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Kerala Agricultural University**



**GOVERNMENT OF KERALA
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FINAL PROJECT REPORT

**EXPLORATIVE STUDY AND CAPACITY
DEVELOPMENT ON HUMAN-WILDLIFE CONFLICT
MANAGEMENT IN SELECTED FOREST TRACTS OF
KERALA**

SUBMITTED BY

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INTRODUCTION

Human-wildlife conflict is a growing concern to the society. The overlapping of requirements of human and wildlife is a foremost cause of conflicts. In the tropical regions, land degradation is a major trigger of the increasing frequency of the conflicts. As the natural habitat of the different wildlife species becomes more and more fragmented, they are forced into smaller pockets of suitable habitats resulting in increasing overlappings. Although increasing conflicts due to human–wildlife interactions have stimulated a body of research, a great deal of this work has focused on the ecological perspectives. Some research has been done on the social and economic factors that influence the success or failure of conservation initiatives (Marshall *et al.*, 2007); however, the majority of these published literatures are focused on the problems of developed nations.

According to the World Conservation Union, human-wildlife conflicts (HWC) occur when the requirements of wildlife overlap with those of human populations creating costs to residents and wild animals (Distefano, 2005). HWC is not restricted to any particular geographical region, these conflicts are more intense in Asia where more than half of the world's human population resides. Asia is also the home of a large portion of the globe's biodiversity. For example, in developing countries like India, where dense human populations live in close proximity to wildlife preserves, competition over natural resources is intense and poses a serious challenge to livestock holdings, agriculture and conservation (Shingote and Schuett, 2013). Alleviating human–wildlife conflict is therefore a real challenge for both managers and locals because it requires an integrated approach that is humane, environmentally sustainable, and socially acceptable (Conover, 2002). Conservation efforts have now recognized the need to look beyond the ecological perspective to understand the dynamics involved in HWC throughout the world.

The continued need of the conservation efforts in our protected areas need not be emphasized. Over twenty eight percentage of our forest area, which is designated as “protected areas”, mostly cradles the Western Ghats region. The fringe areas of these protected areas are also the most vulnerable points, vis-à-vis human pressures. Kerala had strong customs and traditions for conserving biodiversity, including wildlife. But the traditional outlook towards sustainable land use and especially wildlife conservation is undergoing considerable changes in

the context of the recent globalization and liberalization policies. Forest fringe areas are nowadays experiencing large level land use change and land cover changes.

Owing to climate change and other factors as well, the core forest habitats are also undergoing invisible changes, in turn affecting the food security and natural ranges of many wild animals. This is forcing many wild animals to enter human habitations. In the forest fringe areas, human-wildlife conflicts are now increasingly being reported. There are studies which indicate that crops, especially food crops raised by local people often get destroyed by wild animals like elephants, wild boar, monkeys etc and that farmers including tribal and women groups are reluctant to take up farming in forest fringe areas (CGSAFED, KAU and KSWC). By and large the life and land based livelihoods of the forest fringe people are often under threat. There also seems to be a growing public concern over the alleged focus being given to 'wild life-at-the-neglect-of-human-life'.

Many wild species are reported to cause damages of various dimensions to human environments. The extent and nature of these damages varies from species to species, locality and season as well. For developing successful mitigation programmes, it is important to understand the nature of these conflicts and also the probable causes and consequences. It is also important to understand the factors, both at the human and animal level, which triggers the conflicts. It is also important to identify and perhaps to adopt "best management/mitigation practices" found successful elsewhere on the world, in the context of human-wildlife conflicts. FAO has documented the various practices adopted by different countries for mitigating human-wildlife conflicts. The importance of undertaking trials of alternate crops/animal preferred plants is identified as one of the strategics. The compensation measures introduced for the victims of human-wildlife conflicts by the Government are often perceived by the victims as very inadequate and ineffective. To reduce the conflicts, awareness campaigns among the local communities to convince them about the inevitable price of effective forest protection is very important. There is a great need to educate the youth about the causes and triggers of these conflicts. An informed citizenry will be more tolerant of these conflicts and can be expected to be more willing partners in the mitigation programmes. Concurrently, it is also important to evolve participatory mitigation methods to provide life and livelihood security for the forest fringe communities. The current ground situation in many parts of Kerala is serious enough to take up timely exploration, capacity development and formulation of effective mitigation

strategies to address human-wildlife conflicts. The project proposal on “Explorative study and capacity development on human-wildlife conflict management in selected forest tracts of Kerala” was submitted against the background portrayed above with the below mentioned objectives.

1. To assess the extent and nature of human-wildlife conflicts that occur in the selected forest tracts of Kerala with focus on selected wild animals.
2. To identify and document best practices and methods adopted by forest department and local communities to avoid and overcome infringement of wild animals into human habitats.
3. To analyse cause–consequence factors of human-wildlife conflicts in relation to patterns of land use and land cover change.
4. To understand awareness and attitude about the laws and rules of protection and conservation of forest, biodiversity and wild life among victims of human-wildlife conflicts.
5. To organize capacity development programmes for human-wildlife conflict mitigation among stake holders through awareness campaigns.
6. To develop region specific plans of action to mitigate human-wildlife conflicts

REVIEW OF LITERATURE

In India, crop damage is very common along the immediate periphery of wildlife sanctuaries and national parks (Chhangani and Mohnot, 2004). Conflicts between humans and leopards have intensified recently due to a combination of factors: the extensive loss of natural habitats, increasing urban and rural human densities and, in some areas, increasing wildlife populations resulting from effective conservation programs. Specific conflicts can occur in various forms through sightings, straying of leopards outside protected areas, livestock predation, and leopard attacks on humans causing injury or death (Chhangani et al., 2008; Choudhury, 2004). Hence future studies investigating HWC conflicts in India should consider using focus groups to draw out the behavioral beliefs of the communities they are investigating as the behavioral beliefs might not only be unique to the Indian situation but may also differ for communities or regions within India (Shingote and Schuett, 2013). Most conflict incidents occur when animals range around and beyond protected area borders into human-dominated landscapes (Gurung et al., 2008). Conflict can therefore reduce local tolerance towards carnivores, their conservation and also conservation of other non-conflict species.

Any attempt to mitigate human–carnivore conflict and improve the conservation of the culprit species, and possibly other wildlife also, should be based on an explicit understanding of the conflict patterns. This is particularly relevant in Asia, which has some of the highest human population densities living within large carnivore ranges (Dar et al. 2009). In and around Machiara National Park, Pakistan, Dar et al. (2009) reported that goats and sheep were the livestock most vulnerable to attacks, especially during the warmer months. In Sariska Tiger Reserve, India, goats, sheep and calves comprised 88% of leopard livestock kills (Sekhar, 1998). The mean wild and domestic prey body mass killed by leopard in Indian tropical forests was 23 kg (Karanth and Sunquist, 1995), while a synthesis of 33 published and unpublished leopard diet studies found that leopard preferentially preyed upon species within a weight range of 10–40 kg (Hayward et al., 2006). A lower availability of wild prey in Africa, which is often associated with rainfall patterns and seasonal movements of these preys were observed to increase the risk of livestock attacks by carnivores (Patterson et al., 2004; Kolowski and Holekamp, 2006). Leopard tends to be a solitary and nocturnal hunter, relying on stealth and camouflage to stalk up close to their prey (Rabinowitz, 1989). It was therefore unsurprising that livestock in villages

were particularly vulnerable at night, as they were often left unattended and in poorly constructed pens. According to Dar et al., (2009), leopard attacks exhibited a peak during the late afternoon (1600–1700 h), coinciding with livestock being left to graze unattended in fields nearby the village, while their owners were engaged in other work. While dogs might have alerted pastoralists to the presence of an approaching predator, data indicate that dogs were ineffective in reducing leopard kills both inside and outside of villages. The death of 34 dogs to leopard attacks might make dogs reluctant to alert leopard of their presence. From Kenya, dogs were also ineffective in deterring leopard attacks, as well as those by hyena (Kolowski and Holekamp, 2006).

In the Western Terai landscape of Nepal, the perceived threat of leopard attacks resulted in negative attitudes towards the protected area (Baral and Henien, 2007). Those who were less tolerant towards leopard tended to have suffered a greater financial loss, as has been found from human–snow leopard conflict studies in India (Mishra et al., 2003; Oli et al., 1994), which further emphasizes the need to mitigate conflict. Dar et al (2009) recommend a dual strategy through rural development schemes to resolve these carnivore conflicts: installing electricity supplies within villages, such as solar lights or small hydro electric supplies, and vaccinating livestock populations against diseases, which is ideally linked to a wildlife conservation education programme. Compensation schemes for livestock losses to wild carnivores, which currently do not exist in Pakistan, can also improve local tolerance towards wildlife (Bagchi and Mishra, 2006), but this is not always the case (Naughton-Treves et al., 2003), especially if payments are considered to be inadequate or delayed (Madhusan, 2003).

Shingote and Schuett (2013) evaluated local peoples' attitudes toward leopards and leopard conservation in the Junnar Forest Division, a hotspot for human–leopard conflict in India. This study used structured interviews and the theory of reasoned action to explore residents' knowledge, attitudes, subjective norms, and behavioral intentions toward leopards and their conservation. Results indicated a stronger influence of the attitudinal component on locals' behavioral intention toward leopards and leopard conservation. Attitudes toward leopards were complex, with negative and positive views often held by the same person. This study revealed positive dimensions to the local peoples' perceptions of leopards, which are relevant to conservation of this animal.

Kumar (2012) in his study of human-wildlife conflict in a degraded habitat of lower Chambal valley states that the problem of inadequate food and fodder with degraded habitats is posing stress on wildlife to move toward crop land. On the other hand, protected forest cover also provided a safe shelter to wildlife resulting in crop raiding. The raiding of crop fields is posing stress on farmers to change their cropping sites or to avoid most preferred crops for raiding by wild animals. As a result of that, people of the region are avoiding bean crops (gram, pigeon-pea etc). People of the region are also not well aware about modern deterrence techniques. By organizing people in similar interest groups and helping those by training and funding will help to control the encroachment of crop land by wildlife.

In the proximity of Gir National Park and Sanctuary, the Asian lion (*Panthera leo*) and leopard (*Panthera pardus*) use the extensive plantations of sugarcane and mango to find shelter and water and to hunt prey such as buffaloes, cows, pigs and dogs. Several lions are reported to have strayed outside the park boundary and into plantations for more than a week, while leopards have chosen it as permanent habitat and even breed in cultivated fields boarding the edge of the park (Vijayan and Pati, 2002).

In Kibber Wildlife Sanctuary, Himachal Pradesh, (Mishra, 1997) noted that 18% of livestock holdings were killed by snow leopard (*Uncia uncia*) and wolf (*Canis lupus*) for an estimated total value of US \$128 per household per annum and it imparts a very significant economic impact given per annual cash incomes of \$200 to \$400. Villagers claimed predation rates increased after sanctuary establishment, while surveys indicated dramatic increases in livestock numbers accompanying changes in animal husbandry systems (Mishra, 2000). In Karnataka, the overall annual loss due to large tigers and leopards depredation around the Bhadra Tiger Reserve, is reported to be approximately 12% of the total family livestock holding. In addition, elephant damage to crops accounted for an average loss of 14% of the total annual production (Madhusudan, 2003).

Studies on the human-wildlife conflicts are far and few in Kerala. Jayson and Christopher (2008) based on their study on Human-Elephant conflict of Peppara Wildlife sanctuary in Kerala opinioned that cash crops which are more nutritive, attracts elephants and other potential animals resulting in crop raiding. They suggest that low water availability inside the forests is also a cause for wild animals intruding into human habitation. Iqbal (2011) in his study on human wildlife conflict in selected Forest Divisions of Kerala stated that the increased crop damage in

territorial forest areas is due to the vast areas of cultivation of palatable and nutritious crops where as in protected forests only limited agricultural activities is done by the tribal people resulting in lower conflict rates.

There are several approaches to managing human wildlife conflicts. Prevention strategies endeavor to prevent the conflict occurring in the first place and take action towards addressing its root causes, protection strategies are to be implemented when the conflict is certainly to happen or has already occurred, while mitigation strategies attempt to reduce the level of impact and lessen the problem. The main difference between the options is the moment when the measure is implemented. By definition a management technique is only cost-effective if the cost of implementing the technique is less than the value of the damage that is being done, taking into account the fact that a short period of active management may have a continued effect, protecting the crop or the herd over a longer period afterwards.

To understand the human dimension to crop raiding by wildlife it is essential to have a good working knowledge of the particular type of conflict within the local cultural, sociodemographic, political and economic context. Data on local land use strategies and tenure systems, gender roles, farming systems, and people's dependence on agriculture for subsistence will supply a social and economic context for understanding the impact of crop damage by wildlife. Information about farmer's responses to wildlife that crop raid, their understanding of and compliance with wildlife laws, and their expectations of any intervention programme are useful when trying to contextualize the importance of human-wildlife conflict issues for rural communities. Knowledge of how people view a particular issue can help explain why those issues can suddenly become conflict issues to be dealt with by outsiders, when previously they were regarded as part of the normal agricultural cycle, eliciting specific and appropriate responses from within the local community. Identifying whether local people are using their apparent concern about crop raiding to express dissatisfaction with changing access to natural resources, government, or local political institutions, for instance, would be crucial for management intervention design (Hill, 2000; Naughton-Treves, 1998).

Local perceptions of damage as well as having detailed information about the nature of the conflict, it is useful to have knowledge of local perceptions of the severity of damage, how and whether people use particular strategies to try to minimize the levels of crop damage occurring and who actually makes formal complaints about crop raiding by wildlife. Such

information will help identify whether crop damage per se is the important issue or whether it is a proxy for another issue. In addition, this information will help to identify target groups for consultation in any intervention program.

MATERIALS AND METHODS

1. Exploratory studies in the Northern and Eastern Forest Circles of the State

A preliminary reconnoiser survey was conducted in the human-wildlife conflict affected areas of the Northern and Eastern Forest Circles of Kerala (Table 1 & 2). Subsequently, in discussion with Department of Forest and Wildlife, Agriculture, Animal Husbandry, local agencies and forest fringe communities, affected villages located in the Northern and Eastern Forest Circles of the State were selected for the detailed interview.

Table 1. Divisions and Ranges under Northern Forest Circle

Division	Ranges under the division
Kannur	Thaliparambu
	Kannavam
	Kottiyur
Kozhikode	Peruvannamuzhy
	Kuttiyadi
	Thamarassery
North Wayanad	Begur
	Mananthavady
	Periya
South Wayanad	Kalpetta
	Meppady
	Chedleth
Kasargode	Kasargode
	Kanjanahad

Subsequently in discussion with experts an interview schedule was developed and pre-tested (Appendix I). Several sub-questions to be asked during the interview were developed on the following main items.

1. Socio-economic variables
2. Cause-consequent association
3. Extent of Human-wild animal conflict
4. Nature of land use and land cover change
5. Awareness and attitude levels
6. Mitigation strategies

Using this pre-tested interview schedule, respondents who have experienced attacks from wild animals, have suffered damages/loss of properties or crops etc in the indetified villages of the Northern and Eastern Forest Circles of Kerala were identified with the help of key informants.

Table 2. Divisions and Ranges under Eastern Forest Circle

Divisions	Ranges
Nenmara	Nelliyampathy
	Kollengode
	Alathur
Palakkad	Ottapalam
	Olavakkode
	Walayar
Mannarkkad	Agali
	Attapady
	Mannarkad
Nilambur North	Nilambur
	Edavanna
	Vazhikkadavu
Nilambur South	Karulai
	Kalikavu

Statistically valid samples of respondents representing various stakeholder categories – men, women, aged, children will be selected from the identified villages to assess awareness and attitude levels about the forest conservation laws and human-wildlife social conflicts.

2. Awareness creation among stakeholders

Based on the observations and analysis of data, using the local institutions/ CBOs, awareness campaigns will be organized to reach different categories of stakeholders.

The important awareness programmes will be

- a. Awareness workshops for various stakeholders-farmers, farmers organizations, officials, school children, women etc
- b. Awareness campaigns with the aid of visual and print media

3. Evolving location wise participatory plans for human-wildlife conflict mitigation

Location wise participatory planning will be conducted involving all stakeholders to evolve location specific plans of human-wildlife conflict mitigation strategies and networking and catalyzing local panchayaths to evolve strategies for popularizing alternate crops in forest fringe areas.

4. Formulation of policy recommendations

Study conclusions will be validated with multi-stakeholder consultations and policy recommendations will be formulated. Documentation of traditional methods, oral history of successful cases and best practices of human-wildlife conflicts will be done.

RESULTS AND DISCUSSION

The results of the assessment of the extent and nature of human-wildlife conflicts that occur in the selected forest tracts of Kerala conducted across the six districts is outlined and discussed below. The results of the investigations to identify and document the best practices and methods adopted by forest department and local communities to avoid and overcome infringement of wild animals into human habitats in these districts are also listed and discussed.

DISRICT.1 PALAKKAD

The details of the primary data collected through questionnaire surveys among the respondent population of Palakkad district is outlined in Table 1.

Table 1. List of places surveyed in Palakkad district

Sl.No	Panchayath	Block
1.	Kongad	Palakkad
2.	Mundur	Palakkad
3.	Mankara	Palakkad
4.	Parli	Palakkad
5.	Malampuzha	Malampuzha
6.	Marutharode	Malampuzha
7.	Akathethara	Malampuzha
8.	Pudupariyaram	Malampuzha
9.	Pudusserry	Malampuzha
10.	Kodumbha	Malampuzha
11.	Karimba	Mannarkkad
12.	Pottassery	Mannarkkad
13.	Kumaramputhur	Mannarkkad
14.	Kottopadam	Mannarkkad
15.	Thachampara	Mannarkkad
16.	Thenkara	Mannarkkad
17.	Sreekrishnapuram	Sreekrishnapuram
18.	Karimpuzha	Sreekrishnapuram
19.	Vellinezhi	Sreekrishnapuram
20.	Karakurissi	Sreekrishnapuram
21.	Kadampazhipuram	Sreekrishnapuram

The socio-economic profile of the respondents from the twenty one panchayaths in Palakkad district is given in Table 1. From the above table, it is evident that more than 66% of

the respondents were in the age group 50-70 years, followed by respondents in the age group of 30-50 years (25%). Ninety-five percentage of the surveyed respondents were males. The average family size of the interviewed respondents consisted of 3-5 members (43%). Thirty six percent of the respondent population had 5-7 members in their family. Around 58% of respondents were living in the present conflict zones for the past 40-60 years, while another 30% were here since last 60-80 years. Just 4% of the respondents said that they were residing here for less than 20 years. Agriculture was the main occupation of the respondents (100%). The interviewed respondents were interested in acquiring education as is evident from the fact that majority of the respondents (61%) have attended high school. Around 13% of the respondents said that they had opportunities for undergoing higher secondary level education and 11% have attended higher secondary level education.

Table 2. Socio-economic profile of the respondents in Palakkad district

Category	Variable	Frequency	Percentage (%)
Age	Below 30	1	1.47
	30-50	17	25.0
	50-70	45	66.17
	70-90	5	7.35
Household members	1-3	5	7.35
	3-5	32	47.05
	5-7	25	36.76
	7-9	6	8.82
Residing period	Below 30	3	4.41
	20-40	5	7.35
	40-60	39	57.35
	60-80	21	30.88
Occupation	Farmers	67	98.52
	Others	1	1.47
Educational level	No schooling	1	1.47
	Primary	3	4.41
	UP	5	7.35
	HS	42	61.76
	HSS	9	13.23
	College & above	8	11.76
Gender	Male	65	95.58
	Female	3	4.41
Economic status	Above poverty level (APL)	68	100
	Below Poverty Level (BPL)	0	0
			N=68

Table 3. Attitudes towards human-wildlife interactions observed in Paalakkad

Category	AS1 (%)	AS2(%)	AS3(%)	AS4(%)	AS5(%)	AS6(%)	AS7(%)	AS8(%)	AS9(%)
Strongly agree	0	16.41	4.47	68.65	46.26	94.02	7.46	25.37	16.41
Agree	10.44	53.73	55.22	29.85	53.73	5.97	76.11	73.13	74.62
Neutral	10.44	19.4	31.34	0	0	0	2.98	1.49	8.95
Disagree	67.16	8.95	8.95	1.49	0	0	4.47	0	0
Strongly disagree	11.94	1.49	0	0	0	0	8.95	0	0

To assess the opinion of the respondents towards human-wildlife interactions, their reaction for a set of statements were analyzed (Table 3; Fig 1). Majority of the surveyed respondents (67%) in Palakkad expressed their strong disagreement to the first statement (AS1) “Some loss due to wildlife is to be expected in forest fringe areas and should be tolerated by the local people”. This clearly shows that the people’s growing concern about the rising incidents of conflicts and must be taken as a warning bell for initiating mitigatory actions. This attitude also might have influenced their response to statement number 3 and 4. Here, fifty-five per cent of the respondents were observed to be agreeing to the statement “The FD staff generally treat the forest fringe people as encroachers and offenders” (AS3). Majority of the respondents also favoured the statement (AS4) that “Forest department should control wildlife using non-lethal methods such as barriers, deterrents and relocation”. The same holds true for statement 6. Majority of the members (94%) strongly agreed to the statement “Officials and policy makers assigns more value to wildlife over human life and livelihoods” (AS6). Meanwhile they are also concerned about the role of humans in triggering these conflicts which is evident from their response to statement 2. Around 54% agreed and 16% strongly agreed to the statement (AS2) that “Human-wildlife conflict is happening due to encroachment by humans into forest”. The majority of the respondents (54%) agreed to the statement “Tourists coming to see forests/wildlife should pay human wildlife conflict mitigation CESS” (AS5) as they feel that the influx of tourists are influencing the behavior of wild animals by their irresponsible actions like attempting to feed wild animals and thereby encouraging them to attack and snatch food from the tourists. Meanwhile it is an encouraging sign to note that majority of the respondents (76%) also agreed to the fact that “In conflict zones, the Forest Department shows sincerity in taking remedial action” (AS7). The forest fringe people also do have a view on the role of forest degradation in human-wildlife conflicts. Hence the majority view that (AS8) “If FD takes action

to upgrade the quality of the forest habitat, the conflict rates will come down”. Majority of them (75%) were also in favour of the statement “Dearth of accurate data on the carrying capacity of forests is escalating the conflicts” (AS9). All these reactions indicate the necessity to quickly address the solutions to ease the conflicts. It is also pertinent to note that these people who are facing threats has not yet lost faith in the government systems which they believe are struggling to assist them.

Figure 1. Attitudes to human-wildlife interactions in Palakkaad

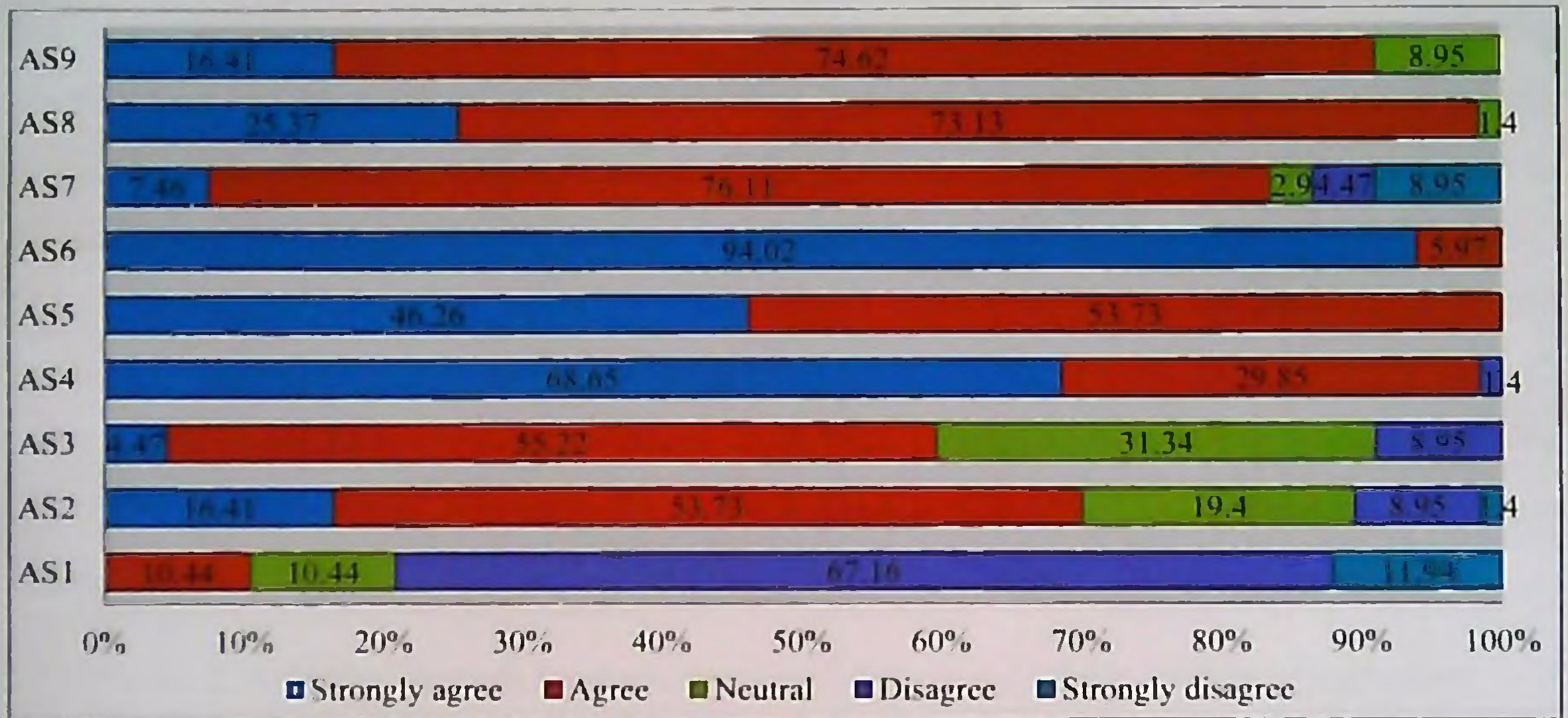


Table 3. Attitudes towards legal measures/policies employed for wildlife conservation

Category	AL1(%)	AL2(%)	AL3(%)	AL4(%)	AL5(%)	AL6(%)	AL7(%)	AL8(%)	AL9(%)
Strongly agree	1.49	29.85	38.8	0	85.07	5.97	98.5	10.44	76.11
Agree	71.64	55.22	53.73	7.46	10.44	11.94	1.49	82.08	22.38
Neutral	11.94	11.94	5.97	41.79	4.47	43.28	0	4.47	0
Disagree	10.44	2.98	0	47.76	0	35.82	0	2.98	0
Strongly disagree	4.47	0	1.49	2.98	0	2.98	0	0	1.49

Analysis of the attitudes of the respondents towards legal measures/policies employed for conservation (Table 3 and Fig. 2) of wildlife, it was observed that majority of the members (71%) agreed that “It is important to conserve wildlife” (AL1). Fifty five percent of the members were of the view that “Wildlife laws ensure the right of the wildlife to live peacefully” (AL2) and 53% agreed that “People who harm wildlife should be strictly punished” (AL3).

These clearly show the pro-conservation mindset of the people who suffer conflicts here on a regular basis. This attitude presents an opportunity to forest managers and policy makers to suitable intervene and reduce the conflicts before the people changes their stance. Interestingly a large majority preferred to be neutral to the statement “Protected areas are too large and should be reduced in size” (AL4). Eighty five percent strongly agreed to the statement “People who traditionally use natural resources in protected areas should be allowed to continue to use them” (AL5). Ironically a large majority (43%) chose to be neutral while 36% disagreed to the statement “Wildlife should be strictly confined to the protected areas” (AL6). This is a confusing reaction from the respondents. A growing frustration due to a looming threat and loss of property and livelihoods may have influenced the majority of the members (98%) who strongly agreed to the statement “Permission can be given to shoot and kill animals that cause continuous trouble” (AL7). The same perception is also perhaps behind why 82% of the members also strongly agreed to “Culling of excess wildlife to keep the population under check is a scientific option” (AL8). These type of sentiments too might have been ringing in their minds when a majority (76% strongly agreed and 22% agreed) attested to the statement “Wildlife conservation laws are biased and do not consider the value of human lives and livelihoods” (AL9).

Figure 2. Attitudes towards legal measures/policies employed for wildlife conservation

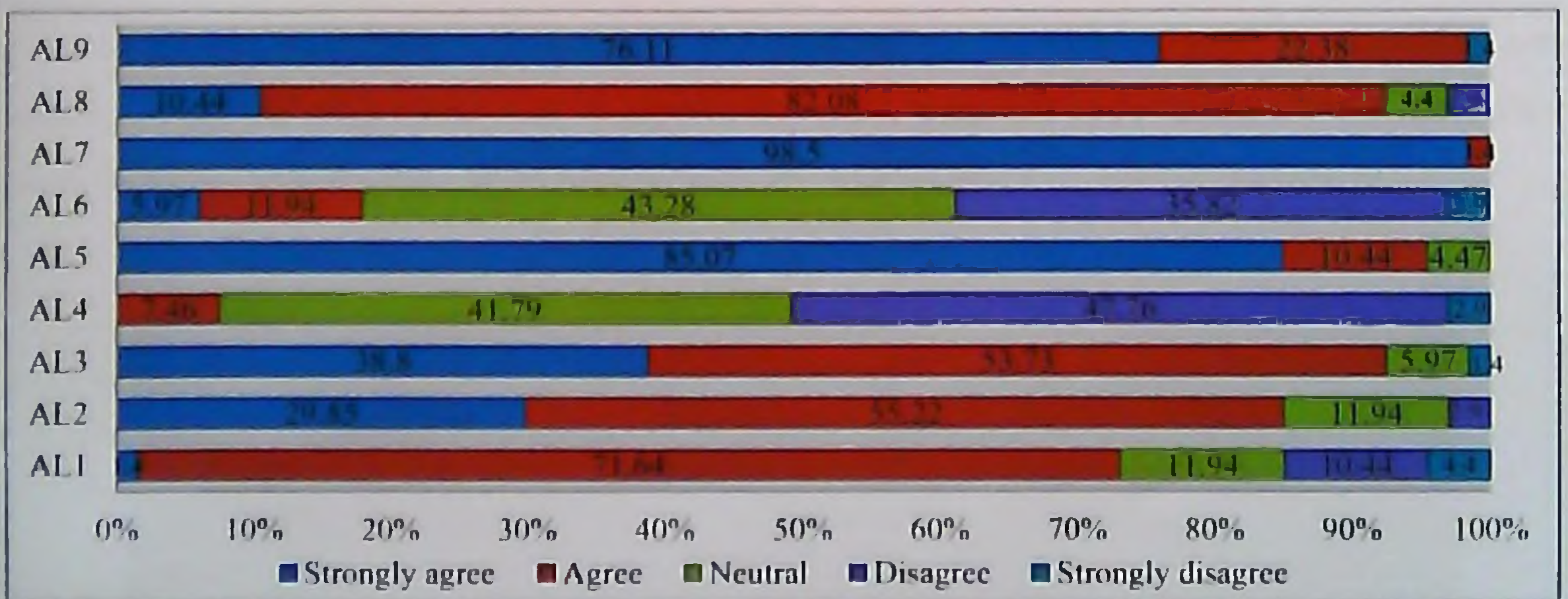


Table 4. Awareness levels about constitutional obligations on wildlife conservation

Category	AC1(%)	AC2 (%)	AC3 (%)	AC4(%)	AC5(%)	AC6(%)	AC7(%)	AC8(%)	AC9(%)
Aware	14.92	7.46	95.52	74.62	1.49	0	0	2.98	0
Partially aware	82.08	86.56	2.98	16.47	4.47	0	0	0	0
Not aware	2.98	5.97	1.49	8.95	94.02	100	100	97.01	100

From Table 4, it is evident that the majority (82%) are partially aware that “It is the fundamental duty of every Indian citizen to protect wildlife” (AC1). A great majority (87%) is also aware of the fact that “Wildlife Protection Act 1972 is exclusively issued for the protection of wildlife” (AC2). Ninety six percent are also aware that “Hunting of a wild animal in a non-forest area is also a punishable activity” (AC3). There was also a high level of awareness (75%) on “The level of legal protection of the different wild animals varies according to the different schedules under which it has been grouped” (AC4) amongst the respondents. However when it came to specific provisions of the WPA 1972, majority (94%) of the members were not aware that “Hunting any wild animal listed in the Schedule 1 to 4 of the WPA is a punishable offence” (AC5). All the respondents were also ignorant of the provision that “A Schedule I wild animal can be shot dead (conditionally) if only it is posing a threat to human life” (AC6). None of the respondents were also not aware that “Wild animals listed in Schedule II, III and IV can be shot dead in the event of threat to human life and property” (AC7). Majority (97%) were also not aware that our national animal, the “Tiger is listed under Schedule I of WPA” (AC8). All (100%) were also not knowing that “Wild boar or Wild Pig is a Schedule III animal” (AC9).

Figure 3. Awareness levels about constitutional obligations on wildlife

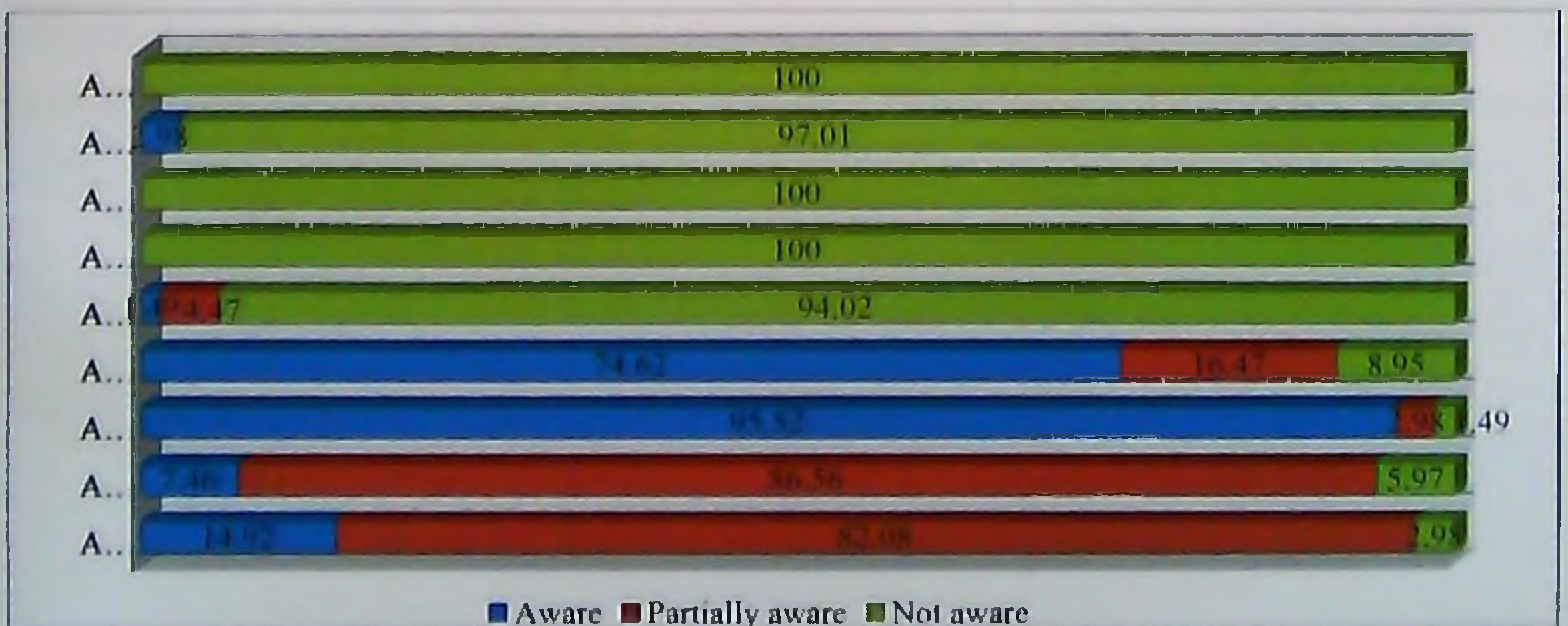


Table 5. Influence of land use/land cover change and cropping practices in human-wildlife conflicts

Category	LC1(%)	LC2(%)	LC3(%)	LC4(%)	LC5(%)
Strongly agree	1.49	4.47	49.25	41.79	1.49
Agree	11.94	2.98	50.74	56.71	65.67
Neutral	19.4	29.85	0	1.49	28.35
Disagree	53.73	55.22	0	0	4.47
Strongly disagree	13.43	7.46	0	0	0

The above table (Table 5) highlights the responses on the influence of land use/land cover change and cropping practices in human-wildlife conflicts. Overall, the respondents did not report a connection between cropping patterns and conflicts. From the above table, a slender majority (67%) said that mixed cropping did not reduce the incidents of HW conflicts (LC1). This attitude also got reflected in their response to statement 2. While 55% percent strongly disagreed to this statement, another 30% chose to be neutral on “Shift to mono- cropping practices have increased the incidents of HW conflicts” (LC2). On the other had all (100%) agreed that “Over the years, the quality of the forest habitat has declined and this is encouraging wild animals to raid human habitation” (LC3). This seems to be a ploy on the part of the respondents to shirk responsibility and put the entire blame on the wild animals and forest managers. There is documented evidence that the cropping patterns have changed and the shift towards a more monoculture cropping scheme attracts the wild herbivores to the farms. Forest management activities like for eg., “Plantation activities (Eg.Teak) has an influential role in increasing human-wildlife conflicts” (LC5) according to 65% of the respondents. At the same time, the respondents also largely admit (56%) that “Urbanisation and subsequent piling up of garbage is attracting wildlife to human habitations” (LC4).

Figure 4. Land use land cover change and cropping practices in human-wildlife conflicts

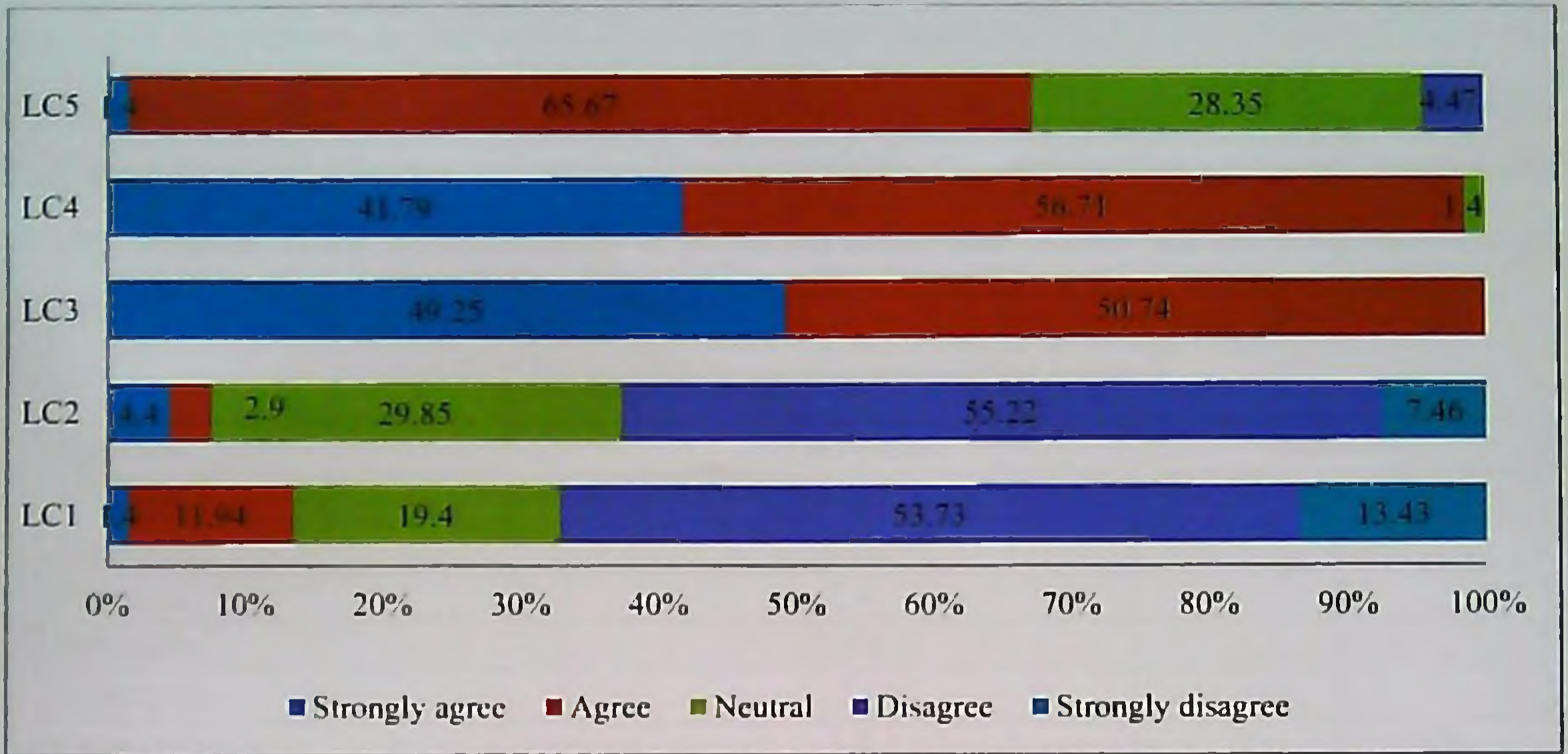


Table 6. Best preventive measure to reduce human wildlife conflicts in Palakkad district

Scheme	Mean value	Ranking
Electric fencing	1.12	1
Construction of rail fence	1.81	2
Electric fencing around park boundaries	2	3
Wire fencing	2.41	4
Deterrent techniques	2.47	5
Improving the habitat within the protected areas	2.9	6
Trenches around park boundaries	3	7
Stopping livestock grazing in the forest	3.12	8
Trenches around fields	5	9
Control of problem animals by the FD	4	10

From the above table 6, it is evident that the respondents at Palakkaad chose “Electric fencing” as the number one option (Rank 1). “Construction of rail fence” was ranked two, while the third rank was given for erecting “Electric fencing around park boundaries”. “Wire fencing” was recommended as the fourth best measure, followed by “Deterrent techniques” (V rank), “Improving the habitat within the protected areas” (VI rank), trenches around park boundaries,

stopping grazing in the forest, creating trenches around fields and control of problem animals by the forest department, in that order. The forest fringe population is always concerned about the protection that has to be assured for their farm lands and crops which justifies the high ranking they gave to electric fencing around the farm boundaries. The support voiced for rail fencing and electric fencing along the boundaries of protected areas also echoes the growing concerns of continuous boundary violations by the wild animal species in Palakkaad.

Table 7. Farmers ranking of crop raiding animals

Species	Mean value	Ranking
Wild pig	1.22	1
Elephant	1.82	2
Peacock	2.4	3
Primates	2.88	4
Porcupine	3	5
Deer (chital)	3.5	6
Leopard	4.33	7

The respondents indentified wild boar as their most problematic animal at Palakkad conflict zones. Elephant was identified as the second most trouble maker. Peacocks, primates, porcupine, deer (*chital* sps) and leopard followed. The list of animals is not surprising as agriculture in the forest fringes comprises of crops which are favourable for the herbivores which justifies the presence of wild boar, elephants and peacocks. Moreover, water availability in the farms also attracts these animals resulting in crop trampling and crop raids.

DISTRICT 2. MALAPPURAM

The details of the primary data collected through questionnaire surveys among the respondent population of Malappuram district is outlined in Table 9.

Table 9. List of places that were surveyed in Malappuram district

Sl.No	Panchayath	Block
1.	Nilambur	Nilambur
2.	Chaliyar	Nilambur
3.	Moothedam	Nilambur
4.	Chungathara	Nilambur
5.	Edakkara	Nilambur
6.	Vazhikkadavu	Nilambur
7.	Pothukal	Nilambur
8.	Karulai	Kalikkavu
9.	Karuvarakkundu	Kalikkavu
10.	Thuvur	Kalikkavu
11.	Edapatta	Kalikkavu
12.	Pandikkad	Wandoor
13.	Porur	Wandoor
14.	Thiruvalli	Wandoor
15.	Wandoor	Wandoor
16.	Trikkalangode	Wandoor

The details of the primary data collected through questionnaire surveys among the respondent population of Malappuram district is outlined in Table 10.

Table 10. Socio-Demographic profile of the respondents of Malappuram district

SL No.	Category	Variables	Frequency	Percentage
1.	Age (years)	Below 30		
		30-50	29	39.18
		50-70	36	48.64
		70-90	8	10.81
2.	Household members (number)	1-3	3	4.05
		3-5	31	41.89
		5-7	25	33.78
		7-9	14	18.91
3.	Gender	Male	62	83.78
		Female	12	16.21
4.	Occupation	Farmers	100	100
		Others		
5.	Residing period (years)	Below 20	3	4.05
		20-40	4	5.40
		40-60	42	56.75
		60-80	24	32.43
6.	Educational level	No schooling	2	2.70
		Primary	8	10.81
		UP	14	18.91
		HS	42	56.75
		HSS	7	9.45
		College & above		
7.	Economic status	Above poverty level (APL)	58	78.37
		Below Poverty Level (BPL)	16	21.62
		No Ration card		
N=74				

The socio-economic profile of the respondents from the sixteen panchayaths of Malappuram district is given in Table 10. From the above table, it is evident that around 49% of the respondents were in the age group 50-70 years. Eighty-four percentage of the surveyed respondents were males. In forty four per cent of the respondent household, the average family size was 3-5 members. Eighty-nine percentage of respondents interviewed were living in the present conflict zone for the past 40-60 years. Majority of them are farmers (78%) and only 22% were engaged in other jobs. The interviewed respondents were interested in acquiring education as is evident from the fact that majority of the respondents (89%) have attended high school.

Eleven percentage of them attended upper primary education. Data obtained on the economic status reveals that 100% of respondents were in the above poverty line category.

Table 11. Attitudes towards human-wildlife interactions

Category	AS1(%)	AS2(%)	AS3(%)	AS4(%)	AS5(%)	AS6(%)	AS7(%)	AS8(%)	AS9(%)
Strongly agree	0	4.05	5.4	31.08	17.56	91.89	40.54	68.91	70.27
Agree	9.45	37.83	59.45	59.45	62.16	6.75	52.7	29.72	28.37
Neutral	2.7	8.1	13.51	4.05	8.1	0	5.4	0	0
Disagree	17.56	25.67	14.86	2.7	4.05	0	1.35	0	0
Strongly disagree	70.27	24.32	6.75	2.7	8.1	1.35	0	1.35	1.35

To assess the opinion of the respondents towards human-wildlife interaction, their reactions for a set of statements were analyzed (Table 11; Fig 5). The surveyed respondents (70%) in Malappuram expressed their strong disagreement to the first statement (AS1) “Some loss due to wildlife is to be expected in forest fringe areas and should be tolerated by the local people”. Interestingly, a few agreed (9%) and a minority remained neutral (2%). There was a mixed response to the second statement (AS2) which said that “Human-wildlife conflict is happening due to encroachment by humans into forest. While almost 50% disagreed to this, 40 per cent of the respondents were agreeing. The rest 8% chose to remain neutral. Though over 65% of the respondents were of the view that (AS3) the “The FD staff generally treat the forest fringe people as encroachers and offenders”, there were also people here who disagreed (20%). The mixed response to the first three statements indicates the possible set of issues connected with both the respondents and wild animals who are parties in the conflict. The more or less good support for AS2 indicates possible encroachments which could be a trigger for conflicts. That some people were not of the view that “The FD staff generally treats the forest fringe people as encroachers and offenders” could be an indication of the boundary violations and other possible offences from the human side. All these issues has to be thoroughly examined at the ground level. But generally, the people largely agreed (AS4) that “Forest department should control wildlife using non-lethal methods such as barriers, deterrents and relocation”. This reflects the growing concern about the recurring conflicts. A majority (62%) also agreed to the statement that “Tourists coming to see forests/wildlife should pay human wildlife conflict mitigation CESS” (AS5). This response could be out of their awareness that tourists are influencing the

behavior of wild animals in the wrong way by their way ward feeding and other actions which provokes a more aggressive response from the wild animals. Feeding makes these wild animals to shed their fear of humans and they also get encouraged to raid and snatch their food. Majority of the members (92%) strongly agreed to the statement that “Officials and policy makers assigns more value to wildlife over human life and livelihoods” (AS6), which is more or less an emotional reaction. However, this reaction, as indicated on earlier occasions, could also be out of the growing threats to life and livelihoods from wild animal species. Amidst these concerns and emotions, majority didn’t choose to accuse the forest department which is evident from their disagreement to the statement that “In conflict zones, the FD shows sincerity in taking remedial action” (AS7). Majority also believed that (AS8) “If FD takes action to upgrade the quality of the forest habitat, the conflict rates will come down”. The respondents were also in favour of generating scientific data to tackle conflicts by agreeing that “Dearth of accurate data on the carrying capacity of forests is escalating the conflict” (AS9).

Figure 5. Attitudes to human-wildlife interactions

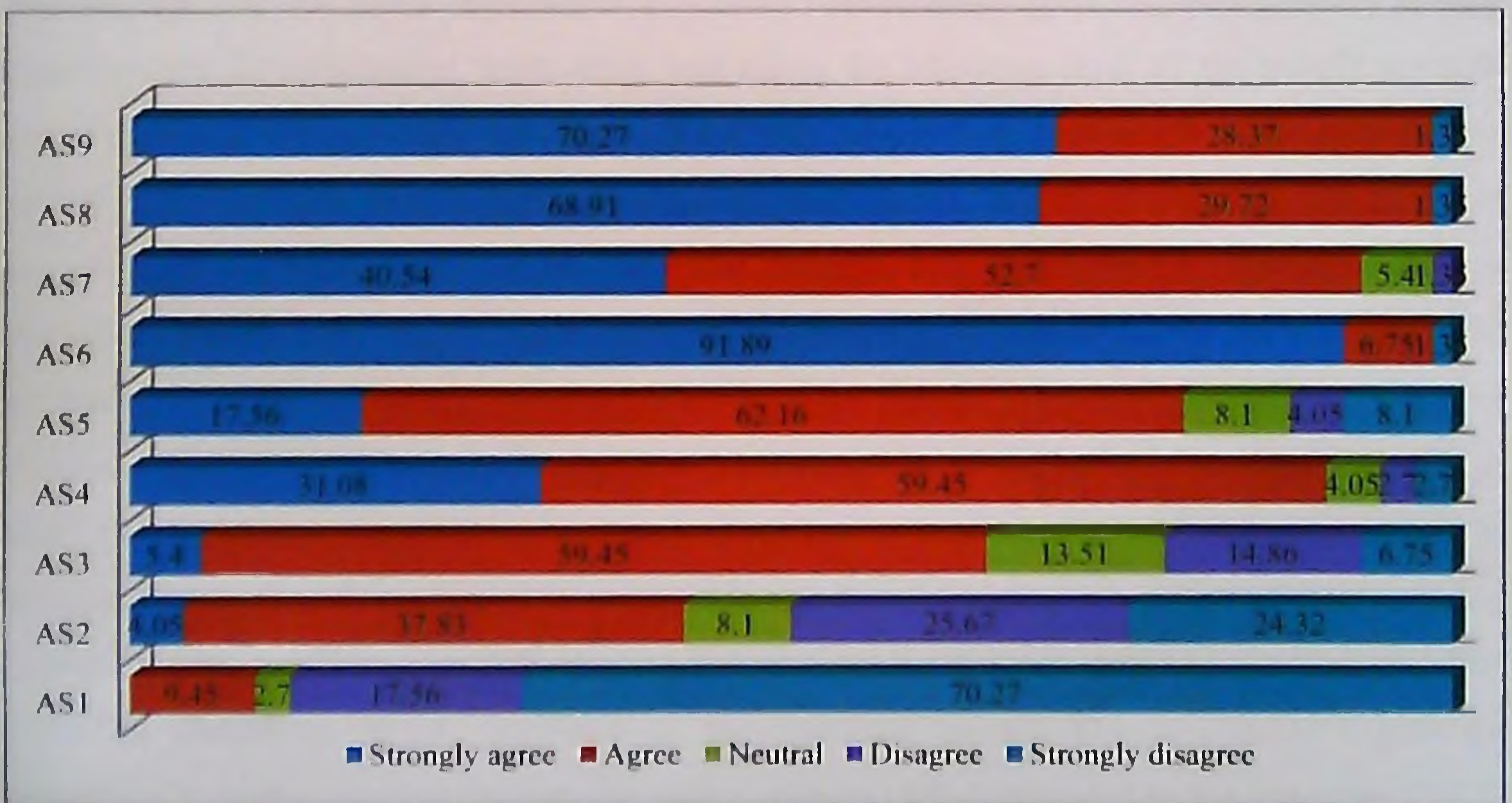


Table 12. Attitudes towards legal measures/policies employed for wildlife conservation

Category	AL1(%)	AL2(%)	AL3(%)	AL4(%)	AL5(%)	AL6(%)	AL7(%)	AL8(%)	AL9(%)
Strongly agree	21.62	21.62	17.56	1.35	85.13	54.05	97.29	86.48	79.72
Agree	37.83	67.56	66.21	8.1	13.51	27.02	2.7	13.51	20.27
Neutral	8.1	2.7	5.4	35.13	0	10.81	0	0	0
Disagree	6.75	2.7	6.75	31.08	0	5.4	0	0	0
Strongly disagree	25.67	5.4	4.05	24.32	1.35	2.7	0	0	0

When the attitudes towards legal measures/policies employed for wildlife conservation (Table 12; Fig 6), was monitored, it was observed that over 58% of the members agreed that “It is important to conserve wildlife” (AL1). Ironically, over 31% of the respondents disagreed to this. This is not surprising as it was observed (Table 11; Fig 5) that this study area possibly has several unresolved forest protection issues including encroachments. These issues, together with frustration over the conflicts might have forced these kinds of mixed reactions from the respondents. For the forest department and other conservation agencies, this presents several opportunities for meaningful interactions and raises the tolerance level of the people towards forest and wild life conservation. At the same time, sixty-eight percentage of the respondents agreed that “Wildlife laws ensure the right of the wildlife to live peacefully” (AL2). Very interestingly, over 83% were of the view that “People who harm wildlife should be strictly punished” (AL3). The basic mindset of the respondents is not in favour of harming the wild animals. Majority also saw no reason to downsize the existing area as evidenced by the higher support extended to the statement that “Protected areas are too large and should be reduced in size” (AL4). Meanwhile, 85% wanted that “People who traditionally use natural resources in protected areas should be allowed to continue to use them” (AL5). Perhaps out of their growing concern for the conflicts, over 80% showed their support for the statement (AL6) which said that “Wildlife should be strictly confined to the protected areas”. The respondent’s growing frustration is further evident through the strong support (97%) extended to the statement (AL7) that “Permission can be given to shoot and kill animals that cause continuous trouble” and 86% of them also supported the statement “Culling of excess wildlife to keep the population under check is a scientific option” (AL8). Eighty percentage also accused that “Wildlife conservation laws are biased and do not consider the value of human lives and livelihoods” (AL9). All these

responses are as a result of the growing resentment from loss of farm income and uncertainty arising thereof.

Figure 6. Attitudes towards legal measures/policies employed for wildlife conservation

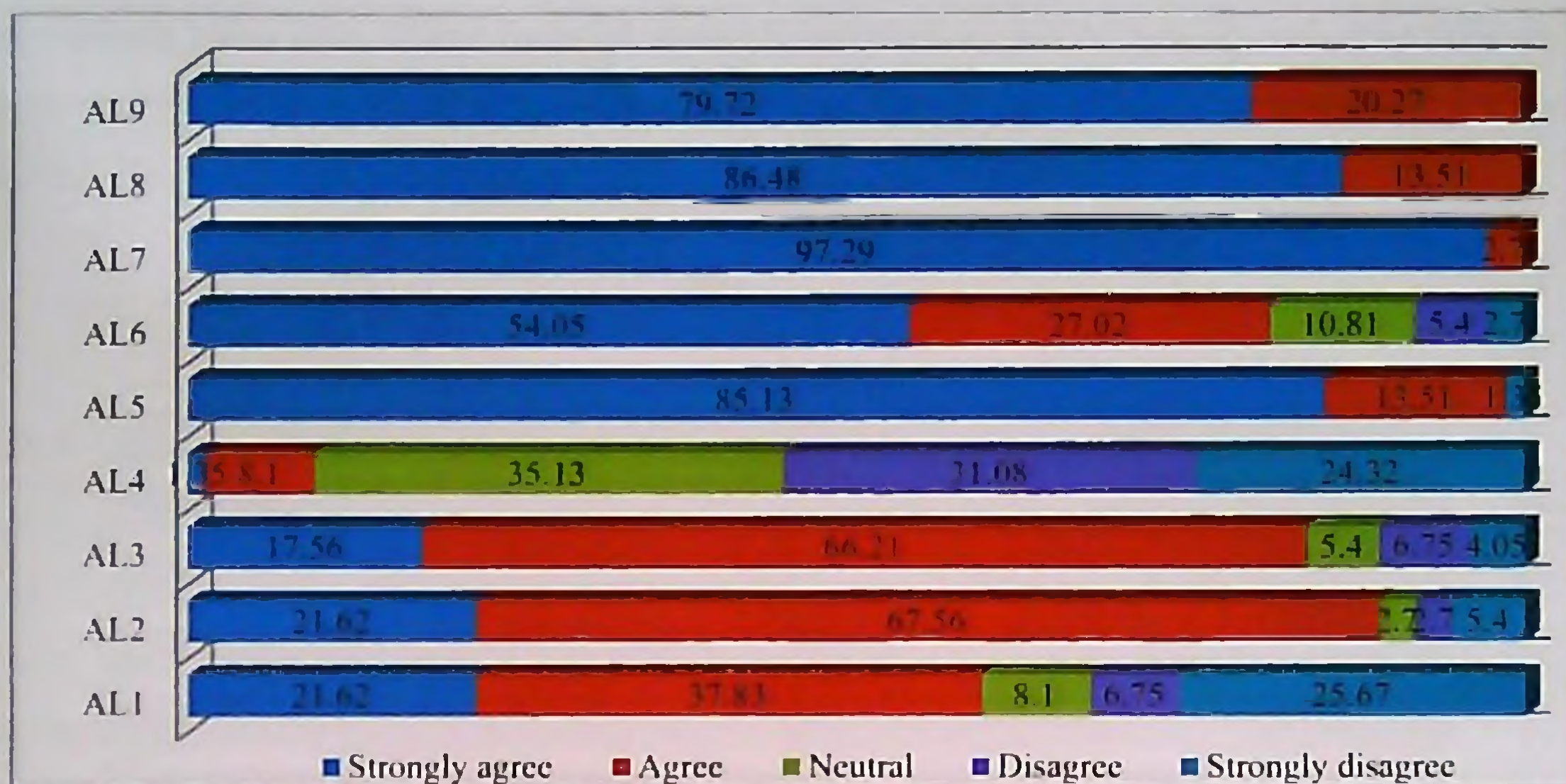


Table 13. Awareness levels about constitutional obligations on wildlife conservation

Category	AC1(%)	AC2(%)	AC3(%)	AC4(%)	AC5(%)	AC6(%)	AC7(%)	AC8(%)	AC9(%)
Aware	71.62	12.16	64.86	54.05	1.35	1.35	0	8.1	1.35
Partially aware	27.02	58.1	29.72	37.83	2.7	0	0	5.4	2.7
Not aware	1.35	29.72	5.4	8.1	95.94	98.64	100	86.48	95.94

From the above (Table 13), it is evident that seventy-two percent of the members were aware of the fact that “It is the fundamental duty of every Indian citizen to protect wildlife” (AC1). At the same time, over 80% were not at all aware that “Wildlife Protection Act 1972 is exclusively issued for the protection of wildlife” (AC2). The respondents displayed high (94%) levels of awareness about hunting of wild animals as was evident from their response to the statement that “Hunting of a wild animal in a non-forest area is also a punishable activity” (AC3). Over 91% were aware that “The level of legal protection of the different wild animals varies according to the different schedules under which it has been grouped” (AC4). However, majority (96%) of the members didn’t knew that “Hunting any wild animal listed in the Schedule

1 to 4 of the WPA is a punishable offence” (AC5). Majority (over 98%) also were unaware that “A Schedule I wild animal can be shot dead (conditionally) if only it is posing a threat to human life” (AC6). None (100%) were aware that “Wild animals listed in Schedule II, III and IV can be shot dead in the event of threat to human life and property” (AC7). Only 86% of the interviewed respondents knew that “Tiger is listed under Schedule I of WPA” (AC8) and only 96% didn’t know that the now common crop raider, the “Wild boar or Wild Pig is a Schedule III animal” (AC9).

Figure 7. Awareness levels about constitutional obligations

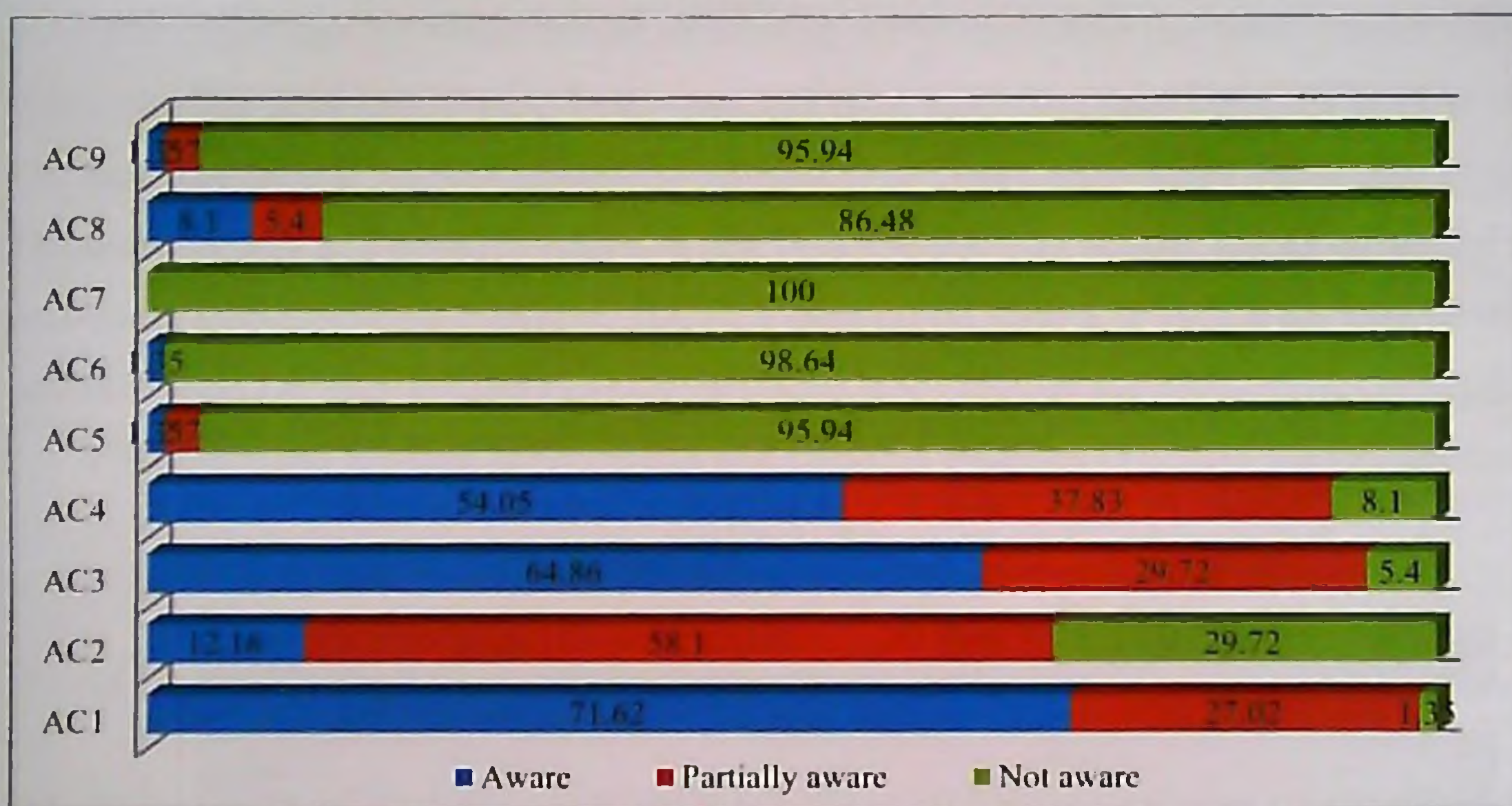


Table 14. Land use/land cover change and cropping practices in human wildlife conflicts

Category	LC1(%)	LC2(%)	LC3(%)	LC4(%)	LC5(%)
Strongly agree	0	0	52.7	54.05	35.13
Agree	0	0	47.29	45.94	47.29
Neutral	4.05	9.45	0	0	10.81
Disagree	12.16	29.72	0	0	2.7
Strongly disagree	83.78	60.81	0	0	4.05

On analysis of the land use/land cover change and cropping practices in human wildlife conflicts (Table 14; Fig 8), it was observed that majority of the surveyed respondents (84%) strongly disagreed to the statement that “When farmers followed mixed cropping, incidents of

HW conflicts were far and few” (LC1). Strong opposition (over 90%) was also shown to the statement “Shift to mono- cropping practices has increased the incidents of HW conflicts” (LC2). All respondents (100%) agreed that “Over the years, the quality of the forest habitat has declined and this is encouraging wild animals to raid human habitation” (LC3). Like elsewhere, in this district too, the respondents were not ready to shoulder responsibility for creating conditions which escalates the conflicts. However, they all (100 %) admitted that “Urbanisation and subsequent piling up of garbage is attracting wildlife to human habitations” (LC4). So here, it is important to educate the community to disengage themselves from activities like farming palatable crops near the forest fringes or erecting cattle sheds near the forest fringes which can create conflict situations. Forest department and other extension agencies must work to educate the local people and suggest alternative options. The respondents (over 82%) also accuse the forest department’s “Plantation activities (Eg.Teak), which they accuse, has an influential role in increasing human-wildlife conflicts” (LC5). Regeneration studies in such areas may be taken up and the validity of such accusations may be scientifically probed and established.

Figure 8. Land use/land cover change and cropping practices in human wildlife conflicts

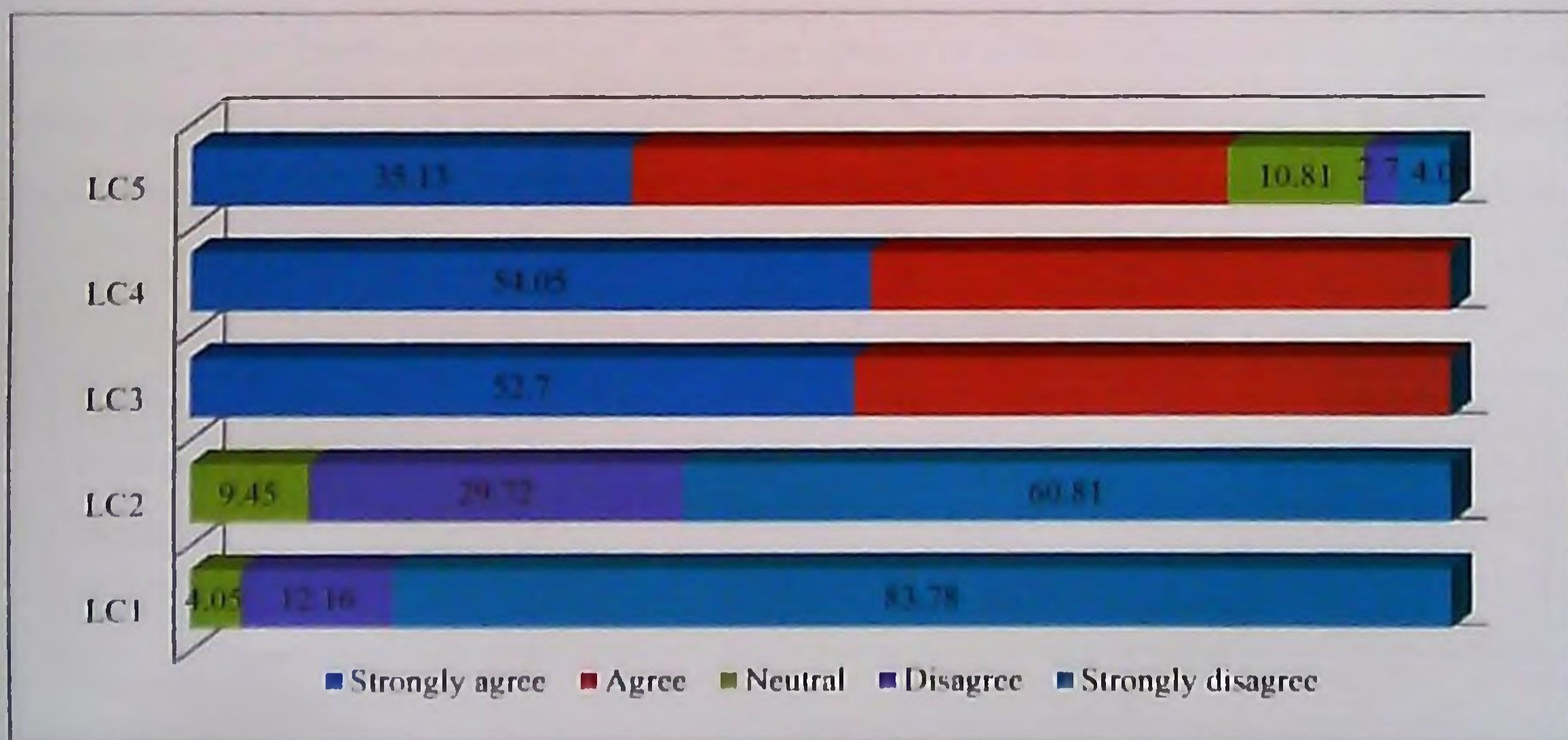


Table 15. Best preventive measure to reduce human wildlife conflicts

Scheme	Mean value	Ranking
Electric fencing	1.01	1
Control of problem animals by the FD	1.9	2
Wire fencing	2	3
Trenches around park boundaries	2	3
Construction of rail fence	2	3
Trenches around fields	2.09	4
Deterrent technique	2.4	5

The respondents (Table 15) ranked “Electric fencing” as the number one preventive option (Rank 1). According to them, the forest department must “Control the problem animals” and hence they ranked this option in the second position. “Construction of rail fence”, digging of “Trenches around park boundaries” and erection of “Wire fencing” were all ranked as the joint third best options. The respondents gave fourth rank to the scheme “Trenches around fields”, followed by use “Deterrent technique”. All these options or choices reflect the mood of the forest fringe population vis-à-vis human-wildlife conflicts. Their general perception is that the forest department must devise ways and means to restrict the wild animals within the forest boundaries.

Table 16. Farmers ranking of crop raiding animals

Species	Mean value	Ranking
Wild pig	1.13	1
Elephant	1.86	2
Deer (chital)	2	3
Peacock	2	3
Primates	2.1	4
Porcupine	2.36	5
Leopard	4	6

According to the respondents (Table 16), the most problematic animal was the Wild pig (wild boar). Elephants came in the second position, followed by Peacock and Deer (chital) in the

joint third position. Primates were ranked as fourth troublemaker, followed by Porcupine and Leopard in that order. Here too, the herbivores are the species that often get into conflicts as both water and food is easily available for them near the human habitations.

DISTRICT 3. KOZHIKODE

The details of the primary data collected through questionnaire surveys among the respondent population of Kozhikode district is outlined in Table 17.

Table 17. List of places that were surveyed in Kozhikode district

Sl.No	Panchayath	Block
1.	Kodencherry	Koodaranji
2.	Koodaranji	Koodaranji
3.	Thiruvambhadi	Thiruvambhadi
4.	Chakkittappara	Chempanoda
5.	Karassery	Kurumanallur
6.	Kodiyathur	Kodiyathur
7.	Maruthonkara	Maruthonkara
8.	Kavillumpara	Kavillumpara
9.	Naripatta	Thinor
10.	Chekkiad	Chekkiad
11.	Vanimel	Vanimel

The details of the primary data collected through questionnaire surveys among the respondent population of Kozhikode district is outlined below. The socio-economic profile of the respondents from the eleven panchayaths of Kozhikode district is given in Table 18. From the table, it is evident that around 50% of the respondents were in the age group 50-70 years, followed by respondents in the age group of 30-50 years (43.28%). Ninety percentage of the surveyed respondents were males. In 43% of the households, the average family size was 3-5 members. Sixty-two per centage of respondents were living in the present conflict zone for the past 40-60 years. Most majority were residing here for long periods, as only 2% of the respondents said that they were residing here for less than 20 years. Agriculture was the main occupation of the respondents (100%). The interviewed respondents were interested in acquiring education as is evident from the fact that majority of the respondents (50%) have attended high school. Around ten percent of the respondents said that they had opportunities for undergoing college level and higher secondary level education. Data obtained on the economic status reveals that 79% of the respondents were in the above poverty line category.

Table 18. Socio-Demographic profile of the respondents at Kozhikode

S. No.	Category	Variables	Frequency	Percentage
1	Age (years)	Below 30	1	1.49
		30-50	29	43.28
		50-70	34	50.74
		70-90	3	4.47
2	Household members (number)	1-3	9	13.43
		3-5	29	43.28
		5-7	24	35.82
		7-9	5	7.46
3	Gender	Male	63	94.02
		Female	4	5.97
4	Occupation	Farmers	67	100
		Others	0	0
5	Residing period (years)	Below 30	2	2.98
		20-40	16	23.88
		40-60	42	62.68
		60-80	7	10.44
6	Educational level	No schooling	1	1.49
		Primary	2	2.98
		UP	12	17.91
		HS	38	56.71
		HSS	7	10.44
		College & above	7	10.44
7	Economic status	Above poverty level (APL)	53	79.10
		Below Poverty Level (BPL)	13	19.40
		No Ration card	1	1.49

N=67

Table 19. Attitudes towards human-wildlife interactions

Category	AS1(%)	AS2(%)	AS3(%)	AS4(%)	AS5(%)	AS6(%)	AS7(%)	AS8(%)	AS9(%)
Strongly agree	3.00	0	22.38	20.89	8.95	89.55	32.83	58.2	52.23
Agree	4.47	8.95	35.82	74.62	19.4	5.97	40.29	34.32	43.28
Neutral	2.98	0	7.46	2.98	46.26	1.49	0	2.98	1.49
Disagree	5.97	13.43	5.97	0	2.98	0	0	2.98	2.98
Strongly disagree	86.56	77.61	28.35	1.49	22.38	2.98	26.86	1.49	1.49

Analysis of the respondents' opinion towards human-wildlife interaction (Table 19; Fig 9) revealed that majority (86%) strongly disagreed that (AS1) "Some loss due to wildlife is to be

expected in forest fringe areas and should be tolerated by the local people". Only 3% agreed that such losses in forest fringe areas are inevitable. Over seventy-eight per cent of the respondents was also strongly disagreeing to the statement (AS2) that "Human-wildlife conflict is happening due to encroachment by humans into forest". The fringe areas in Kozhikode are hotspots of conflicts and hence the resentment of the respondents are not surprising. Allegations of boundary violations and encroachments are also not uncommon. It is perhaps due to all these that 58% accused that "The FD staff generally treats the forest fringe people as encroachers and offenders". Interestingly, over 28% of the respondents opposed this view about the forest department. Recurring conflicts have perhaps influenced the majority of the respondents to say that (AS4) the "Forest department should control wildlife using non-lethal methods such as barriers, deterrents and relocation". Though some people (22%) disagreed, majority of the respondents (46%) took a neutral stand to the statement "Tourists coming to see forests/wildlife should pay human wildlife conflict mitigation CESS" (AS5). This could be either out of ignorance or they are clouded by their opposition to the frequent raids by the wild animals. In line with this thinking, they also heavily (90%) agreed that "Officials and policy makers assigns more value to wildlife over human life and livelihoods" (AS6). However, it seems that these respondents are with the forest department once a conflict occurs. This perhaps is one reason why a majority supported (40% agreed; 33% strongly agreed) the statement "In conflict zones the FD shows sincerity in taking remedial action" (AS7). Or, perhaps they are voluntarily avoiding a conflict with the department by adopting such a stand and making sure that they are provided adequate compensations on time. Like elsewhere, here too, the respondents (58% strongly agreed; 34% agreed) said that (AS8) "If FD takes action to upgrade the quality of the forest habitat, the conflict rates will come down". The respondents are doubtful about the carrying capacity of the protected areas and this perhaps is a reason why majority (52% and 45%) favoured the statement that "Dearth of accurate data on the carrying capacity of forests is escalating the conflict" (AS9).

Figure 9. Attitudes to human-wildlife interactions

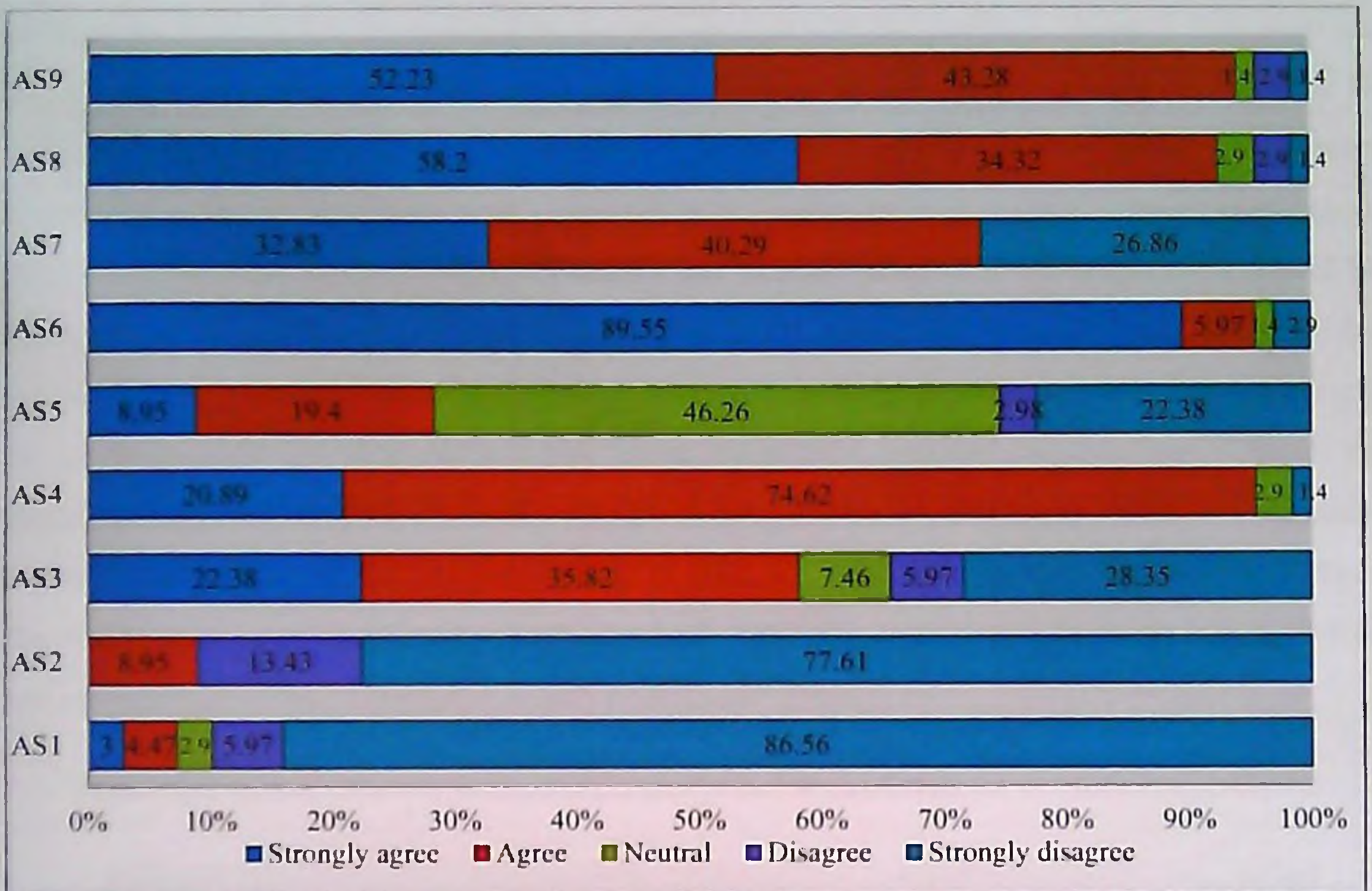


Table 20. Attitudes towards legal measures/policies employed for wildlife conservation

Category	AL1(%)	AL2(%)	AL3(%)	AL4(%)	AL5(%)	AL6(%)	AL7(%)	AL8(%)	AL9(%)
Strongly agree	43.28	37.31	4.47	0	46.26	74.62	94.02	64.17	41.79
Agree	52.23	62.68	44.77	20.89	52.23	8.95	4.47	28.35	55.22
Neutral	0	0	20.89	5.97	0	1.49	1.49	0	0
Disagree	4.47	0	7.46	32.83	1.49	14.92	0	0	0
Strongly disagree	0	0	22.38	40.29	0	0	0	7.46	2.98

According to the measured attitudes of the respondents to legal measures used for wildlife conservation (Table 20; Fig 10) it was observed that majority (over 95%) of the members were agreeing to the statement that “It is important to conserve wildlife” (AL1). All were also of the view that “Wildlife laws ensure the right of the wildlife to live peacefully” (AL2). Around 50% opined that “People who harm wildlife should be strictly punished” (AL3). Interestingly 29% disagreed while 20% chose to take a neutral position on this statement. This

differential opinion is perhaps because of the resentment towards the recurring conflicts and perhaps the hardships to be endured by the human victim of the conflicts. Around 72% were not in favour of the statement which said that the “Protected areas are too large and should be reduced in size” (AL4). They are perhaps aware of the hardships of downsizing the present habitat area. People demanded more rights which is evident from the higher support levels given to the statement that “People who traditionally use natural resources in protected areas should be allowed to continue to use them” (AL5). Over 82% said that “Wildlife should be strictly confined to the protected areas” (AL6). Majority of the members (98%) wanted “Permission can be given to shoot and kill animals that cause continuous trouble” (AL7). Over 92% of the members favoured “Culling of excess wildlife to keep the population under check is a scientific option” (AL8). In a conflict hotspot area like Kozhikode, it is not surprising that close to 97% of the interviewed respondents were of the view that “Wildlife conservation laws are biased and do not consider the value of human lives and livelihoods” (AL9).

Figure 10. Attitudes towards legal measures/policies employed for wildlife conservation

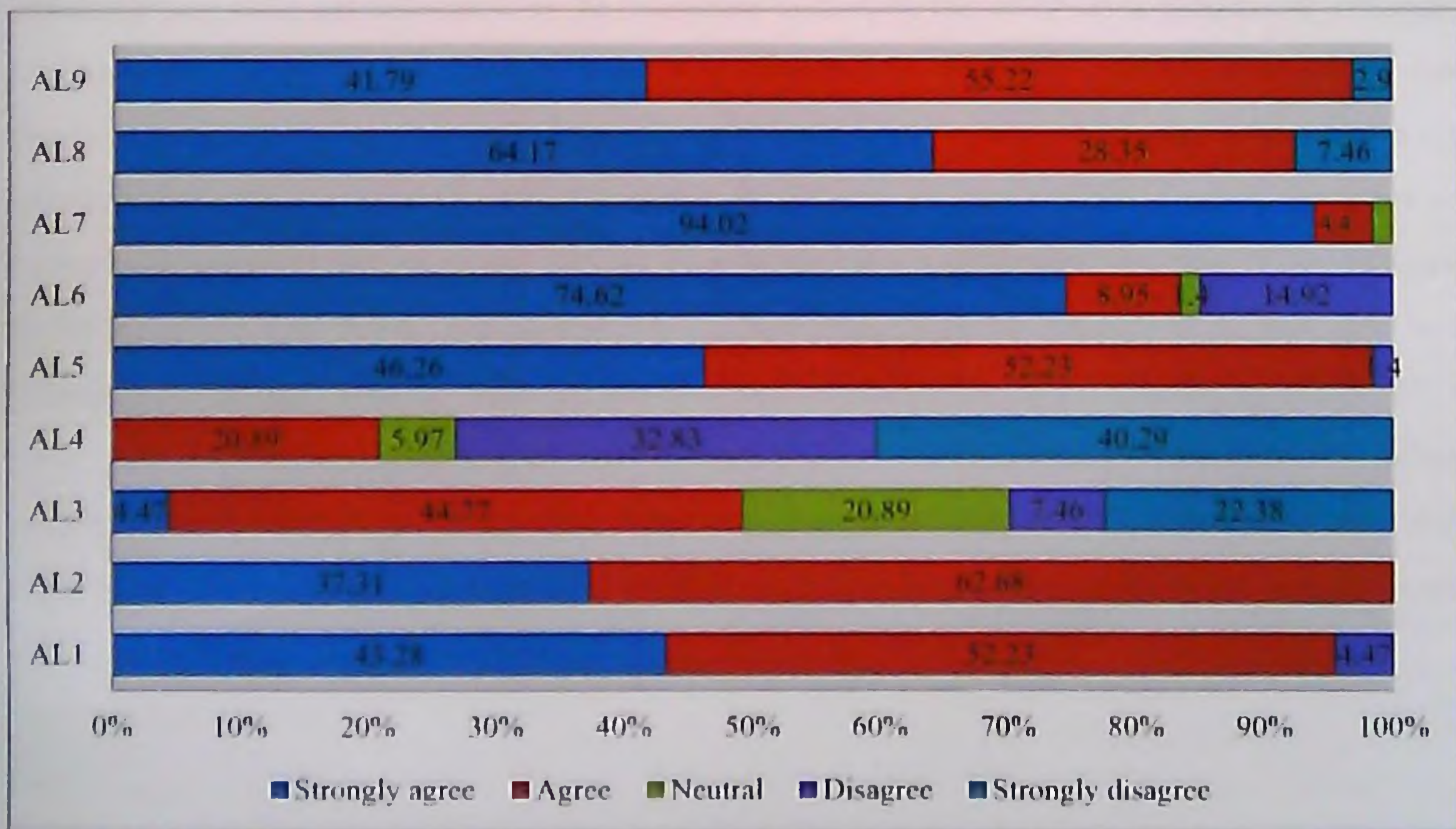


Table 21. Awareness levels about constitutional obligations on wildlife conservation

Category	AC1(%)	AC2(%)	AC3(%)	AC4(%)	AC5(%)	AC6(%)	AC7(%)	AC8(%)	AC9(%)
Aware	74.62	0	50.74	34.3	4.47	2.98	0	5.97	0
Partially aware	25.37	88.05	49.25	64.17	13.43	4.47	1.49	13.43	2.98
Not aware	0	11.94	0	0	82.08	92.53	98.5	80.59	97.01

The above (Table 21) clearly shows that all (100%) knew that “It is the fundamental duty of every Indian citizen to protect wildlife” (AC1). However, only 88% were partially aware that “Wildlife Protection Act 1972 is exclusively issued for the protection of wildlife” (AC2). Almost all knew that “Hunting of a wild animal in a non-forest area is also a punishable activity” (AC3). This indeed is very valuable information and could be a reason why the wild animals are not harmed when they enter the farms and human habitations. The respondents also knew that “The level of legal protection of the different wild animals varies according to the different schedules under which it has been grouped” (AC4). At the same time, only few (over 4%) knew that “Hunting any wild animal listed in the Schedule 1 to 4 of the WPA is a punishable offence” (AC5). Many (92%) were not aware of the provision that “A Schedule I wild animal can be shot dead (conditionally) if only it is posing a threat to human life” (AC6). Majority (98%) also were ignorant that “Wild animals listed in Schedule II, III and IV can be shot dead in the event of threat to human life and property” (AC7). Eighty per cent had no idea that the “Tiger is listed under Schedule I of WPA” (AC8) and 97% didn't know that the “Wildboar or Wild Pig is a Schedule III animal” (AC9). This exposes the lack of awareness of the provisions under WPA 1972, which if provided, can help to build a better rapport with the forest fringe residents. When people become more aware of the legal provisions, instead of taking militant positions, they will show more tolerance and thereby ensure conditions for the forest department to act in accordance with the law to resolve the conflicts.

Figure 11. Awareness levels about constitutional obligations on wildlife conservation

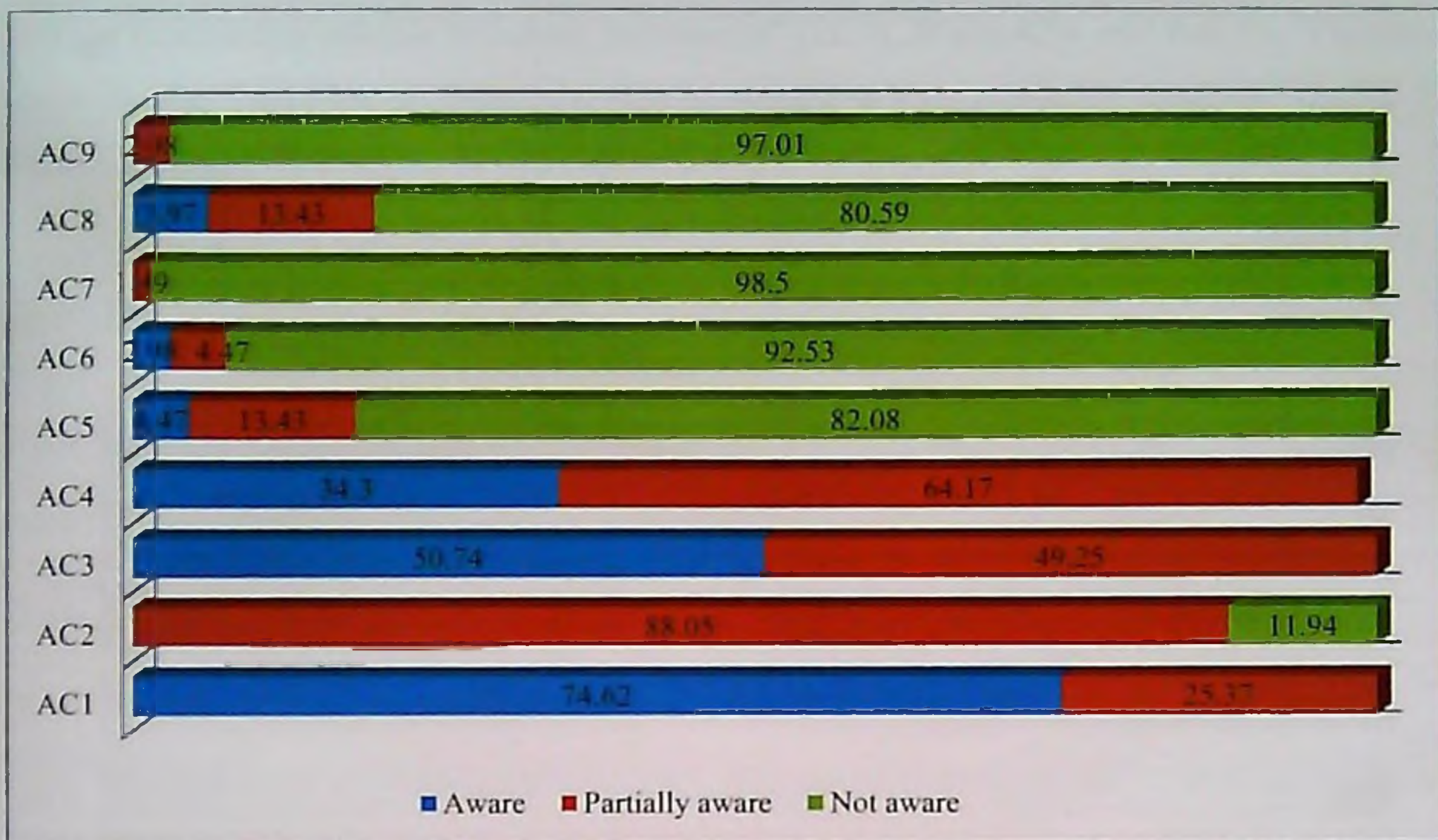


Table 22. Land use/land cover change and cropping practices in human-wildlife conflicts

Category	LC1(%)	LC2(%)	LC3(%)	LC4(%)	LC5(%)
Strongly agree	0	0	32.83	31.34	8.95
Agree	0	0	67.16	68.65	34.32
Neutral	0	0	0	0	49.25
Disagree	0	13.43	0	0	0
Strongly disagree	100	86.56	0	0	7.46

From the above (Table 22), it is evident that, as expected, all (100%) strongly disagreed to the statement that “When farmers followed mixed cropping, incidents of HW conflicts were far and few” (LC1). Simultaneously, majority (87%) too strongly disagreed to the statement that “Shift to mono-cropping practices have increased the incidents of HW conflicts” (LC2). At the same time, all (100%) of the respondents were of the view that “Over the years, the quality of the forest habitat has declined and this is encouraging wild animals to raid human habitation” (LC3). Very typical responses have been echoed here too, which again can be seen as a natural reaction on the part of the human being to pass the responsibility of conflicts to the wild animals. At the

same time, all of them (100%) has realized that “Urbanisation and subsequent piling up of garbage is attracting wildlife to human habitations” (LC4). While 42% said that the “Plantation activities (Eg. Teak) has an influential role in increasing human-wildlife conflicts” (LC5), 7% did not agree and 49% remained non-committed.

Figure 12. Influence of land use/land cover change and cropping practices in human-wildlife conflicts

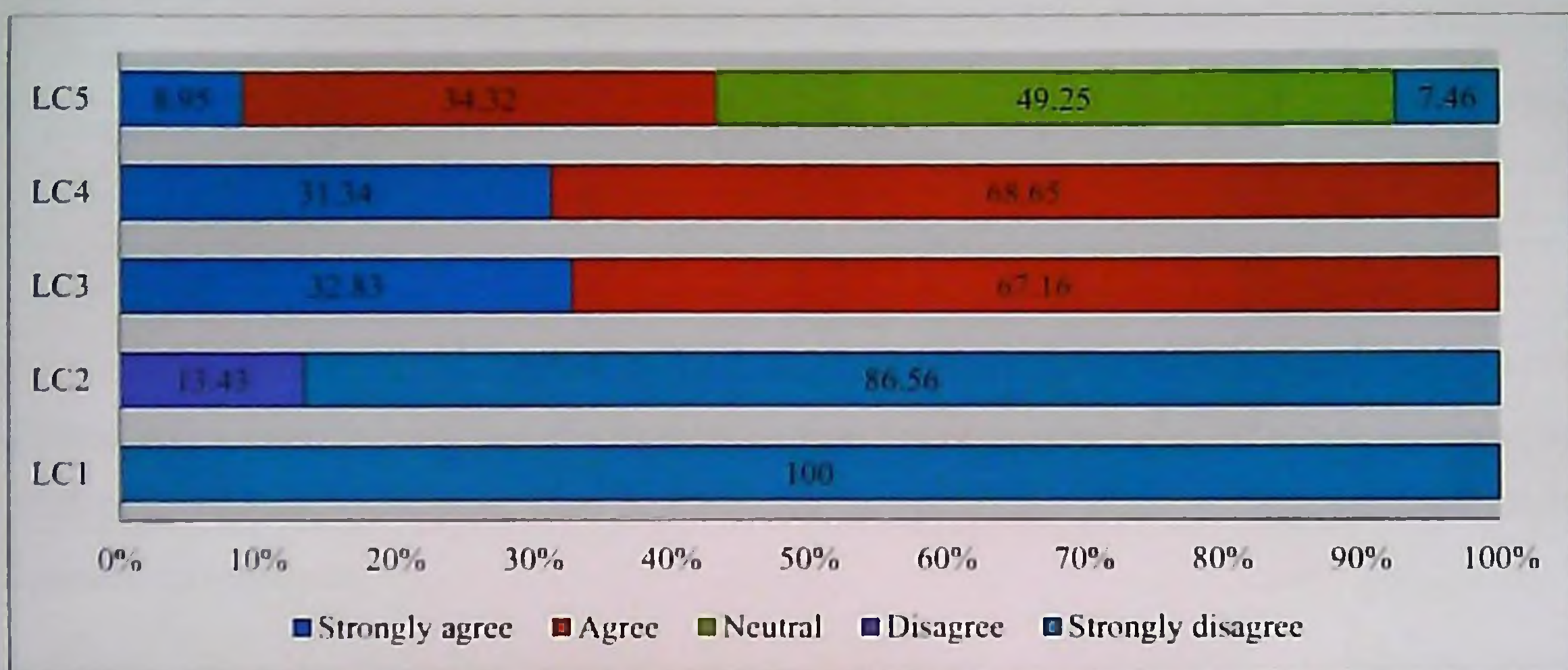


Table 23. Best preventive measure to reduce human-wildlife conflicts

Scheme	Mean value	Ranking
Electric fencing	1.32	1
Construction of rail fence	1.33	2
Trenches around fields	1.87	3
Control of problem animals by the FD	1.93	4

The respondents (Table 23), chose “Electric fencing” as the number one preventive measure in Kozhikode areas to combat conflicts. Respondents also preferred the “Construction of rail fence” which they chose as the second best option. Erection of “Trenches around fields” was an option which was given the fourth rank. Here too, the respondents chose the option “Control of problem animals by the FD” and ranked it as the last option.

Table 24. Farmers ranking of crop raiding animals

Species	Mean value	Ranking
Elephant	1.31	1
Wild pig	1.78	2
Primates	2.32	3
Porcupine	2.94	4
Deer (sambar)	4.27	5
Guar	5	6
Leopard	5	6
Peacock	5	6

In Kozhikode too, the herbivores continue to dominate the conflict scenario. From above (Table 24), it could be seen that elephant is the most frequent crop raider. This was followed by wild pig, primates, porcupine, Deer (sambar). In the joint sixth position they identified Guar, Leopard and Peacock.

DISTRICT 4. WAYANAD

The details of the primary data collected through questionnaire surveys among the respondent population of Wayanad district is outlined below.

Table 25. List of places that were surveyed

Sl.No	Panchayath	Block
1	Thavinjal	Mananthavadi
2	Thirunelli	Mananthavadi
3	Meppady	Kalpetta
4	Sulthan bathery	Sulthan bathery
5	Noolpuzha	Sulthan bathery
6	Mullenkolli	Sulthan bathery
7	Pulpally	Sulthan bathery
8	Poothadi	Sulthan bathery

Table 26. Socio-Demographic profile of Wayanad

S. No.	Category	Variables	Frequency	Percentage
1.	Age (years)	Below 30	3	3.12
		30-50	35	36.45
		50-70	55	57.29
		70-90	3	3.12
2.	Household members (number)	1-3	9	9.37
		3-5	41	42.7
		5-7	40	41.66
		7-9	6	6.25
3.	Gender	Male	72	75
		Female	24	25
4.	Occupation	Farmers	96	100
		Others	-	-
5.	Residing period	Below 20	5	5.20
		20-40	14	14.58

	(years)	40-60	61	63.54
		60-80	16	16.66
6.	Educational level	No schooling	10	10.41
		Primary	20	20.83
		UP	15	15.62
		HS	41	42.70
		HSS	4	4.16
		College & above	6	6.25
7.	Economic status	Above poverty level (APL)	66	68.75
		Below Poverty Level (BPL)	30	31.25
		No Ration card		
N=96				

Table 27. Attitudes towards human-wildlife interactions

Category	AS1(%)	AS2(%)	AS3(%)	AS4(%)	AS5(%)	AS6(%)	AS7(%)	AS8(%)	AS9(%)
Strongly agree	1.04	0	2.08	19.79	0	94.79	58.33	62.5	5
Agree	10.41	4.16	51.04	57.29	11.45	5.2	39.58	37.5	4
Neutral	7.29	3.12	10.41	9.37	10.41	0	2.08	0	
Disagree	23.95	32.29	22.91	5.2	10.41	0	0	0	
Strongly disagree	57.29	60.4	13.54	8.33	67.7	0	0	0	

Majority of the surveyed respondents (57%) in Wayanad expressed their strong disagreement to the statement (AS1) that "Some loss due to wildlife is to be expected in forest fringe areas and should be tolerated by the local people". Sixty per cent of the respondents was also strongly disagreeing to the statement (AS2) that "Human-wildlife conflict is happening due to encroachment by humans into forest". The responses to the first two statements are in line with the response of the respondent population in other districts as well. Though this is an emotional reaction stemming from frustration, this also echoes the resentment of the victims towards the recurring conflicts. This emotion carried through while giving the response to (AS3). Fifty one per cent of the respondents agreement to the statement (AS3) that "The FD staff generally treat the forest fringe people as encroachers and offenders". A majority (57%) also

wanted (AS4) that “Forest department should control wildlife using non-lethal methods such as barriers, deterrents and relocation”. Surprisingly a majority of the respondents (68%) also strongly disagreed to the statement “Tourists coming to see forests/wildlife should pay human wildlife conflict mitigation CESS” (AS5). This reaction could be borne out of ignorance or wrong understanding of the concept or could be just a continuation of their frustration. The resentment mood became very evident as majority of the respondents (95%) were of the strong view that “Officials and policy makers assigns more value to wildlife over human life and livelihoods” (AS6). At the same time, the respondents displayed faith in the forest officials to intervene and resolve conflicts. Majority (58%) were of the view that “In conflict zones, the FD shows sincerity in taking remedial action” (AS7). As elsewhere, there is a general feeling among the forest fringe population that the wild animals are forced to move out of the forest boundaries in search of better food and water resources. It is this feeling that showed up as a mass support (63%) in favour of the statement (AS8) “If FD takes action to upgrade the quality of the forest habitat, the conflict rates will come down”. People here also seem aware of the importance of correct data about wild animal population in resolving conflicts. There was big support, as 95% were of the view that (AS9) “Dearth of accurate data on the carrying capacity of forests is escalating the conflict”.

Figure 13. Attitudes towards human-wildlife interactions

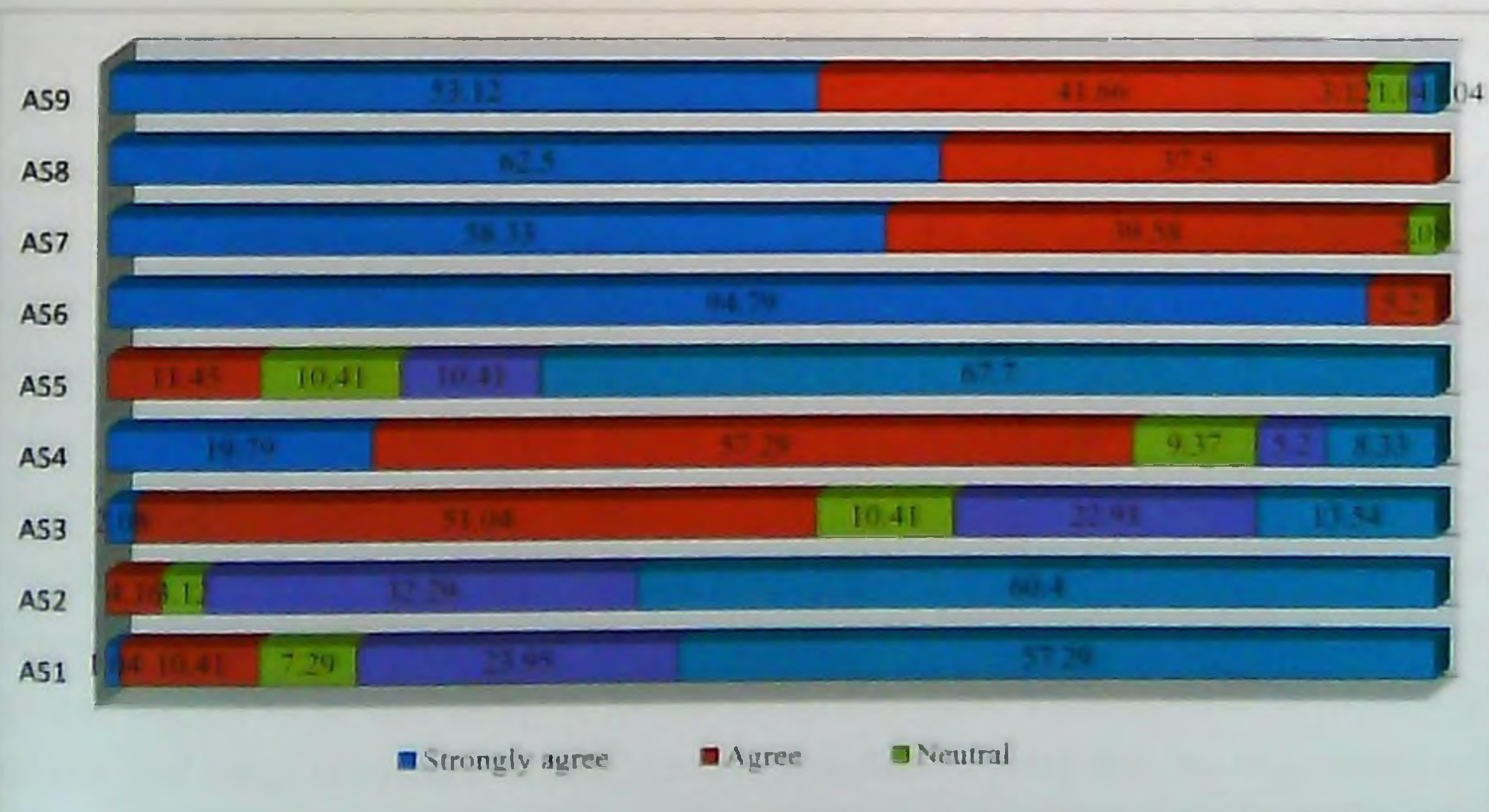


Table 28. Attitudes towards legal measures/policies employed for wildlife conservation

Category	AL1(%)	AL2(%)	AL3(%)	AL4(%)	AL5(%)	AL6(%)	AL7(%)	AL8(%)	AL9(%)
Strongly agree	36.45	57.29	1.04	0	21.87	93.75	95.83	77.08	29.16
Agree	51.04	39.58	7.29	0	71.87	6.25	4.16	8.33	66.66
Neutral	4.16	0	16.66	0	6.25	0	0	5.2	2.08
Disagree	7.29	3.12	54.16	6.25	0	0	0	6.25	0
Strongly disagree	1.04	0	20.83	93.75	0	0	0	3.12	2.08

While assessing the attitudes of victims at Wayanad towards the legal measures in place for wildlife conservation (Table 28; Fig 14), majority (over 87%) of the respondents agreed that “It is important to conserve wildlife” (AL1). The respondents were also heavily in favour (97%) of the wildlife laws as they felt that the current “Wildlife laws ensure the right of the wildlife to live peacefully” (AL2). At the same time, about 75% of the respondents disagreed to the statement “People who harm wildlife should be strictly punished” (AL3). This feeling is quite in collision with their views on the first two statement. This could perhaps be out of their feeling that once they suffer a conflict, they are only left to themselves to suffer the impact. In the event of a conflict, they have to defend their lives and livelihood and an animal can get injured in the process. They feel that the victims should not be subjected to penalties in such unavoidable circumstances. Moreover, the government’s helping hand comes only after a long drawn process. Majority (94%) of the members strongly disagreed to the statement “Protected areas are too large and should be reduced in size” (AL4) as they felt that downsizing will reduce home ranges and force animals out of their natural habitats. The respondents also were favouring (72%) the statement that “People who traditionally use natural resources in protected areas should be allowed to continue to use them” (AL5). The respondents did not mince words as to the ranging behavior of wild animals. Ninety-four percentage strongly agreed to the statement that “Wildlife should be strictly confined to the protected areas” (AL6). This implies that the forest department should ensure that the habitat requirements of the resident and migratory population of wild animals in the nearby forest areas are ensured through sufficient and timely actions. Majority of the members (96%) strongly agreed to the statement “Permission can be given to shoot and kill animals that cause continuous trouble” (AL7). This doesn’t mean that the respondents are trigger-happy but more of an emotional over-reaction out of frustration due to recurring conflicts

and a resultant fear factor. The higher support (77%) to the statement that “Culling of excess wildlife to keep the population under check is a scientific option” (AL8) is a reflection of their concerns of a wild animal population beyond the carrying capacity of the forest area. It is more frustration and equally concern that gets reflected in the higher support given to the statement that “Wildlife conservation laws are biased and do not consider the value of human lives and livelihoods” (AL9).

Figure 14. Attitudes towards legal measures/policies employed for wildlife conservation

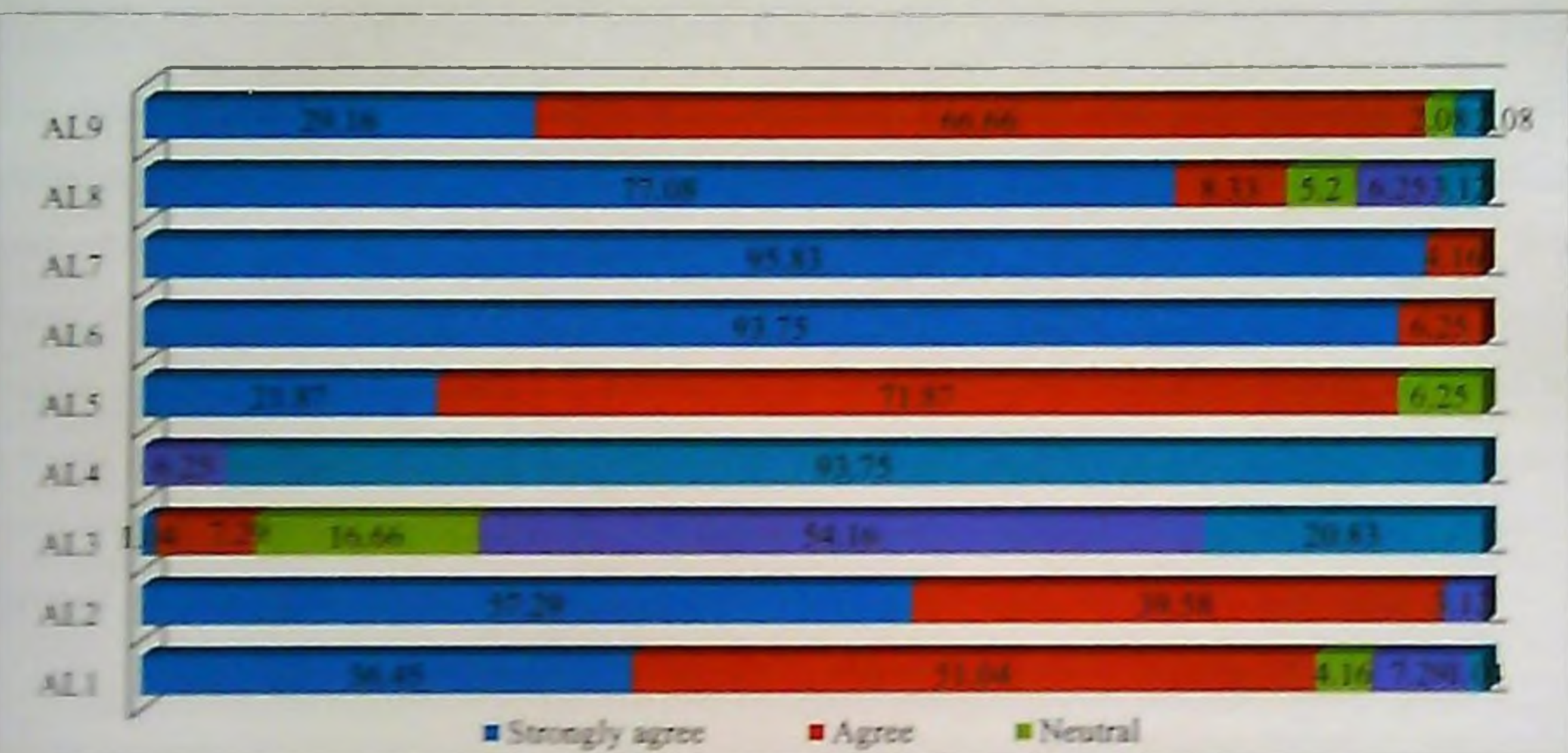


Table 29. Awareness levels about constitutional obligations on wildlife conservation

Category	AC1(%)	AC2(%)	AC3(%)	AC4(%)	AC5(%)	AC6(%)	AC7(%)	AC8(%)	AC9(%)
Not Aware	29.16	6.25	33.33	28.12	0	0	0	0	0
Partly Aware	70.83	26.45	63.54	70.83	6.25	1.04	2.08	19.79	2.08
Fully Aware	0	9.37	3.12	1.04	93.75	98.95	97.91	80.2	97.91

From the above (Table 29), it is evident that there exists a high level of awareness among the respondents to the statement that “It is the fundamental duty of every Indian citizen to protect wildlife” (AC1). Only a minuscule (10%) were ignorant of the fact that “Wildlife Protection Act 1972 is exclusively issued for the protection of wildlife” (AC2). Respondents were also aware of the legal implications of hunting as testified by the high degree of awareness amongst themselves in “Hunting of a wild animal in a non-forest area is also a punishable activity” (AC3). Almost all

the respondents (1% didn't know) knew that "The level of legal protection of the different wild animals varies according to the different schedules under which it has been grouped" (AC4). At the same time, majority (94%) of the members was not aware that "Hunting any wild animal listed in the Schedule 1 to 4 of the WPA is a punishable offence" (AC5). Though this response is contradictory to their earlier response to (AC3), the respondents might have got confused by the mention of "schedules" connected with WPA 1972. As expected, the respondents were not that aware of the schedules and the associated provisions in WPA 1972. Ninety-nine percentage of the members said that they were not aware that "A Schedule I wild animal can be shot dead (conditionally) if only it is posing a threat to human life" (AC6). Ninety-eight percentage were also not aware that "Wild animals listed in Schedule II, III and IV can shot dead in the event of threat to human life and property" (AC7). Eighty percentage were not aware that "Tiger is listed under Schedule I of WPA" (AC8) and 98% were not aware that "Wild boar or Wild Pig is a Schedule III animal" (AC9). Overall, though the respondents agreed to the right of wild animals to live, they were largely ignorant of the subtle provisions and differential protection accorded to various animals under WPA 1972. The forest department and other agencies may constantly intervene to raise the awareness levels about wildlife conservation and associated aspects through various outreach programmes.

Figure 15. Awareness levels about constitutional obligations on wildlife conservation



Table 30. Influence of land use/land cover change and cropping practices in human-wildlife conflicts

Category	LC1(%)	LC2(%)	LC3(%)	LC4(%)	LC5(%)
Strongly agree	0	0	61.45	65.62	87.5
Agree	0	0	38.54	33.33	11.45
Neutral	1.04	0	0	0	1.04
Disagree	6.25	5.2	0	1.04	0
Strongly disagree	92.7	94.79	0	0	0

From the above table, majority of the members (92%) did not agree that “When farmers followed mixed cropping, incidents of HW conflicts were far and few” (LC1). Ninety-five percentage also strongly disagreed that “Shift to mono- cropping practices have increased the incidents of HW conflicts” (LC2). Meanwhile, all respondents (100%) said that “Over the years, the quality of the forest habitat has declined and this is encouraging wild animals to raid human habitation” (LC3). The three responses must be understood in tandem. Shift to a more monoculture agriculture is a reality. There are also reports that raising palatable crops like paddy, plantains, tubers etc in the fringes have increased the incidents of crop raiding. However, the respondents, as expected didn’t want to take their share of responsibility in triggering conflicts and this explains their opposition to the first two statements. At the same time, though an increasing reality, they preferred to put the entire blame of the conflicts on the declining forest habitat quality. One probable reason why majority (66%) agreed that “Urbanisation and subsequent piling up of garbage is attracting wildlife to human habitations” (LC4) is also perhaps because of these factors. However, it is a known fact that garbage is attracting certain wild species like bonnet macaques and wild boar population to human neighbourhoods. Large number of respondents (88%) also had the view that “Plantation activities (Eg. Teak) has an influential role in increasing human-wildlife conflicts” (LC5) through their role in smothering natural vegetation and thereby reducing food availability.

Figure 16. Land use/land cover change and cropping practices in human-wildlife conflicts



Table 31. Best preventive measure to reduce human-wildlife conflicts

Scheme	Mean value	Ranking
Construction of rail fence	1.23	1
Control of problem animals by the FD	1.95	2
Electric fencing	2.13	3
Trenches around fields	2.70	4

Unlike elsewhere, the respondents (Table 31) at Wayanad ranked “Construction of rail fence” as the best option for their area to mitigate conflicts. This is probably because Wayanad is a hot bed of human-wildlife conflicts and in most instances, elephants are involved. Occasional straying of leopards and tiger is also not uncommon here. All these instances might have influenced their decision to choose rail fence as a suitable option. In the second position they ranked “Control of problem animals by the FD”. The respondents were of the view that the forest department may capture and relocate the problematic/excess animals. “Electric fencing” was ranked third while erection of “Trenches around fields” was accorded the fourth rank.

Table 32. Respondent's ranking of crop raiding animals

Species	Mean value	Ranking
Elephant	1.33	1
Wild pig	2.01	2
Guar	2.33	3
Primates	2.33	3
Porcupine	3	4
Deer (sambar)	4	5
Peacock	5	6

From the Table 32, it is evident that the respondents identified elephant as the most problematic animal. Wild pig was ranked as the second most problem species, followed by Primates and Guar (rank III), Porcupine, Deer (sambar) and Peacock, in that order.

DISTRICT 5. KANNUR

The details of the primary data collected through questionnaire surveys among the respondent population of Kannur district is outlined below.

Table 33. List of places that were surveyed in Kannur

Sl.No	Panchayath	Block
1.	Eramam-kuttur	Payyannur
2.	Kankole-Alapadamba	Payyannur
3.	Kunhimangalam	Payyannur
4.	Payyannur	Payyannur
5.	Peringom	Payyannur
6.	Alakode	Thaliparamba
7.	Chengalayi	Thaliparamba
8.	Kadannappally	Thaliparamba
9.	Kurumathur	Thaliparamba
10.	Pariyaram	Thaliparamba
11.	Pattuvam muriyathode	Thaliparamba
12.	Aralam	Iritty
13.	Ayyankunnu	Iritty
14.	Keezhallur	Iritty
15.	Keezhur	Iritty
16.	Koodali	Iritty
17.	Mattannur	Iritty
18.	Payam	Iritty
19.	Thillankeri	Iritty
20.	Eruvessay	Irikkur
21.	Irikkur	Irikkur
22.	Malappattam	Irikkur
23.	Padiyoor	Irikkur
24.	Payyavoor	Irikkur
25.	Kanichar	Peravoor
26.	Kelakam	Peravoor
27.	Kolayad	Peravoor
28.	Kottiyoor	Peravoor
29.	Maloor	Peravoor
30.	Muzhakkunnu	Peravoor
31.	Peravoor	Peravoor
32.	Chittariparamba	Kuthuparamba
33.	Mangattidam	Kuthuparamba
34.	Pattiam	Kuthuparamba
35.	Thripangottur	Kuthuparamba
36.	Kariyad	Panoor
37.	Mokeri	Panoor

Table 34. Socio-Demographic profile

S. No.	Category	Variables	Frequency	Percentage
1.	Age (years)	Below 30	0	
		30-50	43	31.15
		50-70	90	65.21
		70-90	5	3.62
2.	Household members (number)	1-3	8	5.79
		3-5	76	55.07
		5-7	50	36.23
		7-9	4	2.89
3.	Gender	Male	112	81.15
		Female	26	18.84
4.	Occupation	Farmers	134	97.1
		Others	4	2.89
5.	Residing period (years)	Below 20	1	0.72
		20-40	5	3.62
		40-60	101	73.18
		60-80	31	22.46
6.	Educational level	No schooling	1	0.72
		Primary	6	4.34
		UP	26	18.84
		HS	88	63.76
		HSS	12	8.69
		College & above	5	3.62
7.	Economic status	Above poverty level (APL)	114	82.6
		Below Poverty Level (BPL)	24	17.39
		No Ration card		
				N=138

The socio-economic profile of the respondents from the thirty seven panchayaths of Kannur district is given in Table 34. From the above table, it is evident that around 65% of the respondents were in the age group 50-70 years. Eighty-one percentage of the surveyed respondents were males. Fifty five percentage of the surveyed households had 3-5 members, while another thirty five percent of respondent population had 5-7 members in the family. Seventy-three percentage of respondents were living in the present conflict zone for the past 40-60 years. Most majority were residing here for long as only one percent of the respondents said that they were residing here for less than 20 years. Majority of them are farmers (97%) and only 3% were engaged in other jobs. The interviewed respondents were interested in acquiring education as is evident from the fact that majority of the respondents (64%) have attended high

school. Nineteen per cent of them acquired upper primary education. Only three percent of the respondents said that they had opportunities for attending college and 8% had higher secondary level education. Data obtained on the economic status reveals that 83% of respondents were in the above poverty line category.

Table 35. Attitudes towards human-wildlife interactions

Category	AS1(%)	AS2(%)	AS3(%)	AS4(%)	AS5(%)	AS6(%)	AS7(%)	AS8(%)	AS9(%)
Strongly agree	2.17	2.17	0	51.44	10.14	73.18	52.89	57.97	63.04
Agree	7.97	5.79	1.44	39.85	25.36	20.28	42.75	39.13	36.95
Neutral	4.34	13.76	18.84	6.52	39.85	5.79	1.44	2.89	0
Disagree	47.1	40.57	41.3	0.72	10.14	0.72	1.44	0	0
Strongly disagree	38.4	37.68	38.4	1.44	14.49	0	1.44	0	0

In Kannur too, the respondents were in a complaint mode over the loss due to conflicts. The surveyed respondents were in disagreement to the first statement (AS1) “Some loss due to wildlife is to be expected in forest fringe areas and should be tolerated by the local people”. Forty-one per cent of the respondents also did not believe that “Human-wildlife conflict is happening due to encroachment by humans into forest”. However, the response for the third (AS3) statement echoed the support for the forest department. The people were in strong disagreement to the statement “The FD staff generally treats the forest fringe people as encroachers and offenders”. Meanwhile, majority were of the opinion that (AS4) that “Forest department should control wildlife using non-lethal methods such as barriers, deterrents and relocation”. This is simply a reflection of their concerns over life and livelihoods. Majority (58%) of the respondents toed a neutral line vis-à-vis the statement that “Tourists coming to see forests/wildlife should pay human wildlife conflict mitigation CESS” (AS5). This is perhaps out of ignorance of the possible role played the tourists whose behavior of late has been accused of negatively influencing the behavior of wild animals. The majority (73%) opinion in favour of the statement that “Officials and policy makers assigns more value to wildlife over human life and livelihoods” (AS6) is perhaps out of the frustration stemming out from frequently occurring conflicts. At the same time, the majority support (52% strongly agreed; 43% agreed) for the statement that “In conflict zones, the FD shows sincerity in taking remedial action” (AS7) is a reflection of the faith of the local people in the government system. The same trend (58%

strongly agreed: 39% agreed) was also observed for the statement (AS8) “If FD takes action to upgrade the quality of the forest habitat, the conflict rates will come down”. This also reflects the awareness of the people about the importance of the health of the forest habitat. Majority of them (63% strongly agreed and 36% agreed) were in favour of the statement “Dearth of accurate data on the carrying capacity of forests is escalating the conflict” (AS9) which indicates the growing importance of scientific and up-to-date data in tackling and managing conflicts.

Figure 17. Attitudes towards human-wildlife interactions

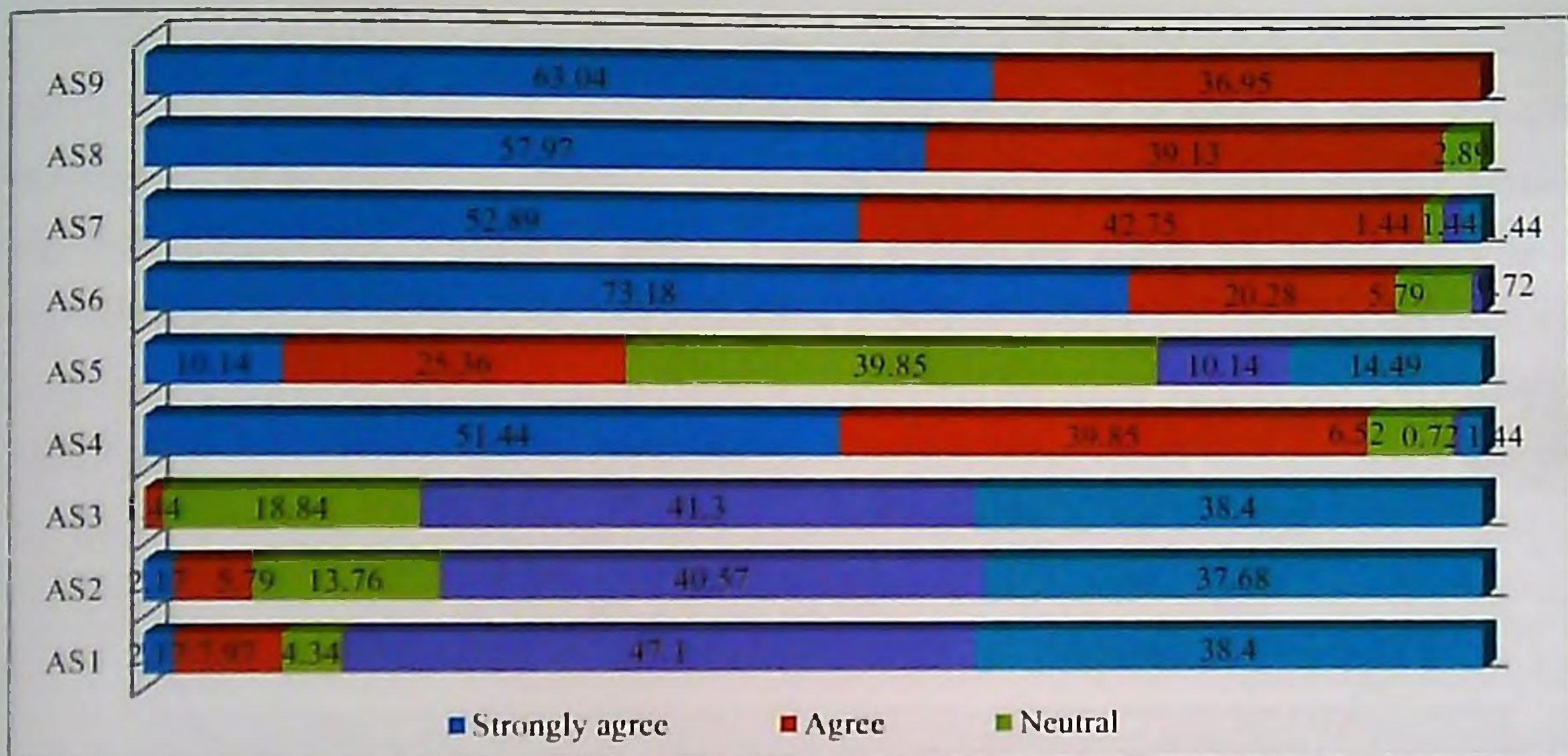


Table 36. Attitudes towards legal measures/policies employed for wildlife conservation

Category	AL1(%)	AL2(%)	AL3(%)	AL4(%)	AL5(%)	AL6(%)	AL7(%)	AL8(%)	AL9(%)
Strongly agree	34.05	42.75	14.49	0	47.1	84.05	89.85	63.04	47.1
Agree	62.31	57.24	42.75	0.72	42.75	13.04	7.97	34.05	50
Neutral	3.62	0	26.81	5.07	9.42	2.17	2.17	0.72	0
Disagree	0	0	14.49	10.86	0.72	0.72	0	2.17	2.17
Strongly disagree	0	0	1.44	83.33	0	0	0	0	0.72

When the attitudes to legal measures for wildlife conservation were assessed, majority of the members (62%) were of the view that “It is important to conserve wildlife” (AL1). Simultaneously, a big majority (57% agreed and 43% strongly agreed) also agreed that “Wildlife laws ensure the right of the wildlife to live peacefully” (AL2). A large majority were also in

favour (43% agreed while 27% were neutral) of imposing penalties for harming wild animals as is evident from the attitudinal response to the statement “People who harm wildlife should be strictly punished” (AL3). Majority (83%) of the members also opposed that “Protected areas are too large and should be reduced in size” (AL4). Respondents also argued (43% agreed and 47% strongly agreed) that “People who traditionally use natural resources in protected areas should be allowed to continue to use them” (AL5). Meanwhile, eighty-four per cent strongly agreed that “Wildlife should be strictly confined to the protected areas” (AL6) which could be seen as a reflection of their growing resentment towards increasing conflicts. Majority of the members (90%) voted strongly in favour of the statement “Permission can be given to shoot and kill animals that cause continuous trouble” (AL7). A large majority too felt (63% strongly agreed and 34% agreed) that “Culling of excess wildlife to keep the population under check is a scientific option” (AL8). However, this reaction is more an emotional reaction than the result of a careful thought process. The same emotions also explains the higher support (50% agreed and 47% strongly agreed) provided for the statement “Wildlife conservation laws are biased and do not consider the value of human lives and livelihoods” (AL9) by the respondents.

Figure 18. Attitudes towards legal measures/policies employed for wildlife conservation

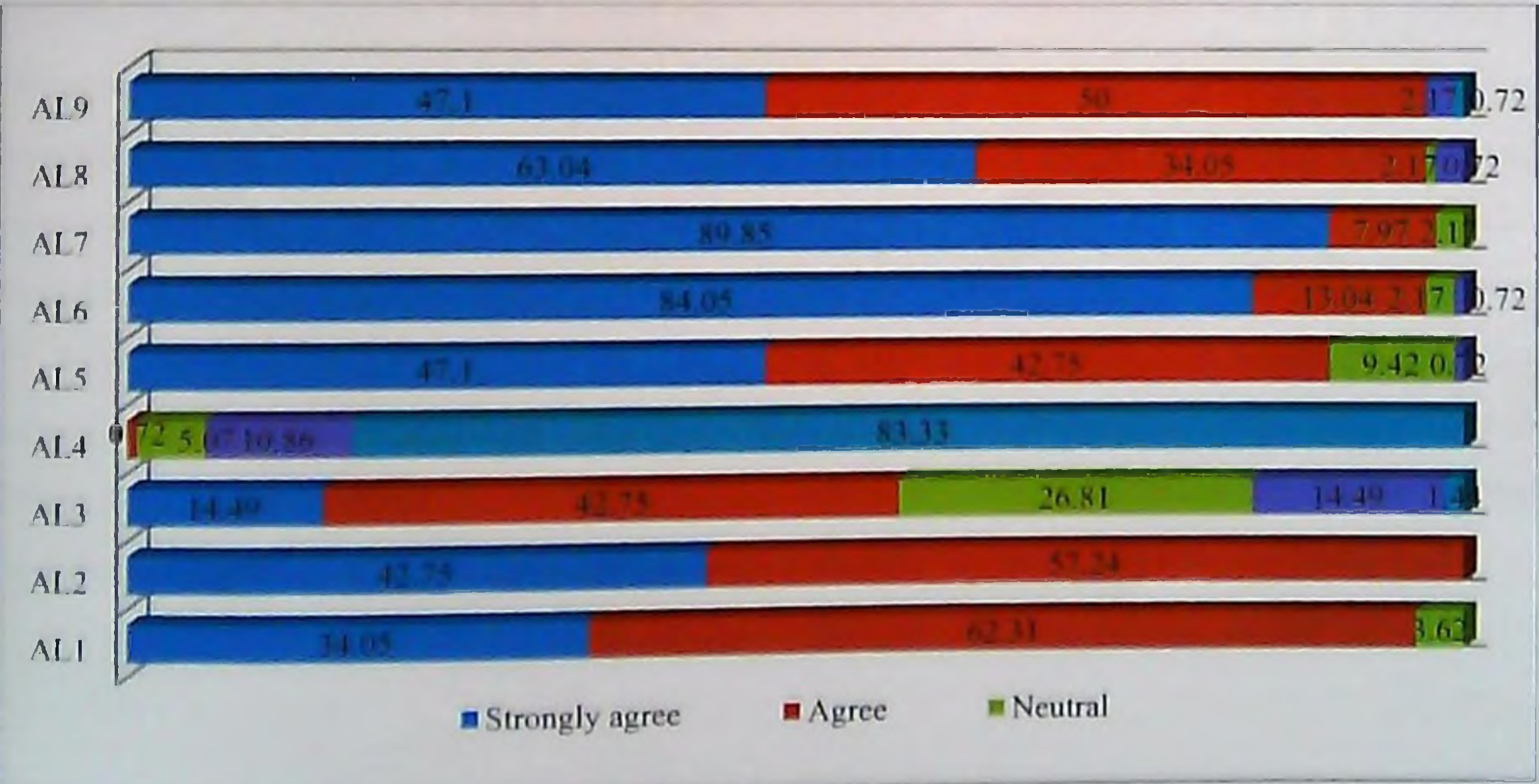


Table 37. Awareness levels about constitutional obligations on wildlife conservations

Category	AC1(%)	AC2(%)	AC3(%)	AC4(%)	AC5(%)	AC6(%)	AC7(%)	AC8(%)	AC9(%)
Aware	65.94	23.18	42.75	24.63	0	0	0	0	0
Partially aware	33.33	73.91	56.52	60.86	18.11	10.86	7.97	15.21	5.79
Not aware	0.72	2.89	0.72	14.49	81.88	89.13	92.02	84.78	94.2

From the above table it is clear that a majority (65%) are aware of the fact that “It is the fundamental duty of every Indian citizen to protect wildlife” (AC1). The respondents also had high awareness levels on WPA (Wildlife Protection Act) as is evident from the support for “Wildlife Protection Act 1972 is exclusively issued for the protection of wildlife” (AC2) and for (AC3) which read “Hunting of a wild animal in a non-forest area is also a punishable activity”. However, when it came to specific schedules under WPA, only sixty-one per cent of the members were partially aware that “The level of legal protection of the different wild animals varies according to the different schedules under which it has been grouped” (AC4). Majority (82%) of the members was also not aware that “Hunting any wild animal listed in the Schedule 1 to 4 of the WPA is a punishable offence” (AC5). Eight-nine per cent of the members were ignorant that “A Schedule I wild animal can be shot dead (conditionally) if only it is posing a threat to human life” (AC6). Ninety-two per cent were also not aware that under WPA “Wild animals listed in Schedule II, III and IV can shot dead in the event of threat to human life and property” (AC7). Eighty-five per cent were not aware to the statement “Tiger is listed under Schedule I of WPA” (AC8). Majority (94%) of them are not aware to the statement “Wild boar or Wild Pig is a Schedule III animal” (AC9). On the whole, this limited awareness presents several opportunities for creating more awareness about wildlife behavior and management. A better informed respondent population will become more willing partners in conflict mitigation and management initiatives undertaken by the government agencies.

Table 38. Influence of land use/land cover change and cropping practices in human-wildlife conflicts

Category	LC1(%)	LC2(%)	LC3(%)	LC4(%)	LC5(%)
Strongly agree	0.72	0.72	46.37	56.52	67.39
Agree	0.72	0.72	53.62	43.47	21.73
Neutral	1.44	0	0	0	3.62
Disagree	1.44	2.17	0	0	2.89
Strongly disagree	95.65	96.37	0	0	4.34

Figure 19. Awareness levels about constitutional obligations on wildlife conservation

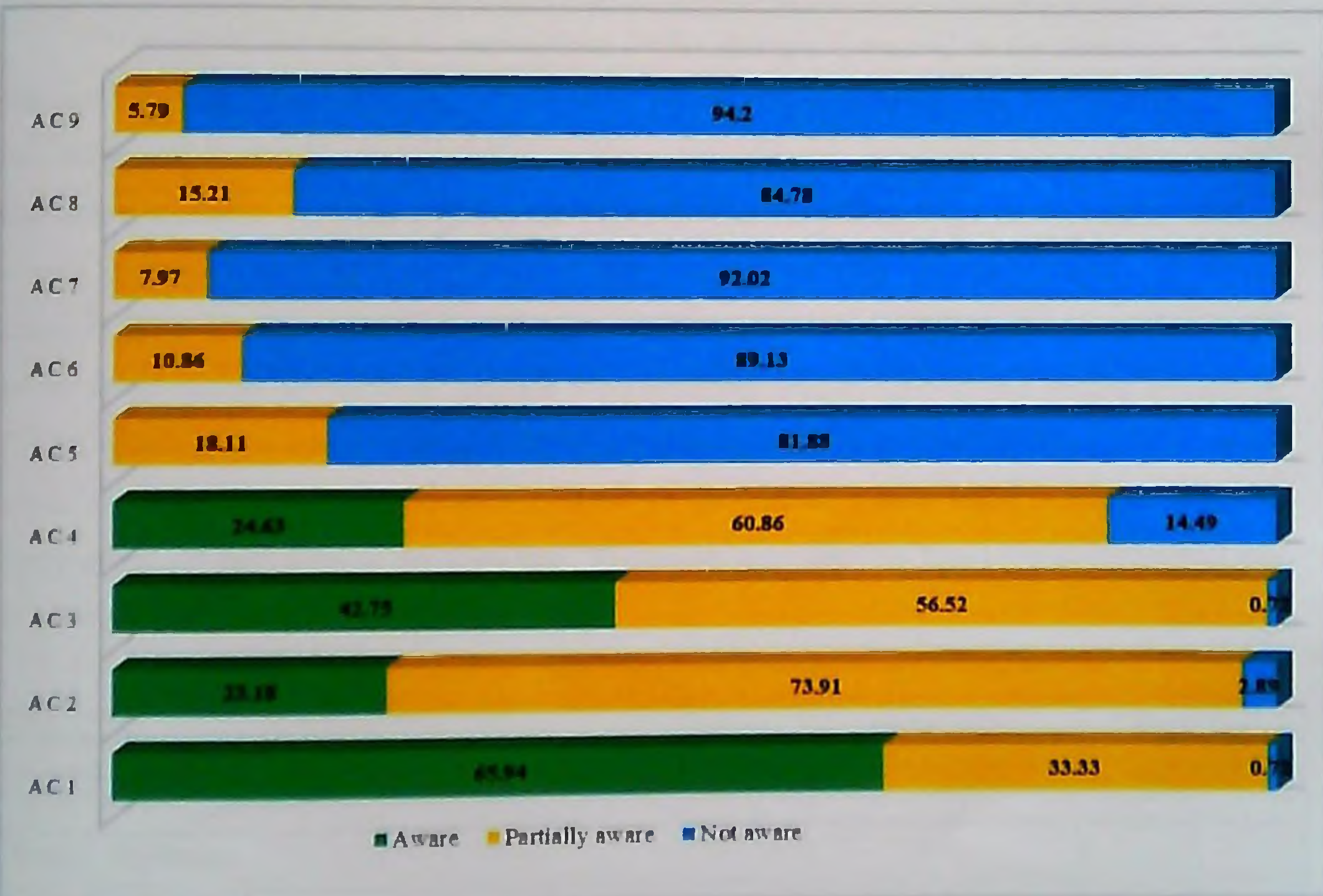
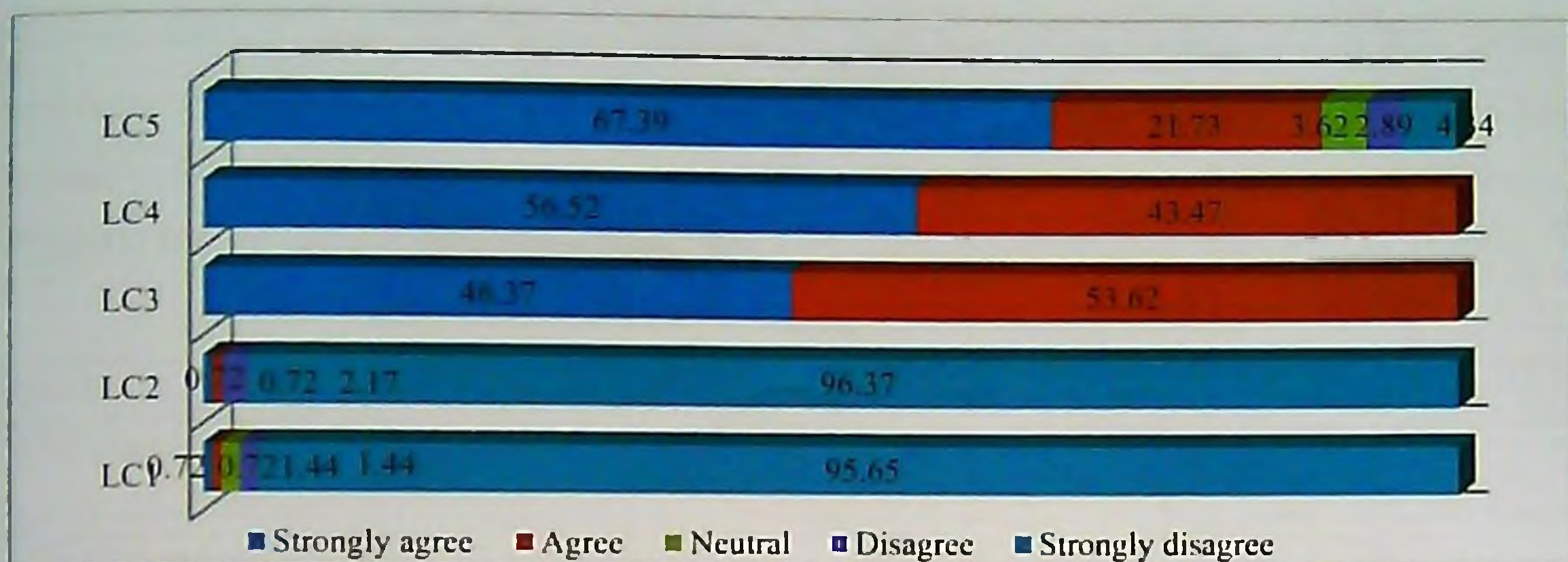


Figure 20. Influence of land use/land cover change and cropping practices in human-wildlife conflicts



Majority of the surveyed respondents (96%) strongly disagreed to the statement “When farmers followed mixed cropping, incidents of HW conflicts were far and few” (LC1). This is not surprising as the fringe population will not be willing to take any responsibility for the increasing conflicts. This also explains the higher (96%) disagreement for the statement “Shift to mono- cropping practices have increased the incidents of HW conflicts” (LC2). However, majority (57% agreed and 46% strongly agreed) are of the view that “Over the years, the quality of the forest habitat has declined and this is encouraging wild animals to raid human habitation” (LC3), which is also true to a great extent. “Urbanisation and subsequent piling up of garbage is attracting wildlife to human habitations” (LC4) is also agreed to as a major reason of conflicts. Sixty-seven per cent were of the view that “Plantation activities (Eg. Teak) has an influential role in increasing human-wildlife conflicts” (LC5).

Table 39. Best preventive measure to reduce human-wildlife conflicts

Scheme	Mean value	Ranking
Control of problem animals by the FD	1.23	1
Electric fencing	1.36	2
Wire fencing	1.57	3
Deterrent techniques	1.6	4
Natural fencing	2	5
Electric fencing around park boundaries	2	5
Construction of rail fence	2	5

The surveyed respondents were of the view that the government must launch programmes to effectively “Control of problem animals by the FD” (Ranked first). The respondents voted “Electric fencing” and “Wire fencing” around the farm boundaries respectively as their second and third best options. They listed the employment of “Deterrent techniques” as the fourth best option. In the fifth rank was the suggestion “Construction of rail fences”, followed by erection of “Electric fencing around park boundaries” and establishment of “Natural fences”.

Table 40. Respondent’s ranking of crop raiding animals

Species	Mean value	Ranking
Wild pig	1.24	1
Elephant	1.81	2
Primates	1.93	3
Deer (sambar)	2	4
Giant squirrel	2	4
Deer(chital)	2.5	5
Peacock	3.18	6
Porcupine	3.2	7
Guar	3.6	8

In this area too, it is the herbivores that is occupying the centre stage in most of the conflicts. Respondents at Kannur ranked (Table 12) ranked wild pig as the most problematic wild animal. In the second position they cited elephant, followed by primates (rank III), Deer (sambar) and Giant squirrel, Deer (chital), Peacock, Porcupine and Guar in that order.

DISTRICT 6. KASARAGOD

The details of the primary data collected through questionnaire surveys among the respondent population of Kasaragod district is outlined below.

Table 41. List of places that were surveyed

Sl. No.	Panchayath	Block
1.	Karadka	Karadka

Table 42. Socio-Demographic profile

S. No.	Category	Variables	Frequency	Percentage
1.	Age (years)	Below 30	0	0
		30-50	2	22.22
		50-70	7	78
		70-90	0	0
2.	Household members (number)	1-3	1	11.11
		3-5	4	44.44
		5-7	4	44.44
		7-9	0	0
3.	Gender	Male	6	67
		Female	3	33.33
4.	Occupation	Farmers	7	78
		Others	2	22.22
5.	Residing period (years)	Below 20	0	0
		20-40	0	0
		40-60	8	89
		60-80	1	11.11
6.	Educational level	No schooling	0	0
		Primary	0	0
		UP	1	11.11
		HS	8	89

		HSS	0	0
		College & above	0	0
7.	Economic status	Above poverty level (APL)	9	100
		Below Poverty Level (BPL)	0	0
		No Ration card	0	0
				N=9

The socio-economic profile of the respondents from Kasaragod district is given in Table 41. From the above table, it is evident that around 78% of the respondents were in the age group 50-70 years. Sixty-seven percentage of the surveyed respondents were males. The average family size (numbers) was 3-5, while 44% of the households had 5-7 members. Eighty-nine percentage of respondents were living in the present conflict zone for the past 40-60 years. Majority of them are farmers (78%) and only 22% were engaged in other jobs. The interviewed respondents were interested in acquiring education as is evident from the fact that majority of the respondents (89%) have attended high school. Eleven per cent had attended upper primary education. Data obtained on the economic status reveals that 100% of the respondents were in the above poverty line category.

Table 43. Attitudes towards human-wildlife interactions

Category	AS1(%)	AS2(%)	AS3(%)	AS4(%)	AS5(%)	AS6(%)	AS7(%)	AS8(%)	AS9(%)
Strongly agree	0	0	0	77.77	0	100	55.55	66.66	66.66
Agree	11.11	11.11	0	0	0	0	44.44	33.33	33.33
Neutral	11.11	11.11	11.11	11.11	44.44	0	0	0	0
Disagree	55.55	55.55	44.44	0	11.11	0	0	0	0
Strongly disagree	22.22	22.22	44.44	11.11	44.44	0	0	0	0

The surveyed respondents at Kasargode generally displayed a strong reservation towards the human-wildlife conflicts. This is evident from the cautious responses they gave for the various statements connected with attitude (Table 43). Fifty six per cent of the respondents in Kasaragod expressed their disagreement (another extra 23% were in strong disagreement) to the

first statements (AS1) that “Some loss due to wildlife is to be expected in forest fringe areas and should be tolerated by the local people”. This same attitude was echoed towards the second (AS2) statement “Human-wildlife conflict is happening due to encroachment by humans into forest”. The third (AS3) statement, however, evoked a surprisingly positive response. The respondents reacted against the statement which stated that “The FD staff generally treats the forest fringe people as encroachers and offenders” (45% disagreed; 45% strongly disagreed). The reactions to the first three statements clearly shows that though the forest department is often in the firing line of the people in times of conflicts, they are not ready to play a blame game to escape from their responsibilities. Meanwhile the people’s reactions are to the point as is evident from the high (78%) agreement received for the statement (AS4) “Forest department should control wildlife using non-lethal methods such as barriers, deterrents and relocation”. Concerns about a probable social insecurity could have triggered a cent per cent support for the statement “Officials and policy makers assigns more value to wildlife over human life and livelihoods” (AS6). Forty five percent of the respondents were neutral and 45% were strongly disagreed to the statement “Tourists coming to see forests/wildlife should pay human wildlife conflict mitigation CESS” (AS5). This perhaps could be out of ignorance among the respondents about the possible linkages between tourist behavior and animal adaptations. When a majority supported (56% strongly agreed; 44% agreed) the statement “In conflict zones, the FD shows sincerity in taking remedial action” (AS7), it is possible evidence of the faith of the victims in the government system to tackle the conflict. The same trend (67% strongly agreed; 33% agreed) was also observed for the statement (AS8) “If FD takes action to upgrade the quality of the forest habitat, the conflict rates will come down”. Majority of them (66% strongly agreed and 33 % agreed) were in favour of the statement “Dearth of accurate data on the carrying capacity of forests is escalating the conflict” (AS9) which shows that they believe that scientifically generated data can help in developing effective mitigatory mechanisms.

Figure 21. Attitudes towards human-wildlife interactions

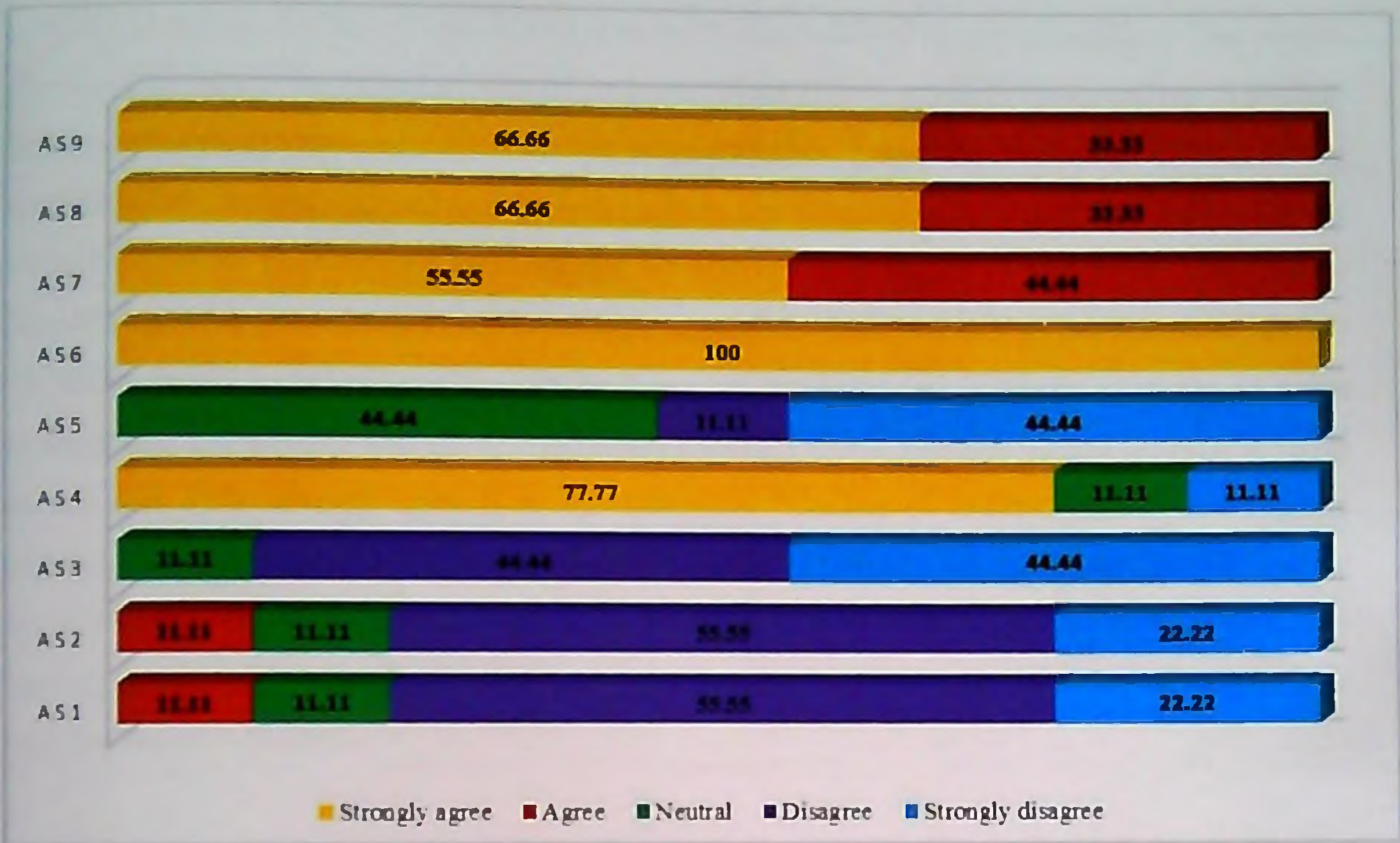


Table 44. Attitudes towards legal measures/policies employed for wildlife conservation

Category	AL1(%)	AL2(%)	AL3(%)	AL4(%)	AL5(%)	AL6(%)	AL7(%)	AL8(%)	AL9(%)
Strongly agree	0	55.55	0	0	44.44	100	100	33.33	22.22
Agree	100	44.44	11.11	0	55.55	0	0	66.66	66.66
Neutral	0	0	44.44	0	0	0	0	0	11.11
Disagree	0	0	33.33	0	0	0	0	0	0
Strongly disagree	0	0	11.11	100	0	0	0	0	0

It was meanwhile heartening to observe the cent percent support received for the statement “It is important to conserve wildlife” (AL1). This also explodes the myth that the fringe people treat wild animals as their enemies. That these people also has high regards for the right of the wildlife to exist is evident by the high support (56% of the members strongly agreed and 44% agreed) to the statement “Wildlife laws ensure the right of the wildlife to live peacefully” (AL2). However, when it came to penalties, the respondents toed a cautious line. Forty four per cent of the members chose to be neutral, while 33% opted to disagree to the

statement that “People who harm wildlife should be strictly punished” (AL3). This stand could possibly be due to the fear of loss of social security as a result of recurring conflicts. The people chose not to reduce the extent of area of protected areas (100% strongly disagreed) as is evident from the statement “Protected areas are too large and should be reduced in size” (AL4). Mixed attitudes (44% strongly agreed and 56% agreed) to the statement “People who traditionally use natural resources in protected areas should be allowed to continue to use them” (AL5). The people’s concern got reflected (100% strongly agreed) in their reaction to the statements (AL6) “Wildlife should be strictly confined to the protected areas and (AL7) “Permission can be given to shoot and kill animals that cause continuous trouble”. There was also strong agreement (67% agreed and 33% strongly agreed) to the statement “Culling of excess wildlife to keep the population under check is a scientific option” (AL8) is perhaps an emotional reaction out of social distress. The same emotions got reflected in their reactions (67% agreed and 22% strongly agreed) to “Wildlife conservation laws are biased and do not consider the value of human lives and livelihoods” (AL9).

Figure 22. Attitudes towards legal measures/policies employed for wildlife conservation

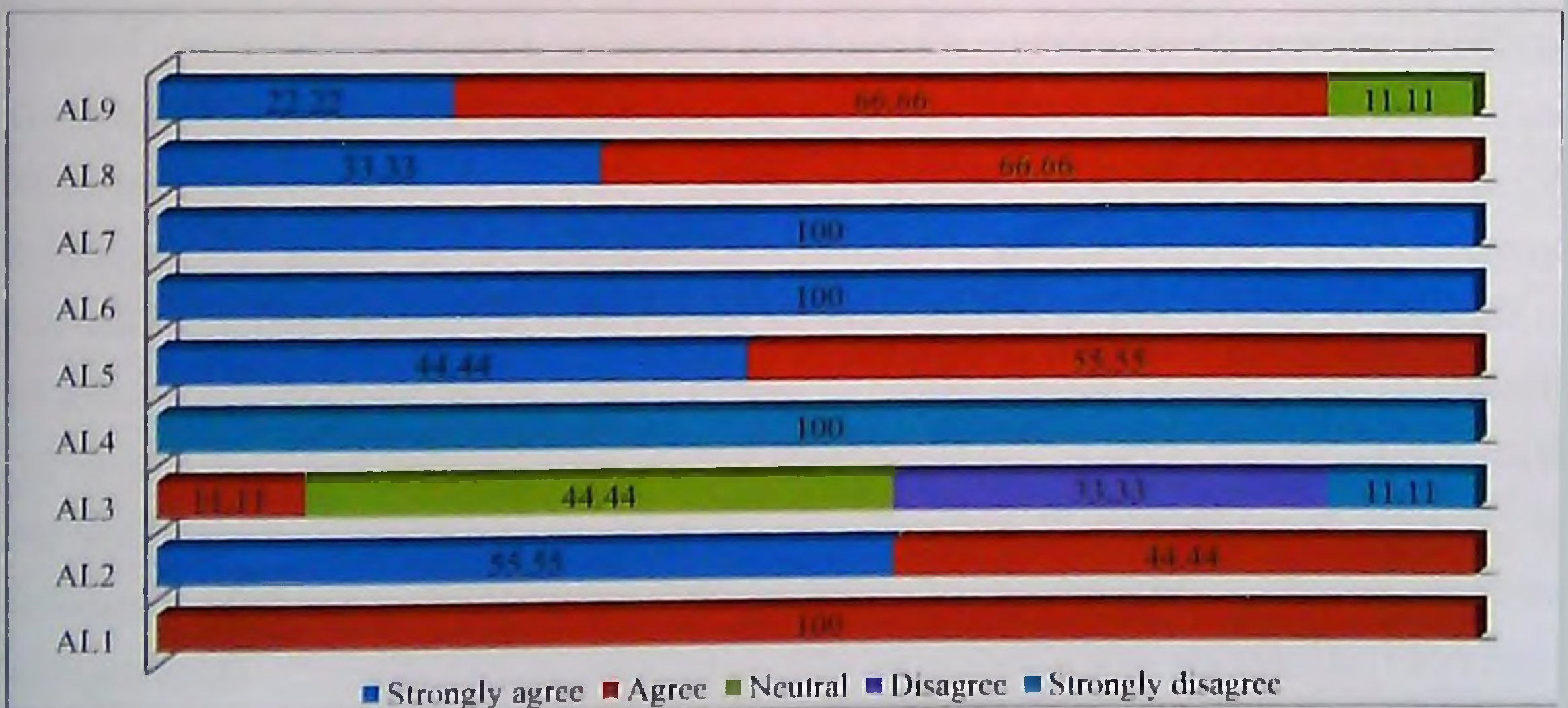


Table 45. Awareness levels about constitutional obligations on wildlife conservation

Category	AC1(%)	AC2(%)	AC3(%)	AC4(%)	AC5(%)	AC6(%)	AC7(%)	AC8(%)	AC9(%)
Aware	100	44.44	66.66	0	11.11	0	0	0	0
Partially aware	0	55.55	33.33	100	22.22	11.11	0	33.33	0
Not aware	0	0	0	0	66.66	88.88	100	66.66	100

From the above table, it is evident that respondents are aware of their constitutional obligations to conserve wildlife as is evident from their support (100%) to the statement “It is the fundamental duty of every Indian citizen to protect wildlife” (AC1). The respondent population at Kasargode were also highly aware (56% partially aware and 44% were aware) that “Wildlife Protection Act 1972 is exclusively issued for the protection of wildlife” (AC2). The awareness levels among this group on “Hunting of a wild animal in a non-forest area is also a punishable activity” (AC3) was also on the higher side (66% were aware and 33% were partially aware). All respondents had some idea about the preferential law protection extended to different wild animal species is evident from their response to the statement “The level of legal protection of the different wild animals varies according to the different schedules under which it has been grouped” (AC4). However, vis-à-vis various schedules, the awareness levels were low as 66% of the members were not aware that “Hunting any wild animal listed in the Schedule I to 4 of the WPA is a punishable offence” (AC5). Likewise, 89% of the members not aware that “A Schedule I wild animal can be shot dead (conditionally) if only it is posing a threat to human life” (AC6). All the respondents (100%) were not aware that “Wild animals listed in Schedule II, III and IV can shot dead in the event of threat to human life and property” (AC7). Majority (67%) were not aware that the “Tiger is listed under Schedule I of WPA” (AC8). 100% of them are not aware that “Wild boar or Wild Pig is a Schedule III animal” (AC9). Overall, the assessment of awareness levels exposes the ignorance levels of the conflict victims about the different levels of legal protection extended to different species of wild animals who incidentally are also involved in conflicts. This information also highlights the need to create more awareness about the legal provisions amongst the respondents. Concurrently, classes on behavior of wild animals and their importance in ecosystem dynamics also need to be arranged so as to build up the tolerance levels of the forest fringe population.

Figure 23. Awareness levels about constitutional obligations on wildlife conservation

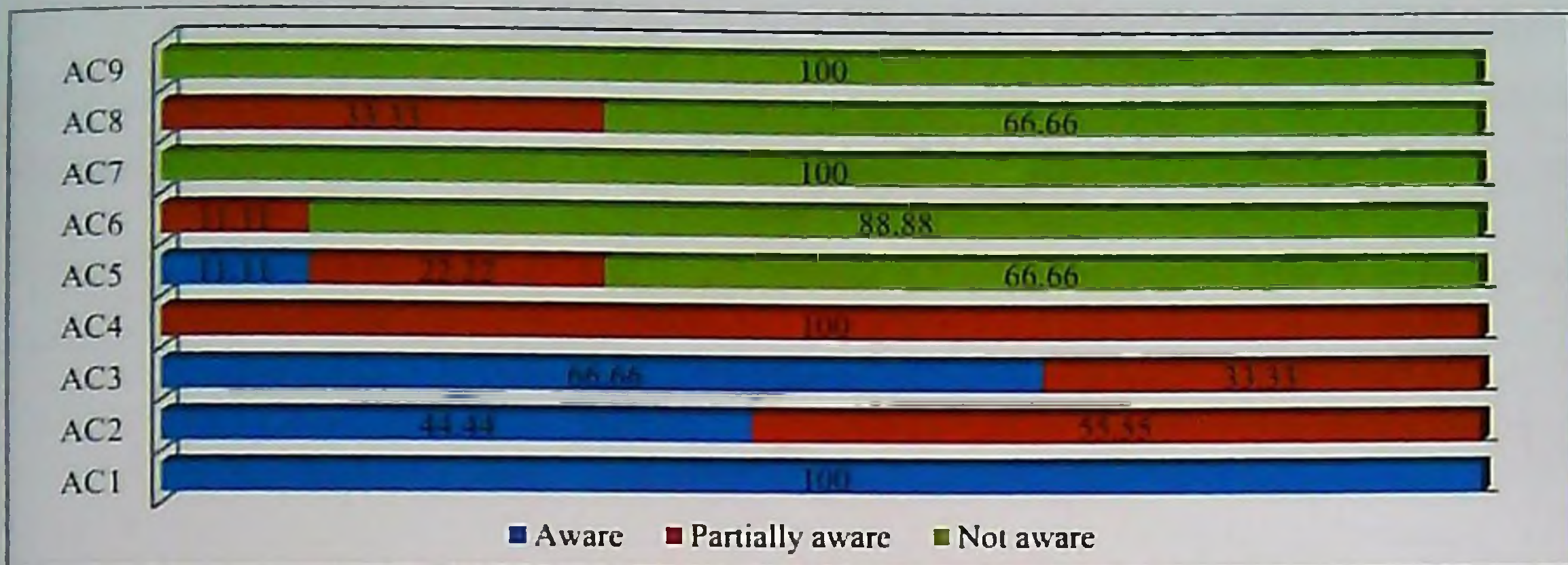


Table 46. Influence of land use/land cover change and cropping practices in human-wildlife conflicts

Category	LC1(%)	LC2(%)	LC3(%)	LC4(%)	LC5(%)
Strongly agree	0	0	44.44	66.66	100
Agree	0	0	55.55	33.33	0
Neutral	0	0	0	0	0
Disagree	22.22	44.44	0	0	0
Strongly disagree	77.77	55.55	0	0	0

The respondents dismissed the thinking that mixed cropping reduces conflict incidents. Majority of the surveyed respondents (78%) strongly disagreed to the statement “When farmers followed mixed cropping, incidents of HW conflicts were far and few” (LC1). Fifty six per cent strongly disagreed and another 44% disagreed to the statement that “Shift to mono-cropping practices have increased the incidents of HW conflicts” (LC2). There is no doubt that cropping patterns has changed and more than mixed cropping mono-cultures are now popular. However, location specific data to link this shift with increased instances of conflict are not available. The general disagreement is perhaps because the forest fringe people do not want to see their changed farming practices as a trigger of conflicts. However majority were of the view (56% agreed and 44% strongly agreed) that “Over the years, the quality of the forest habitat has declined and this is encouraging wild animals to raid human habitation” (LC3). Majority (67%) were supporting the statement that “Urbanisation and subsequent piling up of garbage is attracting wildlife to

human habitations” (LC4). All (100%) were also of the view that “Plantation activities (Eg. Teak) has an influential role in increasing human-wildlife conflicts” (LC5) as under these monocultures, invasive alien weeds colonise and smother natural vegetation and thereby reduce the food basket of herbivores.

Figure 24. Influence of land use/land cover change and cropping practices in human-wildlife conflicts

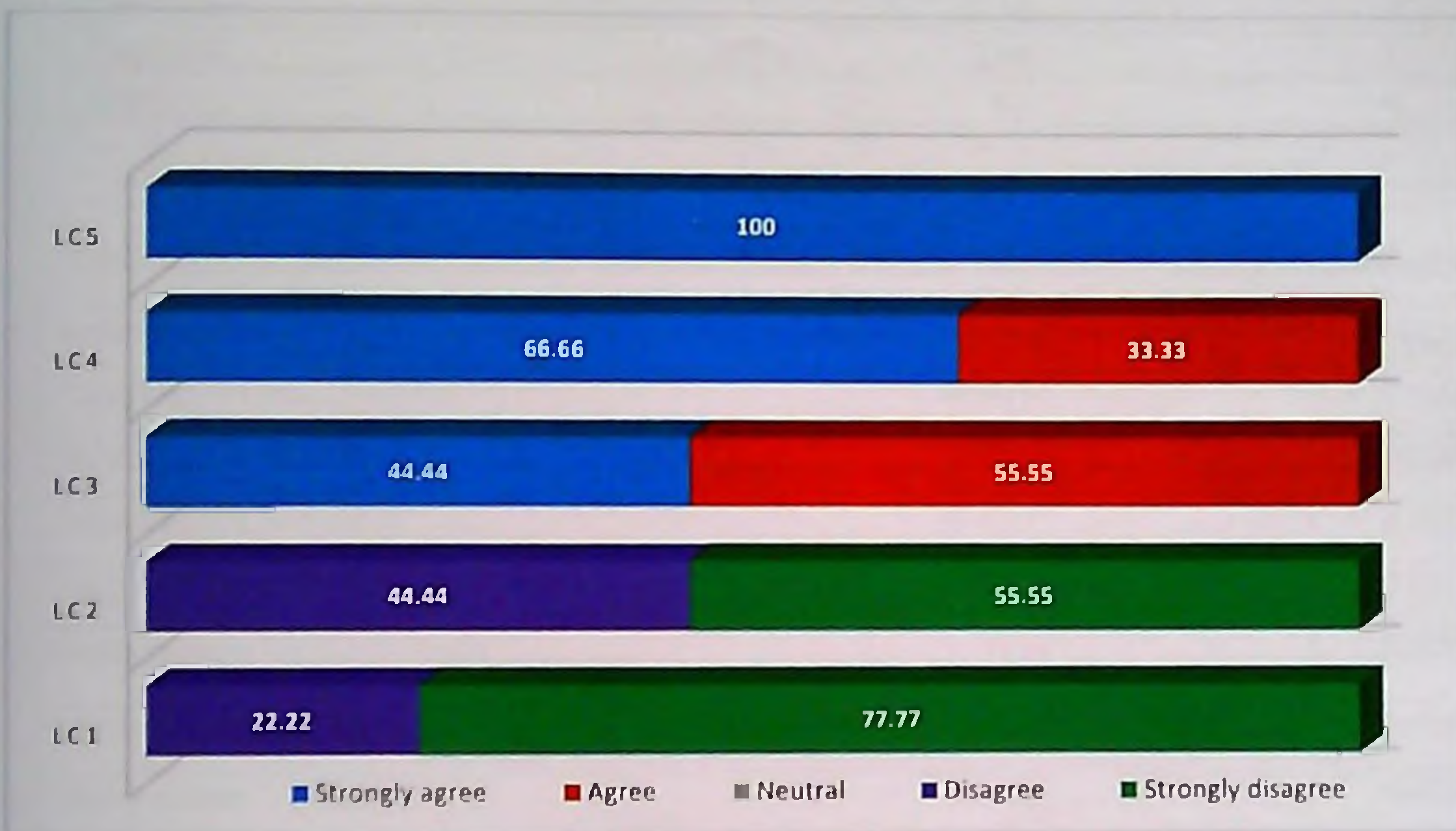


Table 47. Best preventive measure to reduce human-wildlife conflicts

Scheme	Mean value	Ranking
Control of problem animals by the FD	1	1
Deterrent technique	2	2

According to the respondents, the preferred preventive measure to be adopted to reduce conflict instances is “Control of problem animals by the FD”. They expect the department to check the population of wild animals and introduction of schemes that will keep the wild animals within the forest boundaries. They also favoured the usage of “Deterrent techniques” like erecting electric fences or technology assisted alarm calls that will deter, but not harm the wild

animals and keep them away from the farm lands and human habitations. According to the respondents, the most troublesome animal was the wild boars. The second most trouble maker was the porcupine, followed by elephants and gaur.

Table 48. Respondent's ranking of crop raiding animals

Species	Mean value	Ranking
Wild pig	1	1
Porcupine	2.33	2
Elephant	2.66	3
Guar	4	4

Table 49. Comparison of attitude towards Human wildlife interactions among respondents

Respondents	Man-Whitney U statistic	p-value
Palakkad Vs Malappuram	-3.101*	0.002
Palakkad Vs Kozhikode	-8.646*	0.000
Palakkad Vs Wayanad	-9.439*	0.000
Palakkad Vs Kannur	-8.876*	0.000
Malappuram Vs Kozhikode	-6.737*	0.000
Malappuram Vs Wayanad	-7.418*	0.000
Malappuram Vs Kannur	-6.146*	0.000
Kozhikode Vs Wayanad	-0.060 ^{ns}	0.952
Kozhikode Vs Kannur	-2.713*	0.007
Wayanad Vs Kannur	-2.935*	0.003

*Significant at 5% level. ns=non-significant

Table 50. Comparison of attitude towards constitutional obligations among respondents

Respondents	Man-Whitney U statistic	p-value
Palakkad Vs Malappuram	-10.326*	0.002
Palakkad Vs Kozhikode	-10.106*	0.000
Palakkad Vs Wayanad	-3.178*	0.001
Palakkad Vs Kannur	-11.713*	0.000
Malappuram Vs Kozhikode	-0.234 ^{ns}	0.815
Malappuram Vs Wayanad	-11.095*	0.000
Malappuram Vs Kannur	-0.474*	0.000
Kozhikode Vs Wayanad	-10.781*	0.000
Kozhikode Vs Kannur	-1.009 ^{ns}	0.313
Wayanad Vs Kannur	-13.003*	0.000

*Significant at 5% level. ns=non-significant

Table 51. Comparison of attitudes to legal measures for wildlife conservation among respondents.

Respondents	Man-Whitney U statistic	p-value
Palakkad Vs Malappuram	-3.002*	0.002
Palakkad Vs Kozhikode	-1.286 ^{ns}	0.199
Palakkad Vs Wayanad	-3.258*	0.001
Palakkad Vs Kannur	-1.836 ^{ns}	0.066
Malappuram Vs Kozhikode	-1.304	0.192
Malappuram Vs Wayanad	-5.728*	0.000
Malappuram Vs Kannur	-1.464*	0.000
Kozhikode Vs Wayanad	-4.092*	0.000
Kozhikode Vs Kannur	-.193*	0.000
Wayanad Vs Kannur	-5.491	0.000

*Significant at 5% level. ns=non-significant

Table 52. Association of socio-demographic variables with the score on attitude towards HW interaction

Chi-square statistic					
Variables	Palakkad	Malappuram	Kozhikode	Wayanad	Kannur
Age	1.136 ^{ns}	1.33 ^{ns}	5.353 ^{ns}	1.70 ^{ns}	1.33 ^{ns}
Education	2.51 ^{ns}	2.37 ^{ns}	1.574 ^{ns}	2.47 ^{ns}	2.37 ^{ns}
Residing period	1.32 ^{ns}	1.84 ^{ns}	15.76*	4.00 ^{ns}	1.84 ^{ns}
Occupation		.30 ^{ns}			.30 ^{ns}
Economic status	2.47 ^{ns}	.277 ^{ns}	3.65 ^{ns}	.96 ^{ns}	.277 ^{ns}

*Significant at 5% level. ns=non-significant

The differences in the attitudes of the respondents drawn from different districts towards human wildlife interactions are outlined in Table 49.

Table 49. Comparison of attitude towards human wildlife interactions among respondents

Respondents	Man-Whitney U statistic	p-value
Palakkad Vs Malappuram	-3.101*	0.002
Palakkad Vs Kozhikode	-8.646*	0.000
Palakkad Vs Wayanad	-9.439*	0.000
Palakkad Vs Kannur	-8.876*	0.000
Malappuram Vs Kozhikode	-6.737*	0.000
Malappuram Vs Wayanad	-7.418*	0.000
Malappuram Vs Kannur	-6.146*	0.000
Kozhikode Vs Wayanad	-0.060 ^{ns}	0.952
Kozhikode Vs Kannur	-2.713*	0.007
Wayanad Vs Kannur	-2.935*	0.003

*Significant at 5% level. ns=non-significant

It can be seen that, all the respondents, barring those from Kozhikode and Wayanad district were having significantly different views about human wildlife interactions. As human wildlife interactions are both location specific as well as animal specific, the significant

differences in the opinions across the districts are not surprising. These observations call for a continuous monitoring of the nature, frequency and intensity of conflicts in these areas which will help in designing appropriate micro-site specific mitigation measures.

The differences in the awareness levels of the respondents drawn from different districts towards constitutional obligations meant for wildlife conservation are outlined in Table 50.

Table 50. Comparison of awareness levels towards constitutional obligations among respondents

Respondents	Man-Whitney U statistic	p-value
Palakkad Vs Malappuram	-10.326*	0.002
Palakkad Vs Kozhikode	-10.106*	0.000
Palakkad Vs Wayanad	-3.178*	0.001
Palakkad Vs Kannur	-11.713*	0.000
Malappuram Vs Kozhikode	-0.234 ^{ns}	0.815
Malappuram Vs Wayanad	-11.095*	0.000
Malappuram Vs Kannur	-0.474*	0.000
Kozhikode Vs Wayanad	-10.781*	0.000
Kozhikode Vs Kannur	-1.009 ^{ns}	0.313
Wayanad Vs Kannur	-13.003*	0.000

*Significant at 5% level. ns=non-significant

From the above, it is evident that there exist significant differences in the awareness levels of the respondents of all districts, except between the respondents drawn from Malappuram and Kozhikode and Kozhikode and Kannur. The success of conservation depends on the levels of awareness of the people living near the forest fringes who are also part and parcel of the forest ecosystem and also victims of conflicts. If the awareness levels are high, they will be more tolerant and will be willing partners in the conservation efforts. Overall, the significant differences in the awareness levels exhibited by the respondents from the different districts present numerous opportunities for creating more awareness about the importance of forests and wildlife and their conservation.

The differences in the attitudes of the respondents drawn from different districts towards the legal measures used for wildlife conservation are outlined in Table 51.

Table 51. Comparison of attitudes to legal measures for wildlife conservation among respondents

Respondents	Man-Whitney U statistic	p-value
Palakkad Vs Malappuram	-3.002*	0.002
Palakkad Vs Kozhikode	-1.286 ^{ns}	0.199
Palakkad Vs Wayanad	-3.258*	0.001
Palakkad Vs Kannur	-1.836 ^{ns}	0.066
Malappuram Vs Kozhikode	-1.304	0.192
Malappuram Vs Wayanad	-5.728*	0.000
Malappuram Vs Kannur	-1.464*	0.000
Kozhikode Vs Wayanad	-4.092*	0.000
Kozhikode Vs Kannur	-.193*	0.000
Wayanad Vs Kannur	-5.491	0.000

*Significant at 5% level. ns=non-significant

As in the earlier case, here too, except a few districts, there exist significant differences in the attitudes of the respondents from different districts towards the policies or legal measures being currently followed or employed for the conservation of wildlife. Though the respondents were largely aware that it is important to conserve wildlife, specific awareness about the different levels of legal protection extended to different species of wild animals is sketchy. These observations highlight the importance to create a better informed citizenry vis-à-vis forest and wildlife conservation, which is also a genuine need of the hour. After all, one of the parties in these types of conflicts are the humans, whose tolerance levels could be shaped by creating awareness.

Important Observations of the Explorative Study

The important observations of the explorative study undertaken under this project are listed below:

1. At Palakkad, the respondents were equally divided on the importance of conserving wildlife. This is despite the fact that majority knew that hunting of a wild animal in a non-forest area is also a punishable activity.
2. Palakkad respondents also strongly supported extending permission to shoot and kill animals that cause continuous trouble and were also of the view that culling of excess wildlife to keep the population under check is a scientific option.
3. Eighty percentage of the Palakkad respondents also accused that wildlife conservation laws are biased and do not consider the value of human lives and livelihoods.
4. The most problematic animal at Palakkad is the Wild pig (wild boar). Elephants came in the second position, followed by Peacock and Deer (chital) in the joint third position. Primates were ranked as fourth troublemaker, followed by Porcupine and Leopard in that order.
5. The respondents of Palakkad ranked "Electric fencing" as the number one preventive option, followed by "Control the problem animals, "Construction of rail fence", digging of "Trenches around park boundaries", erection of "Wire fencing", creation of "Trenches around fields", followed by use of "Deterrent techniques" in that order. Their general perception is that the forest department must devise ways and means to restrict the wild animals within the forest boundaries.
6. A slender majority (58%) of the Kozhikode respondents accused the Forest Department staff for treating the forest fringe people as encroachers and offenders. Interestingly, over 28% of the respondents interviewed opposed this viewpoint.

7. A sizeable majority (over 95%) of the respondents of Kozhikode agreed that it is important to conserve wildlife. At the same time, close to 97% of these respondents were of the view that “Wildlife conservation laws are biased and do not consider the value of human lives and livelihoods”.
8. There was a lack of awareness of the schedules and the connected provisions under WPA 1972, among the forest fringe residents of Kozhikode district who are victims of the conflicts.
9. Elephant is the most frequent crop raider In Kozhikode, followed by wild pig, primates, porcupine, Deer (sambar), Guar, Leopard and Peacock.
10. The Kozhikode respondents chose “Electric fencing” as the number one preventive measure followed by “Construction of rail fence”, erection of “Trenches around fields”, “Control of problem animals by the FD” in that order.
11. In Wayanad, while 57% of the surveyed respondents did not agree that some loss due to wildlife is to be expected in forest fringe areas and should be tolerated by the local people, 11% is ready to accept this reality. Around 95% of them were of the view that dearth of accurate data on the carrying capacity of forests is escalating the conflicts.
12. About 75% of the respondents in Wayanad disagreed to the statement that “People who harm wildlife should be strictly punished”. About 94% strongly demanded that wildlife should be strictly confined to the protected areas.
13. Eighty percentage of the respondents in Wayanad were not aware that “Tiger is listed under Schedule I of WPA” and 98% were not aware that “Wild boar or Wild Pig is a Schedule III animal”.
14. At Wayanad, the respondents identified elephant as the most problematic animal, followed by Wild boar, Primates and Guar (rank III), Porcupine, Deer (sambar) and Peacock, in that order.

15. In Wayanad, “construction of rail fence” was the first preferred option probably because in most instances, elephants are involved. This was followed by “Control of problem animals by the FD”, “Electric fencing” and erection of “Trenches around fields”.
16. At Kannur, around 41% of the respondents did not believe that “human-wildlife conflict is happening due to encroachment by humans into forest”. At the same time, a majority of them were also not of the view that the forest department staff is treating the forest fringe people as encroachers and offenders. Majority were of the opinion that the forest department should control erring wildlife using non-lethal methods such as barriers, deterrents and relocation.
17. Respondents at Kannur ranked wild pig as the most problematic wild animal. In the second position they cited elephant, followed by primates (rank III), Deer (sambar) and Giant squirrel, Deer (chital), Peacock, Porcupine and Guar in that order.
18. Kannur respondents were of the view that the government must launch programmes to effectively “Control the problem animals” (Ranked first). “Electric fencing” and “Wire fencing” around the farm boundaries respectively was chosen as their second and third best options. They listed the employment of “Deterrent techniques” as the fourth best option. In the fifth rank was the suggestion “Construction of rail fences”, followed by erection of “Electric fencing around park boundaries” and establishment of “Natural fences”.
19. Though affected by conflicts, the respondents of Kasaragode were not of the opinion that the forest department staff generally treats the forest fringe people as encroachers and offenders.
20. At Kasargode, the most troublesome animal was the wild boars, followed by porcupine, elephants and gaur. The preferred preventive measure suggested was “Control of problem animals by the FD”, followed by the usage of “Deterrent techniques” like erecting

electric fences or technology assisted alarm calls that will deter, but not harm the wild animals and keep them away from the farm lands and human habitations.

21. In all the districts, the respondents were also not ready to connect the long term shift in cropping patterns in the forest fringe areas as a possible trigger of the escalating conflicts.
22. In all the study areas, the respondents were largely of the view that in the event of a conflict, the Forest Department staff shows sincerity in taking remedial action.
23. Another general perception of the respondents spanning all the districts is that if the forest department takes action to upgrade the quality of the forest habitat, the conflict rates will come down.
24. Across the six districts, the respondents accused the forest department's "Plantation activities (Eg. Teak)" as having a negative influential role in increasing human-wildlife conflicts.
25. All the respondents, barring those from Kozhikode and Wayanad district were having significantly different views about human-wildlife interactions. As human-wildlife interactions are location specific as well as animal specific, this call for a continuous monitoring of the nature, frequency and intensity of conflicts in these areas which will help in designing appropriate micro-site specific mitigation measures
26. There exist significant differences in the awareness levels of the respondents of all districts vis-à-vis forest and wildlife conservation issue, except between the respondents drawn from Malappuram and Kozhikode and Kozhikode and Kannur. There is indeed a felt need for the forest department and other agencies to meaningfully intervene so as to raise the awareness levels about wildlife conservation and associated aspects through various outreach programmes. A better informed respondent population will become more willing partners in conflict mitigation and management initiatives undertaken by the government agencies.

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APPENDIX

Screening of the documentary film “Athijeevanam” produced as a part of the WGDP project



Screening at Nelliampathy on 14.3.2017



Screening at Malakkappara in 26 August 2017



Screening at Kongad KPRP HS, Palakkad



Screening at Karakurissi GVHSS, Palakkad



Screening at Karuvarakkund HSS, Malappuram



Screening at Yamania English Medium HS, Amarambalam, Malappuram



Screening at St. George HS, Chakkittappara, Kozhikode



Screening at St. Mary's HS, Maruthonkkara, Kozhikode



Screening at Munderi VHSE School, Kalpetta, Wayanad



Screening at Govt. Ashram HS, Thirunelli, Wayanad



Screening at Thalapuzha GHS, Wayanad



Screening at St. Mary's LP School, Aralam, Kannur



Screening at Govt. Chettiyamparambu UPS, Kelakam, Kannur




Information leaflets were distributed to all the school children where the film was screened

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**EXPLORATIVE STUDY AND
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HUMAN-WILDLIFE CONFLICT MANAGEMENT IN
SELECTED FOREST TRACTS
OF KERALA**

മൂവ്



വനശാസ്ത്ര കോളേജ്
കേരള കാർഷിക സർവ്വകലാശാല
തൃശ്ശൂർ

വിജ്ഞാന ലഘുലേഖ - 6

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കേരള കാർഷിക സർവ്വകലാശാല
തൃശ്ശൂർ

വിജ്ഞാന ലഘുലേഖ - 8

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കേരള കാർഷിക സർവ്വകലാശാല
തൃശ്ശൂർ

വിജ്ഞാന ലഘുലേഖ - 7

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വിജ്ഞാന ലഘുലേഖ - 6

വെസ്റ്റേൺ ഘട്ട് ഡെവലപ്മെന്റ് പ്രോഗ്രാം

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കാട്ടുപന്നികൾ



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വിജ്ഞാപന ലഘുലേഖ - 5

വെസ്റ്റേൺ ഘട്ട് ഡെവലപ്മെന്റ് പ്രോഗ്രാം

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പുളിപ്പുലികൾ



വനശാസ്ത്ര കോളേജ്
കേരള കാർഷിക സർവ്വകലാശാല
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വിജ്ഞാപന ലഘുലേഖ - 4

വെസ്റ്റേൺ ഘട്ട് ഡെവലപ്മെന്റ് പ്രോഗ്രാം

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OF KERALA

കാട്ടാനകൾ



വനശാസ്ത്ര കോളേജ്
കേരള കാർഷിക സർവ്വകലാശാല
തൃശ്ശൂർ

വിജ്ഞാപന ലഘുലേഖ - 3

വെസ്റ്റേൺ ഘട്ട് ഡെവലപ്മെന്റ് പ്രോഗ്രാം

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വന്യജീവി സംരക്ഷണ തീയന്തത്തിലെ പ്രവൃത്തികൾ



വനശാസ്ത്ര കോളേജ്
കേരള കാർഷിക സർവ്വകലാശാല
തൃശ്ശൂർ

വിജ്ഞാപന ലഘുലേഖ - 2

വെസ്റ്റേൺ ഘട്ട് ഡെവലപ്മെന്റ് പ്രോഗ്രാം

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വേട്ടയാടൽ നിയമവശങ്ങൾ

വിജ്ഞാപന ലഘുലേഖ - 1



വനശാസ്ത്ര കോളേജ്
കേരള കാർഷിക സർവ്വകലാശാല
തൃശ്ശൂർ

വെസ്റ്റേൺ ഘട്ട് ഡെവലപ്മെന്റ് പ്രോഗ്രാം

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മുളുളൻപന്തി



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കേരള കാർഷിക സർവ്വകലാശാല
തൃശ്ശൂർ

വിജ്ഞാപന ലഘുലേഖ - 10

DOCUMENTARY

FILM SCRIPT

വനങ്ങളും വന്യ ജീവികളും, മനുഷ്യനെ സംബന്ധിച്ചിടത്തോളം എന്നും കൗതുകമുണ്ടാർത്തുന്നതാണ്. വനങ്ങളുടെ നിശ്ശബ്ദതയും നിഗൂഢതയും, കുളിർമയും ഒക്കെ ഇഷ്ടപ്പെടാത്തവർ ആരുമുണ്ടാവില്ല. വന്യമൃഗങ്ങളെ കടം ആസ്വദിക്കുന്നതിന് വേണ്ടി മാത്രമായി വനയാത്രകൾ നടത്തുന്ന മനുഷ്യരും ധാരാളമാണ്. എന്നാൽ, കാടിനോടും കാട്ടുമൃഗങ്ങളോടും മനുഷ്യർ കാട്ടുന്ന ഈ ഇഷ്ടം ആത്മാർത്ഥമാണോ! പലപ്പോഴും, അല്ല, എന്നു പറയേണ്ടി വരും. മിക്ക സഞ്ചാരികളുടെയും വനയാത്രകളുടെ ലക്ഷ്യം കേവലം വിനോദം മാത്രമാണ്. വനങ്ങളെയും വന്യജീവികളെയും ഹൃദയം കൊണ്ട് സ്നേഹിക്കുന്ന അവ എത്രത്തോളം വിലപ്പെട്ടവയാണെന്ന് മനസ്സിലാക്കുന്ന മനുഷ്യർ നന്നേ കുറവാണ് എന്നു പറയേണ്ടി വരും. അതിനുള്ള ഏറ്റവും വലിയ തെളിവാണ്, മനുഷ്യവാസമേഖലകളിലേക്ക് ഇറങ്ങിവരുന്ന വന്യമൃഗങ്ങൾക്കു നേരെയുള്ള മനുഷ്യന്റെ പ്രതിഷേധവും അക്രമണവും, ഈ സാധ്യ മൃഗങ്ങൾ എന്തുകൊണ്ടാണ് കാടിറങ്ങേണ്ടി വരുന്നു എന്നതിന്റെ വസ്തുതയെക്കുറിച്ച് നാം ചിന്തിക്കുന്നതേയില്ല. വനമേഖലയിൽ ജീവിതത്തിൽ അവർ തൃപ്തരാവാത്തതെന്തുകൊണ്ട്? അതിനൊക്കെ സാധിക്കണമെങ്കിൽ, സ്വാർത്ഥതയുടെ പുറംതോടിനു വെളിയിൽ വന്ന് നമ്മുടെ ചുറ്റുപാടുകളെക്കുറിച്ച് അറിയണം. ഈ പ്രകൃതിയുടെ ആത്മാവിനെ കൈമാറ്റം.

ഈ മഹാപ്രപഞ്ചത്തിന്റെ ഏതോ ഒരു കോണിൽ ഒരു മൺതരി എന്നു തോന്നിക്കാൻ പോന്നതു മാത്രമാണ് നമ്മുടെ കൊച്ചു ഗ്രഹമായ ഭൂമി. മനുഷ്യന്റെ പരിമിതമായ അറിവിൽ, ലഭ്യമായ കണക്കുകൾ പ്രകാരം, ഏതാണ്ട് 454 കോടി വർഷങ്ങളാണ് ഭൂമിയുടെ പ്രായം. അതിനു ശേഷം, കഴിഞ്ഞ നൂറുകോടി വർഷങ്ങൾക്കിപ്പുറം, ഭൂമിയുടെ പ്രതലത്തിൽ ആദ്യ ജീവൻ പ്രത്യക്ഷപ്പെടുന്നതിനു കാലം സാക്ഷിയായി.

അതിസൂക്ഷ്മമായ ഒരു ഏകകോശ ജീവിയായി ഭൂമിയിൽ തുടിച്ചു തുടങ്ങിയ ജീവൻ കോടിക്കണക്കിനു വർഷങ്ങളിലെ പരിണാമ ദശകളിലൂടെ സഞ്ചരിച്ച്, വിവിധ രൂപങ്ങളിലേക്ക് വളർന്ന് വികസിപ്പിച്ച് ഭൂമിയെ സമ്പന്നമാക്കുന്നതും കാലം കഴിഞ്ഞു. ഇത് ഭൂമിയുടെ അന്തരീക്ഷത്തിലും ഘടനയിലും വലിയ മാറ്റങ്ങൾക്ക് കാരണമായിത്തീർന്നു. ഇങ്ങനെയുള്ള മാറ്റങ്ങളിൽ സുപ്രധാന പങ്കു വഹിച്ചത് ഓക്സിജൻ ഉപയോഗിച്ചു ജീവിക്കുന്ന

ജീവികൾ, അഥവാ എയറോബിക് ജീവികളാണ്. എയറോബിക് ജീവി വർഗ്ഗത്തിൽ ഏറ്റവും നിർണ്ണായക സ്ഥാനം വഹിക്കുന്നത്, ചെറു സസ്യങ്ങൾ മുതൽ വൻ വൃക്ഷങ്ങൾ വരെ തിങ്ങി പാർക്കുന്ന വനമേഖലകളും അവയിൽ ജീവിക്കുന്ന വന്യ മൃഗങ്ങളുമാണ്.

എന്നാൽ, ജീവന്റെ പരിണാമഘട്ടങ്ങളിൽ ഏറ്റവും അവസാനം ഭൂമിയിലെത്തിയ ജീവി വർഗങ്ങളിൽ ഒന്നാണ് മനുഷ്യൻ. ജീവി വർഗ്ഗങ്ങളുടെ സ്വർഗ്ഗമായ ഭൂമിക്ക് ഭൂമിയിൽതന്നെ ഒരു സംരക്ഷകൻ വേണമെന്നുള്ളതുകൊണ്ടാവാം ഇത്രയും വികാസം പ്രാപിച്ച ഒരു മസ്തിഷ്കത്തോടു കൂടി പ്രകൃതി മനുഷ്യനെ സൃഷ്ടിച്ചത്. എന്നാൽ മനുഷ്യന്റെ ആ ബുദ്ധി, ഭൂമിയെ പരിപാലിക്കുന്നതിനു പകരം കടന്നാക്രമിക്കുന്നതിനാണ് ശ്രമിച്ചത്. ഒടുവിൽ, അഹങ്കാരിയും അത്യാഗ്രഹിയുമായി മാറിയ മനുഷ്യൻ, അവന്റെ സ്വാർത്ഥ താല്പര്യങ്ങൾക്കായി ഭൂമിയിലെ ആവാസ വ്യവസ്ഥകൾ ഓരോന്നായി നശിപ്പിക്കുന്ന വേദനാജനകമായ കാഴ്ചകൾ പ്രകൃതി തേങ്ങുന്നതിനും കാലം സാക്ഷിയാകുന്നു.

ജീവയോഗ്യമായ ഗ്രഹമായി ഭൂമിയെ മാറ്റുന്നതിൽ, ചെറിയ പുൽക്കൊടിക്കു മുതൽ വൻ വൃക്ഷങ്ങൾക്കു വരെയുള്ള പ്രാധാന്യം വളരെ നിർണ്ണായകമാണ്. ഭൂമിയുടെ ശ്വാസകോശമാണ് വനങ്ങൾ. അന്തരീക്ഷ ഊഷ്മാവിന്റെ സന്തുലിതാവസ്ഥക്ക് കാരണം വൃക്ഷങ്ങളും സസ്യങ്ങളുമാണ്. നേരിട്ടുള്ള സൂര്യതാപത്തിൽ നിന്നും ഭൂമിയുടെ ഉപരിതലത്തെ സംരക്ഷിക്കുന്നതും വൃക്ഷങ്ങളാണ്. ഇതേ വൃക്ഷങ്ങളുടെ തന്നെ വേരുകൾ മണ്ണിലേക്ക് ആഴ്ന്നിറങ്ങുന്നതിനാലാണ് മണ്ണൊലിപ്പ് തടയപ്പെടുന്നതും, മഴവെള്ളം മണ്ണിലേക്ക് സുഗമമായി ഇറങ്ങി ചെല്ലാൻ ഇടയാക്കുന്നതും, വൃക്ഷങ്ങൾ പൊഴിക്കുന്ന ഇലകൾ അഴുകി മണ്ണിനോട് ചേരുന്നത് മണ്ണിന്റെ കാഠിന്യം കുറയുന്നതിന് ഇടയാക്കുകയും, ഇത് കൃഷിയെ സഹായിക്കുകയും ചെയ്യുന്നു. പുല്ലുകൾ നിറഞ്ഞ മൊട്ടക്കുന്നുകൾ ഭൂമിയിലെ സ്വാഭാവിക ജലസംഭരണികളാണ്. ഇവക്കെല്ലാം പുറമെയാണ് പല മൃഗങ്ങളുടെയും മനുഷ്യന്റെയും നേരിട്ടുള്ള ഭക്ഷണമായി സസ്യങ്ങൾ മാറുന്നത്. അതുകൊണ്ടാണെന്നു തന്നെ, കരയിൽ ജീവിക്കുന്ന ഏതൊരു ജീവിയും വൃക്ഷസസ്യലതാദികളോടും അവ നല്കുന്ന സൗഭാഗ്യങ്ങളോടും കടപ്പെട്ടിരിക്കുന്നു എന്ന് നിസ്സംശയം പറയാം.

സമൂഹ ജീവിയായ മനുഷ്യൻ കൃഷിക്കും താമസത്തിനും വേണ്ടിയാണ് കാടുകൾ വെട്ടിത്തെളിച്ചു തുടങ്ങിയത്. എന്നാൽ കാലം കടന്നുപോകെ മനുഷ്യന്റെ ആരാധനയും

അഭിനിവേശവും എല്ലാം പണത്തിനോടായി പണം സമ്പാദിക്കുവാനായി വനസമ്പത്ത് കൊള്ളയടിക്കുവാൻ അവൻ ഒട്ടും മടി കാണിച്ചില്ല. തടിക്കുവേ 1 വൃക്ഷങ്ങൾ മുറിച്ചു മാറ്റി. പല്ലിനും നഖത്തിനും, തോലിനും മാംസത്തിനുമായി മൃഗങ്ങളെയും പക്ഷികളെയും കൊന്നൊടുക്കി. ഭൂമിക്കുവേ 1 കാട് ചുട്ടുകരിച്ചു. എല്ലാം പണത്തിനു വേ 1 കച്ചവടമാക്കി.

മനുഷ്യന്റെ പണക്കൊതി, ഭൂമിയുടെ മറ്റ് സമ്പത്തുകളെയും വേട്ടയാടിക്കൊ 1രുന്നു. അടിത്തട്ടിലെ മണൽ ഊറ്റിയെടുത്ത് പല നദികളെയും അവൻ മരണത്തിലേക്ക് തള്ളി വിട്ടു. കുന്നുകളും കരിമ്പാറക്കെട്ടുകളും ഇടിച്ചു നിരപ്പാക്കി. എത്തിപ്പെടാവുന്നിടത്തെല്ലാം കോൺക്രീറ്റ് കെട്ടിടങ്ങൾ കെട്ടി ഉയർത്തി. പട്ടണങ്ങളുടെ വിസ്തൃതി ഏറുന്ന തനുസരിച്ച് മരങ്ങൾക്കിടമില്ലാതായി. പാടങ്ങളും കുളങ്ങളും നികത്തി, പകരം കോൺക്രീറ്റ് മാളികകൾ പണിതുയർത്തുന്നു. വർദ്ധിച്ചു വരുന്ന വാഹനങ്ങളും വ്യവസായ ശാലകളും പുറം തള്ളുന്ന പുക അന്തരീക്ഷത്തെ വിഷമയമാക്കുന്നു. ഭൂമിയുടെ സംരക്ഷണ കവചമായി വർത്തിക്കുന്ന ഓസോൺ പാളി അപകടാവസ്ഥയിലായിരിക്കുന്നു. കാർബൺഡൈഓക്സൈഡ്, മീഥേൻ, നൈട്രസ് ഓക്സൈഡ് തുടങ്ങിയ ഹരിതവാതകങ്ങളുടെ അന്തരീക്ഷത്തിലുള്ള അളവ് വർദ്ധിക്കുന്നു. ആഗോള താപനം ഭൂമിയിലെ ആവാസവ്യവസ്ഥകൾക്കൊക്കെ വെല്ലുവിളിയാകുന്നു. ഈ അവസരത്തിലാണ്, കാർബൺഡൈഓക്സൈഡ് സ്വീകരിച്ച് പകരം ഓക്സിജൻ മടക്കി നൽകുകയും ചൂടിനെ പ്രതിരോധിക്കുകയും ചെയ്യുന്ന നമ്മൾ തന്നെ വെട്ടി നശിപ്പിച്ച വനങ്ങളെ കുറിച്ച് ഓർത്തു പോകുന്നു.

ആഗോളതാപനത്തിന്റെ വെല്ലുവിളി ഭൂമിയിലെ താപനില കൂടിക്കൊ 1രിക്കുന്നു എന്നതാണ്. കാലാവസ്ഥാവ്യതിയാനമാണ് മറ്റൊരു വിപത്ത്. ദൈർഘ്യമേറുന്ന വേനലുകളും കാലം തെറ്റിയുള്ള മഴയും ജീവിതം ദുസ്സഹമാക്കിയിരിക്കുന്നു. മരങ്ങൾ നശിച്ചതും മണ്ണിടിച്ചിലും കാരണം ചിലയിടങ്ങളിൽ വെള്ളപ്പൊക്കം, ഉരുൾപൊട്ടൽ തുടങ്ങിയ ദുരിതങ്ങൾ ഉ വാവുമ്പോൾ, മറ്റിടങ്ങളിൽ മഴവള്ളം മണ്ണിൽ ശേഖരിക്കപ്പെടാത്ത അവസ്ഥയാണ്. ഇത് വേനലിൽ കടുത്ത പ്രതിസന്ധിയാകുന്നു. ജലദൗർലഭ്യവും വരൾച്ചയും കൃഷി നാശമു വാക്കുന്നു. ഇത്തരം കാലാവസ്ഥ മാറ്റങ്ങൾ കൃഷിയെ സാരമായി ബാധിക്കുമ്പോൾ, അതിനെ ചെറുത്തുകൊ വിളകളെ പാകപ്പെടുത്താനായി ഉപയോഗിക്കുന്ന രാസവസ്തുക്കളും, കീടനാശിനികളും, മണ്ണിനെയും പ്രകൃതിയെയും, പക്ഷികളെയും, ചെറു ജീവികളെയും, എന്തിന് മനുഷ്യനെത്തന്നെ ദോഷകരമായി ബാധിക്കുന്നു. പരമ്പ

രാഗത കർഷകരും, പ്രകൃതിയോട് ചേർന്ന് ജീവിക്കുന്ന വനവാസികളുമാണ് പ്രകൃതിയുടെ ഇത്തരം മാറ്റങ്ങളിൽ ഏറ്റവും ദുരിതമനുഭവിക്കുന്നത്.

മനുഷ്യൻ പതറിപ്പോകുന്ന ഈ മാറുന്ന കാലാവസ്ഥകളിൽ, മിവാപ്രാണികളായ മൃഗങ്ങളുടെ അവസ്ഥ നമുക്ക് ഊഹിക്കാവുന്നതേ ഉള്ളൂ. അന്തരീക്ഷ ഊഷ്മാവിലുള്ള വർദ്ധനവ്, മരങ്ങൾ കുറഞ്ഞുകൊണ്ടിരിക്കുന്ന കാടുകളിലും അനുഭവവേദ്യമാകുന്നു. താരതമ്യേന തണുത്ത കാലാവസ്ഥ ഇഷ്ടപ്പെടുന്ന വന്യജീവികൾക്ക്, വർദ്ധിക്കുന്ന ചൂട് അസഹനീയമാണ്.

വർഷകാലങ്ങളിൽ പോലും വനമേഖലകളിൽ ലഭിക്കുന്ന മഴയുടെ അളവ് നാശിക്കുവാൻ കുറഞ്ഞു വരികയാണ്. ഇത് വേനലിലെ കൂടുതൽ കടുത്തതാക്കുന്നു. മണ്ണിനെ ജലാംശമുള്ളതാക്കി നിർത്താൻ മരങ്ങൾ കുറയുകകൂടി ചെയ്യുമ്പോൾ, വേനലിൽ, വനങ്ങളിലെ മണ്ണ് വേഗത്തിൽ ഉണങ്ങുന്നു. കടുത്ത ചൂടിൽ, പുൽമേടുകളിലെ പച്ചപ്പുല്ലുകൾ കരിഞ്ഞുണങ്ങുന്നതിനാൽ അടുത്തടുത്തുള്ള നദികളിൽ ജലനിരപ്പ് കുറയുന്നു. വേനലിലെ കാട്ടുതീയും മണ്ണിന്റെ ഘടനയെ സാരമായി ബാധിക്കുകയും ജലക്ഷാമം ഉണ്ടാക്കുകയും ചെയ്യുന്നു. ആവശ്യത്തിന് പച്ചപ്പുല്ലു ലഭിക്കാത്തത് മാനുകൾ, വരയാടുകൾ തുടങ്ങിയവയെ പട്ടിണിയിലാക്കും. സസ്യഭുക്കുകളുടെ നാശം മാംസഭുക്കായിട്ടുള്ള മൃഗങ്ങളെയും ബാധിക്കുന്നു. നദികളിലെ വിസ്തൃതി കുറഞ്ഞ വെള്ളക്കെട്ടുകളിൽ പലപ്പോഴും ഇരപിടിയന്മാരായ മുതലകളും, ചീങ്കണ്ണികളും മറ്റുമുണ്ടാവുമെന്ന് കരയിലെ മൃഗങ്ങൾ നേരിടുന്ന മറ്റൊരു വെല്ലുവിളിയാണ്.

വേനലിൽ വിശന്നു വലയുന്ന സാധു മൃഗങ്ങളെ കൂടുകൂണുന്ന മറ്റൊരു അപകടമാണ്. മനുഷ്യൻ ഉപേക്ഷിക്കുന്ന പ്ലാസ്റ്റിക് മാലിന്യം, കുരങ്ങുകൾ, മാനുകൾ, കരടികൾ തുടങ്ങി കാട്ടുപോത്തുകളും ആനകളും വരെ പ്ലാസ്റ്റിക് മാലിന്യം ശരീരത്തിനുള്ളിൽ ചെന്ന് ജീവൻ നഷ്ടപ്പെടുന്നവയിൽ പെടുന്നു. കാട്ടുതീയിൽപെട്ടു കത്തുന്ന പ്ലാസ്റ്റിക് മാലിന്യങ്ങൾ ഉണ്ടാക്കുന്ന വിഷപ്പുകയും മൃഗങ്ങൾക്ക് ദോഷകരമാണ്.

ആന, പുലി, കാടടുപോത്ത്, മാൻ തുടങ്ങിയ മൃഗങ്ങൾ വെള്ളവും ഭക്ഷണവും തേടി കിലോമീറ്ററുകളോളം നടക്കാൻ കഴിവുള്ളവയാണ്. വിശന്ന് വലഞ്ഞ് മനുഷ്യവാസമുള്ള ഇടങ്ങളിലെത്തുന്ന മനുഷ്യർക്കെതിരെ അവ അക്രമാസക്തരാകുന്നു. തുരത്താനെ

ത്തുന്ന മനുഷ്യർക്കെതിരെ അവ അക്രമാസക്തരാകുന്നു. എല്ലാത്തിനും കാരണം വിശപ്പുതന്നെ.

ആന പുലി, കാട്ടുപോത്ത്, മാൻ തുടങ്ങിയവയാണ് മനുഷ്യവാസകേന്ദ്രങ്ങളിലിറങ്ങി നാശനഷ്ടങ്ങളു ള്കുന്ന മൃഗങ്ങളിൽ പ്രധാനികൾ. ഈ മൃഗങ്ങൾ വെള്ളവും ഭക്ഷണവും തേടി കിലോമീറ്ററുകളോളം സഞ്ചരിക്കാൻ കഴിവുള്ളവയാണ് എന്നതാണ് ഇതിനു കാരണം. കുരങ്ങ്, കാട്ടുപൂച്ച, പെരുമ്പാമ്പ്, മയിൽ തുടങ്ങിയവയും നാട്ടിലിറങ്ങുന്ന മറ്റു മൃഗങ്ങളാണ്. സ്വാർത്ഥമതികളായ മനുഷ്യർ ആലോചനയില്ലാതെ വനഭൂമികൾ കയ്യേറി കൃഷിക്കും മറ്റുമായി ഉപയോഗിക്കുന്നു. വന്യമൃഗങ്ങളുടെ ആവാസവ്യവസ്ഥയെ ബാധിക്കുന്നു. പെരുകി വരുന്ന മൃഗങ്ങൾക്ക് മതിവരാത്ത തരത്തിലേക്ക് കാട് ചുരുങ്ങുന്നു. ഈ കാരണങ്ങളും മൃഗങ്ങൾ നാട്ടിലേക്കിറങ്ങുന്നതിന് കാരണമാകുന്നു. കാലാവസ്ഥാ വ്യതിയാനം, കൃഷിനാശം, വിലയിടിവ് എന്നിവ മൂലം കഷ്ടപ്പെടുന്ന കർഷകർക്ക് മൃഗങ്ങളുടെ നാട്ടിലേക്കുള്ള ഈ വരവ് പ്രകോപനമു ള്കുന്നു.

വിശന്നു വലഞ്ഞു നാട്ടിലെത്തുന്ന മൃഗങ്ങൾ കൃഷിയിടങ്ങൾ നശിപ്പിക്കുന്നതിനും വളർത്തു മൃഗങ്ങളെ കൊല്ലുന്നതിനും ഇടയാവുന്നു. തുരത്താനെത്തുന്ന മനുഷ്യർക്കെതിരെ അവ അക്രമാസക്തരാകുന്നു. എല്ലാത്തിന്റെയും മൂലകാരണം വിശപ്പുതന്നെ. മൃഗങ്ങളും മനുഷ്യരും തമ്മിലുള്ള ഈ ഏറ്റുമുട്ടലിൽ, കൂടുതൽ ദുരിതം നേരിടുന്നത് മൃഗങ്ങൾക്കാണെന്നാണ് ദേശീയ തലത്തിലെ കണക്കുകൾ സൂചിപ്പിക്കുന്നത്. ദേശീയ ശരാശരിയുമായി തട്ടിച്ചു നോക്കുമ്പോൾ വന്യമൃഗങ്ങളു ള്കുന്ന നാശനഷ്ടങ്ങൾ കേരളത്തിൽ കുറവാണ്. കേരളത്തിൽ വന്യമൃഗങ്ങളുടെ അക്രമണം ഏറ്റവും കൂടുതൽ അനുഭവപ്പെടുന്ന ജില്ലയാണ് വയനാട്. കേരളം, തമിഴ്നാട്, കർണാടകം, എന്നീ മൂന്ന് സംസ്ഥാനങ്ങളുടെ വനാതിർത്തികൾ കൂടിച്ചേരുന്നു എന്ന ഭൂമിശാസ്ത്രപരമായ പ്രത്യേകതകളാണ് ഇതിനു കാരണം. വൈവിധ്യങ്ങൾ നിറഞ്ഞ വിവിധ വനങ്ങളുടെയും വന്യജീവി സങ്കേതങ്ങളുടെയും ആനത്താരകളുടെയും ഒത്തുചേരലും ഇവിടെയാണ്. 2008 മുതൽ ആനകളുടെ അതിക്രമം ഏറ്റവും കൂടുതൽ അനുഭവപ്പെടുന്നത് കാസർകോഡ് ജില്ലയിലാണ്. കർണാടകത്തിന്റെ ഭാഗത്തുനിന്നും വേലി കെട്ടുന്നതുൾപ്പെടെയുള്ള പ്രവർത്തനങ്ങൾ ആനകളുടെ സ്വതന്ത്ര സഞ്ചാരത്തെ ബാധിച്ചപ്പോഴാണ് ആനകൾ നാട്ടിലേക്കിറങ്ങാനാരംഭിച്ചത്. വേനൽക്കാലത്താണ് ഇത് ഏറ്റവും രൂക്ഷമാവുന്നത്.

കൃഷി നാശം ഉണ്ടാക്കുന്ന മറ്റൊരു മൃഗം കാട്ടുപന്നിയാണ്. മാംസാവശിഷ്ടങ്ങൾ കാടിനോട് ചേർത്ത് ഉപേക്ഷിക്കുന്നതാണ്. പന്നികളെ കാടിനു പുറത്തേക്ക് ആകർഷിക്കുന്ന ഒരു പ്രധാന ഘടകം സാരികളും, മറ്റു നീളമുള്ള വസ്ത്രങ്ങളുപയോഗിച്ചുള്ള വേലികളാണ് പന്നിക്കെതിരെ ഏറ്റവും ഫലപ്രദമായി കാണുന്നത്.

അതുപോലെതന്നെ ശല്യക്കാരാകുന്ന മറ്റൊരു വിഭാഗമാണ് കുരങ്ങുകൾ. വലിച്ചെറിയപ്പെടുന്ന ഭക്ഷണാവശിഷ്ടങ്ങളും മറ്റുമാണ് ഇവയെയും ആകർഷിക്കുന്നത്, നാട്ടിലേക്കിറങ്ങുന്ന ചെറു ജീവികളിൽ പ്രധാനികളാണ് മയിലുകൾ. ഭക്ഷണമാണ് ഇവയുടെയും ആവശ്യമെങ്കിലും കാടിനുള്ളിൽ നേരിടേണ്ടി വരുന്ന വേട്ടക്കാരുടെ ആക്രമണവും ഒരു കാരണമാണ്.

മനുഷ്യനെ ആക്രമിക്കുന്ന പ്രധാന വന്യമൃഗം പുലിയാണ്. മനുഷ്യവാസമേഖലകളിലെ പുലിയുടെ ആക്രമണം, പ്രത്യേകിച്ച് മധ്യകേരളത്തിൽ വർദ്ധിച്ചു വരികയാണെന്നാണ് കണക്കുകൾ സൂചിപ്പിക്കുന്നത്. കാട്ടിലെ സ്വാഭാവിക ഇരകുടെ കുറവും ആവാസവ്യവസ്ഥയുടെ മാറ്റങ്ങളും ജനവാസ കേന്ദ്രങ്ങളുടെ രൂപാന്തരവുമെല്ലാം പുലികളെ നാട്ടിലേക്കിറങ്ങാൻ പ്രേരിപ്പിക്കുന്നു. വനത്തിനോട് ചേർന്ന് കാലികളെ മേയ്ക്കുന്നതാണ് മറ്റൊരു കാരണം. കുട്ടികളെയും, വളർത്തു നായ്ക്കളെയുമാണ് പ്രധാനമായും പുലി ആക്രമിക്കുന്നത്. പിടിക്കുന്ന ഇരയെ കാടിനുള്ളിലേക്ക് വലിച്ചുകൊണ്ടുപോകുകയും പൂർണ്ണമായും ആഹാരമാക്കുകയും ചെയ്യുന്നതിനാൽ ആ ആക്രമണത്തിന്റെ തെളിവുകൾ കാര്യമായി അവശേഷിക്കാറില്ല. അതിനാൽ സർക്കാരിൽ നിന്നും നഷ്ടപരിഹാരം വാങ്ങാനുള്ള സാധ്യതയും കർഷകർക്കു ലഭിക്കുന്നില്ല. ഇതൊക്കെ മനുഷ്യരിൽ മൃഗങ്ങളോടുള്ള ശത്രുത വർദ്ധിപ്പിക്കാൻ കാരണമാക്കുന്നു. കേരളത്തിന്റെയും തമിഴ്നാടിന്റെയും അതിർത്തി പ്രദേശങ്ങളായ മലപ്പുറം, പാൽപ്പാറ തുടങ്ങിയ ഇടങ്ങളിലാണ് പുലിയുടെ ആക്രമണം ഏറ്റവും അധികമായിട്ടുള്ളത്.

പെരുമ്പാമ്പുകളും മറ്റ് ഇഴജന്തുക്കളും നാട്ടിലിറങ്ങുന്നതിന്, കാട്ടിലെ വർദ്ധിക്കുന്ന ചൂടും ഒരു പ്രധാന കാരണമാണ്. നെല്ല്, കപ്പ, കരിമ്പ്, ഇഞ്ചി, കൈതച്ചക്ക, വാഴ, പച്ചക്കറികൾ തുടങ്ങിയവയാണ് കാട്ടുമൃഗങ്ങൾ മൂലം നാശം നേരിടുന്ന പ്രധാന വിളകൾ. വിളകൾ നശിപ്പിക്കുന്നത് കൂടാതെ വളർത്തു മൃഗങ്ങളെയും ഇവ ഭക്ഷണമാക്കുന്നു. പശു, ആട്, കോഴി, പട്ടി തുടങ്ങിയ വളർത്തു മൃഗങ്ങൾ ധാരാളമായാണ് വന്യമൃഗങ്ങളാൽ കൊല്ലപ്പെടുന്നത്.

ടുന്നത്. ഇതു കൂടാതെ പലപ്പോഴും മനുഷ്യർക്കും പരിക്കുകൾ ഏൽക്കുകയും ജീവൻ
പരെ നഷ്ടപ്പെടുകയും ചെയ്യുന്നു .

ഇത്തരം ആക്രമണങ്ങളിൽ അസ്വസ്ഥരാകുന്ന മനുഷ്യർ, വൈരാഗ്യബുദ്ധിയോടെ മൃഗ
ങ്ങൾക്കെതിരെ തിരിയുന്ന കാഴ്ചകൾ ഇന്ന് ധാരാളമായി കൂടുവരുന്നു. പലയിടങ്ങ
ളിലും വന്യമൃഗങ്ങളെ കൂട്ടിക്കൊൻ വേ 1 വിഷം വെക്കുക, കിടങ്ങുകൾ കുഴിക്കുക,
പലതരം കെണികളും കുടുക്കുകളും ഒരുക്കുക തുടങ്ങിയ കാര്യങ്ങൾ മനുഷ്യൻ
ചെയ്യുന്നു. 2012 നും 2015 നു ഇടയിലായി നാട്ടിലിറങ്ങി പിടിലായ എട്ടോളം പുലികളിൽ
ഒരേണ്ണം കൊല്ലപ്പെടുകയും ചെയ്തിട്ടു .

കാടുവിട്ട് നാട്ടിലെത്തുന്ന മൃഗങ്ങളെ ഉപദ്രവിക്കുന്നതിനു പകരം മൃഗങ്ങൾ നാട്ടിലേക്കിറ
ങ്ങുന്നതിനെയോ, തന്മൂലമുള്ള നാശനഷ്ടങ്ങളെയോ എങ്ങിനെ പ്രതിരോധിക്കാം എന്നു
ചിന്തിക്കുകയാണ് വേ ത്. അതിരുകളിൽ കൽമതിലുകളും, കിടങ്ങുകളും,
സൗരോർജ്ജം വൈദ്യുത ലൈനുകൾ സ്ഥാപിച്ചും, വേലികൾ തീർത്തും, ചുവന്ന പ്രകാ
ശമുള്ള ലൈറ്റുകളും, സൈറണുകളും സ്ഥാപിച്ചും ഒരു പരിധി വരെ നമുക്ക് മൃഗങ്ങളെ
പ്രതിരോധിക്കാൻ സാധിക്കും. എന്നാൽ ഇതിനെല്ലാമുപരിയായി നാം ചിന്തിക്കേ മറ്റൊ
ന്നു . മനുഷ്യരുടെ ദുഷ്പ്പവൃത്തികളുടെ ഫലമാണ് മൃഗങ്ങൾ കാടുവിട്ടിറങ്ങേ 1 വരു
ന്നത് എന്ന സത്യം. വികസന പ്രവർത്തനങ്ങൾക്കും കൃഷിക്കുമായി മനുഷ്യൻ അശാ
സ്ത്രീയമായി കാടു കൈയ്യേറുന്നത് മൃഗങ്ങളുടെ ആവാസവ്യവസ്ഥയെ തകിടം മറിക്കു
ന്നു. വീ ുവിചാരമാല്ലാത്തുള്ള മനുഷ്യന്റെ ഇടപെടലുകളാണ് കാലാവസ്ഥയെ തന്നെ
പ്രതികൂലമാക്കിയതും കാട്ടിലെ അന്തരീക്ഷം മൃഗങ്ങൾക്ക് വാസയോഗ്യമല്ലാതാക്കിയ
തും. ഭൂമിയും ഭൂമിയിലെ മറ്റ് ജീവജാലങ്ങളുമെല്ലാം മനുഷ്യനു വേ 1 ഉള്ളതാണെ
ന്നുള്ള സ്വാർത്ഥ ചിന്ത മനുഷ്യൻ വെടിയണം. മറ്റു ജീവജാലങ്ങൾ കൂടിയുെ കിലേ
മനുഷ്യനു നിലനില്പുള്ളു എന്ന വസ്തുത ഉൾക്കൊള്ളണം. നമ്മൾ കാരണം ദുരിതമനു
ഭവിക്കുന്ന മൃഗങ്ങളെ, നമ്മുടെ ലാഭത്തിനായി വീ ും ഉപദ്രവിക്കുന്നതിനു പകരം,
കാടിനെ അവർക്ക് വാസയോഗ്യമാക്കി മാറ്റുകയാണ് വേ ത്.

വനത്തിനോട് ഇണങ്ങുന്ന കൃഷിയും കൃഷിരീതികളും അവലബിക്കുന്നത്, മൃഗങ്ങളുടെ
ആക്രമണം കുറയ്ക്കും എന്ന് പഠനങ്ങൾ തെളിയിക്കുന്നു. അനധികൃത മദ്യവാറ്റ്,
കഞ്ചാവ് കൃഷി, മൃഗവേട്ട തുടങ്ങിയവയ്ക്ക് കാട് കൈയ്യേറാതിരിക്കുന്നതും ഗുണം
ചെയ്യും. കച്ചവട താല്പര്യത്തോടെ വരുന്നവർക്കു പകരം, പ്രകൃതിയെ മനസ്സിലാക്കു

നവരായിരിക്കണം വനാതിർത്തികളിൽ കൃഷി ചെയ്യേ ത്. വനങ്ങൾ മൃഗങ്ങൾക്കു വിഹരിക്കാനുള്ളവയാണെന്നുള്ള സത്യം ഉൾക്കൊള്ളാൻ സാധിക്കുന്നവരായിരിക്കണം കർഷകൻ. മൃഗങ്ങൾ വരുത്തുന്ന ചെറിയ നഷ്ടം പോലും സഹിക്കാൻ കഴിയാത്ത കച്ചവട മനസ്ഥിതിക്കാരെ ഇത്തരം പ്രദേശങ്ങളിൽ നിന്നും ഒഴിവാക്കേ താണ്.

2016 അഭിമുഖീകരിക്കാൻ പോകുന്നത്, ഇന്നേവരെയു ായിട്ടുള്ളതിൽ ഏറ്റവും വലിയ വേനലായിരിക്കും എന്നാണ് പഠനങ്ങൾ പറയുന്നത്. ഈ അവസരത്തിൽ കാട്ടുതീയും ജലക്ഷാമവും മൃഗങ്ങളെ ഏറെ വലയ്ക്കാം. വനങ്ങളിലെ സ്വാഭാവിക താപനില 13 മുതൽ 29 ഡിഗ്രി സെൽഷ്യസാണെങ്കിൽ ഈ വർഷം അത് 31 ൽ എത്തിക്കഴിഞ്ഞു. ഈ അവസരത്തിൽ വനങ്ങളിൽ കൃത്രിമ ജലസംഭരണികൾ തീർത്തും, ജലാശയങ്ങളിൽ തടയണകൾ തീർത്തും ഒരു പരിധി വരെ നമുക്ക് മൃഗങ്ങൾക്കൊരു ആശ്വാസമാവാൻ കഴിയേ താണ്. മനുഷ്യനു ചെയ്യാൻ സാധിക്കുന്ന മറ്റൊരു ഗുണകരമായ കാര്യം വനവൽക്കരണമാണ്. നഗരങ്ങളെന്നോ, ഗ്രാമങ്ങളെന്നോ വ്യത്യാസമില്ലാതെ മരങ്ങൾ വെച്ചു പിടിപ്പിക്കുന്നത് ആഗോള താപനം മൂലമുള്ള പ്രത്യാഘാതങ്ങൾ കുറയ്ക്കുകയും, ഇതു മൂലം വനങ്ങളിലേതുൾപ്പെടെയുള്ള കാലാവസ്ഥാ വ്യതിയാനത്തിന് ഒരളവുവരെ സമാശ്വാസം പകരാനും സാധിക്കുമെന്ന് നമുക്ക് പ്രത്യാശിക്കാം.

ഭൂമിയിൽ കരയിലും, ജലത്തിലും ആകാശത്തിലുമായി ലക്ഷക്കണക്കിനു ജീവിവർഗ്ഗങ്ങളാണുള്ളത്. അവയിൽ മിക്ക ജീവി വർഗ്ഗവും, തങ്ങളുടെ ആവാസവ്യവസ്ഥയിലെ മറ്റു ജീവജാലങ്ങളുടെ നിലനിൽപ്പിന് അറിഞ്ഞോ അറിയാതെയോ, പ്രത്യക്ഷമായോ, പരോക്ഷമായോ സഹായിക്കുന്നു . എന്നാൽ മനുഷ്യവർഗ്ഗമോ? ഗുണമൊന്നും തന്നെ ചെയ്യുന്നില്ല എന്നു മാത്രമല്ല, ഭൂമിക്കു തന്നെ ദോഷകരമായി മാറിയിരിക്കുന്നു. ശ്രേഷ്ഠനെന്നു സ്വയം വിശ്വസിക്കുകയും അഹങ്കരിക്കുകയും ചെയ്യുന്ന മനുഷ്യൻ, ഈ ഭൂമുവെത്തു നിന്നും പാടേ അപ്രത്യക്ഷമായാൽ പോലും ഇവിടെ ഒരു ദോഷവും സംഭവിക്കില്ല, മറിച്ച് ഗുണങ്ങൾ പലതും സംഭവിക്കുകയും ചെയ്യും എന്ന സത്യം നമ്മെ ലജ്ജിപ്പിക്കുന്നതാണ്. അതെ, ഇന്ന് ഭൂമി നേരിടുന്ന ഏറ്റവും വലിയ വെല്ലുവിളി മനുഷ്യനാണ്. കൂടുതൽ ആധുനികനാവാൻ ശ്രമിക്കുന്ന, നഗരവാസിയായിരിക്കാൻ ശ്രമിക്കുന്ന മനുഷ്യൻ, പക്ഷേ മാറണം, ഇനിയെങ്കിലും മനുഷ്യൻ ഉണരണം. ഭൂമിയുടെ ഒരു സുന്ദരശോഭനേ ഭാവിക്കുവേ ി നമ്മുടെ ശ്രേഷ്ഠമായ ബുദ്ധിയെ പ്രവർത്തിപ്പിക്കണം. നമ്മൾ സഹജേ ജീവികളുടെ പരിപാലകന്മാരാകണംമറിച്ച്, ഇനിയും സത്യത്തിന് പുറം തിരിഞ്ഞ് നിൽ

ജുവാനാണ് ഭാവമെങ്കിൽ, ഭൂമി പ്രതികരിക്കും. ശക്തമായ ഭാഷയിൽ. അന്ന്, ആ ഭാഷയുടെ മാറ്റാലികൾ അവസാനിക്കും മുൻപേ മനുഷ്യകുലം ഈ ഭൂമുഖത്തുനിന്നും തുടച്ചു നീക്കപ്പെട്ടിട്ടു വാവും. അതിനും കാലം മാത്രമായിരിക്കും സാക്ഷി.

DEVELOPING AN ELEPHANT INTRUSION DETECTION AND EARLY WARNING SYSTEM AND ITS NETWORKING

As a pilot attempt, College of Forestry, Kerala Agricultural University, Govt. Model Engineering College, Kochi and Integrated Rural Technology Centre (IRTC), Palakkad had jointly developed an elephant sensing system using IR sensors as a part of this project.



TCR/PKD

02

THURSDAY

WEDNESDAY 25.10.2017

MAN-ANIMAL CONFLICT

Hark! It's a 'trunk' call

KAU's new warning system will alert the local residents if presence of wild tuskers is detected

C.P. SANKU (Special)

INDIA had to tackle the growing man-elephant conflict, the Kerala Agricultural University (KAU) has developed a warning system that can detect the presence of wild tuskers and alert people living near the elephant corridor.

S. Gopal Kumar, a professor at KAU's College of Forestry, told Express the system has been developed in collaboration with scientists at the Government Model Engineering College, Thrissur, and Integrated Rural Technology Centre (IRTC), Muvattupuzha. "We believe the system can help as a deterrent to areas notorious for elephant attacks." He said the key feature of the system is it can clearly distinguish an elephant from other animals and send wireless alerts to human habitations within five km.

"The first sensing system developed using IR sensors and high resolution IR camera was established in one of the main elephant pathways in the Wadi Project area in the Pudukkottai in Palakkad," he said.

After realising the first prototype couldn't distinguish the elephant from other animals, the team developed an algorithm to avoid wrong detection and false alarms, he said.

Gopal Kumar initiated research on the subject as part of the Western Charu Cell-funded research project after realising the scope for developing an all-weather electronic warning system.

He said the system was developed at a cost of ₹20 lakh.

P. Jithin Davu, KAU Director of Research, said the system will be most effective near the Malabar-Kannada railway track, where elephants were hit by trains while crossing the track.

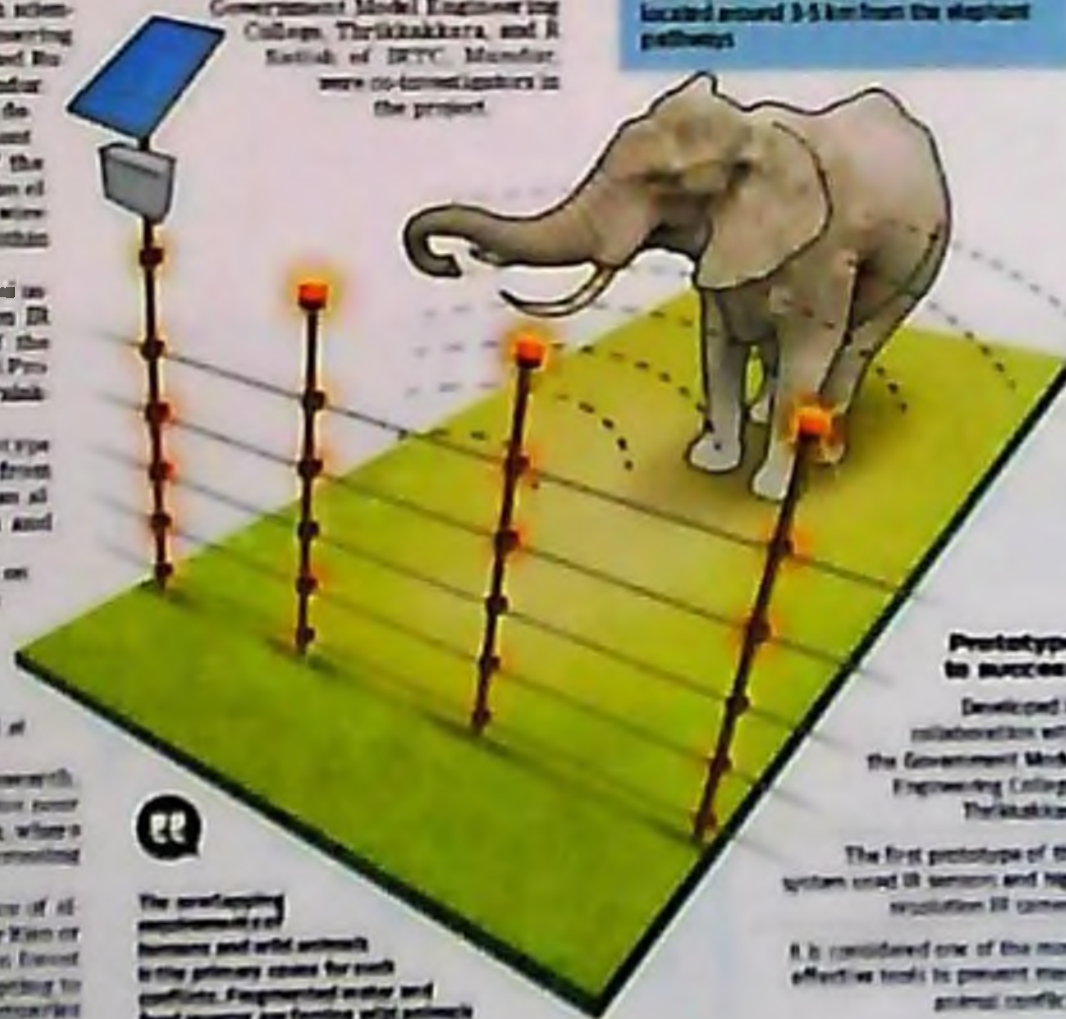
The system can detect the presence of elephants and alert the railway authorities or even the forest guard. It can also warn forest authorities about elephants attempting to cross the 200 adjoining wildlife sanctuaries in Muvattupuzha, Muthanga and Thodupuzha, he said. This may not be a silver bullet, but can be one of the most effective tools to prevent

man-elephant conflicts, she said.

KAU Vice-Chancellor P. Rajendran said the overlapping requirements of humans and wild animals is the primary cause for such conflicts. Fragmented water and food sources are forcing wild animals to intrude into human habitations. Animal specific devices (for wild bear, porcupine etc) based on this concept can be further developed, he said. M. Pradeep and Jagdish Kumar of the Government Model Engineering College, Thrissur, and R. Satish of IRTC, Muvattupuzha, were co-investigators in the project.

HOW THE SYSTEM WORKS

Once the system detects an elephant, it sends a message to the GSM receiver kept in a house around 7 km away. Subsequently, a wireless alert message will be relayed to the human habitations located around 3-5 km from the elephant pathways.



Prototype to success

Developed in collaboration with the Government Model Engineering College, Thrissur.

The first prototype of the system used IR sensors and high resolution IR camera.

It is considered one of the most effective tools to prevent man-animal conflicts.



The overlapping requirements of humans and wild animals is the primary cause for such conflicts. Fragmented water and food sources are forcing wild animals to intrude into human habitations.

P. Rajendran, KAU Vice-Chancellor

MR VACCINATION

Fig. 1. Media reports about the device

The sensing part of the system was redesigned with high resolution IR camera with an algorithm for the exact detection of elephants during daytime and as well as during the night to avoid misdetection and false alarm. Once an image is captured, the device will compare the

profile of the captured animal picture with an existing data base and a decision whether or not to send an alarm is made accordingly. This sensing system was integrated with LORa based network systems and tested.



Fig 2. IR Sensing system kept atop a tree

If the moving animal is confirmed as an elephant, the message is sent to LORA receiver kept in a house around 2KM away from the camera device which is erected in the elephant pathway.



Fig. 3. LORA receiver

Subsequently a wireless alert message will be relayed through alternate means (in areas with poor GSM connectivity) to the human habitations located around 3-5 KM from the elephant path ways. Such an early warning can help people get alerted about the presence of wild elephants and take evasive action to either minimise or manage conflicts, if it occurs. This device was successfully lab tested and later on, this device was tested in the field among the domestic elephants, which was also found to be successful. This device is now erected in the IRTC's Wadi project area in the Pudur Gram Panchayath of Attappady Block in Palakkad district.

C. Way ahead

Human-wildlife conflict is a growing concern for policy makers, planners and development departments under government. The overlapping of requirements of forest fringe communities and wildlife is a foremost cause of conflicts. Fragmented habitats, water and food requirements are alleged to be forcing wild animals into human inhabitations. In Kerala, large herbivores like the wild elephants pose a major threat in many forest fringe areas. With no single solution to date, management of human-wildlife conflict calls for interdisciplinary collaborations. Multi-disciplinary or trans-disciplinary approaches can scale down the confrontations and conflicts. Based on the initial success we could our experience, there is a scope to use technology for the early detection of the presence of wild elephants in different "elephant path ways" and sending timely alerts. Such an early warning system can help people and other stakeholders to take evasive action to minimise and manage conflicts.

The above mentioned pilot device and concept has to be refined further so as to design and develop a much sophisticated all weather electronic system for the early detection of elephants and timely warning. This sophistication would be further facilitated by the development of a more efficient image processing algorithm for elephant detection during day and night times. In case of areas with poor GSM connectivity, wireless connectivity through LORA based wireless network system will be established. This developed device will be tested in the laboratory and in the potential conflict zones in consultation with the forest department. The successfully field tested system will be transferred to the forest department for mitigating human-wild life conflicts involving elephants.

Potential Applications

1. On the “elephant death trap” on the Walayar-Kanjikode railway stretch between Palakkad and Coimbatore: The forest/railway authorities can receive an early warning about the presence of elephants. An alert can also be given to the loco pilot of the train.
2. At all possible elephant crossings including Palakkad-Kozhikode National Highway, NH-212 which runs through three different wildlife sanctuaries - Wayanad National Park, Muthanga Wildlife Sanctuary and Bandipur National Park and elsewhere: Forest staff can get an early warning about the upcoming elephant presence.
3. In all forest fringe areas, alerts can be given about the presence and activity of wild elephants, so that the forest fringe communities can take evasive action.
4. Animal-specific devices (like for wild boar, peacocks etc) based on the present concept can be further developed and used.



GOVA INSTITUTE OF LOCAL ADMINISTRATION

25.10.2016

ಪ್ರಿಯರ,

ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ನಡೆಸುತ್ತಿರುವ ಸರ್ಕಾರಿ ಸೇವೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸರ್ಕಾರದಿಂದ ಸಹಕಾರವನ್ನು ಪಡೆಯುವುದರಲ್ಲಿ ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ಸಾಧಿಸಿರುವ ಸಾಧನೆಗಳನ್ನು ನಾವು ಅಭಿನಂದಿಸುತ್ತೇವೆ. ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ಸರ್ಕಾರದ ಸೇವೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸರ್ಕಾರದಿಂದ ಸಹಕಾರವನ್ನು ಪಡೆಯುವುದರಲ್ಲಿ ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ಸಾಧಿಸಿರುವ ಸಾಧನೆಗಳನ್ನು ನಾವು ಅಭಿನಂದಿಸುತ್ತೇವೆ. ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ಸರ್ಕಾರದ ಸೇವೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸರ್ಕಾರದಿಂದ ಸಹಕಾರವನ್ನು ಪಡೆಯುವುದರಲ್ಲಿ ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ಸಾಧಿಸಿರುವ ಸಾಧನೆಗಳನ್ನು ನಾವು ಅಭಿನಂದಿಸುತ್ತೇವೆ.

ನಿರ್ದೇಶಕರು

ಪಿ.ಪಿ. ಸಾವರ್ಕೆ

ನಿರ್ದೇಶಕರು

ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ನಡೆಸುತ್ತಿರುವ ಸರ್ಕಾರಿ ಸೇವೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸರ್ಕಾರದಿಂದ ಸಹಕಾರವನ್ನು ಪಡೆಯುವುದರಲ್ಲಿ ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ಸಾಧಿಸಿರುವ ಸಾಧನೆಗಳನ್ನು ನಾವು ಅಭಿನಂದಿಸುತ್ತೇವೆ.

ಪ್ರಿಯರ,

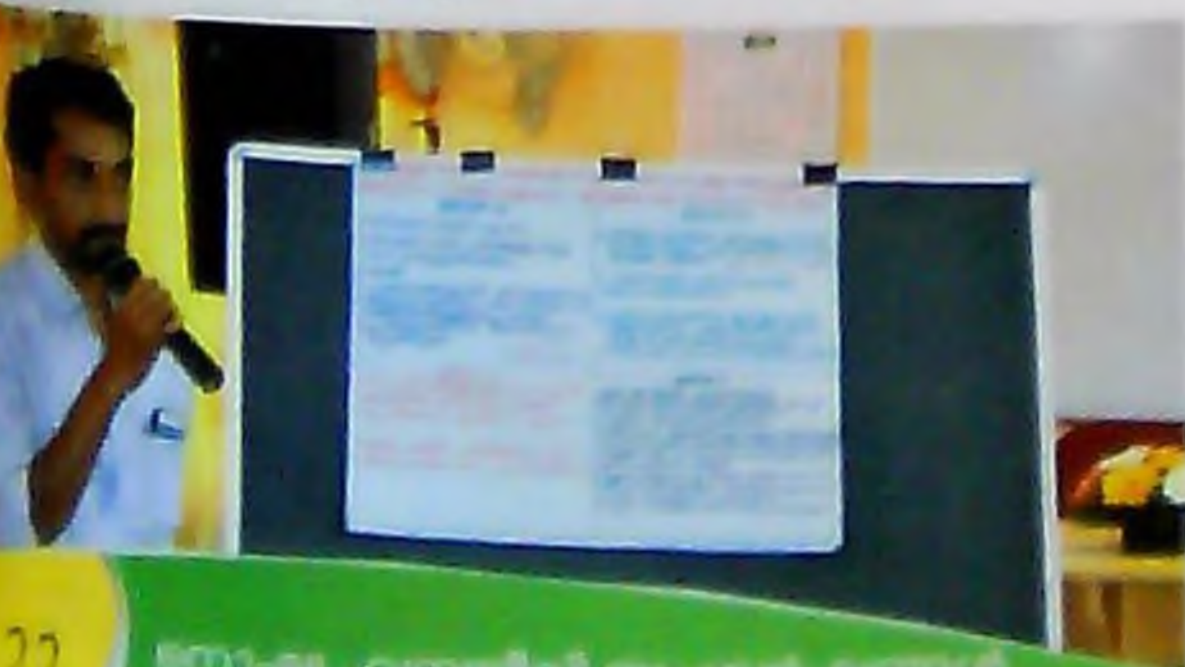
ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ನಡೆಸುತ್ತಿರುವ ಸರ್ಕಾರಿ ಸೇವೆಗಳಿಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಸರ್ಕಾರದಿಂದ ಸಹಕಾರವನ್ನು ಪಡೆಯುವುದರಲ್ಲಿ ನಿಮ್ಮ ಸಂಸ್ಥೆಯು ಸಾಧಿಸಿರುವ ಸಾಧನೆಗಳನ್ನು ನಾವು ಅಭಿನಂದಿಸುತ್ತೇವೆ.

പ്രധാനപ്പെട്ട ശില്പശാലാ നിർദ്ദേശങ്ങൾ

വന്യജീവികളെ കൃഷിയിടങ്ങളിൽ നിന്നും പരമാവധി അകറ്റിനിർത്താൻ ജനപങ്കാളിത്തത്തിലൂന്നിയുള്ള പ്രവർത്തനങ്ങളും, അതിൽ തദ്ദേശീയ സർക്കാരുകൾ നടത്തേണ്ട ഇടപെടലുകളും.



- പരിസ്ഥിതിയെയും വനസംരക്ഷണത്തെയും വന്യജീവികളെയും കുറിച്ചുള്ള ബോധവൽക്കരണ ക്ലാസ്സുകൾ സംഘടിപ്പിക്കണം.
- മനുഷ്യ-വന്യജീവി സംഘർഷങ്ങൾ ലഘൂകരിക്കുന്നതിന് ഗവേഷണ സ്ഥാപനങ്ങളുടെയും NGOs ന്റെയും ഉപദേശവും സഹായവും തേടണം.
- സംഘർഷങ്ങൾ മൂലമുണ്ടാകുന്ന നഷ്ടങ്ങൾ നികത്താൻ പഞ്ചായത്ത് തലത്തിൽ പ്രത്യേക ഫണ്ട് രൂപീകരിക്കണം.
- സംഘർഷ ബാധിത പ്രദേശങ്ങളിലെ പഞ്ചായത്തുകൾ തമ്മിലുള്ള സഹകരണം.
- പഞ്ചായത്ത് തലത്തിൽ ആവാസ വ്യവസ്ഥ നിലനിർത്താൻ സമഗ്രമായ രൂപരേഖ തയ്യാറാക്കി അത് പ്രാബല്യത്തിൽ കൊണ്ടുവരുത്തുക.



- ഗ്രാമസഭകളിൽ വനം വകുപ്പിന്റെ പ്രാതിനിധ്യത്തോടുകൂടി ജാഗ്രതാ കമ്മിറ്റികൾ രൂപീകരിച്ചുകൊണ്ടുള്ള പ്രവർത്തനങ്ങൾ.
- പഞ്ചായത്ത് പ്രതിനിധികൾക്ക് വനം-വന്യജീവി സംരക്ഷണത്തെക്കുറിച്ച് പ്രത്യേക ബോധവൽക്കരണ പരിപാടികൾ വേണം.
- വാർഡ് തലത്തിലെ ജനജാഗ്രതാ സമിതികളിൽ പഞ്ചായത്ത് പ്രതിനിധികൾ, കർഷകർ, വനം വകുപ്പ്-വന്യജീവി വകുപ്പ്, പോലീസ്, ആദിവാസികൾ എന്നിവരെയും ഉൾപ്പെടുത്തണം.



- മനുഷ്യ-വന്യജീവി സംഘർഷം കുറയ്ക്കുന്നതിന് ജനപങ്കാളിത്തം ഉറപ്പുവരുത്തുക.
- സംഘർഷ മേഖലകളിൽ കൂടുതൽ കാവൽ മാടങ്ങൾ നിർമ്മിക്കുക.
- ശാശ്വത പരിഹാരത്തിന് മുൻഗണന കിട്ടുന്ന രീതിയിലുള്ള കർമ്മ പദ്ധതികൾ വിദഗ്ദ്ധരുടെ സഹായത്തോടെ രൂപീകരിക്കണം.
- നഷ്ടപരിഹാര തുക ഉയർത്തണം.
- അത്യാവശ്യ ഘട്ടങ്ങളിൽ നിരന്തര ശല്യക്കാരായ മൃഗങ്ങളെ വെടിവെയ്ക്കാനുള്ള അനുമതി നൽകുക.
- വന്യജീവികൾ നിരന്തരമായി വിളതാശം വരുത്തുന്ന മേഖലകളിൽ തോക്കിനു ലൈസൻസ് നൽകുന്നതിനുള്ള നടപടിക്രമങ്ങൾ ലഘൂകരിക്കുക.
- മുളളൻപന്നിക്കും കറട്ടുപന്നിക്കും എതിരെ സ്റ്റീൽ നെറ്റ് എന്ന ആശയം പരീക്ഷിക്കുക.



- കാട്ടാനകൾക്ക് എതിരെ റെയിൽ ഫെൻസ് സംവിധാനം നടപ്പിൽ വരുത്തുക.
- സംഘർഷ മേഖലയിലെ വിവിധ വകുപ്പുകളുടെ കാര്യക്ഷമമായ സംയോജനം പഞ്ചായത്തുകളിൽ ഉറപ്പാക്കണം.

വന്യമൃഗങ്ങളെ അകറ്റിനിർത്താനും കഷ്ടനഷ്ടങ്ങൾ പരിഹരിക്കാനും ബോധ വീകരണ വകുപ്പുകൾ സ്വീകരിക്കേണ്ട പ്രശ്നപരിഹാര സമീപനങ്ങൾ

- സംഘർഷ മേഖലയിലെ വിവിധ ഡിപ്പാർട്ടുമെന്റുകളുടെ പ്രവർത്തനങ്ങൾ ഏകോപിപ്പിക്കുക.
- നൂതന സാങ്കേതിക വിദ്യകളുടെ സഹായത്തോടെ സംഘർഷബാധിത പ്രദേശങ്ങളിൽ പ്രശ്നപരിഹാര സമീപന മാർഗ്ഗങ്ങൾ കണ്ടെത്തുക.
- ബോധവൽക്കരണ ക്ലാസ്സുകളും സെമിനാറുകളും നിരന്തരം നടത്തുക.
- പുനരധിവാസ പദ്ധതികൾ ആകർഷകമാക്കുക.
- നഷ്ടപരിഹാരത്തുക കൂട്ടുക. അതിന്റെ നടപടിക്രമങ്ങൾ ലാഘ്യകരിക്കുക.
- നഷ്ടപരിഹാര നിർദ്ദേശങ്ങളുടെ പുനഃപരിശോധന.
- കാർഷിക വിളകൾക്കും കന്നുകാലികൾക്കും കൂടുതൽ ആകർഷകമായ ഇൻഷുറൻസ് പദ്ധതികൾ.



- ജീവൻ നഷ്ടപ്പെടുന്നവരുടെ കുടുംബത്തിന്റെ പൂർണ്ണ സംരക്ഷണം സർക്കാർ ഏറ്റെടുക്കുക.
- സംഘർഷ ബാധിത പ്രദേശത്ത് പ്രശ്ന പരിഹാരത്തിനായ് ജനകീയാസൂത്രണ പദ്ധതികൾ ആവിഷ്കരിക്കുക.
- സംഘർഷ മേഖലയിൽ പോലീസിന്റെ സേവനം ലഭ്യമാക്കുക.
- വൈദ്യുതിവേലിക്കു സബ്സിഡി നൽകുക.
- പ്രാദേശിക അവസ്ഥകൾ കണക്കിലെടുത്ത് കന്നുകാലി വിതരണം.
- സംഘർഷ മേഖലയിൽ ഏറുമാട നിർമ്മാണം.
- ആഴത്തിലുള്ള ട്രെയ്നിംഗ് നിർമ്മാണം.
- നിരപ്പായ സ്ഥലങ്ങളിൽ റെയിൽ ഫെൻസ് നിർമ്മിക്കുക.

വന്യമൃഗങ്ങളുടെ ഇടപെടലുകളും പ്രശ്നങ്ങളും - കുറയ്ക്കാൻ വനപരിപാലന സംരക്ഷണ നിയമങ്ങളിലും നയങ്ങളിലും വരുത്തേണ്ട മാറ്റങ്ങൾ

- വന്യജീവി സംരക്ഷണ നിയമത്തിലെ സെക്ഷൻ 9 ന്റെ നിർവ്വചനം ശാസ്ത്രീയമായി പുനഃപരിശോധിക്കുക.
- വന്യജീവി സംഘർഷങ്ങളുടെ മൂല കാരണങ്ങൾക്ക് ശാസ്ത്രീയമായ പരിഹാരം.
- വനാതിർത്തിയിലെ പുനരധിവാസം ശാസ്ത്രീയമായ അടിസ്ഥാനത്തിലായിരിക്കണം.
- വയനാട് പോലുള്ള പ്രദേശങ്ങളെ ഒരു ഭൂപ്രദേശമാച്ച് കണക്കാക്കി പരിഹാരം കണ്ടെത്തണം.
- ജനപങ്കാളിത്തത്തോടെ സംഘർഷ ബാധിത പ്രദേശത്തെ പ്രശ്നപരിഹാരങ്ങൾ.
- എല്ലാ വനസർക്കിളിലും വന്യജീവി പുനരധിവാസ കേന്ദ്രങ്ങൾ.
- മനുഷ്യ-വന്യജീവി സംഘർഷ കാരണങ്ങളിൽ വന്യജീവികളുടെ വംശവർദ്ധനവിന്റെ പങ്ക് പഠനവിധേയമാക്കുക.



- കാട്ടാനകൾക്ക് എതിരെ റെയിൽ ഫെൻസ് സംവീധാനം നടപ്പിൽ വരുത്തുക.
- സംഘർഷ മേഖലയിലെ വിവിധ വകുപ്പുകളുടെ കാര്യക്ഷമമായ സംയോജനം പദ്ധതികളിൽ ഉറപ്പാക്കണം.

വന്യമൃഗങ്ങളെ അകറ്റിനിർത്താനും കഷ്ടനഷ്ടങ്ങൾ പരിഹരിക്കാനും ബണ്ടി വികസന വകുപ്പുകൾ സ്വീകരിക്കേണ്ട പ്രശ്നപരിഹാര സമീപനങ്ങൾ

- സംഘർഷ മേഖലയിലെ വിവിധ ഡിപ്പാർട്ടുമെന്റുകളുടെ പ്രവർത്തനങ്ങൾ ഏകോപിപ്പിക്കുക.
- നൂതന സാങ്കേതിക വിദ്യകളുടെ സഹായത്തോടെ സംഘർഷബാധിത പ്രദേശങ്ങളിൽ പ്രശ്നപരിഹാര സമീപന മാർഗ്ഗങ്ങൾ കണ്ടെത്തുക.
- ബോധവൽക്കരണ ക്ലാസ്സുകളും സെമിനാറുകളും നിരന്തരം നടത്തുക.
- പുനരധിവാസ പദ്ധതികൾ ആകർഷകമാക്കുക.
- നഷ്ടപരിഹാരത്തുക കൂട്ടുക. അതിന്റെ നടപടിക്രമങ്ങൾ ലഘൂകരിക്കുക.
- നഷ്ടപരിഹാര നിർദ്ദേശങ്ങളുടെ പുനഃപരിശോധന.
- കാർഷിക വിളകൾക്കും കന്നുകാലികൾക്കും കൂടുതൽ ആകർഷകമായ ഇൻഷുറൻസ് പദ്ധതികൾ.



- ജീവൻ നഷ്ടപ്പെടുന്നവരുടെ കുടുംബത്തിന്റെ പൂർണ്ണ സംരക്ഷണം സർക്കാർ ഏറ്റെടുക്കുക.
- സംഘർഷ ബാധിത പ്രദേശത്ത് പ്രശ്ന പരിഹാരത്തിനായ് ജനകീയാസൂത്രണ പദ്ധതികൾ ആവിഷ്കരിക്കുക.
- സംഘർഷ മേഖലയിൽ പോലീസിന്റെ സേവനം ലഭ്യമാക്കുക.
- വൈദ്യുതിവേലിക്കു സബ്സിഡി നൽകുക.
- പ്രാദേശിക അവസ്ഥകൾ കണക്കിലെടുത്ത് കന്നുകാലി വിതരണം.
- സംഘർഷ മേഖലയിൽ ഏറുമാട നിർമ്മാണം.
- ആഴത്തിലുള്ള ട്രെയ് നിർമ്മാണം.
- നിരപ്പായ സ്ഥലങ്ങളിൽ റെയിൽ ഫെൻസ് നിർമ്മിക്കുക.

വന്യമൃഗങ്ങളുടെ ഇടപെടലുകളും പ്രശ്നങ്ങളും - കുറയ്ക്കാൻ വനപരിപാലന സംരക്ഷണ നിയമങ്ങളിലും നയങ്ങളിലും വരുത്തേണ്ട മാറ്റങ്ങൾ

- വന്യജീവി സംരക്ഷണ നിയമത്തിലെ ടെക്സ്റ്റ് 9 ന്റെ നിർവ്വചനം ശാസ്ത്രീയമായി പുനഃപരിശോധിക്കുക.
- വന്യജീവി സംഘർഷങ്ങളുടെ മൂല കാരണങ്ങൾക്ക് ശാസ്ത്രീയമായ പരിഹാരം.
- വനാതിർത്തിയിലെ പുനരധിവാസം ശാസ്ത്രീയമായ അടിസ്ഥാനത്തിലായിരിക്കണം.
- വയനാട് പോലുള്ള പ്രദേശങ്ങളെ ഒറ്റ ഭൂപ്രദേശമായി കണക്കാക്കി പരിഹാരം കണ്ടെത്തണം.
- ജനപങ്കാളിത്തത്തോടെ സംഘർഷ ബാധിത പ്രദേശത്തെ പ്രശ്നപഠനങ്ങൾ.
- എല്ലാ വനസർക്കിളിലും വന്യജീവി പുനരധിവാസ കേന്ദ്രങ്ങൾ.
- മനുഷ്യ-വന്യജീവി സംഘർഷ കാരണങ്ങളിൽ വന്യജീവികളുടെ വംശവർദ്ധനവിന്റെ പങ്ക് പഠനവിധേയമാക്കുക.

- വനപരിപാലന നിയമങ്ങളിലും നയങ്ങളിലും ആവശ്യമായ മാറ്റങ്ങൾ വരുത്തുക-കാട്ടു പന്നിയെ വെർമിനായ് കണക്കാക്കുക.
- തോക്കുകളുടെ ലൈസൻസ് പുതുക്കുന്നത് വിവിധ വകുപ്പുകളുടെ സമ്മർദ്ദംമൂലം ദീർഘിപ്പിക്കുന്നത് ഒഴിവാക്കുക.

വന്യമൃഗങ്ങളെ - അക്വിനിർത്തൽ - നാട്ടറിവുകളും നൂതന സാങ്കേതികവിദ്യ ഉപയോഗിച്ചുകൊണ്ടുള്ള പരിഹാര മാർഗ്ഗങ്ങൾ

- പരമ്പര്യ കൃഷിരീതികളെ ഇന്നത്തെ സാഹചര്യത്തിന് അനുസൃതമായി പ്രയോജനപ്പെടുത്തുക.
- ഈ മേഖലയിലെ ഗവേഷണ-വികസന വിഷയങ്ങളിലെ കണ്ടെത്തലുകൾ ഉപയോഗപ്പെടുത്തി പ്രശ്നപരിഹാര മാർഗ്ഗങ്ങൾ നടപ്പിലാക്കണം.
- പരമ്പരാഗതമായി വന്യജീവി സംഘർഷം ഒഴിവാക്കാൻ ഉപയോഗിച്ചുവരുന്ന നാട്ടറിവുകളുടെ ക്രോഡീകരണവും നടപ്പാക്കലും.



- വന്യമൃഗങ്ങൾ കൃഷിയിടങ്ങളിലിറങ്ങിയാൽ ഉടനെ അല്ലെങ്കിൽ മുൻകൂട്ടി അറിയാൻ കഴിയുന്ന സാങ്കേതിക വിദ്യകൾ നടപ്പിൽ വരുത്തുക.
- അന്യസംസ്ഥാനങ്ങളിൽ ഈ മേഖലയിലെ വിജയങ്ങൾ മാതൃകയാക്കുക.
- കർഷകന് കൃഷി സംരക്ഷണത്തിനു പൂർണ്ണമായും അവകാശം നൽകുക.

ദ്വിദിന പങ്കാജിത്ത ശില്പശാല
മുഖ്യാൻ മേഖലയിലെ
മനുഷ്യ-വന്യജീവി സംഘർഷം :
പ്രശ്നങ്ങളും പരിഹാര നമിപനങ്ങളും
 2016 മാർച്ച് 15, 16
 വനത്താൽ കോളേജ് ഹൈമാനിക്കര പാലം
 വെർമിനായ് ഓട്ട് ഹൈവേയ്ക്കടുത്ത്



**College of Forestry, Vellanikkara
Kerala Agricultural University**



**GOVERNMENT OF KERALA
WESTERN GHAT CELL
PLANNING AND ECONOMIC AFFAIRS DEPARTMENT**

FINAL PROJECT REPORT

**EXPLORATIVE STUDY AND CAPACITY
DEVELOPMENT ON HUMAN-WILDLIFE CONFLICT
MANAGEMENT IN SELECTED FOREST TRACTS OF
KERALA**

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