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Human-wildlife conflict in Telangana: Analyzing the socio-economic profile of affected farmers

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Abstract

Human-Wildlife Conflict (HWC) poses a growing threat to rural livelihoods in Telangana, particularly in forest-fringe farming communities that experience frequent crop damage from wild boars, monkeys and other wildlife species. This study was undertaken to analyze the socio-economic profile of farmers affected by HWC. The study was conducted across all three Agro-climatic zones of Telangana - Northern, Central, and Southern zones ensuring comprehensive geographical representation. From each zone, one district with the highest recorded forest cover and frequent Human-Wildlife Conflict cases was purposively selected. Accordingly, Mancherial district was chosen from the Northern zone, Bhadradi Kothagudem from the Central zone, and Nagarkurnool from the Southern zone. Within each selected district, one mandal with the highest incidence of wildlife-related crop damage was identified. From each mandal, five villages located near forest fringes were selected for the study. In each village, 20 farmers who had experienced crop loss due to wildlife were selected using purposive sampling, culminating in a total sample size of 300 respondents. Data were collected through structured interviews and analyzed using descriptive statistics. The findings revealed that the majority of respondents were middle-aged, had middle level of educational backgrounds and operated small to semi-medium landholdings. Most farmers reported medium level of annual income, low level of extension contact, community participation, trainings and poor access to mass media exposure related to HWC. Furthermore, a significant portion of farmers lived within 5 kilometres of forest areas, increasing their exposure to wildlife, had superstitious beliefs, no one had claimed compensation and government support. The study highlights the need for targeted awareness programs, improved institutional outreach and the development of tailored interventions to address the socio-economic challenges faced by conflict-prone farming communities.

Keywords: Crop loss, human wildlife conflict, mitigation, measures, Telangana, profile

Introduction

Telangana, with approximately 26,969 sq. km of forest cover accounting for 24.06 percent of its geographical area (FSI, 2021) ^[3] is home to a rich array of wildlife, including wild boars, monkeys, black bucks, peafowls and other herbivores. As agriculture land expands into the forest fringes, rural communities increasingly face Human-Wildlife Conflict (HWC), particularly in villages with high forest density. Crop loss due to wildlife incursions has emerged as one of the most pressing livelihood threats for small and marginal farmers in these regions (Prasad *et al.*, 2021; Reddy *et al.*, 2020) ^[14, 15]. While the ecological causes of HWC have been widely discussed, the socio-economic profile of the affected farmers who are often the most exposed yet least equipped to respond remains understudied in Telangana.

A variety of socio-economic factors, including age, landholding size, cropping patterns, income level, education and proximity to forest areas, trainings, community

participation, extension contact, mass media support mediate farmer's vulnerability to wildlife-induced damage; these factors not only determine the extent of loss suffered but also determine access to institutional support, adoption of protective measures and overall resilience (Karanth *et al.*, 2013) ^[9]. In Telangana, where agrarian communities frequently reside next to protected areas, interactions with wildlife like wild boars, monkeys and elephants have increased, leading to significant economic losses and heightened tensions between humans and wildlife (Prasad *et al.*, 2021) ^[14].

This study seeks to explore the socio-economic characteristics of farmers experiencing HWC in Telangana, with a specific focus on crop damage and the mitigation strategies employed. By profiling these communities, the research aims to identify vulnerable groups, highlight patterns of exposure and response, and contribute to the development of context-specific solutions that balance conservation with rural livelihood security.

Methodology

The present study used an exploratory and ex-post facto research design. Because the variables being studied had already happened and the researcher could not change them, the ex post facto design was used. This allowed for the retrospective examination of cause-and-effect correlations (Kerlinger, 1973) ^[10]. An exploratory research design was used to gain deeper insights around conflict between humans and animals, especially in regions with little previous study (Kothari, 2004) ^[12]. The study was conducted across all three Agro-climatic zones of Telangana - Northern, Central, and Southern zones ensuring comprehensive geographical representation. From each zone, one district with the highest recorded forest cover and frequent Human-Wildlife Conflict cases was purposively selected. Accordingly, Mancherial district was chosen from the Northern zone, Bhadrachalam from the Central zone, and Nagarkurnool from the Southern zone. Within each selected district, one mandal with the highest incidence of wildlife-related crop damage was identified. From each mandal, five villages located near forest fringes were selected for the study. In each village, 20 farmers who had experienced crop loss due to wildlife were selected using purposive sampling, culminating in a total sample size of 300 respondents.

Results and Discussion

Age

The results presented in table 1 and figure 1 indicates that majority of farmers (56.00%) were in the "Middle age" followed by (28.00%) in the "Old age" and (16.00%) in the "Young age" category.

From the table it was evident that majority of the farmers fell in middle age group category followed by old age. The predominance of respondents in the middle age category may be attributed to the declining interest of younger individuals in agriculture within the study area. Access to higher education, urban migration, and the search for alternate sources of income in metropolitan areas, such as jobs in the public and private sectors. Agriculture is often perceived as labour-intensive, less profitable and vulnerable to risks related to climate variability and market instability by youth. Conversely, elderly farmers' involvement shows their ongoing commitment to agriculture, which is probably fuelled by generational inheritance and long-standing attachment to farming practices. The results were in line with Dereje *et al.* (2022) ^[2], Islam *et al.* (2022) ^[4], Meena (2015) ^[7].

Education

From the table 1 and figure 2 it was clear that majority of the respondents (29.67%) had a middle-level education, followed by (23.00%) illiterate. Additionally, 13 percent of farmers had completed a graduate degree and above, while 12.33 percent had completed primary school. A meagre percentage i.e. 8.00 percent were found to had literacy and secondary school, whereas the least proportion (6.00%) of the sample had completed higher secondary education. The results were in accordance with Jaleta (2023) ^[5] and Kopke (2024) ^[11].

From the table it can be observed that large proportion of respondents had middle-level education points to better

access to elementary and upper-primary education in rural regions. However, the findings suggests that educational inequalities persist, especially among the older generation, who probably had less access to formal education because of socioeconomic limitations, lack of higher education infrastructure in rural areas, and cultural preference for early farming involvement over ongoing academic pursuits were some of the other reasons for the low percentage of farmers with higher secondary (6.00%) and graduate-level (13.00%) education.

Operational landholding

The results in table 1 and figure 3 reveals that the majority (30.00%) of the respondents belonged to the small landholding category, followed by semi-medium (25.00%), marginal (20.00%), and medium landholders (15.00%), while the large landholding category accounted for only 10.00 percentage.

As the study was exclusively conducted among farmers owing to its specific focus on human-wildlife conflict in relation to crop loss all respondents owned land. Due to their frequent reliance on agriculture as their only source of income, the prevalence of small and semi-medium farmers highlights the vulnerability of individuals with inadequate land resources. Their limited operating holdings limit their ability to apply large-scale mitigation strategies, leaving them more vulnerable to the detrimental effects of wildlife-caused crop loss.

On the other hand, despite their smaller numbers, medium and large landholders could have more access to infrastructure, resources which could improve their capacity to deal with and manage conflict between humans and animals. The results were in conformity with karanth *et al.* (2012) ^[9] and Jaleta *et al.* (2023) ^[5].

Annual income

It could be observed from the table 1 and figure 4 that majority of the respondents (54.00%) belonged to the medium-income category, followed by high-income group (38.66%), while only 2.33 percent fell into the low-income group category.

A considerable proportion of respondents fell into the medium and high-income groups, indicating that a significant portion of the sample may be dependent on agriculture and rural livelihoods with moderate to limited financial resources. This economic distribution mirrors the larger socioeconomic context of rural Telangana, where small and marginal farmers predominate in agriculture sector.

The impact of limited income levels on the adoption of effective human-wildlife conflict mitigation strategies was evident in the fact that many farmers reported that they were unable to adopt advanced mitigation measures like solar fencing due to financial constraints, instead using low-cost, traditional methods such as scarecrows, manual guarding, and noise-making devices to deter wildlife, but these methods were perceived as significantly less effective in preventing crop damage compared to solar fencing. Farmers also stressed that they would readily adopt solar fencing to improve crop protection if subsidies or financial assistance were made available by the Government.

Cropping intensity

The table 1 and figure 5 showed that most respondents (90.67%) fell into the medium range of cropping intensity category, followed by 9.33 percent of farmers with high cropping intensity.

From the above it can be observed that, majority of farmers in the study area engage in multiple cropping, which is the practice of growing two or more crops on the same plot of land each year and comparatively high cropping intensity revealed that farmland was continuously put to cultivation throughout the year, perhaps in an effort to increase revenue and land productivity.

The year-round availability of crops, however, may also be a significant contributing factor for conflict humans and wildlife since it offers a continuous food source that draws herbivores such as monkeys and wild boars into agricultural areas. Therefore, the results emphasized the necessity of prompt interventions, such as the application of habitat management techniques, introduction of non-palatable crops and animal deterrents, particularly in areas that follow high cropping intensity.

In addition to the primary crops, non-palatable crops which were less attractive to wild boars and monkeys should be grown to minimize crop damage. Scientists and researchers must use systematic investigations to find out and suggest suitable crop, to help farmers to adopt implement integrated farming systems that reduce losses caused by wildlife and necessary action strategies may also need to take up to promote them on a larger scale. The results were in line with the results of Joshi (2013) [6].

Wildlife vicinity to farmers

According to the results presented in table 1 and figure 6, most of the farmers (51.00%) live within 3-5 km from forest areas, indicating that they frequently contact with wildlife like monkeys and wild boars. Around 28.00 percent of farmers were found to be < 3 km from the forest or wildlife area, which puts them at a far higher risk of crop damage and conflict between humans and wildlife. Whereas 21.00 percent of farmers, on the other hand, are located >5 km from forest areas, where there may be a lower frequency of direct agricultural damage and conflict than among those who live closer.

These results demonstrated how farmer's reported experiences of conflict were strongly correlated with their physical closeness to forest areas. Farmers habitat nearer to wildlife areas were more likely to face difficulties including crop raiding, property damage, and sporadic dangers to public safety. This highlighted the necessity of implementing customized conflict mitigation initiatives according to the distance from the wildlife habitats.

The results were in accordance with Rao *et al.* (2002) [16], Shane McGuinness and David Taylor (2014) [8] and Pandav *et al.* (2021) [13]. Analogous findings have been documented in other conflict-prone environments, where farmers living close to forest borders were especially susceptible to financial losses and disturbances in their livelihoods due to animals.

Traditional or superstitious beliefs

According to the information in table 1 and figure 7, a significant majority of farmers (84.30%) have superstitious or traditional beliefs, whereas just 15.70 percent did not. Because monkeys are revered and symbolically connected

to Lord Hanuman in Hindu mythology, respondents frequently held the opinion that they shouldn't be harmed or killed. Even when considerable crop damage occurs, the employment of forceful or deadly management methods is frequently discouraged by this cultural respect.

Along with cultural views, several farmers expressed ecological viewpoints, pointing out that due of the degradation of their natural habitats, wildlife, especially monkeys and wild boars, have developed a habit of raiding crops. Wild animals enter agricultural areas in quest of food while forests are being destroyed, and fruiting trees are becoming less in number. Farmers recognized that wildlife once inhabited these areas that animals will adapt by depending on farmed foods to survive because of deforestation. This comprehension highlights the necessity of habitat restoration and long-term landscape-level conservation planning and indicates a greater awareness of the human involvement in intensifying conflict between people and animals.

To tackle this intricate problem, it is necessary to combine culturally sensitive communication with scientific knowledge. Community-based education initiatives and awareness campaigns could help farmers embrace sustainable and successful conflict management techniques without compromising their beliefs by bringing contemporary mitigation techniques into line with traditional values.

The results were in conformity with the results of Barua *et al.* (2013) [1].

Table 1: Socio- economic profile of farmers

S. No	Profile Characteristics	Frequency	Percentage
1.	Age		
	Young (less than 35 years)	48	16.00
	Middle (35-50 years)	168	56.00
	Old (above 50 years)	84	28.00
2.	Education		
	Illiterate	69	23.00
	Functionally literate	24	8.00
	Primary	37	12.33
	Middle	89	29.67
	Secondary	24	8.00
	Higher secondary	18	6.00
	Graduate and above	39	13.00
3.	Operational land holding		
	Marginal (<1 ha)	60	20.00
	Small (1-2 ha)	90	30.00
	Semi-medium (2-4 ha)	75	25.00
	Medium (4-10 ha)	45	15.00
	Large (> 10 ha)	30	10.00
4.	Annual income		
	Low (Up to 33,750)	7	2.33
	Medium (Rs.33,750 - Rs.1,44,000)	162	54.00
	High (> Rs. 1,44,000)	116	38.66
5.	Cropping intensity		
	Low (100-150)	0	0.00
	Medium (150-200)	272	90.67
	High (200-250)	28	9.33
6.	Wildlife vicinity to farmers		
	< 3 km	84	28.00
	3-5 km	153	51.00
	> 5 km	63	21.00
	Yes	No	
	F	%	F %
7.	Traditional or superstitious belief	253	84.30
		47	15.70

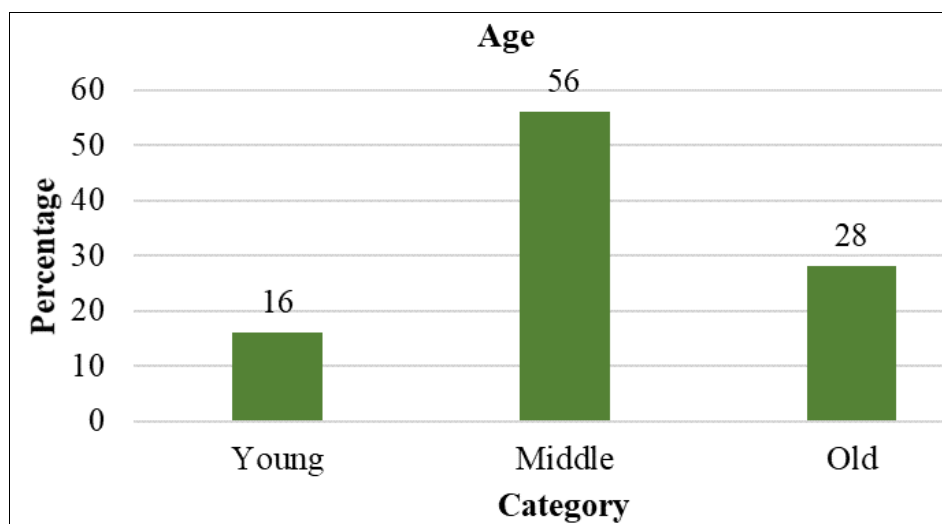


Fig 1: Distribution of farmers based on their age

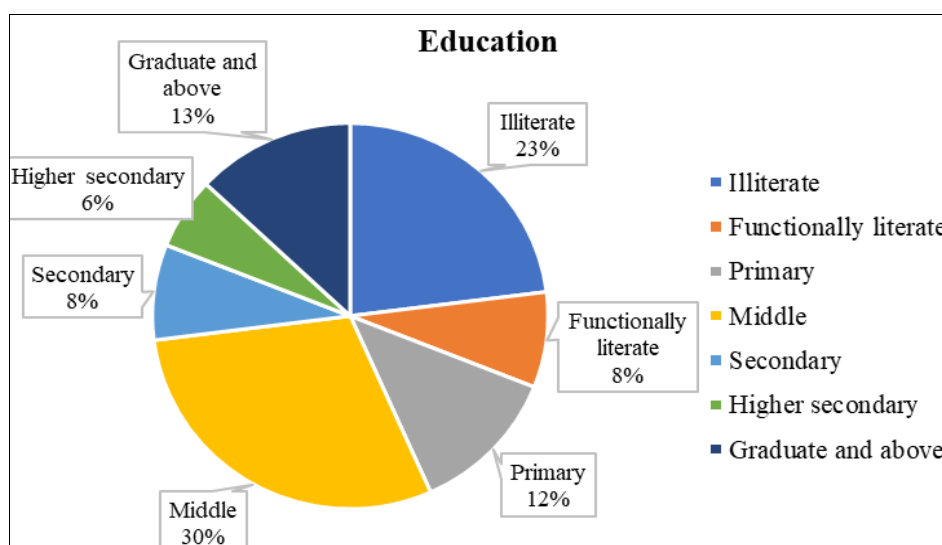


Fig 2: Distribution of farmers based on their education

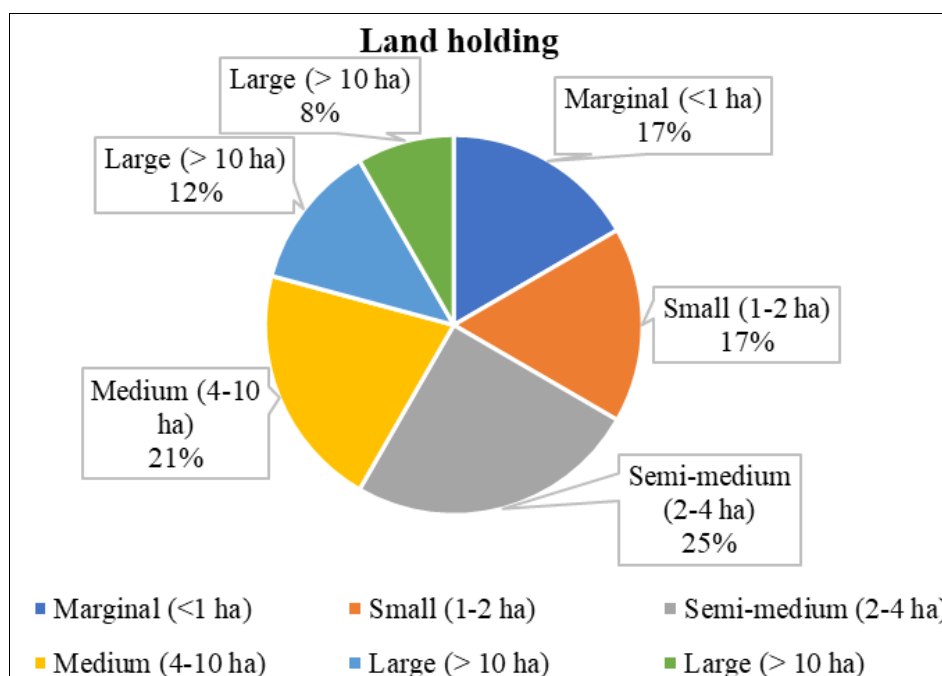


Fig 3: Distribution of farmers based on their land holding

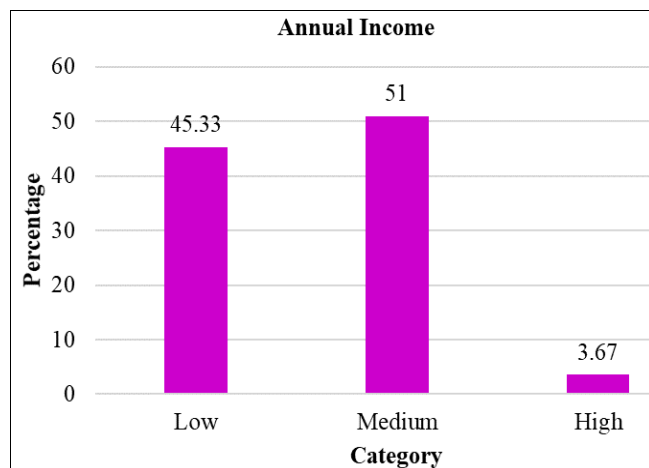


Fig 4: Distribution of farmers based on their annual income

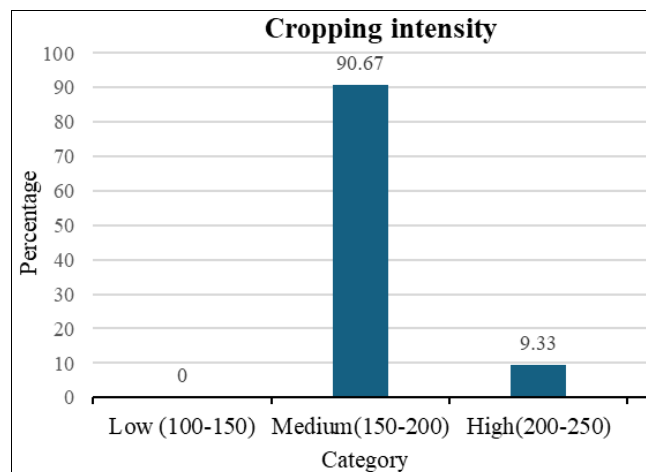


Fig 5: Distribution of farmers based on their cropping intensity

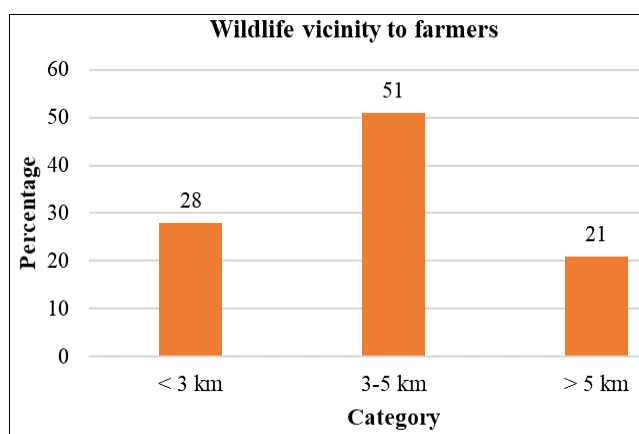


Fig 6: Distribution of farmers based on their wildlife vicinity of farmers

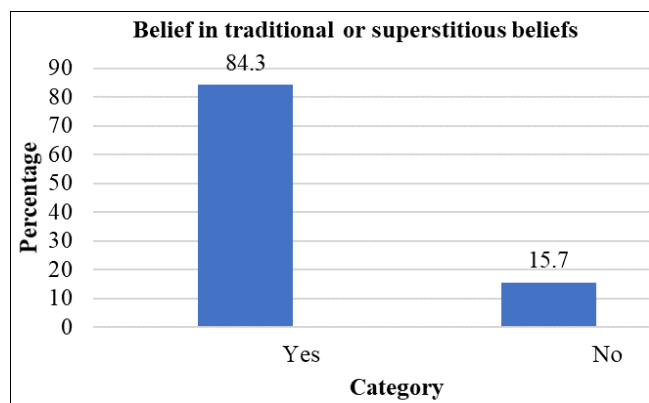


Fig 7: Distribution of farmers based on their traditional or superstitious beliefs

Conclusion

The present study highlights the socio-economic landscape of farmers vulnerable to human-wildlife conflict in Telangana. The findings indicate that a significant proportion of respondents belong to the middle-age group, possess limited formal education, and operate on small to semi-medium landholdings. Most of them fall within low to medium income brackets and practice continuous cropping, often in close proximity to forest areas conditions that increase their exposure to wildlife-induced crop damage. Limited access to training, inadequate extension contact, and low mass media exposure further constrain their

capacity to adopt effective mitigation practices. Additionally, widespread traditional beliefs and lack of awareness regarding compensation and government support reveal major gaps in institutional outreach.

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