

# **Night Traffic Ban on NH 212**

## **A Report**



**P. S. Easa**

**Kerala Forest Research Institute, Peechi**



**November 2014**

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**Kerala Forest Research Institute**  
(An Institution of Kerala State Council for Science, Technology and Environment)  
**Peechi, Thrissur 680 653, Kerala**

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Dr. P. S. Easa  
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## INTRODUCTION

Linear infrastructures like roads, power lines, railway lines act as a medium for the economic and cultural growth of the nation. Better facilities and infrastructures can attract large-scale investments in the country. Linear infrastructures that pass through Protected Areas such as Sanctuaries, National parks and Reserve forests are now widely recognized as a threat to the forest and its wildlife population. Impact on habitat due to transport infrastructure is receiving growing concern among conservationists (Van der Zande *et al.*, 1980; Ellenberg *et al.*, 1981; Bernard *et al.*, 1987; Andrews, 1990; Bennett, 1991; Reck and Kaule, 1993; Forman, 1995; Evink *et al.*, 1996; Canters *et al.*, 1997; Jalkotzky *et al.*, 1997; Prillewitz, 1997; Evink *et al.*, 1998; Spellerberg, 1998; Forman and Alexander, 1998; Clevenger, 1998; Pierre-LePense and Carsignol, 1999; Glitzner *et al.*, 1999; Trombulak and Frissell, 2000; Holzang *et al.*, 2000). Possible consequences to wildlife have been recognised and evidences brought in on the effects on both species and ecosystems at different spatial scales (Canters *et al.*, 1997). The natural environment is affected by infrastructure in both direct and indirect ways. The physical presence of roads and railroads in the landscape creates new habitat edges, alters hydrological dynamics and disrupts natural processes and habitats often leading to habitat degradation. Road maintenance and traffic contaminate the surrounding environment with a variety of chemical pollutants and noise. In addition, infrastructure and traffic impose dispersal barriers to most non flying terrestrial animals, and vehicle traffic causes the death of several animals. The various biotic and abiotic factors operate in a synergetic way across several scales, and cause not only an overall loss and isolation of wildlife habitat, but also split up the landscape in literal sense.

Roads are possibly the most prevalent linear infrastructure in the world. An estimated 750 million vehicles ply on approximately 50 million km of public roads. With roads attracting large-scale investments and with huge negative impacts on wildlife and their habitats, road ecology has been identified as an important discipline in conservation biology (Ree *et al.*, 2011). Roads improve access which facilitates resource extraction, human settlement and habitat degradation (Laurance *et al.*, 2006). Roadless wilderness is widely recognised for its high conservation value in terrestrial ecosystems (Strittholt and Dellasala, 2001). Roadless areas and, to a lesser extent, low-traffic areas, represent relatively undisturbed natural habitats and functioning ecosystems (NuriaSelva *et al.*, 2011).

Roads are both facilitators and indicators of economic development of a nation. Hence it is important that roads built through key wildlife habitats, if unavoidable, have minimal impact on wildlife (Prakash, 2012). Roads have been known to aid illegal wildlife trade (Yiming and Dianmo, 1998) in certain conditions. Artificial intrusions may also lead to behavioral changes in animals, such as getting accustomed to human presence, increased aggression towards humans and possible disruption of social structure in group living animals (Jackson, 2000).

Forest elephants adopt a siege strategy in the face of road encroachment, rather than face the dangers associated with skirmishing (Blake *et al.*, 2008). To maintain viable elephant populations composed of individuals whose ranging behaviour is driven by ecological constraints rather than by fear, at least two management policies must be included and implemented; the first is to stop new road encroachment into remaining large roadless wildernesses, and the second is to reduce the factors that promote elephant's fear of roads (Blake *et al.*, 2008). Key areas that provide connectivity between priority elephant populations or that give elephants access to seasonally important resources such as large swamps should either remain roadless or existing roads should be kept free of human settlement and policed to reduce rates of poaching (Blake *et al.*, 2008). The costs of wildlife protection are trivial compared to the investments being made in resource extraction and the profits they generate.

There had been a few studies on the complex impact of the rail lines and roads on wildlife and landscapes and even on the ecological processes. Seiler (2001) reviewed the ecological effects of roads. Five major categories of ecological effects have been recognised by various workers (Van der Zande *et al.*, 1980; Bennett, 1991; Forman and Alexander, 1998). Effects of roads on nature and wildlife can be included as primary and secondary. Primary effects as per Van der Zande *et al.* (1980), Bonnet *et al.* (1999) and Forman (1995) include habitat loss, disturbance, mortality and as a barrier. These are represented in Figure 1.

**Habitat loss:** Construction of roads and railroads always implies a net loss of wildlife habitat. The physical encroachment on the land gives rise to disturbance and barrier effects that contribute to the overall habitat fragmentation due to infrastructure.

**Disturbance:** Roads, railroads and traffic disturb and pollute the physical, chemical and biological environment and consequently alter habitat suitability for many plant and animal species for a much wider zone than the width of the road or railroad itself.

**Corridor:** Road verges and roadsides can however provide refuges, new habitats or serve as movement corridors for wildlife. These beneficial effects of infrastructure are a major challenge to planners and biologists as management and design must be adapted to a wider landscape context.

**Mortality:** Traffic leads to the death of many animals that utilize verge habitats or try to cross the road or railroad. Traffic mortality has been growing constantly over the years, but is considered as a severe threat only to a few species. Collisions between vehicles and wildlife are also an important traffic safety issue.

**Barrier:** For most non-flying terrestrial animals, infrastructure implies movement barriers that restrict the animals' range, make habitats inaccessible and can finally lead to an isolation of populations. The barrier effect is the most prominent factor in the overall fragmentation caused by infrastructure. Secondary effects include changes in land use, human settlement or industrial development, or resource exploitation, which may be induced by the construction of new roads or railroads, etc. Seiler (2001) also describes the different views where the road sides and verges are argued to be refuges, new habitats and movement corridors thereby benefitting the wildlife.

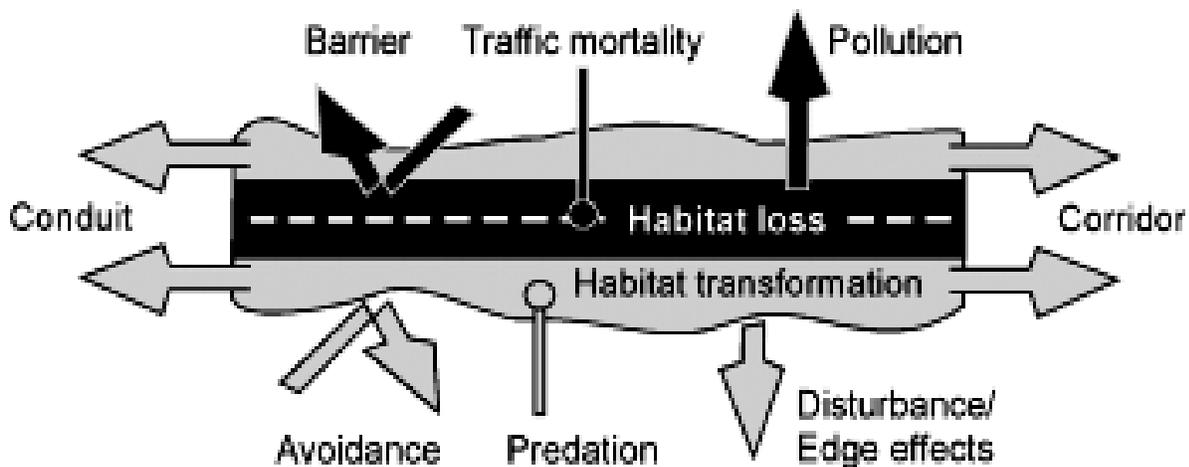


Figure 1: Schematic representation of the five primary ecological effects of infrastructure: Habitat loss and transformation, disturbance due to pollution and edge effects, barrier and avoidance, mortality due to traffic and predation, and the conduit or corridor effect. Together, the various primary effects lead to a fragmentation of habitat. Modified after Van der Zande *et al.* (1980).

A number of studies abroad have shown the impact of road infrastructure on the wildlife in the surroundings (Hodson, 1966; Van den Tempel, 1993; Rodts *et al.* 1998. Amphibians have been considered as one of the most affected due to transport infrastructure (Vestjens, 1973;

Blaustein and Wake, 1990; Reh and Seitz, 1990; Fahrig *et al.*, 1995). The roads would kill a constant proportion of a population and therefore can have a significant impact on rare species. In general, species that occur in small isolated populations, requiring large extensive areas for their home ranges, or exert long migratory movements, are especially sensitive to road mortality. The larger their home range, the more often individuals will encounter roads; the smaller their populations, the higher the relative importance of each individual. Naturally, collisions with wildlife can only occur where a road or railroad dissects a species' habitat, but local factors can alter the relationship considerably. Road kills seems to increase with traffic intensity, but very high traffic volumes, noise and vehicle movement seem to repel many animals, which is described as avoidance behavior. Though this may reduce mortality rate, the animals will be deprived of the habitat available to them. Though most of these studies are on highways and their impact, the highlighted impacts are the same in the forest roads.

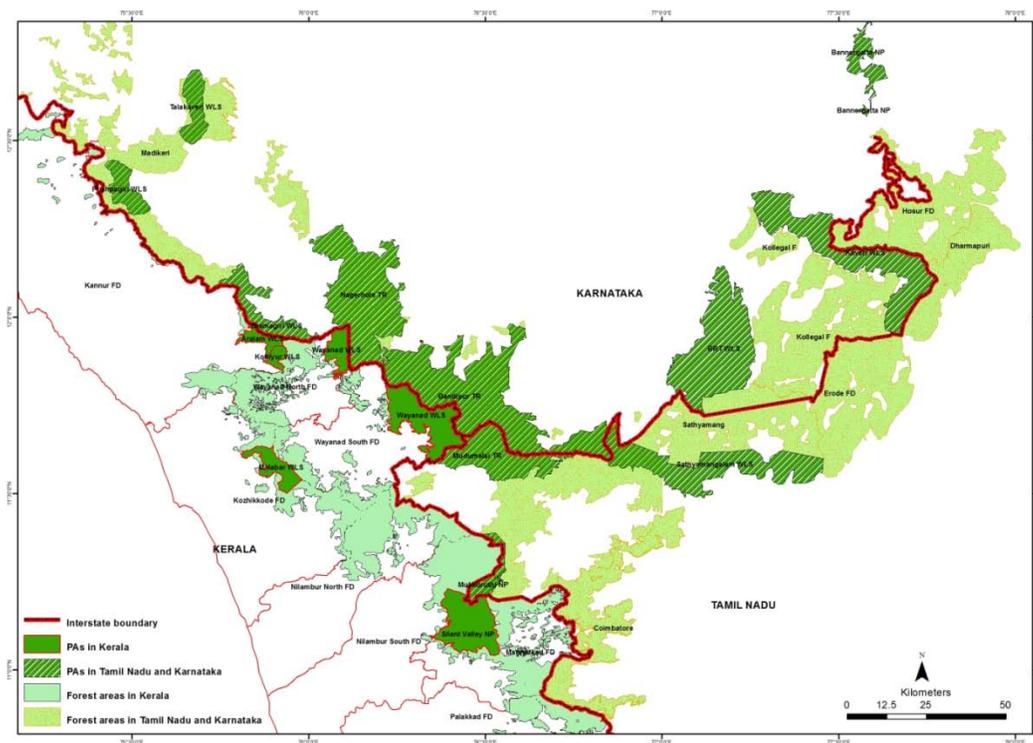
In India, unfortunately, there had been only very few observations on the impact of roads on landscape and the behavior of animals in terms of changes in activity, feeding habits, breeding and other aspects. Most of the studies, that too mostly of short term nature, have been on the impact on selected groups of animals or species. These were also on the mortality. Presence of road and their impact on elephants have been described by Desai and Baskaran (1996) and Menon *et al.* (2005). There are a number of studies in India on the road kills along the highways. Sharma (1988) reported animal deaths on NH 11 in Bharathpur. Based on one year long observations, he recorded 439 casualties, which included amphibians, reptiles, birds and mammals. Gokula (1997) reported mortality in snakes due to highway traffic in the dry deciduous forests of Mudumalai Wildlife Sanctuary, Tamil Nadu. Kumara *et al.* (2000) reported road kills in Indira Gandhi Wildlife Sanctuary. A month long study by Vijayakumar *et al.* (2001) reported mortality of herpetofauna from the highway segments passing through rainforest fragments and tea gardens in the Anamalai Hills, where more amphibians were killed. Seventy three reptiles were seen killed against 311 amphibians. Changani (2004) recorded 228 birds of 32 species in the highways passing through Kumbhalgarh Wildlife Sanctuary in Rajasthan. Das *et al.* (2007) reported the reptile mortality along the NH 37 passing adjacent to Kaziranga National Park. The five month long study recorded 68 instances of road kills. About 50 kills, mostly of herpetofauna and also birds and mammals were recorded in a one month long observations along the NH 220 in Kambam - Kumily road (Selvan *et al.*, 2011). A study on NH 212 and NH 67

during 2012 by Prakash (2012) through Bandipur Tiger Reserve reported a total of 265 road kills (reptiles, birds and mammals), which include one elephant on NH 212.

Unfortunately, there is no clear understanding of the impact of roads on any of the ecological aspects including ecological quality of the areas in India. Also there is no such study on the social aspects of roads through wilderness areas.

## The Landscape

Wayanad and adjacent areas form a part of a larger landscape with an extent of about 12500 km<sup>2</sup> encompassing a number of Tiger Reserves and Protected Areas (Fig. 2) spread over Karnataka, Tamil Nadu and India. This is also part of Elephant Reserve and part of the area is under Nilgiri Biosphere Reserve.



**Fig. 2 The landscape covering a larger area**

## The National Highway 212

The National Highway 212 (NH 212) is a link between Kerala and Kanataka and is considered as the life line for the people of Northern Kerala and also for the farmers of

Gundlupet in Karnataka (Fig. 3). People of Kerala especially from Malabar region depends on NH 212 for their various needs. The Highway is passing through Bandipur Tiger Reserve of Karnataka and Wayanad wildlife sanctuary of Kerala. As many other highways in India that passes through Protected Areas, it also creates issues such as road kills, pollution to the edge habitat etc. As per the records of forest department of Karnataka, a total of 42 large animals were killed within a period of 12 years (01-01-2000 to 25-12-2012) due to road accidents on NH 67, and 14 large animals (including one male elephant and an elephant calf) were killed on NH 212 from 01-01-2000 to 25-12-2012 (Conservator of Forests & Director, Bandipur Tiger Reserve, Annexure I).

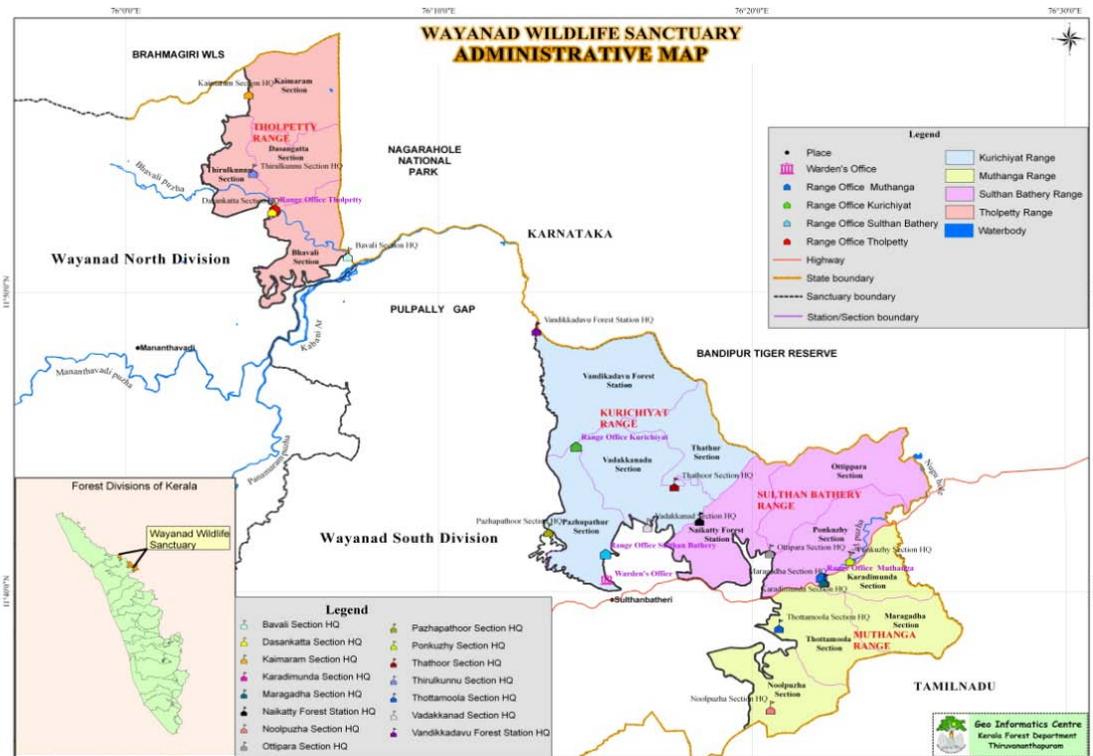


Fig.3. The roads in Wayanad area

The Deputy Commissioner of Chamarajanagar issued an order dated 03.06.2009 prohibiting traffic of all kinds of motor vehicles on NH-212 between Gundlupet and Sulthan Bathery and on NH-67 between Gundlupet and Ooty on certain conditions resulting in restriction of movement of traffic between 9 PM and 6 AM, for avoiding nuisance to the wild animals of

Bandipur Tiger Reserve. The order was withdrawn by the Deputy Commissioner on 10.06.2009. However, the ban was made operational again from 27-07-2009.

The Government of Kerala, considering several representations from the general public and People's Representatives decided to entrust a study to Kerala Forest Research Institute to look at the present situation and suggest alternative routes, if necessary. Though KFRI was asked to look at NH 67, this was not taken into consideration since the road is not directly connected to Kerala.

## **METHODS**

Considering the time frame, it was decided to go for interaction with different stake holders through structured questionnaire. The stake holders included farmers, retail and whole sale businessmen, tourism industry, press people, truck/medium/ light vehicle drivers and operators, forest officials. The farmers interacted were from Gundlupet and Sulthan Bathery. The questionnaires were designed according to the type of stake holder but broadly covered to measure the attitude towards conservation, frequency of use of the NH 212 before and after the ban, response to night traffic ban, response to wildlife on sighting at night, type of goods transported in case of medium/heavy vehicles, suggestions regarding alternate routes and willingness to pay extra for night journey (Annexure II – X). This was a sort of modified *Rapid Rural Appraisal* seeking information from a variety of stake holders over a short period of time. Through consultation, the attempt was to test the implemented regulation for acceptance to local community thus leading to a solution in collaboration with the stakeholders

In addition, details of vehicular movement from and towards Karnataka were recorded at the border from 6 to 8 in the morning (immediately after opening of the road) and from 6 to 9 in the evening (before the closure of the road). There was also interaction with the officials of Karnataka and Kerala for more information on road kill.

## **OBSERVATIONS**

People's dependency on NH 212 for fulfilling their various needs such as tourism, trade, education, health, job and business etc. were identified broadly. To identify and record the problems of night traffic ban on NH 212, direct interview and questionnaire survey is used. A total of about 326 stake holders were interviewed with structured questionnaires. The stake

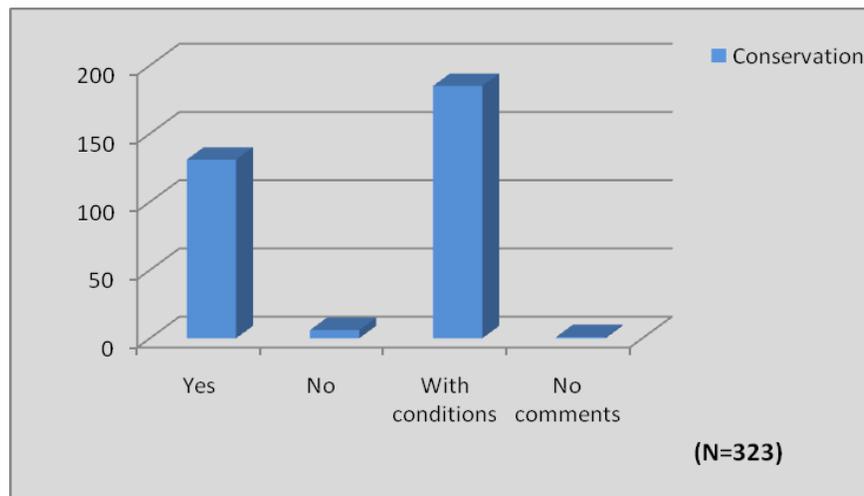
holders interviewed included 238 drivers on NH 212, 26 farmers in Gundlupet, 17 traders in Wayanad, 23 truck owners of Wayanad and Calicut, 8 representatives of tourism industry in Wayanad.

The following questions were common to all the stake holders

- Need and importance of bio diversity conservation?
- Response on night traffic ban?
- Whether ban should be lifted or not?
- Response towards wildlife on roads?
- Suggestions regarding alternate routes for NH 212?
- Willingness towards extra money for night journey? If yes how much would they pay?

### Need and Importance of Conservation

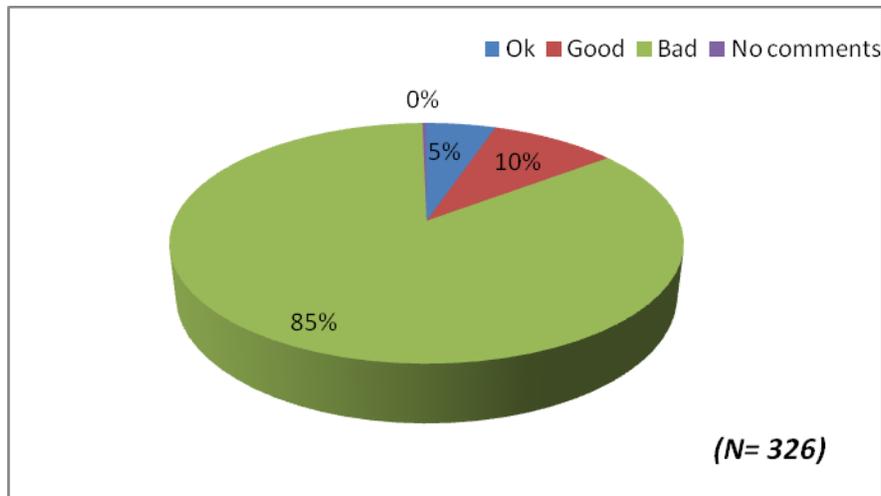
Majority of the people (57%) were for conservation but with conditions (Fig. 4). Almost 41 % believe that animals should be conserved. Forest officials were excluded from this question.



**Fig. 4. Response of the people on the need and importance of conservation**

### Response on Night traffic ban

Responses regarding night traffic ban on NH 212 were recorded by giving four options viz. Ok, Good, Bad and No comments. Other than one with no comment, only 5 % of those responded felt it necessary (Fig. 5). About 10 % were affirmative and replied that it is good whereas 85 % of the respondents considered night traffic ban on NH 212 as bad. Among the stake holders, traders, drivers, farmers, truck owners and representatives of tourism industry considered night traffic ban on NH 212 as a bad move. Whereas representatives of forest department and media persons commented that night traffic ban on NH 212 was a good thing and a small percentage of the total remains with no specific opinion.



**Fig. 5 Response on night traffic ban**

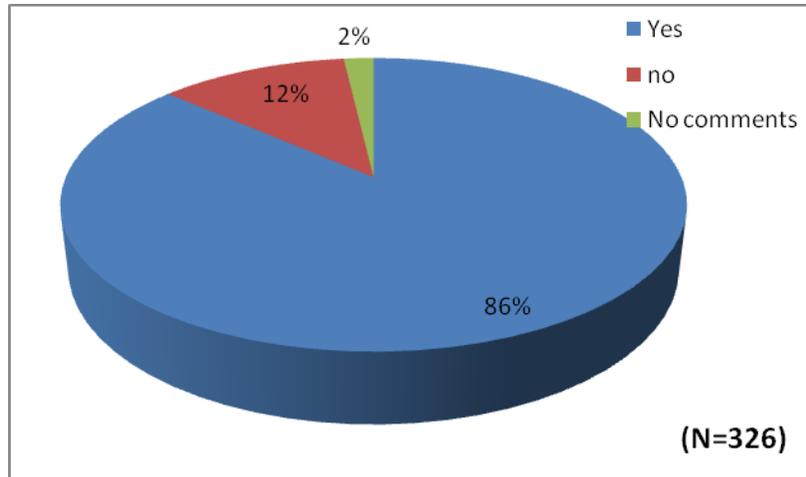
### Response on removal of night traffic ban

People responded to the three options on lifting of night traffic ban. About 12% replied that there is no need of removal of night traffic ban whereas 86% felt it necessary to lift the ban on night traffic (Fig. 6).

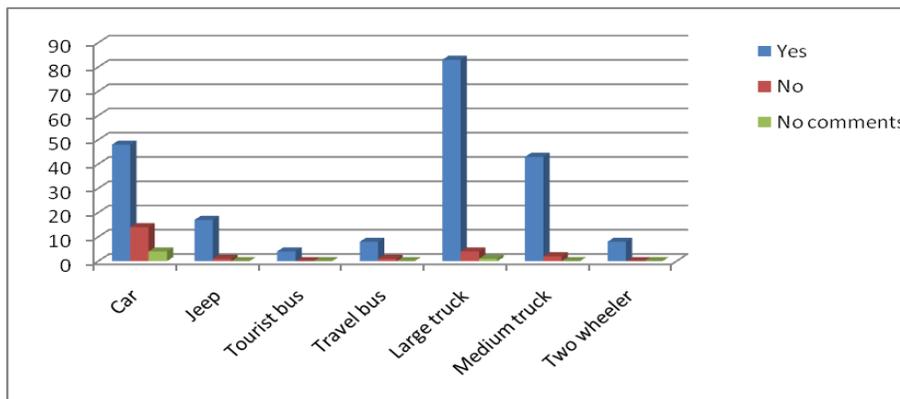
### Drivers response on removal of ban (N=238)

Out of 238 drivers, 211 were for lifting the ban, 22 were comfortable with the present situation and 5 remained with no comments (Fig. 7). Large/medium trucks and private cars were

the major type of vehicle that depends on NH 212 frequently. About 73% of car drivers and 96% of truck drivers were against the night traffic ban.



**Fig. 6 Response on lifting the ban on night traffic**

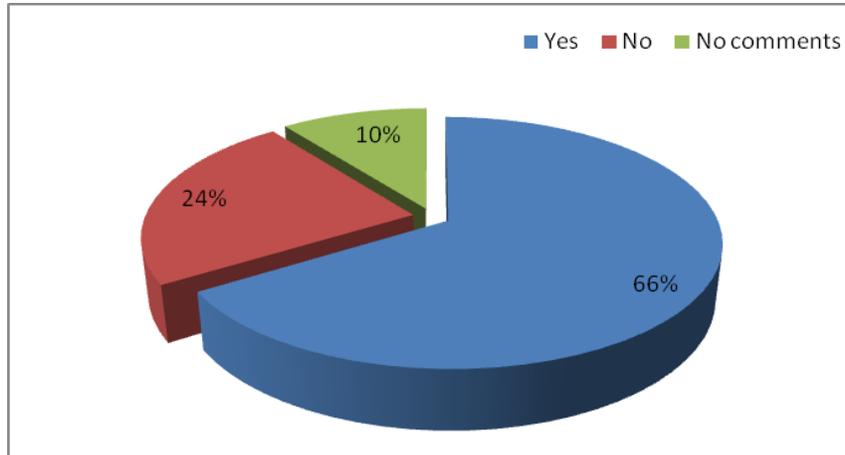


**Fig. 7. Drivers' response on lifting of ban**

### **Extra payment for night journey (N=298)**

The question of payment was towards a number of stake holders including truck owners, tourism operators and drivers. The willingness for extra payment (a sort of levy for conservation) for night journey indicates the necessity of night traffic and hence included in the questions. Forest officials and farmers were excluded from this question. People responded positively to this suggestion and 66% of them replied that they are ready to pay and felt that it might reduce

the rush of vehicles during night (Fig. 8). However, 24 % were not comfortable with the idea of payment for night journey.



**Fig. 8 Willingness to pay for night traffic**

#### **Amount willing to pay for night journey (N=281)**

Out of those responded positively for paying for night journey, 42% (119) were willing to pay between Rs. 10 and 50, 35% (97) to pay between Rs. 50 and 100, 5% (13) between Rs. 100 and 200 (Fig. 9). About 1% each was for Rs. 200-300 and 300-500. There was just one who was willing to pay up to Rs. 1000. Majority of the traders were willing to pay (82.3%) and 41% of the willing traders were ready to pay to the tune of Rs. 50-100 for night journey. Out of the 67% of the willing drivers, 44% were ready to pay Rs. 10-50 and 33% offered Rs. 50-100. About 75% of the tourism operators offered to pay. But the amount varied a lot and one of them was ready even for Rs. 1000. Truck owners (57%) also were willing and the amount varied from 10 to 100.

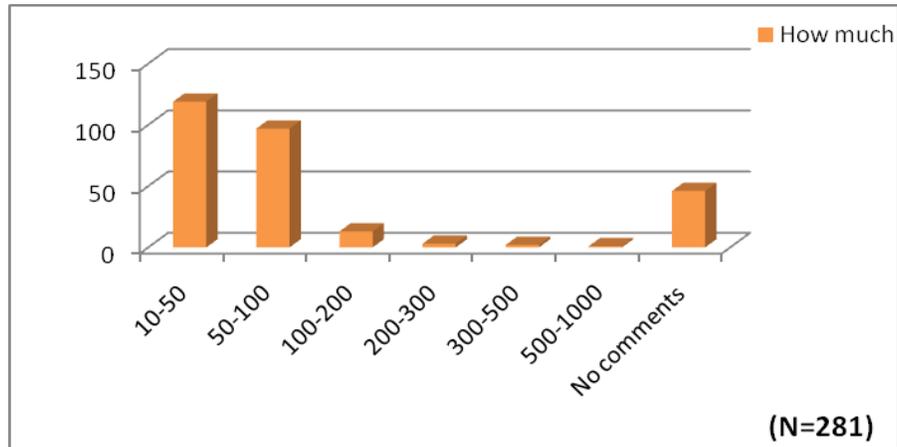
#### **Response while sighting animals on road**

Response towards wild animals sighted on the road shows that 77% (217) of the people were reducing their speed and moved on, 22% (61) stopped and waited till the animal moves out from the road, 1% (3) used to scare the animal away by blowing horn (Fig. 10).

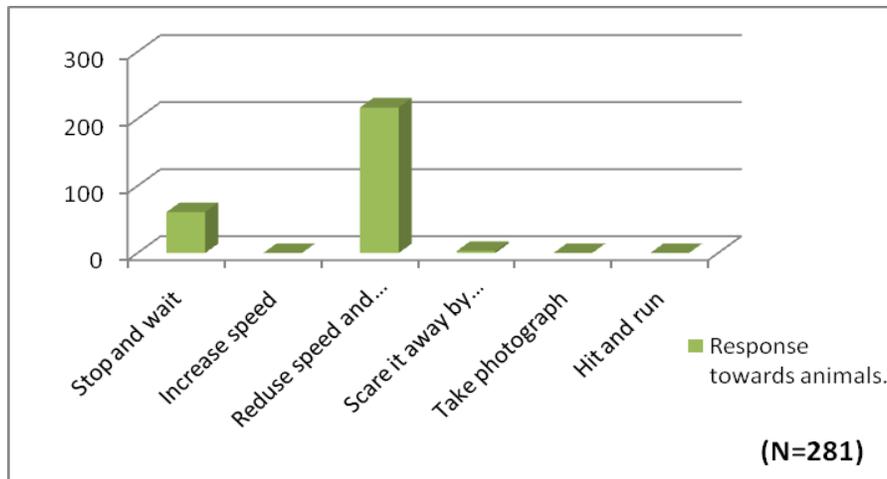
#### **The vehicle types on the road**

The taxis, goods carriers and private vehicle were using NH212 in almost equal proportion (Fig. 11). Majority of the goods vehicles were transporting vegetables and fruits and

others included rice and construction materials (Fig. 12). The goods vehicles were moving towards Kerala.



**Fig. 9 Response on the amount to be paid for night journey**

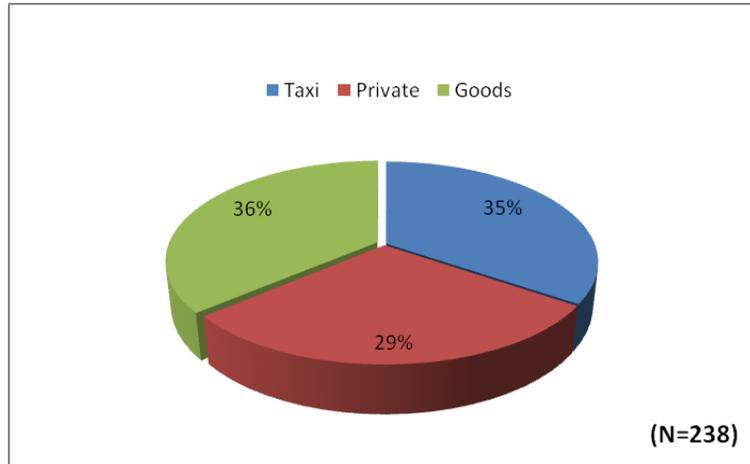


**Fig. 10 Response while sighting animals on road**

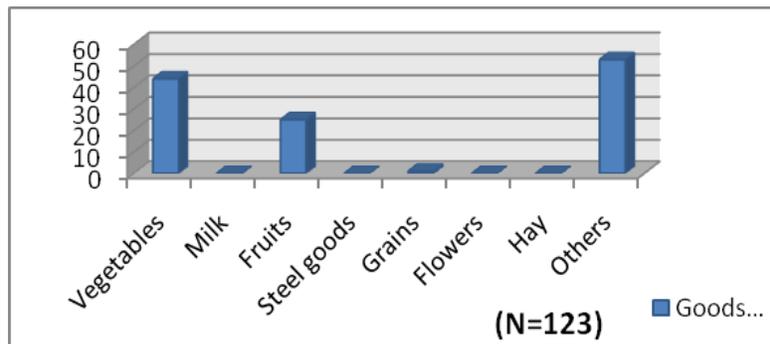
### Response of Farmers

The questionnaire survey among the farmers of Gundlupet brought out information on various aspects. They cultivate mostly vegetables and flowers (Fig. 13). Majority of the farmers sold their products through auction and/or whole sale contract (Fig 14). Majority of the buyers of the products from Gundlupet market was from Kerala (Fig. 15). The medium trucks were the main means of transportation though large trucks were used to some to extent (Fig. 16). The farmers were almost unanimous in expressing their displeasure on the night traffic ban (Fig. 17).

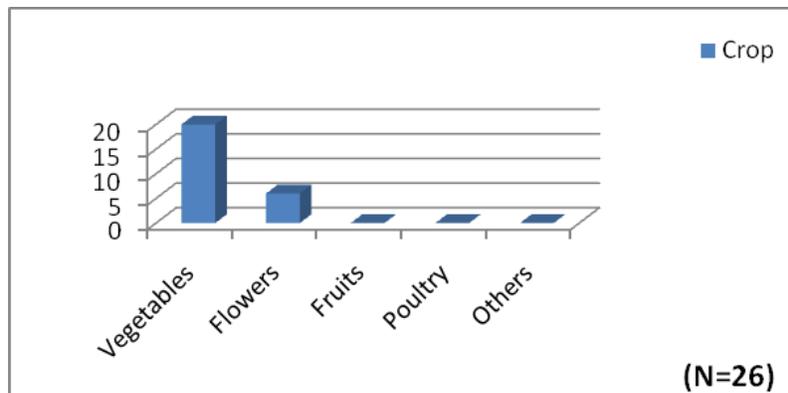
However, majority of the responded farmers were reluctant to talk about the loss in terms of money. The loss was below Rs. 5000 per day for about 31 % of the respondents and above Rs. 5000 per day for 4% of the people (Fig. 18).



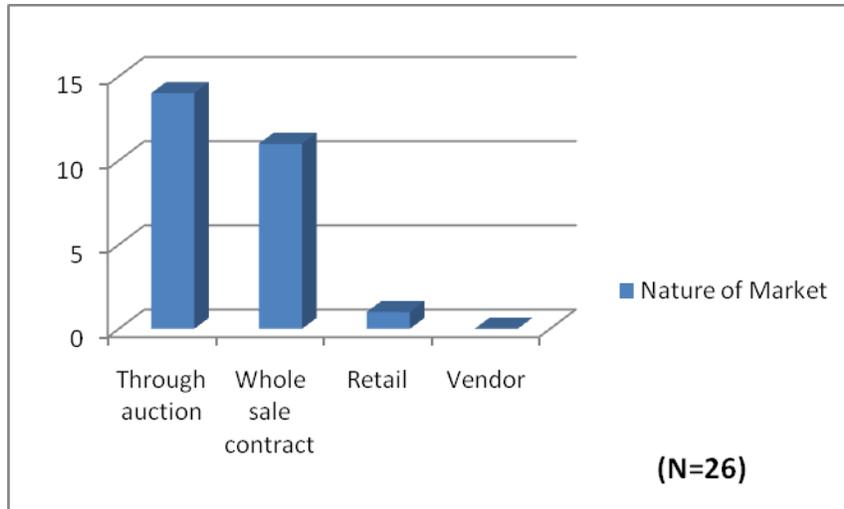
**Fig. 11 The type of vehicles plying on NH 212 during the period**



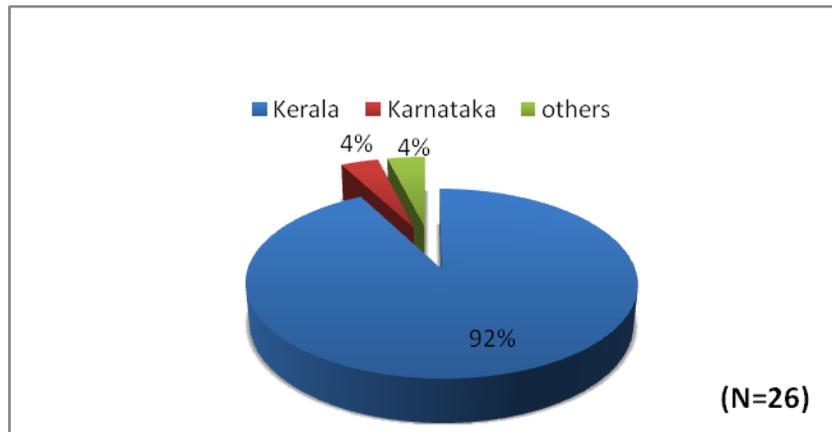
**Fig. 12 Type of goods carried by vehicles**



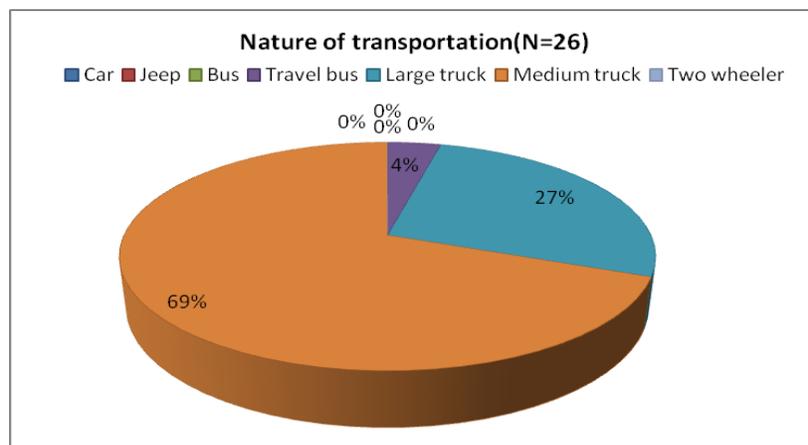
**Fig. 13 Types of crops cultivated by farmers of Gundlupet**



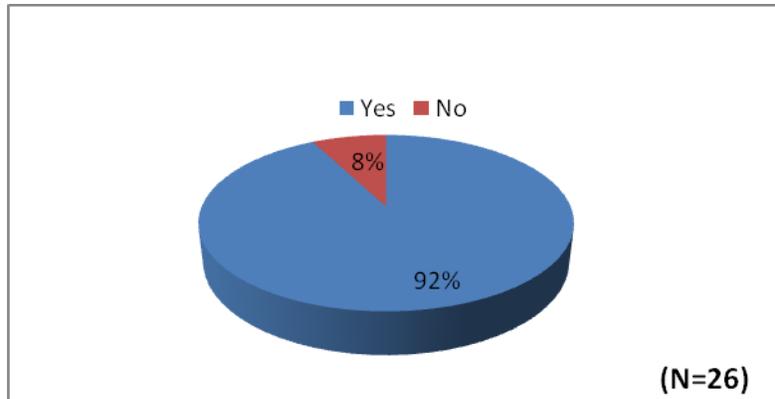
**Fig. 14. Nature of marketing of products by farmers of Gundlupet**



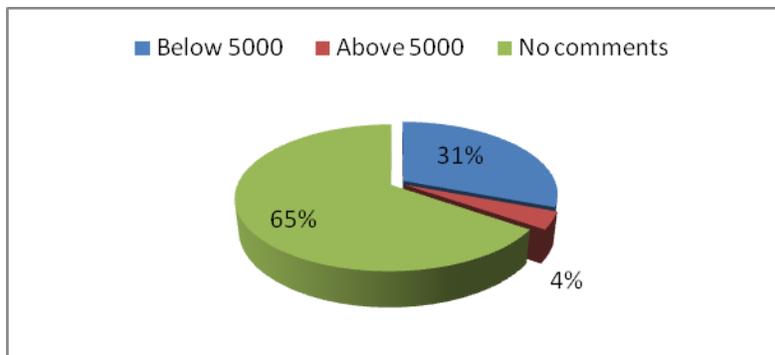
**Fig. 15 The state wise buyers of products from Gundlupet market**



**Fig. 16 Nature of transportation of the products from Gundlupet**

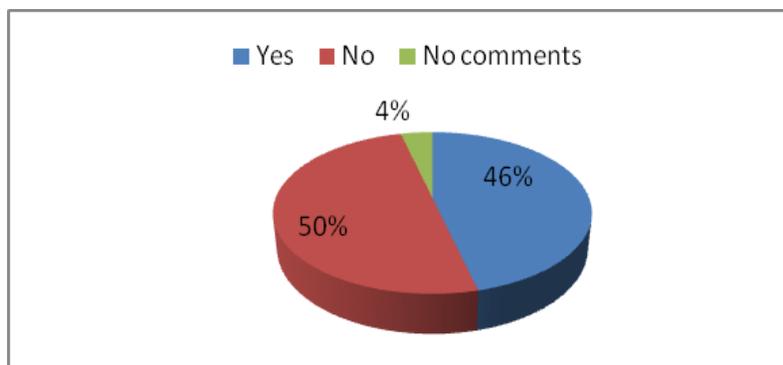


**Fig. 17 The response of the farmers on inconvenience after closure**



**Fig. 18 Response of the farmers on the per day loss due to night traffic ban**

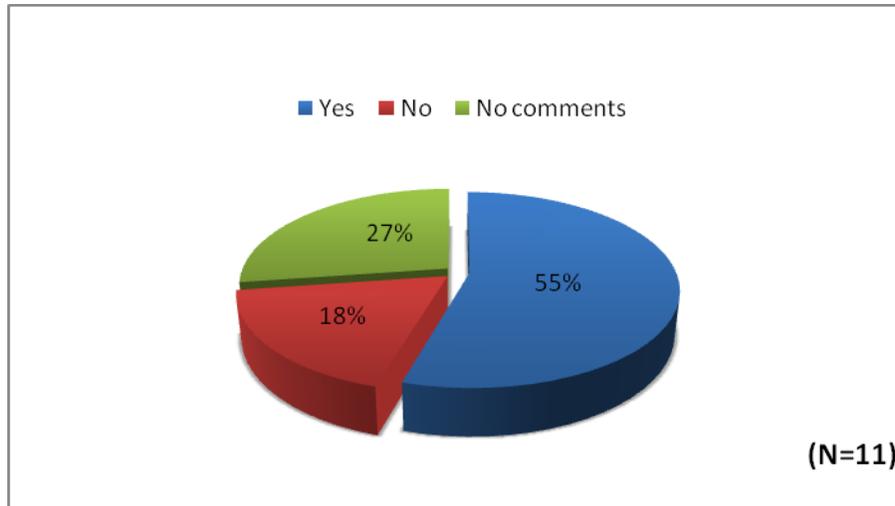
On the human wildlife conflict issues, 50% of the farmers in Gundlupet reported no conflict issue with wildlife, 46 % had problems of conflict. The rate of conflict was related to the location of the field.



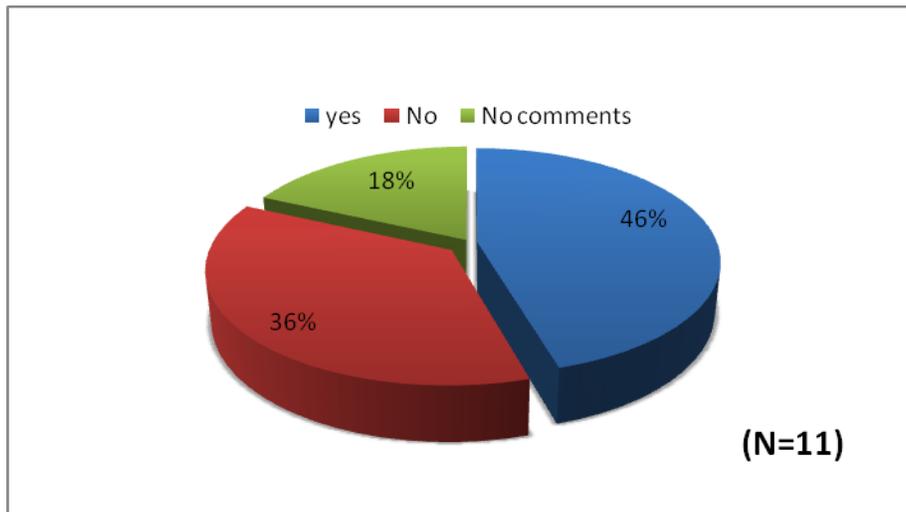
**Fig. 19 The response of farmers on human-wildlife conflict**

## Response of Media

The media persons were mostly depending on their experience especially on reporting of wildlife related incidences. Before the night traffic ban, 55% of the respondents had reported road kills (Fig. 20). After the night traffic ban, there was a slight reduction on the reports (Fig. 21).

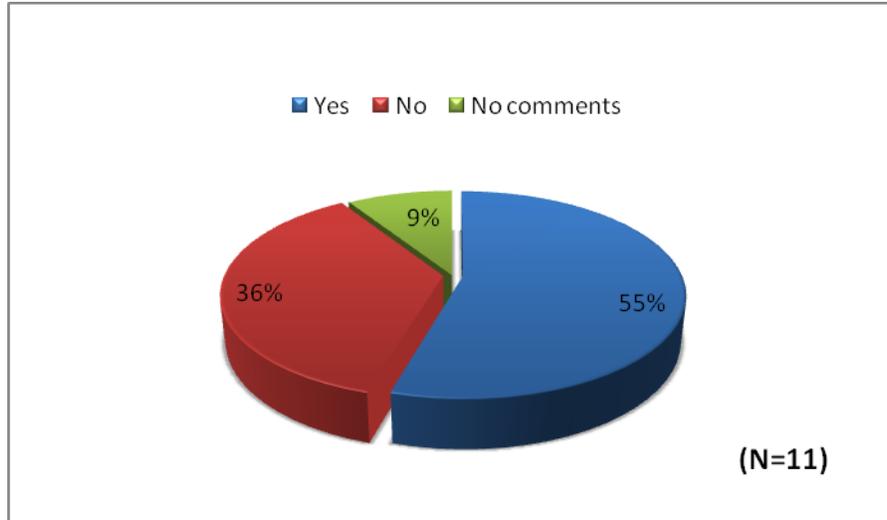


**Fig. 20** The media response on road kill reports before night traffic ban

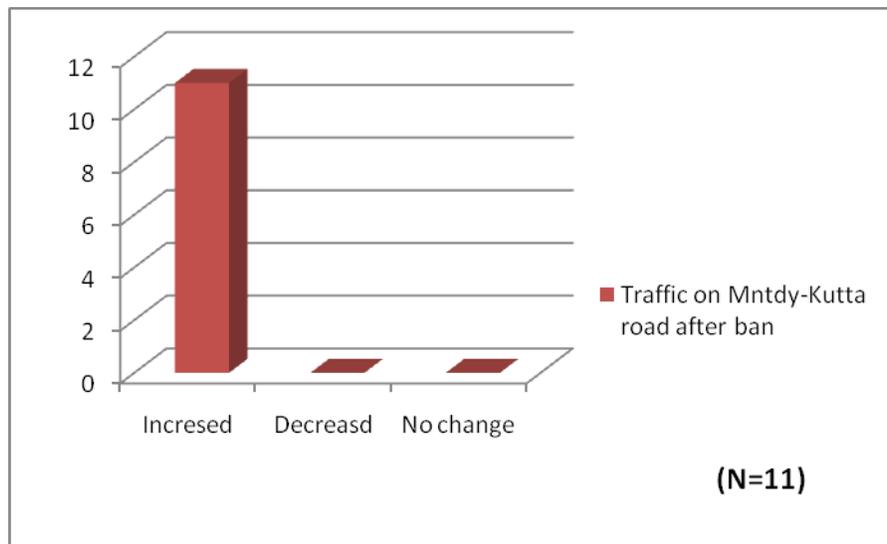


**Fig. 21** The media response on road kills reports after night traffic ban

After the night traffic ban, 55 % of media persons felt that there was a reduction in the number of reports on human animal conflict on NH 212 (Fig. 22). According to them, after night traffic ban on NH 212, the rate of traffic on Mananthavady – Kutta road has increased (Fig. 23).

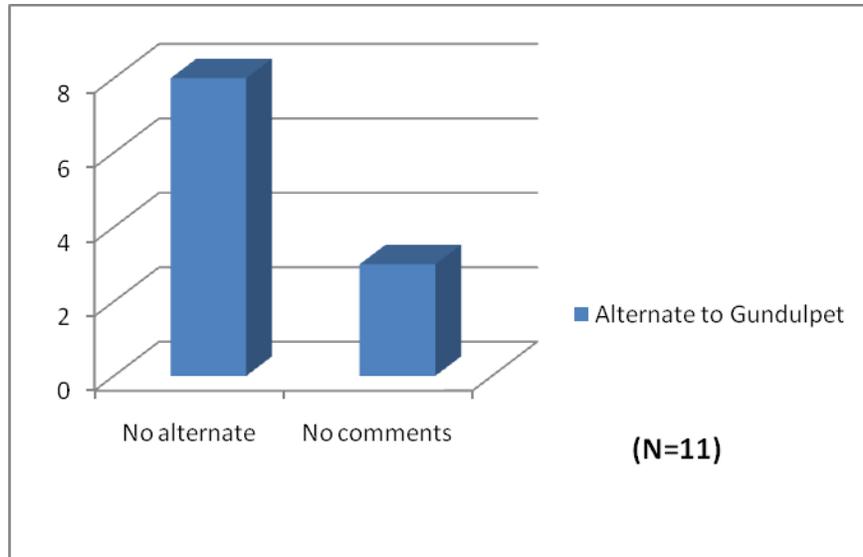


**Fig. 22 Media persons on human animal conflict after the ban**

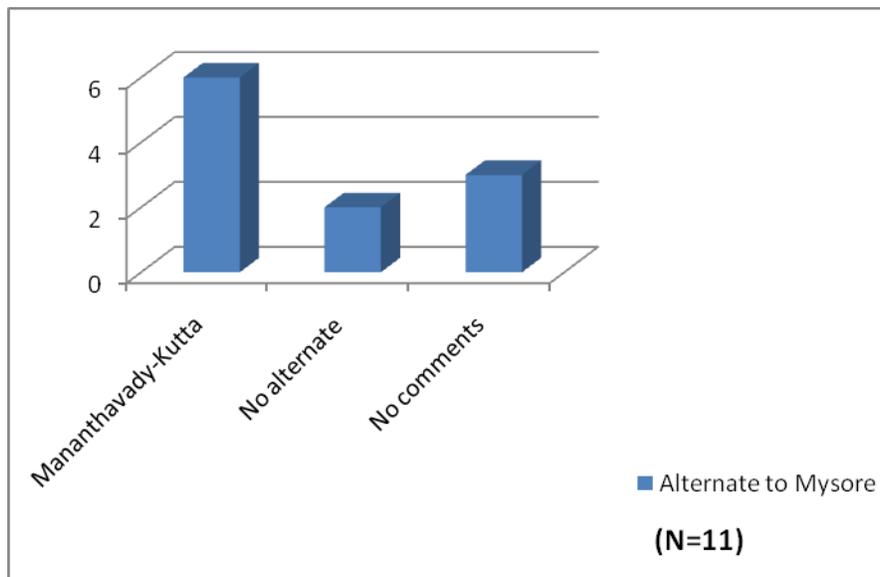


**Fig. 23 Media persons on traffic on Mananthavady-Kutta road**

According to the media persons, there is no alternate route to Gundlupet from Sulthan Bathery and suggested Mananthavady-Kutta road as alternate to Mysore (Figs. 24 and 25).



**Fig. 24 Media persons on alternate road to Gundlupet**

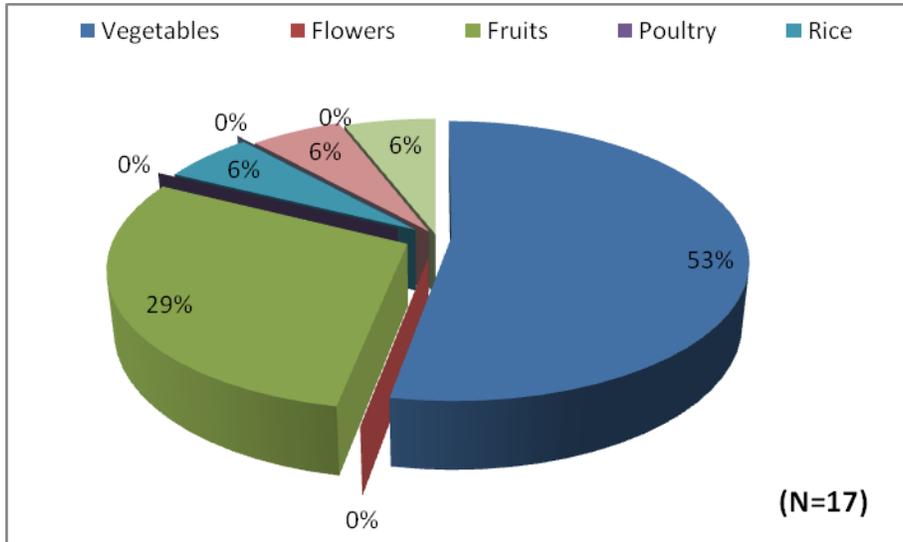


**Fig. 25 Media persons on alternate road to Mysore**

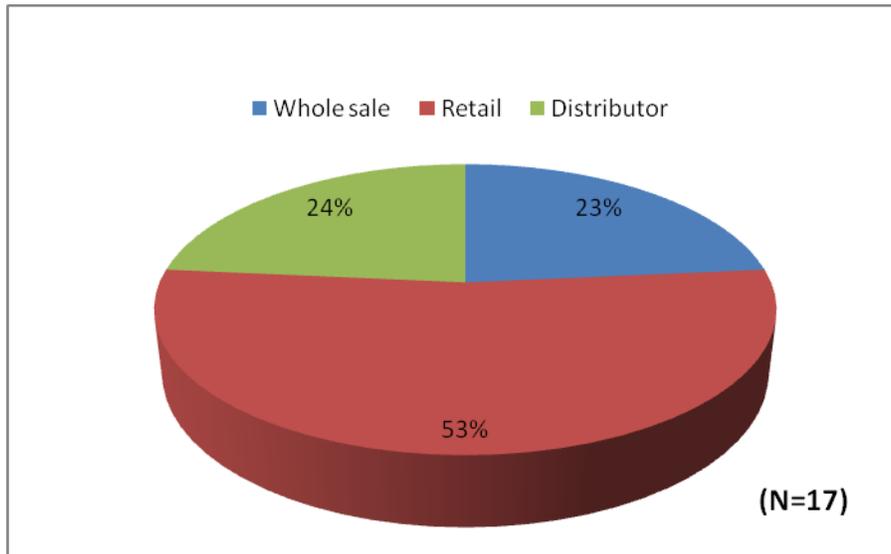
### Response of Traders

Traders use NH 212 on a regular basis to transport materials from markets of Karnataka to Kerala (Wayanad, Calicut). The traders/dealers from major towns of Wayanad (SulthanBathery, Kalpetta, Kaniyampetta) who depend on Karnataka (Gundlupet) markets were

interviewed. Of these, 53% were vegetable traders and 29% were dealing with fruits (Fig. 26). About 53% of those interviewed were retailers (Fig. 27).



**Fig. 26 The type of traders interviewed**



**Fig. 27 The Nature of trade**

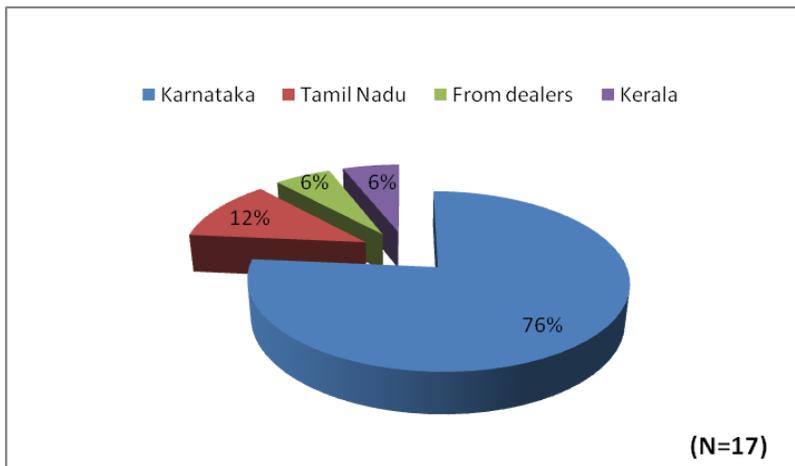
### Response of Traders on NH 212

Among the traders, 76% were dependent on Karnataka (Gundlupet, Mysore, and Bangalore) markets for their materials, 12% collect materials from Tamil Nadu and only 12% depend either on whole sale dealers and other sources of Kerala (Fig. 28). The respondent traders

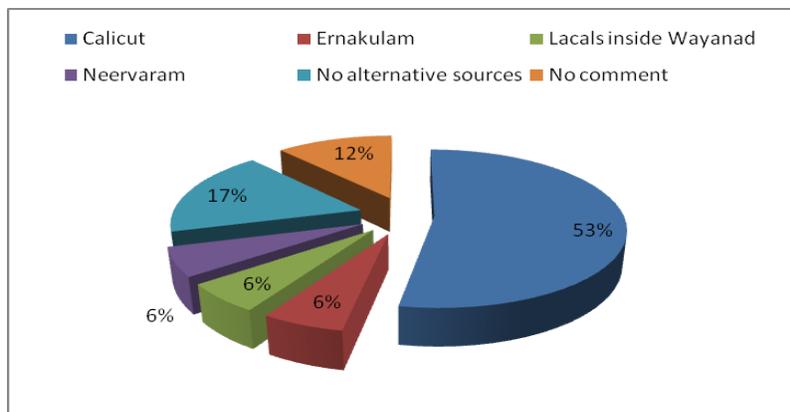
pointed out other possibilities of sources, which included Calicut (53%), Ernakulam (6%), Neervaram (6%), local markets in Wayanad (6%). But there was a group of 17 %, who believed that there was no other source inside Kerala (Fig 29).

Traders bring materials mostly on a day to day basis or once in two days (Fig. 30). This is to ensure freshness of materials especially vegetables and fruits. To transport the materials from Karnataka markets (mostly Gundlupet and then Mysore), medium trucks followed by two wheelers were used (Fig. 31).

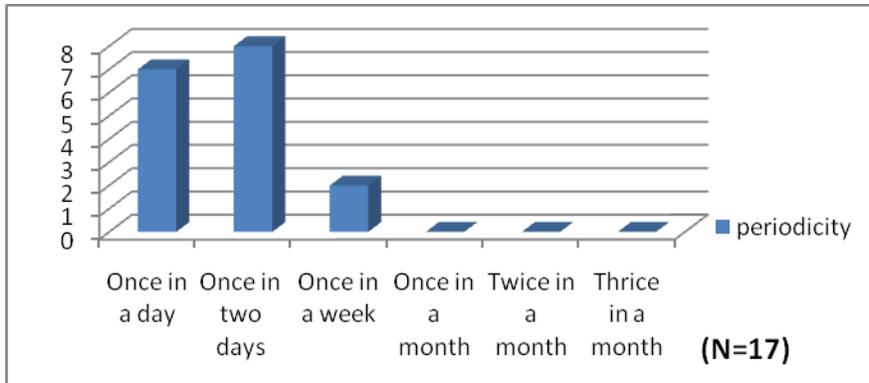
On the sighting of animals on the NH 212 while transporting materials, the traders responded that wildlife sightings very near the road was almost equal during day and night time (Figs. 32 and 33).



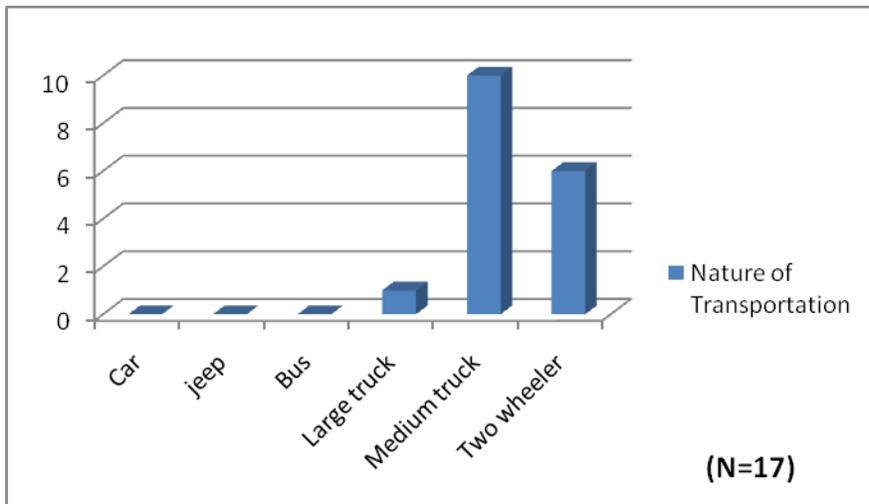
**Fig. 28 The material source of traders in Wayanad**



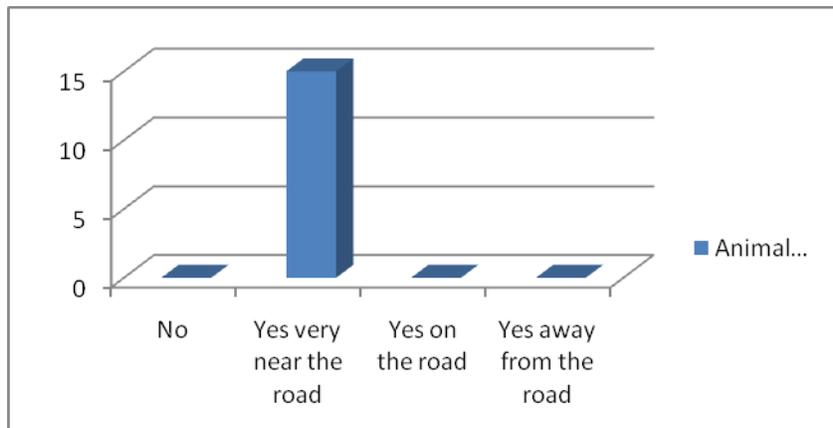
**Fig. 29 The traders' response on alternate sources of materials**



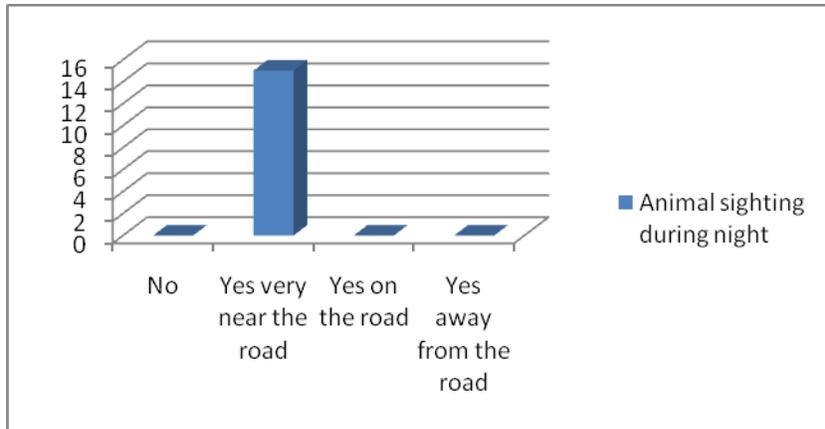
**Fig. 30 Frequency of road use by traders**



**Fig. 31 The mode of transportation of materials by traders**



**Fig. 32 The animal sightings on NH 212 during day time**

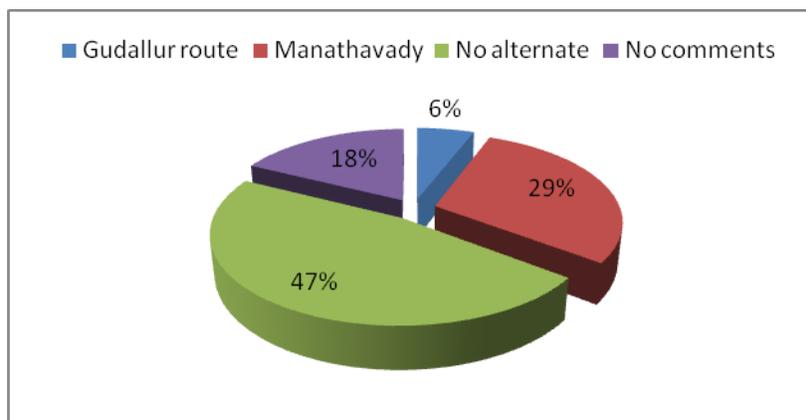


**Fig. 33 The animal sightings on NH 212 during night time**

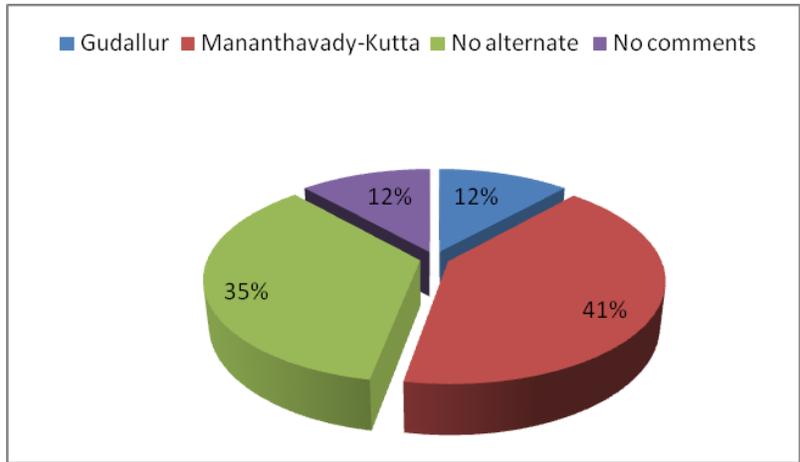
About 47 % of the respondent traders believed that there was no alternate ways to Gundlupet market and 29 % suggested Mananthavady-Kutta as an alternate route. About 6% suggested via Gudallur as an alternate (Fig. 34). On alternate route to Mysore, 41 % suggested mananthavady – Kutta as an alternate route, 35% commented that there was no alternate to Mysore and 12% suggest Gudallur route (Fig. 35). Traders had never seen a road kill on NH 212 (Fig. 36).

### Response of tourism industry

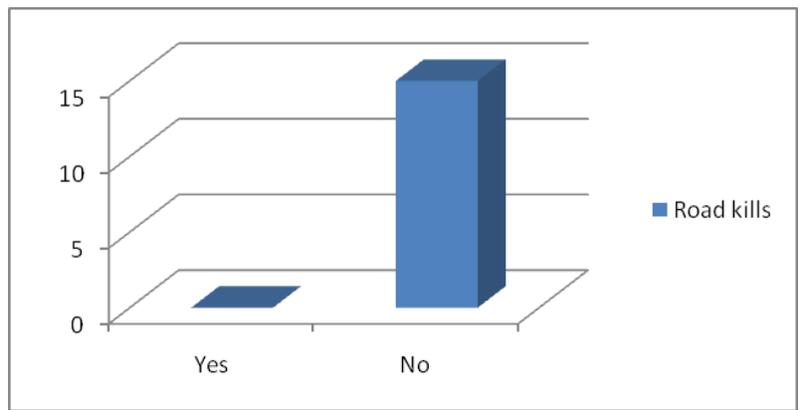
The visitors to Wayanad are mostly from Bangalore and Mysore, who comes to the destination on weekends. The tourism industry reported a loss of 87% in the income after the night traffic ban (Fig. 37), which is a reflection on the reduction of visitors to Wayanad.



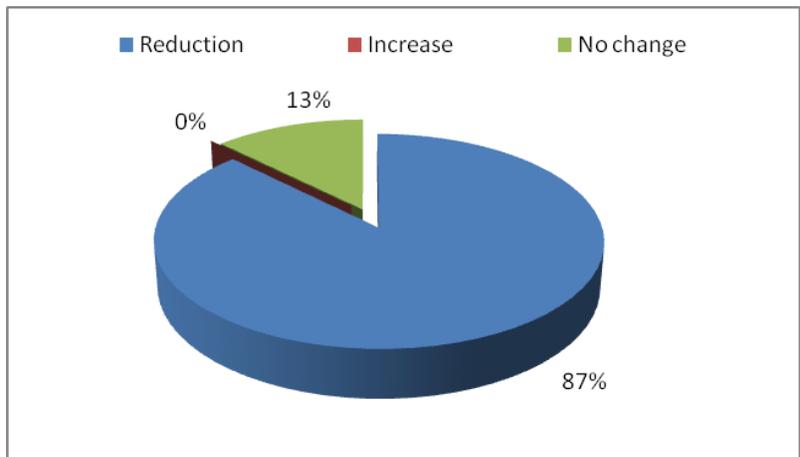
**Fig. 34 Response of traders on alternate route to Gundlupet**



**Fig. 35 Response of traders on alternate route to Mysore**



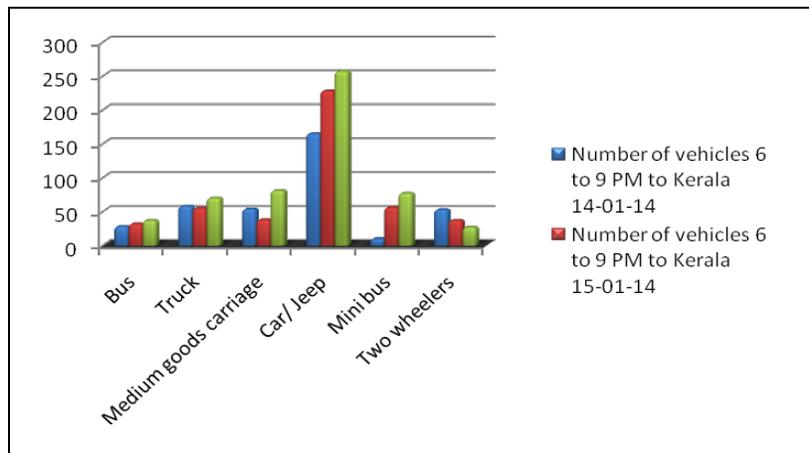
**Fig. 36 Traders' response on sighting road kills**



**Fig. 37 The loss to the tourism industry after the ban**

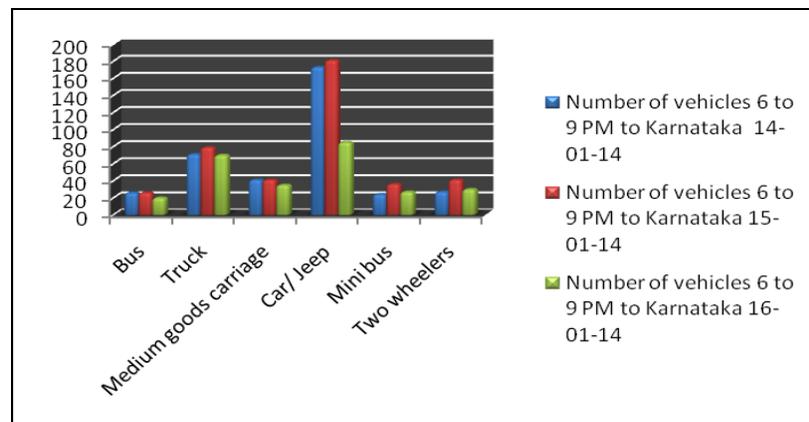
## Vehicle Count

The vehicles counted between 6 PM and 9 PM on various days indicate that light vehicles like jeep/car numbering up to 250 were plying towards Kerala during the three hour period (Fig. 38). Medium goods carriages, large trucks and minibuses were in 50s. These when added up shows that a minimum of about 300 and a maximum of about 510 vehicles will be on the road between 6 PM and 9 PM.



**Fig. 38 The vehicular movement to Kerala(6 PM to 9 PM) on selected days**

The vehicular movement figures for the period 6 PM to 9 PM towards Karnataka are presented in Figure 39. These figures, collected directly on various days indicate a minimum of about 240 and maximum of about 370 vehicles moving towards Karnataka during the three hour period.



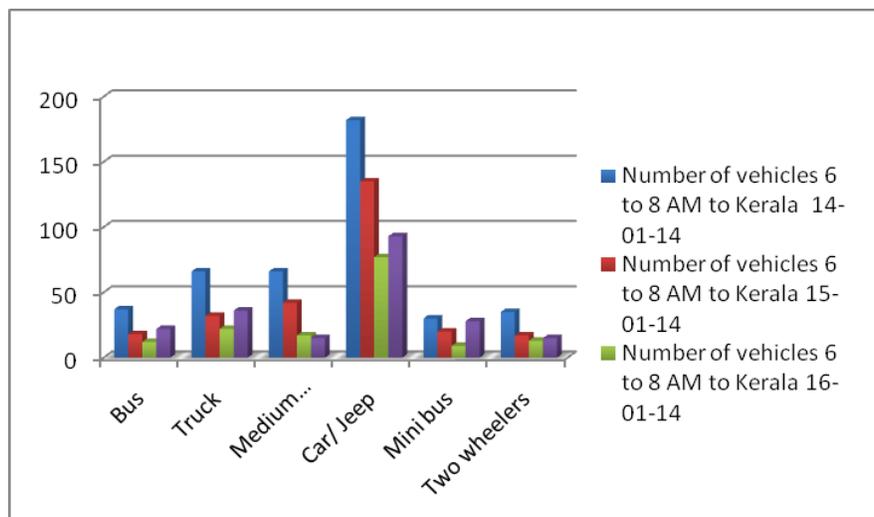
**Fig. 39 The vehicular movement to Karnataka (6 PM to 9 PM) on selected days**

The number of vehicles moving towards and from Karnataka during the three hour period of 6 PM to 9 PM, when added up indicates a minimum of 540 and a maximum of 880 vehicles on the road, which is about 180 to 290 vehicles per hour on the road.

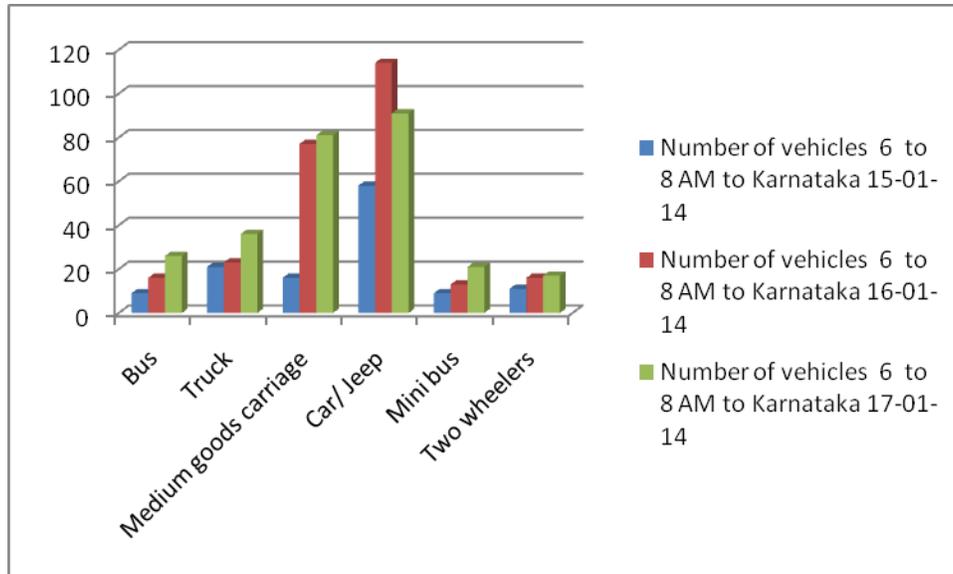
The vehicle movement during the two hour period of 6 AM to 8 AM to Kerala also indicates that majority were light vehicles followed by medium and large trucks (Fig. 40). During the two hour period in the morning there was a minimum of about 148 and a maximum of 416 vehicles on the NH 212 road in Bandipur area. This is worked out to be about 74 to 208 per hour.

The number of light vehicles like car and jeeps formed the majority of vehicles moving towards Karnataka in the morning hours when the check posts are open after the night ban. The medium goods carriages also were in good numbers during the period. The total of various vehicles counted during the period indicates a minimum of 124 and a maximum of 295 vehicles on the road, which is about 62 to 147 vehicles per hour in Bandipur road.

The figures obtained from the sampling of the vehicles, from 6 AM to 8 AM, moving from and towards Kerala check post indicate the presence of about 272 to 711 vehicles on the road during the two hour period. In other words, there are about 136 to 355 vehicles per hour pass through Bandipur in the morning when the check posts are lifted for vehicles to pass through.



**Fig. 40 The vehicular movement to Kerala (6 to 8 AM) on selected days**



**Fig. 41 The vehicular movement to Karnataka (6 to 8 AM) on selected days**

## Discussion

Biodiversity or the biological capital is of utmost important providing direct and indirect benefits to humanity, which is one of the important economic aspects of biodiversity conservation. There are several attributes to biodiversity conservation which include ecological, recreational, scientific, spiritual, cultural and religious values. The structure and function of ecosystem are threatened by changes in land use, over exploitation of the natural resources leading to habitat loss and fragmentation, invasion by introduced species depletion of living resources and pollution (WRI, IUCN and UNEP. 1992).

Forest roads are known to have important environmental impacts on natural habitats. These impacts could be acute in tropical rain forests because of the unique biological characteristics (Laurance *et al.*, 2009). Roads are reported to contribute to deforestation and habitat fragmentation and sometimes lead to ecological catastrophe in aquatic ecosystem. Roads and railways are often providing improved access and opportunity for human settlement which can grow from discontinuous clusters to continuous narrow band of urbanization. This can transform a previously remote undisturbed forest area to highly fragmented human dominated landscape. Colonization of roadside has happened in areas falling with in Wayanad Wildlife Sanctuary but has never been a problem along the roads passing through Bandipur Tiger Reserve.

The World Bank published *Road and Environment: a hand book* in 1997. This is considered to be a guide to encourage integration of environmental consideration into road development (World Bank Technical report No: 376). The response of an ecosystem to impacts due to road development is governed by many factors and the ecosystems adapt itself in difficult ways to road related impacts. The forest ecosystem which is the most affected due to impacts of roads is the one which exhibit changes in the shorter duration but are highly resilient (Rajvanshi *et al.*, 2001).

The direct impacts, which include the loss of habitat, increased soil erosion, road kill of wild animals and changes in the habitat structure are more often measurable. The indirect impacts such as restricted movement of some species, impact on the animal communication are the ones which are difficult to be quantified though they are sometimes of profound consequences. There could also be the problems of cumulative impacts, each individual impacts adding to the larger consequence (Rajvanshi *et al.*, 2001) have detailed the impacts on the wildlife with examples. Environmentally sensitive designing of roads and its operation with effective regulations, credible compliance monitoring and enforcement could lead to better protection of wildlife thereby reducing the adverse impact of roads (Rajvanshi *et al.*, 2001).

It is comparatively easy to quantify the magnitude of impacts on physical environment. Though it is difficult to quantify effects on the biological environment, it is much more complex to measure the effects on people. Some of the indicators of the impact on people could include the number of people affected, estimated economic loss and effect on social and economic culture. The community tolerance of the impact and preference in relation to the cost and benefits of the project during construction and operation is also an important aspect.

The development and execution of an effective public consultation programme is essential in defining relevant mitigative measures even in road construction and operation. The mitigation measures/regulations should also be accepted by local people. Anything implemented without public support will put serious pressures on the quality of life of the local population and frequently reduce it. There are many examples of this around the world. The planning of practical mitigative measures will also bring in goodwill and a collaborative atmosphere. It is also important to have the support of the general public for conservation.

Protected areas are considered to be the last refuges for wild plants and animals. The areas around the protected areas provide links between protected areas and often contribute to the formation of large sized habitat for long term conservation. This in turn ensures the functional integrity of wildlife habitat and maintenance of viable population which are the two pre-requisites for long term conservation. It has been suggested that impacts of roads on wildlife values must be managed and monitored throughout the life cycle of a road project include, planning construction, operation periods (Rajvanshi *et al.*, 2001).

Bandipur Tiger Reserve, which is a part of the larger landscape including several Protected Areas in Karnataka, Tamil Nadu and Kerala is also the home to several species. Falling within the Tiger Reserve and Elephant Reserve, the area is also critical for conservation of wildlife. The Tiger Conservation Plan guidelines also have indicated the necessity to reduce pressure on the Reserve. But the guidelines have also suggested to go for highway patrolling for regulation for curbing illegal activities.

The statement on road kills along NH 212, for the period 2000-01 – 2012-2013, provided by the Conservator of Forests and Director, Bandipur Tiger Reserve (Annexure I) indicates deaths of only 14 animals in a period of 10 years. Even if some of the smaller ones were not recorded, the number of road kills, as per record is not very large to bring in a total ban on night traffic. It may be mentioned that the number of offences (poaching) recorded during the period was 58 animals of which 8 were related to elephants.

Prakash (2012) conducted a study (February – May) on the impact of highways on wildlife in Bandipur Tiger Reserve. This was the period when the night traffic ban was in place. The short term study on the road kills were from the observations from 06.00 to 07.00 hrs. Prakash (2012) recorded kills of 158 individual animals in 43 species. About 105 of these were reptiles and 38 were birds. According to him, the highways impact each species differently and garbage disposal and vehicular speed are the two factors contributing to the mortality. These recorded mortalities have not accounted the amphibians. These observations definitely indicates that the mortality of these animals have occurred not at night as envisaged but was either during traffic during day time or in the evenings before closure. The list of animals hit also indicates that it was mostly the nocturnal or crepuscular ones which were hit by vehicles though there were diurnal ones also (Prakash, 2012).

The road, which existed before Bandipur was declared as a Tiger Reserve in 1974, have since been expanded and notified as National Highways. The interactions with various stake holders during the present study have revealed the economic loss and ‘inconvenience’ to the people both in Wayanad and also in Gundlupet in Karnataka. Though ‘inconvenience’ cannot be a valid reason for an action, the dissatisfaction and the loss to the people should be a factor to be considered while bringing in regulation. This is especially true for a community, which has been in constant touch and business with Gundlupet and Mysore in Karnataka. It is to be remembered that the agitation of the people of Wayanad against the ‘proposed’ buffer of Tiger Reserve and Eco-sensitive area was a fall out of the ban on night traffic ban and the people have become totally against any conservation programme for fear of strict regulation affecting their normal life.

The National Board for Wildlife has considered a Guideline for linear infrastructure intrusions in natural areas: roads and power lines, where certain regulations have been suggested while considering the roads. According to the guideline, the existing provisions in Section 38V of the Wildlife Protection Act, 1972 could be brought in force with certain conditions like complete night traffic ban of commercial vehicles. The relaxation is also applicable to vehicles carrying crops and produce from plantations and agriculture within or adjoining protected areas where no alternative roads exist, with registration and monitoring of speed norms and checks at designated forest check posts. The guideline also suggest convoy systems with regulated speed and timing as alternatives to a complete ban on traffic in areas where a dual-check post monitoring system is feasible. High toll fee during late evening and early morning hours (along with night closure) as a disincentive for use of roads passing through critical areas is also suggested. According to the guideline, vehicle speed should be within 30 km per hour and speed surveillance system should be in place.

There had been a number of suggestions as alternate to the existing road. One of the suggestions has been upgradation of the following existing roads.

- Hassan – Somvarpet – Madikeri – Gonikoppa – Kutta – Tholpetty – Aranappara – Appapara – Panavalli –Mananthavadi
- SH 33 of Karnataka with extension from Mananthavadi to Vadakara and from Koratagaere to Penukonda

Flyovers in NH 212 had also been suggested. There had also been suggestions for railway lines passing through Wayanad. All these suggestions could be considered as long term solutions and can be implemented after appropriate studies including EIAs. As it stands now, these suggestions, if at all implemented will take years and may not address the issues raised by the people at present.

## **Recommendations**

Considering the above facts and the inferences from the stakeholder interactions, it is clear that the present ban of traffic between 9 PM and 6 AM is not justifiable. The following suggestions will protect the interest of both the wildlife and the people and ensure public support for conservation.

- Considering the observations after the implementation of the night traffic ban, it is suggested that a total ban could be in place between 6.00 and 7.00 in the mornings and evenings.
- For the rest of the time of the existing ban period from 9 PM, convoy system could be in place and the number of vehicles in one convoy could be limited to 50.
- The convoy will also be only once in an hour. The convoy from both the check posts (in Gundlupet and Kerala) will start at an interval of half an hour to ensure that the number of vehicles on the road at a given time is limited to 50.
- The convoy should be guided by a vehicle with Forest department staff limiting the speed to less than 30 km/hour. The Kerala and Karnataka Forest Department will work together for the implementation of the programme.
- The vehicle could be levied a fee of at least Rs. 50/- for LMVs and Rs. 100/- for HMTVs for the night traffic. This will work as a disincentive for travelling at night. No two wheelers should be permitted at night and the suggestion is for the safety of the passengers.
- Speed surveillance system should be in place at every one km and the violators could be fined heavily, preferably Rs. 1000/-.
- There should be a quarterly review of the system after implementation and a monitoring team with competent persons of scientific back ground should be formed. The Review

Committee should have the representatives of both Kerala and Karnataka Forest Department and the Monitoring Team.

- The monitoring team will collect data on road kills, recording the time and species along with GPS readings of the locations. They will also collect information on the animal sightings on the road during day and night through appropriate methods. A quarterly report will be submitted to both Karnataka and Kerala Forest Officials.

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**ANNEXURE I – Information provided by Karnataka Forest department**

**OFFICE OF THE  
CONSERVATOR OF FORESTS &  
DIRECTOR,  
BANDIPUR TIGER RESERVE, BANDIPUR,  
GUNDLUPET, CHAMARAJANAGAR 571126**

**GOVERNMENT OF KARNATAKA**



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E-mail: dcf.bandipur@gmail.com  
Web: www.bandipurreserve.in

**KARNATAKA FOREST DEPARTMENT**

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No. B2/WL/RTI/GL-5838/2012-13  
Σ-03

Dated : 11-02-2013

To,  
Sri. T.M Rsheed,  
✓ Convener, The Nilgiri Biosphere Reserve Form,  
Near Court Complex,  
Manikuni, Sulthan Bathery,  
Wayanada District

Sir,

Sub: Requirement of information under RTI Act 2005.  
Ref: (1) Your letter dated 24-12-2012 & 06-02-2013.  
(2) This office even letter dated 30-01-2013.  
(3) Your letter dated 06-02-2013.

\*.\*.\*

With reference to the above, I am to state that, the information sought by you under RTI act cited under reference (1) is enclosed herewith for your information.

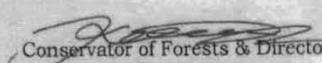
Yours faithfully,

  
Conservator of Forests & Director, 11/2/13  
Bandipur Tiger Reserve,  
Bandipur

**Bandipur Tiger Reserve**

**Statement Showing the Details of Wildlife Death due to Road Accident-  
NH-212 by Moter Vehicles from 01-01-2000 to 25-12-2012**

Year	Name of Animal
2000-01	NIL
2001-02	NIL
2002-03	Spotted Deer
2003-04	Male Elephant
	Spotted Deer
	Spotted Deer
	Tiger
2004-05	Spotted Deer
	Civat Cat
	Spotted Deer
2005-06	Sambar
2006-07	NIL
2007-08	NIL
2008-09	NIL
2009-10	Spotted Deer
	Barking Deer
2010-11	NIL
2011-12	Spotted Deer
	Elephant Calf
2012-13	NIL

 11/2/13  
 Conservator of Forests & Director,  
 Bandipur Tiger Reserve,  
 Bandipur

**BANDIPUR TIGER RESERVE**

Statement Showing the Details of Year-wise number of Cases registered under wildlife Protection Act from 2000 Jan-1 to 2012 Dec-25 for Hunting & poaching.

Year	Name of Animal											Total			
	Elephant	Tiger	Leopard	Sambar	Wild Cat	Hare	Spotted deer	Wild Pig	Civet Cat	Sloth Bear	Langur		Barking Deer	Gaur	Remarks
2000-01	-	-	-	2	-	-	-	-	-	-	-	-	-	1	3
2001-02	-	-	-	1	1	-	-	-	-	-	-	-	-	-	2
2002-03	2	-	-	1	-	1	-	-	-	-	-	-	-	1	4
2003-04	2	1	-	1	-	1	1	-	1	-	-	-	-	1	10
2004-05	1	-	-	1	-	3	-	-	-	-	-	1	1	1	6
2005-06	1	-	-	-	-	3	-	-	-	-	-	-	-	1	5
2006-07	2	-	-	-	-	1	-	-	-	-	-	-	-	3	3
2007-08	-	3	-	-	-	-	-	-	-	-	-	-	1	-	4
2008-09	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
2009-10	1	1	1	-	-	-	-	-	-	-	-	-	-	-	5
2010-11	-	3	1	1	-	-	-	-	-	-	-	-	-	-	5
2011-12	-	-	1	1	-	1	-	-	-	1	-	-	-	-	4
2012-13	-	-	1	1	-	2	1	-	-	-	-	1	-	-	6
<b>Total</b>	<b>8</b>	<b>8</b>	<b>4</b>	<b>9</b>	<b>1</b>	<b>6</b>	<b>10</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>58</b>

  
 Conservator of Forests & Director, 16/2/13  
 Bandipur Tiger Reserve,  
 Bandipur

## Annexure II Questionnaire used for drivers

**Vehicle Number:**

**Vehicle type:** Car/jeep/tourist bus/mini bus/travel Bus/large truck/Medium truck/Two wheeler

**If car, taxi or private:** Taxi/private

**If car, purpose:** recreation/educational tour/pilgrimage/family trip/Hospital case

**Name of the driver:**

**Occupation:**

**State:** Kerala/Karnataka/Tamil Nadu/Others

**Driver's educational qualification:**

**Own vehicle or not:** Own/not own

**Origin of travel:**

**Destination:**

**Frequency of use of the road NH 212:** Once in a day/Once in a week/twice in a month/once in a month/twice in a month/once in a month/once in a while.

**If not car, Goods carried:** Vegetables/milk/fruits/steel goods/grains/flowers/hay/ others – specify

**What do you think of night travel ban:** ok/good/bad

**Do you think night traffic ban should be lifted:** Yes/No

**If yes, why?**

**Is there any benefit due to night travel:** Yes/No

**If yes, what (explain):**

**Do you think wild animal should be conserved:** Yes/No/yes with conditions

**Do you see animals on the road while driving during day time:** No/Yes very near the road/yes on the road/yes away from the road

**Do you see animals on the road while driving during night time:** No/Yes very near the road/yes on the road/yes away from the road

**What do you do when a large animal (mammals) is sighted on road during day time:** Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run

**What do you do when a small animal (rodent, frog, snake etc) is sighted on road during day time:** Stop and wait/ increase speed/reduce speed and move/ scare it away by blowing horn/take photograph/hit and run/

**What do you do when a large animal (mammals) is sighted on road at night:** Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run

**What do you do when a small animal (rodent, frog, snake etc) is sighted on road at night:** Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run/

**Do you see animal carcass on road while driving:**

**Will you pay extra for night travel?:** Yes/No

**If yes, how much will you pay for per trip at night:** Rs. 10-50/ 50-100 /100-200/200-300/300-500/500-1000

Filled by :

### **Annexure III Questionnaire used for drivers in Sulthan Bathery**

**Vehicle Number:**

**Name of the driver:**

**Vehicle type:** Car/jeep/tourist bus/mini bus/travel Bus/large truck/Medium truck/Two wheeler

**If car, taxi or private:** Taxi/private

**If car, purpose:** recreation/educational tour/pilgrimage/family trip/Hospital case

**Driver's educational qualification:**

**Own vehicle or not:** Own/not own

**Frequency of use of the road NH 212:** Once in a day/Once in a week/twice in a week/once in a month/twice in a month/once in a month/once in a while.

**If not car, Goods carried:** Vegetables/milk/fruits/steel goods/grains/flowers/hay/ others – specify

**What do you think of night travel ban:** ok/good/bad

**Do you think night traffic ban should be lifted:** Yes/No

**If yes, why?**

**Is there any benefit due to night travel:** Yes/No

**If yes, what (explain):**

**Do you think wild animal should be conserved:** Yes/No/yes with conditions

**Do you see animals on the road while driving during day time:** No/Yes very near the road/yes on the road/yes away from the road

**Do you see animals on the road while driving during night time:** No/Yes very near the road/yes on the road/yes away from the road

**What do you do when a large animal (mammals) is sighted on road during day time:** Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run

**What do you do when a small animal (rodent, frog, snake etc) is sighted on road during day time:** Stop and wait/ increase speed/reduce speed and move/ scare it away by blowing horn/take photograph/hit and run/

**What do you do when a large animal (mammals) is sighted on road at night:** Stop and wait/  
increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit  
and run

**What do you do when a small animal (rodent, frog, snake etc) is sighted on road at night:**  
Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take  
photograph/hit and run/

**Do you see animal carcass on road while driving:**

**Will you pay extra for night travel?:** Yes/No

**If yes, how much will you pay for per trip at night:** Rs. 10-50/ 50-100 /100-200/200-300/300-  
500/500-1000

Filled by :



**Is there any benefit due to night transport:** Yes/No

**If yes, what (explain):**

**Do you think wild animal should be conserved:** Yes/No/yes with conditions

**Do you see animals on the road while transporting during day time:** No/Yes very near the road/yes on the road/yes away from the road

**Do you see animals on the road while transporting during night time:** No/Yes very near the road/yes on the road/yes away from the road

**What do you do when a small animal (rodent, frog, snake etc) is sighted on road at night:**  
Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run/

**Do you see animal carcass on road while transporting:**

**Will you pay extra for night travel?:** Yes/No

**If yes, how much will you pay for per trip at night:** Rs. 10-50/ 50-100 /100-200/200-300/300-500/500-1000

**Do you think of any other alternate route to Gundalpet:**

**Do you think of any other alternate route to Mysore:**

Filled by :

**Annexure V Questionnaire used for Framers in Gundlupet area**

**Date:**

**Time of interview:**

**Name of the Farmer:**

**Address:**

**Type of cultivation: Vegetables/Flowers/fruits/poultry/others (specify)**

**Nature of market/outlet: Through auction/Whole sale contract/retail/Vendor**

**Place of the buyers: Kerala/Wayanad/Sultan Bathery/Malappuram/ Kozhikode/others/  
Karnataka**

**Current time of harvesting: Early Morning/day time/evening**

**Time (specific) of harvesting prior to road closure:**

**Time (specific) of harvesting after the road closure:**

**Approximate Quantity sold per day: kg./ load (nature of vehicle)/ bundle/**

**Nature of transportation: Car/jeep/bus/travel Bus/large truck/Medium truck/Two wheeler**

**Is there any inconvenience after the closure:**

**What is the per day loss in cash due to night ban:**

**What do you think of night travel ban: ok/good/bad**

**Do you think night traffic ban should be lifted: Yes/No**

**If yes, why?**

**Is there any benefit due to night transport: Yes/No**

**If yes, what (explain):**

**Do you think wild animal should be conserved: Yes/No/yes with conditions**

**Do you have any problem with wild animals:**

**Do you think of any other alternate market for your products other than Kerala:**

**Filled by :**





**Do you see animals on the road while transporting during day time:** No/Yes very near the road/yes on the road/yes away from the road

**Do you see animals on the road while transporting during night time before ban:** No/Yes very near the road/yes on the road/yes away from the road

**What do you do when a small animal (rodent, frog, snake etc) is sighted on road at night:**  
Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run/

**Do you see animal carcass on road while transporting:**

**Will you pay extra for night travel?:** Yes/No

**If yes, how much will you pay for per trip at night:** Rs. 10-50/ 50-100 /100-200/200-300/300-500/500-1000

**Do you think of any other alternate route to Gundlupet:**

**Do you think of any other alternate route to Mysore:**

Filled by :

## Annexure VIII Questionnaire used for tourism industry

**Name and address of the respondent:**

**Occupation:**

**Business type:** Resort/Hotels/tourist guides/Home stays/Others

**What do you think of night travel ban:** ok/good/bad

**Do you think night traffic ban should be lifted:** Yes/No

**If yes, why?**

**Is there any benefit due to night travel:** Yes/No

**If yes, what (explain):**

**Do you think wild animal should be conserved:** Yes/No/yes with conditions

**Do you take tourists out at night:** Yes/No

**If yes, the route:**

**Do you see animals on the road while driving during day time on NH 212:** No/Yes very near the road/yes on the road/yes away from the road

**Do you see animals on the road while driving during night time:** No/Yes very near the road/yes on the road/yes away from the road

**What do you do when a large animal (mammals) is sighted on road during day time:** Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run

**What do you do when a small animal (rodent, frog, snake etc) is sighted on road during day time:** Stop and wait/ increase speed/reduce speed and move/ scare it away by blowing horn/take photograph/hit and run/

**What do you do when a large animal (mammals) is sighted on road at night:** Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run

**What do you do when a small animal (rodent, frog, snake etc) is sighted on road at night:** Stop and wait/ increase speed/reduce speed and move/scare it away by blowing horn/take photograph/hit and run/

**Do you see animal carcass on road while driving:**

**What is the nature of tourists you get in percentage:** Scenic lovers /wildlifers /study tour/

**What is the status of your visitors:** IT professionals ( %), Other professionals ( %), Students ( %), family ( %),

**What is the duration of their stay in Wayanad:** one day ( %)/two days ( %)/three days ( %)/, a week ( %), more than a week ( %)

**The percentage of visitors in terms of origin:** Foreigners ( %)/ Indians ( %)

**What is the percentage of visitors among the Indians:** Kerala/Karnataka/Tamil Nadu/ Andhra /Other states

**What percentage of your visitors come via NH 212:**

**What is the percentage of visitors via Mananthavady – Kutta road:**

**Is there any observed change in the tourist volume after the night ban:**

**If yes, what is the change in terms of numbers:**

**Is there any change in the income due to night traffic ban:** Reduction/Increase

**What is the percentage of loss due to night traffic ban:**

**Will you pay extra for night travel?:** Yes/No

**If yes, how much will you pay for per trip at night:** Rs. 10-50/ 50-100 /100-200/200-300/300-500/500-1000

Filled by :

**Annexure IX Questionnaire used for Forest Officials**

**Name and address of the respondent:**

**Designation:**

**How long you have been in Wayanad:**

**The names of Ranges you have served in Wayanad:**

**What do you think of night travel ban: ok/good/bad**

**Do you think night traffic ban should be lifted: Yes/No?**

**If Yes/No, why?**

**Is there any benefit due to night travel: Yes/No**

**If yes/No, what (explain):**

**What are the observed good/bad impacts on wildlife due to the ban of night traffic on NH 212:**

**What are the management issues faced by you in Kerala side due to night traffic ban on NH 212:**

**Is there any change in the number of human wildlife conflict incidences after the closure of the road for night traffic? Reduced/increased/No change**

**Do you think the night traffic ban has helped in reducing human Wildlife Conflict? Yes/No**

**Do you see animal carcass on road while driving: Yes/No**

**If yes, what are the species normally seen dead:**

**Is there change in the night traffic on the Mananthavady-Kutta Road after the ban:  
Increased/Decreased/No change**

**Is there any observed change in the tourist volume after the night ban:  
Increased/Decreased/No change**

**If yes, what is the change in terms of numbers (approximate):**

**Is there any change in the income from tourism due to night traffic ban: Reduction/Increase**

**Filled by :**

**Annexure X Vehicle Count Form**

**Duration: From                      To**

**Bus:**

**Truck:**

**Medium goods carriage:**

**Car/jeep:**

**Mini bus:**

**Two wheelers:**

**Destination:**