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Studies on Crop Depredation Caused by Wild Animals in Some Villages of Chenab Valley Jammu and Kashmir India

Kulbhushan Kumar*, Satpal Singh Bisht, Netrapal Sharma, Ajay Kumar, Shikha Bora, Neelaxi Pandey and Nagma Parveen
Department of Zoology, D.S.B. Campus Kumaun University
Nainital Uttarakhand-263002
Correspondence: kulbhushankumar01041990@gmail.com

ABSTRACT
In India about 65% of the people are directly or indirectly dependant on agricultural sector for economic survival. The annual income of farmers is significantly influenced by the yield of the crops which is affected by wild animals. However, the particular attention should be paid to the depredation caused by wild animals. Crop depredation by wildlife is mostly frequent in the Chenab valley. Understanding of crop depredation factors is crucial to the development of effective management strategies. The frequency of damage events mostly observed in fields and also after harvesting of crops. Farmers use number of traditional and conventional techniques to protect their crops from wild animals. Crop raiding represents a major threat to the survival of farmers and significantly increase in the rate of frequency of crop raiding. Habitat degradation and destruction of the wild animals need to be monitored and addressed. This result in the decline of number of wild animals and therefore management strategies should target biodiversity conservation without impeding socioeconomic condition of the people. The aim of study is to provide a general description of agricultural damage caused by wild animals in the study site.
Key Words; *Economic survival, Crop raiding, biodiversity conservation*

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INTRODUCTION

The study area that is Chenab Valley is located in the Northern Himalayan regions of India. It has distinct climatic zones *viz.* Jammu region, temperate mid hills, temperate Kashmir valley and cold arid zone of Ladakh. The cropping system of the study site includes rice, maize, barley, pulses, peas and wheat as the major crops. Farmers of valley are rarely compensated for their crop losses [1,2]. The individual economic losses suffered from crop raiding could be high and farmers have inability to minimize the crop raiding and the absence of compensation schemes lead to retaliatory killing of problem wildlife species [3,4]. Location of agricultural farms near the forest boundaries explains the susceptibility of that farm to crop damage. Most of the cultivated crops are vulnerable to crop raiding [5,6]. While many species raid cultivated crops, primates in particular are known to be the most frequent crop raiders [7]. Crop depredation has a relation to the nutritional content of crops or the number of farms on which the crops are grown [8]. Crop raiding by wild animals sometimes results into conflict between humans and wild animals. Crop damage causing vertebrates of Chenab valley mainly includes birds and mammals [9]. Crop raiding by wild animals is most frequent especially along the boundaries of agricultural fields. Interestingly, farmers in some parts of valley did not take measures to protect their crops because crop protection techniques used by the farmers are not sufficient enough to counter crop damaging species [10]. The aim of study is to analyze the quantitative crop loss by the farmers and to emphasize on the management of wildlife.

MATERIAL AND METHODS

Description of Study Area

J&K consists of three distinct region *viz* Jammu region, Kashmir region and Ladakh region. The Chenab Valley is part of Jammu region. Chenab valley is comprised of three districts Ramban, Doda and Kishtwar. The study site experiences very cold and chilly weather during winters but Monsoon is very low.

Fig.1. Depiction of Chenab Valley

Major Dominated Wild Animals of Study site

The major dominated primates of Chenab Valley are, Monkey (*Macaca mulata*) Brown bear (*Ursus isabellinus*) Leopard (*Panthera pardus*) Snow leopard (*Panthera uncial*) Himalayan musk deer (*Moschus moschiferus*) Hangul (*Cervus elaphus hangula*) Shrew (*Capricornis sumatraenis*) Kashmiri Flying Squirrel (*Hylepated fimbriatus*) Himalayan Black Bear (*Selenaractos thibetanus*) Common Langur (*Presbytis entellus*)

Major Crops of Study Area

Chenab valley has three broad crop seasons viz. Rabi season and Kharif season and Zaid. Rabi crops are raised in winter and harvested in spring and these crops require low temperature e.g., Barley, Peas, Oil seeds etc. Kharif crops are sown in summer and are harvested in autumn e.g. Jawar, Pulses, Maize etc. Zaid crops are grown throughout the year e.g. Leafy and tuber vegetables.

Pilot survey

A pilot survey was conducted in three selected villages of study area from October 2018 to December 2018 based on the information gathered during the preliminary survey. During the pilot survey farmers were randomly selected and interviewed. The aim of the pilot survey was to evaluate the questionnaire and to check whether it was applicable and suitable in the study area. Based on the pilot survey results, the questionnaire was revised in each village. The current status of crop damage was studied in the study area through observations.

Collection of Data

The collected data is primary data as well as secondary. Primary data was collected by the field visits and questionnaire survey. The secondary data was collected from wildlife department of Chenab Division. The collected data was statistically analyzed by using excel software.

RESULTS

Saras

The expected and actual yield of maize, potato, peas and wheat was recorded during the year 2018 in village Saras via questionnaire survey from local farmers is shown in fig.1. A decrease was observed in maize, potato, peas and wheat of 466kg, 347kg, 342kg and 498kg respectively after the damage done by wild animals.

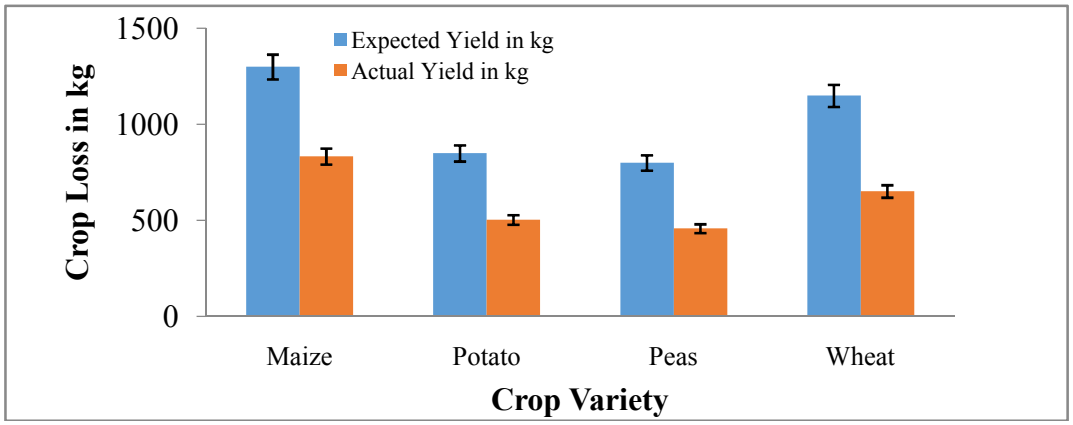

Fig.2. Depiction of wild animal's damage in Saras Village

Bhubha

The expected yield of maize, peas, pulses and mustard was recorded during the year 2018 in village Bhubha via questionnaire survey from local farmers and details are shown in fig.2. A decrease was observed in maize, peas, pulses and mustard of 429kg, 241kg, 156kg and 145kg respectively after damage done by wild crop raiding animals.

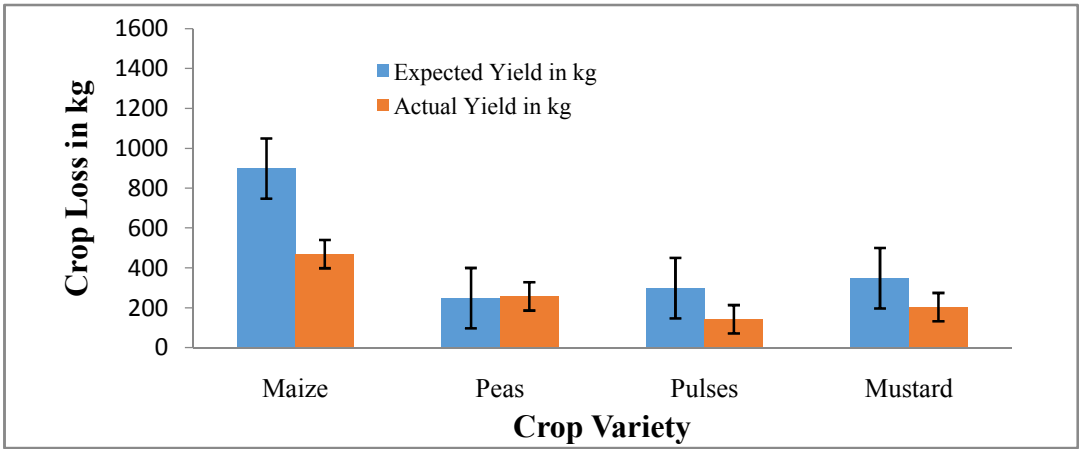

Fig.3. Depiction of wild animal's damage in Bhubha Village

Rewara

The expected and actual yield of maize, mustard, wheat and peas was recorded in village Rewara via questionnaire survey from local farmers as depicted in fig.3. A decrease was observed in maize, mustard, wheat and peas of 709, 206kg, 392kg and 435kg respectively after damage done by wild animals.

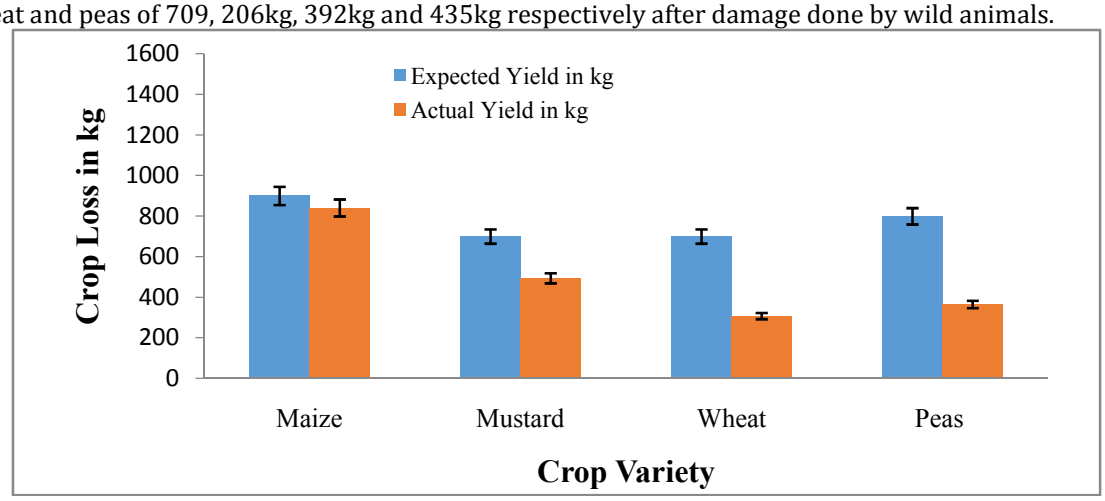

Fig.4. Depiction of wild animal's damage in Rewara Village

Percentage Loss of Crops: The expected percentage of crop loss due to wild animals in villages Saras, Bhubha and Rewara are depicted through pie chart Fig.4, Fig.5 and Fig.6 in the form of percent loss.

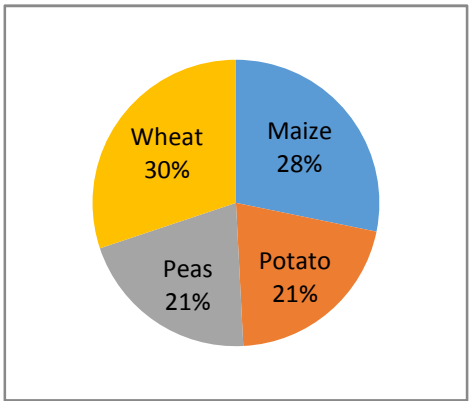

Fig.5. Percent Crop loss in Saras

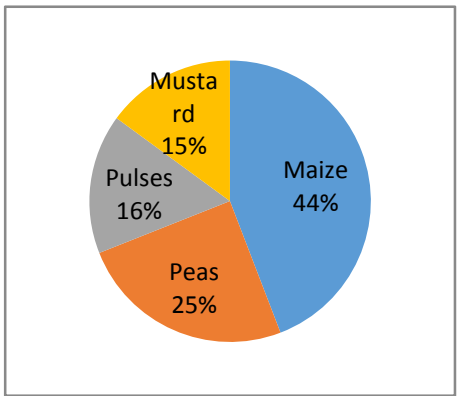

Fig.6. Percent Crop loss in Bhubha

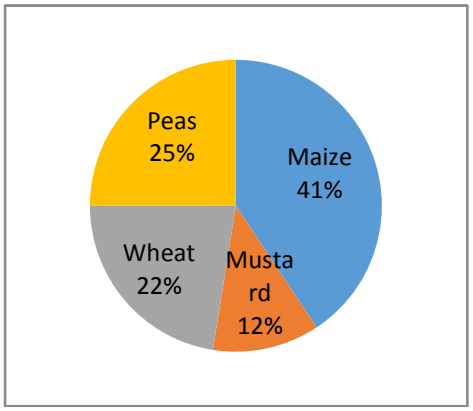

Fig.7. Percent Crop loss in Rewara

DISCUSSION

The damage of agricultural crops by wild animals has been a major problem that farmers are facing in the study site. Wildlife raids inflict heavy losses on farm produce with the cost borne by the local farmers [11,12]. During the present investigation there were losses in the economically important crops like maize, wheat, potato, pulses and peas etc [13]. Damage to crops may be influenced by numerous factors, including animal habituation, availability of native forage, local weather conditions and animal nutritional state [14,15]. There are different designs to be successful in reducing damage to crops [16]. The realization that actual loss of farmers can be greater than the direct damage done by animals is important in providing justice to the farmers [17]. Different species of wild animals differ in their population size, gregariousness and activity periods, qualitative and quantitative patterns of damage [18]. Crop damage would differ according to the crop species, agricultural practices and microeconomics of farmers, the major damaging herbivore species, their habits, habituation and prevalent laws. Gardening crop fields during harvesting is most effective methods of preventing crop damage. Crop cultivator's guarding is the primary effective means of preventing crop raiding by wild vertebrate [19]. The farmers need to mitigate crop raiding by wildlife is significant from the first day of sowing until they put the harvest into granaries. Farmers use traditional crop protection methods such as staying in field watching, throwing objects, producing noise by beating drums or shouting loudly to reduce crop raiding and these methods are mostly successful.

CONCLUSION

The damage to field crops caused by wild animals is a major problem in the Valley. It is found that crop varieties, population of wild animals, distance of the farm from the forest and the surrounding ecology are the main factors in crop damage. This highlights the need for site-specific management techniques to minimize the crop damage problem by wild animals. At present it is almost impossible to bring down crop damage by wild animals without management. People need to be educated to live with the situation by awareness programmes to deal with the incidences of attack on human beings and livestock.

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