection of damaged trees and their surroundings can often reveal the species responsible. The most important features to note are:

- form of damage (i.e. browsing, gnawing or rubbing);
- height of damage;
- time of year when damage occurred;

- presence and size of teeth marks;

Signs of animal presence and abundance – droppings, footprints, run, scrape or burrows.

Animals involved in crop damage



Rabbits It can feed on plants year round. Rabbits damage woody plants by gnawing bark or clipping off branches, stems, and buds. In winter, rabbits can severely damage trees and shrubs. Deer will browse on foliage and twigs and can damage the bark.

Deer

The deer is one of the most widely distributed and well-known mammals and it is a common species throughout the district. They are also abundant in agricultural areas where field crops are interspersed with forest habitat. Deer are most active during early morning and evening hours. They can have a home range of several square miles, but this varies with season, habitat, sex, and even individual characteristics.

Rats and Mice

Successful rat and mouse control involves two steps: 1) killing rats and mice already present and 2) removing conditions that attracted the pests. The most important step is to destroy their hiding places and eliminate their food and water supply. Rats like to find shelter in refuse and, burrow under floors and nest inside double walls. Rats get their food from garbage cans, feed bins, granaries, corncribs and other food-storage facilities.

Tree Squirrels

Tree squirrels (e.g., the common gray squirrel found throughout Tennessee) often become a nuisance for home owners by gaining entrance into attics, gnawing wires and wood decks.

Monkey- It can feed on plants year round. The monkey is one of the most widely distributed and well-known mammals and it is a common species throughout the district.

Effect on farmer

Defining Human-Wildlife Disturbances

Human-wildlife conflict can be viewed in two contexts: 1) Wildlife behavior conflicting with human goals (e.g., safety, satisfaction, property), or 2) human behavior conflicting with wildlife safety and well-being (e.g., harassment, noise, direct mortality due to hunting, destruction of habitat). Regardless of either situation, human behavior and the decisions made regarding human-wildlife interactions ultimately determine the outcome for both humans and wildlife. Management actions needed to direct these decisions inevitably rely on a combination of both biological and sociological data. For the purpose of this document, only a review of human-attributed disturbances and associated impacts are discussed.

The problems associated with wildlife found out of protected areas include:

1. Loss of human life
2. Injury to human beings
3. Destruction of crops
4. Destruction of farm infrastructure
5. Creation of an environment of fear

REVIEW OF LITERATURE -

1) M.R.Davari et.al (2000) studied that, there is urgent need to manage the conflict either by controlling the population of offending animals or by introducing some compensation schemes, observe that, the nationwide scale of crop damage by wild animals could put national food security at stake and ultimately undermine the realization of Gross National Happiness.

2) Robert Cline and Susan C. (2002) studied that Deer damage management is a complicated issue with many alternatives that depend on financial considerations and the amount of damage that can be tolerated conclude that the combination of control methods such as fencing and repellents is most effective. 3) Conver (2002) estimated that wildlife-related economic losses to agricultural producers (farmers and ranchers) in the United States found that, In Africa, most of the people whose farming activities are often impacted by the presence and abundance of 'problem' wild animal species are the resource poor local subsistence farming communities, and in some cases beneficial agricultural practices. 4) Historical records show that, that lion in the Gir preyed mainly on the domestic livestock, studies conducted by Saberwal *et al.* (1994) have observe that, only 36% of the kills were from domestic livestock.5) Newmark *et al.*(1994) studied the in various parts of Africa, serious human-wildlife conflicts were observed in the adjoining areas of nature reserves, observe that conservation of wildlife, and their threatened habitats faces many challenges and involves a wide variety of issues, and thus require a fresh look at the ways that these challenges can be met.

MATERIALS AND METHODS-

A total of 160 households were surveyed through a structured questionnaire, in the villages. A systematic sampling procedure was used to survey the Household samples were taken at regular intervals; A pretesting of the questionnaire was conducted before the finalization of the survey plan. Respondents were asked questions regarding gender, landholding, main crops cultivated, the types of wild animals that caused agricultural damage, and the measures adopted by the local people to contain them. Apart from face to face interviews with the respondents, the forest office provided with some valuable secondary data.

Temporal and spatial patterns of crop raiding incidents were monitored on the 50 farms from November 2013 to April 2014. Participating farmers were trained to use a calendar to record daily crop raiding incidents by each species and the crop type damaged during an initial 1-month study.

Questionnaire Survey-

Questionnaire surveys at the parish (extensive) and household level (intensive) formed the basis of the study in which farmers' perceptions of the crop damage and the raiding animal were considered with a 7 view to estimating crop losses. Actual crop losses were observed on farms, as a means of cross-checking data collected by other means. With the help of two field assistants, farms were visited at weekly intervals to carry out farm survey.

QUESTIONNAIRE FOR FARMERS-

Record data from each farm with the help of questionnaire-

1. Species involved and number of animals?
2. Location of incident?
3. When incident occurred?
4. Damage caused?
5. Who was affected?
6. Action taken?
7. Was any mitigation in place?
8. Sex and age structure of animals?
10. Any other information which may be appropriate?

RESULT AND DISCUSSION-

Data was collected from 29 farmers by direct interview, in which the 4 farmers from Khandala which has 1.00 ha damage damaged area. The 3 farmers from Adoli which has also 1.00 damaged areas. And the 14 farmers from Kiniraja which has damaged area 1513.00 ha approximately. The 2 farmers from Jawala which has 0.16 ha damaged area. 2 farmers from Gohagaon which has 0.57 damaged area .And also in Vakad the information collected from 2 farmers which has about 0.54 ha damaged area. Only 32% had education levels ranging from secondary to certificate, 49.5% studied up to primary level and 18.5% did not attain any level of education. Subsistence agriculture dominates within these communities; up to 78% of people

reported agriculture as their sole, or main, source of livelihood. These Information on human livestock killings, compensation relief measure, cropping pattern, nature and extent of agricultural and horticultural crop damage and traditional control method has been collected from forest department.

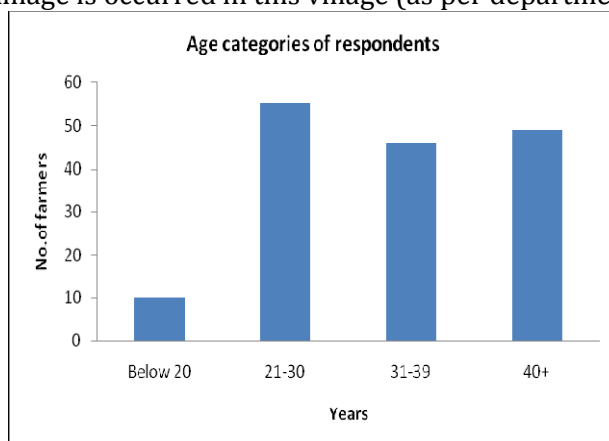
Maximum crop damage occurred in kinhiraja, Malegaon, Adoli and savergaon.35% crop is damage due to wild animals. Animals like deer, monkey and pig are responsible for this damage. Totally, 90% crop damage occurrences were recorded by the enumerators from 2013 to 2014, in villages. The crop damages occurred in 100 farms. Several farms were repetitively damaged during the monitoring period. A total amount of 660.5 acres was damaged by wildlife over an overall surveyed area of 2456.72 acres. Totally 27% of the surveyed area was damaged between 2013 and 2014 (Table 1). Crop damage affected mainly small peasant farmers (average cultivated field = 6.6 acres; sd=10.18). On average 1.79 acres (SD=4.33) per farm was damaged equivalent to 33% of the size of the farm. The average size of the damage per farm was 0.87, 1.93 and 3.25 acres respectively. On average the proportion of damaged area per farm was higher in Kinhiraja (44%) and lowest in Vakad. (25%). The most damaged crops were (in descending order): soybean (54.5%), chickpea (21.6%), maize (9.1%) and green gram (6.8%). Crops marginally damaged were cowpeas, sunflower.

Socio-economic backgrounds of farmers, farmland profiles and perceived crop damage-

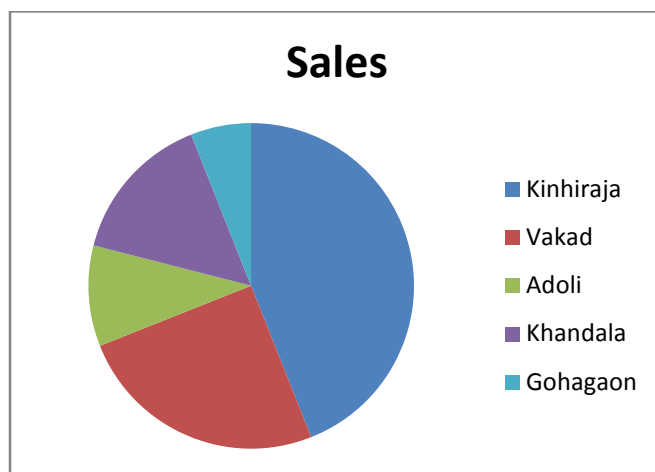
The socio-economic backgrounds of farmers differed little across participating farms, with a mean age of 22 to 14years. Most farmers (71%) had attained a primary school education level, but only 29% had achieved higher. The average farm size and perimeter length was 3900m² 2300 and 890m 315, respect. Not correlated with distance to forest edge Farmers grew their crops for subsistence (56%) and commercial (44%) purposes. Among the subsistence crops edible to wildlife species, all farmers grew chickpea and wheat as their main crops, while banana, chili, maize, papaya plant and water spinach were among the other subsistence crops. The main commercial crops grown were wheat (62%), soybean (18%) or a combination of both (20%) crops, which are unpalatable to most mammal species. Most farmers thought that cutting down the forest would increase flooding (94%), soil erosion (88%) and attacks from insect crop pests (66%).

NAME OF THE VILLAGE	CROP DAMAGE PERCENTAGE
KINHIRAJA	44
VAKAD	25
ADOLI	10
KHANDALA	15
GOHGAON	6

Fig-Large number of damage is occurred in this village (as per departmental information)



Age categories of respondents including in interview.



Percentage of crop damage in villages of washim district

Wild Animals	Crops	Types of damage
1.Monkey	Soyabean	Eating leaf
2.Pig	Wheat,maize and Cheakpea	Breaking the plant
3.Deer	Soyabean and Vegetables.	Eating leaves and fruit

crop-targeted and types of damage by wild animals.

SUMMARY AND CONCLUSION-

In Washim district as indicated earlier, most of the people whose farming activities are often impacted by the presence and abundance of 'problem' wild animal species are the resource poor local subsistence. Various studies has shown that previous research has mainly concentrated on understanding only the socio-economic dynamics of human-wildlife interaction with very limited understanding of the spatial distribution of this conflict. Such an approach has caused considerable difficulties in drawing contextual conflict resolution measures, hence the need to map the extent and severity of this conflict. Participatory GIS, a tool that incorporates local expertise and knowledge with technical expertise, provides an efficient and effective way to map the extent and severity of damage caused by wild animals on agricultural land. This study has shown that crop damage by wildlife seriously affects the livelihoods of the farmers. This can lead to an increased negative human attitude towards wildlife with potentially negative effects for conservation. This study has also shown that the problem has a peak in the dry season (May-August) coinciding with the availability of alternative food (maturation of the crops) and the low quality / scarcity of the forage. Crop damage by wild animals is a severe problem in some parts of district. Field surveys showed that on an average 20% of the crop was damaged by wild animals. Forty-seven species of crops were vulnerable to animal damage. Highly nutritious crop like wheat, were more vulnerable. Field surveys and information collected from the Forest offices showed high incidence of crop damage at Northern regions followed by Southern areas.

SUGGESTIVE MEASURES-

- Barriers** - erection of fencing, tree guards or tree shelters; use of chemical repellents;
- Control of animal numbers** - shooting, trapping, poisoning or biological control;
- Habitat management** - regrettably, this is a largely theoretical option at present.

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