

## **Project Update: February 2011**

The first phase of our research was focused on mapping fig trees outside the protected area matrix in and around Kaziranga National Park. Nearly 300 trees in the area were mapped and measured, and team members were trained in bird identification skills / monitoring protocols. We also designed a social science questionnaire, examining people's perceptions of figs and frugivores, and to identify threats to species in the area. The second phase of the project focused on collecting questionnaire sample across villages where *Ficus* trees were located. We collected 278 questionnaires, the results of which are included in this report. The project had to be extended from its initial finishing time (Sept 2010) due to heavy rains during the monsoon that made bird sampling difficult. However, bird monitoring has been completed and the results are being analyzed. In addition, we also conducted outreach programmes amongst school children and the local community to create awareness of *Ficus* and frugivores in the area. Key take home messages from this are being evaluated and next steps for concentrated actions will be presented in the final report.

### **Major Activities**

#### **(1) *Assessment of the role of Ficus in providing resources for Frugivores***

Focal observations of birds on *Ficus* trees were conducted in four distinct matrix habitat types: tea estates, village home gardens, paddy fields and peri-urban areas. Due to heavy monsoon rains between May and August 2010, we had to lengthen the study period to early November. However, we managed to complete nearly 300 hours of bird sampling over the year-long study period and have a database of over 2000 individual bird records. The data is now being analyzed (Feb-Mar 2011) and we will be generating crucial information on:

- (1) Patterns of frugivory in the non-reserve matrix, and whether this is influenced by the underlying landscape structure
- (2) Determine what individual tree (site) level variables influence patterns of bird visitation
- (3) Identify key features that will contribute to the survival of frugivory patterns outside protected areas

This information will then be used to identify future conservation strategies. We also hope to write one academic paper in collaboration with academics from the Biodiversity Cluster at the School of Geography and Environment at Oxford. This will give impetus and credibility to the current project and help continue important work in the future.

#### **(2) *Assessment of threats to Ficus and Frugivores***

Between April and October 2010, we conducted 278 questionnaire-based interviews on figs and frugivores amongst the local community in the region. This is perhaps the first large-scale survey exploring peoples' perceptions of trees in India. Key findings of the survey include:

- (1) Religious values play an important role in mediating peoples' perception and knowledge of *Ficus* trees. The main uses people attribute to figs are related to religious practices.
- (2) *Ficus* trees are not planted around peoples' homes or gardens, as they rank low in commercial benefits. Rather, natural regeneration / dispersal by frugivores are the main reason for their growth. However, once figs attain a particular size and morphology, they are revered and mature trees are not cut down because of the religious features attributed to them.
- (3) *Ficus* conservation in the region has to blend extant cultural factors (e.g. religious values of figs, their social value as markers of place or spaces to rest under) with ecological awareness of the broader benefits *Ficus* have for the ecosystem.
- (4) As ecological keystones and culturally important species, there is great potential of using *Ficus* as a way to create awareness of conservation values in the local community. These results should be harnessed to implement a long-term conservation and monitoring project in the area.

Further details of the results are presented at the end of this report.



### **(3) Targeted awareness programme**

We conducted awareness programmes amongst school children in different schools across the landscape. Four village schools were targeted. Team members gave talks about *Ficus* trees in the landscape and their conservation value. There was high attendance, and we reached out to over 200 students and teachers. After the talk, selected students were taken the following day to a fruiting fig in the landscape to observe birds and learn more about frugivory. Students were taught basic skills in bird identification and how to observe birds in the field. Further, they were given on-ground demonstrations of how *Ficus* trees are pollinated by fig wasps, how their seeds are dispersed by birds and bats, and the ecological importance of these trees as keystone structures. A total of 24 students from four different schools took part in the field awareness programme. In addition, we also conducted two focus group interviews (10 people; 5 in each group) with village elders and individuals from local governance bodies to discuss the potential of managing *Ficus* trees in the landscape. People thought that there was a need to plant *Ficus* trees in public places and this should form part of a future *Ficus* conservation strategy. This also tallies with the

results from our questionnaire-based surveys and we feel there is great scope for continuing the community aspect of this project in the future.



### Project Objective and Status

Objective	Status (Feb 2011)
#1: Investigating role of <i>Ficus</i> trees as food source for frugivores	Field surveys completed with over 250 hours of observations; c.300 <i>Ficus</i> trees in the landscape mapped; data currently being analyzed
#2: Identification of threats to figs and frugivores	Threats to fig trees identified; final analysis of bird data required.
#3: Explore local perceptions of figs and frugivores in the region	Completed; 278 questionnaires, several focus group and qualitative interviews conducted. Data presented in report. Final paper to be written up.
#4: Assess feasibility of community-based fig conservation programme	Currently being reviewed; key strategies will be provided in final report.

### Current and Planned Activities

- Analyse spatial data of *Ficus* trees using GIS imagery of the landscape to identify ecological correlates of tree presence-absence
- Complete analysis of frugivory patterns in the landscape (statistical analysis using SPSS, Distance and SAM)
- Identify next steps for *Ficus* conservation / further ecological work in the area
- Write up two academic papers on *Ficus* and frugivory in the landscape (to be submitted to international conservation journals)
- Popularize results of the work and Rufford support through local media; design a poster for outreach activities

### Local Perceptions of Figs in Assam, India: Findings

A total of 278 questionnaires were completed during the study period (April 2010 to October 2010). A majority of the respondents were male (89.5%; n=247) as our

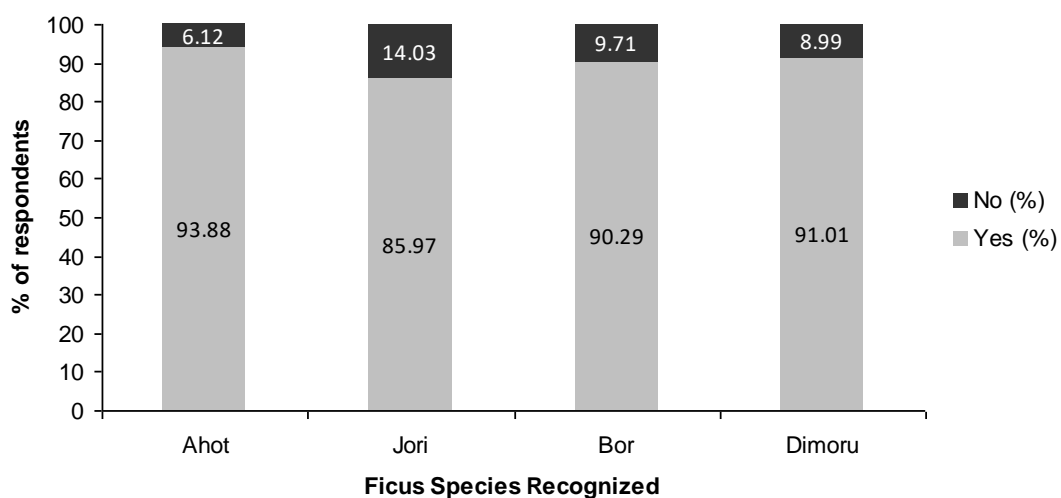
sampling was generally through households and men are the general spokespersons in the community. The mean age of the respondents was 37 years (range from 18 to 95); only individuals above the age of 18 were interviewed. Average monthly income ranged from none to Rs. 15,000 (mean monthly income Rs. 4,700). The average education of the respondents was 9 years (ranging from no education to 17 years). None of these variables were normally distributed (Kolmogorov Smirnov Z test); hence non-parametric statistics have been used.

**What are the most valuable trees in your garden?**

A total of 58 different trees were mentioned by respondents. Tree species were then ranked using a simple score (Number of times mentioned / total number of respondents). Mango scored the highest (0.71), followed by Jackfruit (0.53), Teak (0.42), Coconut (0.32) and Betelnut (0.31). All these species are valuable either for their fruit or timber. *Ficus* scored low: *Ficus religiosa* had a score of 0.04, followed by *F.bengalensis* (0.02), *F.retusa* (0.01) and *F.glomerata* (0.01). This shows that the overall value people attach to *Ficus* in comparison to other trees is low. Amongst respondents who mentioned *Ficus* trees, 58% said that *F.religiosa* was present in their garden from before and that they did not plant them. For other *Ficus* species, all the *F.bengalensis* (100%), 80% of *F.retusa*, and 40% of *F.glomerata* were either present from before or had grown on their own, i.e. they were not planted.

***Ficus* species recognized by people**

Four different *Ficus* species were most frequently mentioned by people: *Ficus religiosa* (local name Ahot), *Ficus bengalensis* (local name Bor), *Ficus retusa* (local name Jori) and *Ficus glomerata* (local name Dimoru). Ability to recognize *Ficus* species differed between species (Cochran’s Q=22.73, DF=3, p=0.000), with fewer people recognizing *F.retusa* than the other three prominent figs present in the landscape (Fig. 1).

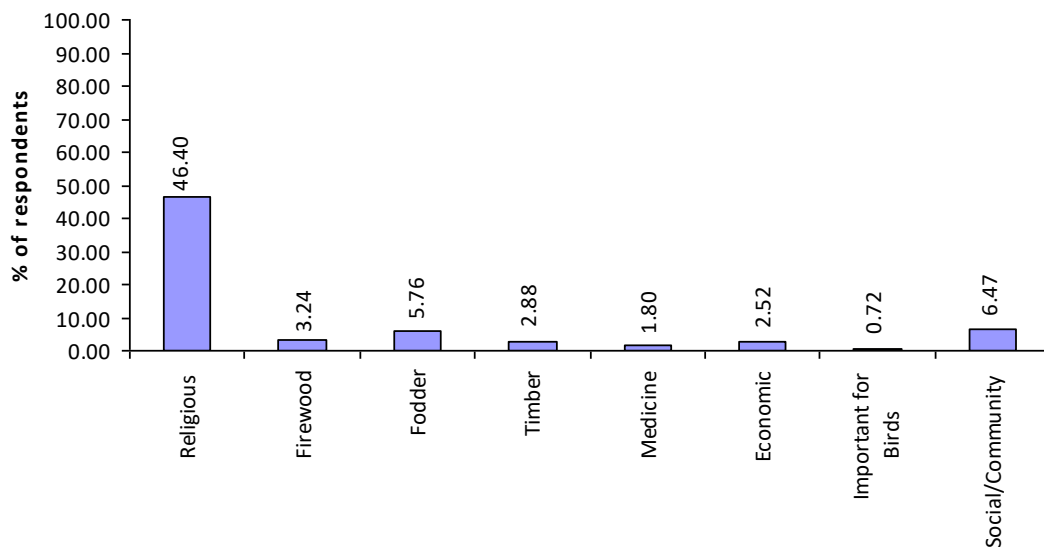


**Fig. 1: *Ficus* species recognized by respondents; fewer respondents recognized *F.retusa***

The category “*Ficus*” or “fig” was absent in the local terminology. People grouped these trees as “species related to *F.bengalensis* or *F.religiosa*”. This suggests that future conservation strategies in the area need to use ethno categories that at least convey the meaning of scientific terminology, rather than imposing additional categories that may not be meaningful or to which people might not be able to directly relate.

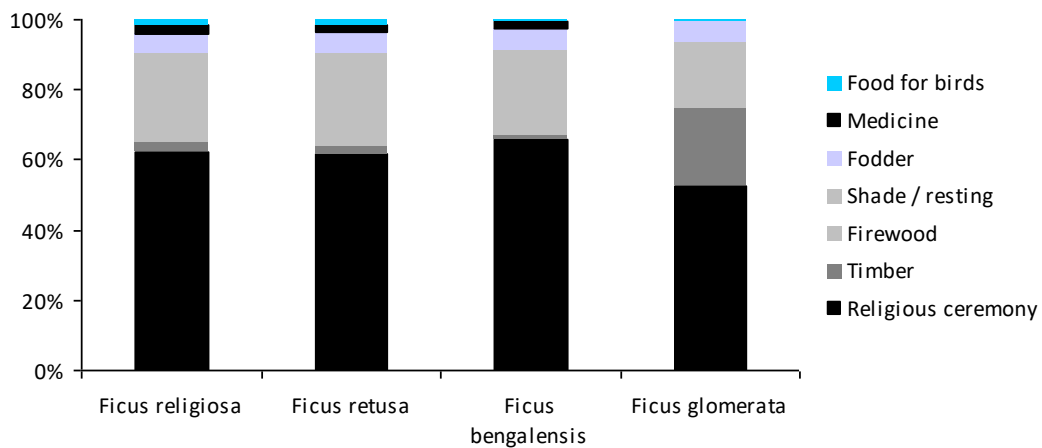
### Values associated with *Ficus*

Responses to the question “Do *Ficus* trees have any value?” showed that 70% (n=191) felt that these trees had some value, whilst 30% (n=82) said they didn’t. A range of values and uses were associated with these trees, including religious value, use as firewood and timber, fodder for cattle, as food for birds or animals and social / community benefits (Fig. 2). The most frequent value associated with *Ficus* was religious, accounting for 46% of the responses (n=129). Religious values included use of some part of the fig in religious ceremonies or were innate religious attributes of trees (place for spirits, as shrines, etc). This was followed by social values or community benefits such as markers of place, resting space, etc. (6.47%; n=18), and as fodder for cattle (5.76%; n=16). Differences between the values mentioned were significant (Cochran’s Q=5.65, DF=7,  $p=0.000$ ).



**Fig. 2: Values and uses associated with *Ficus*; religious values were the main feature.**

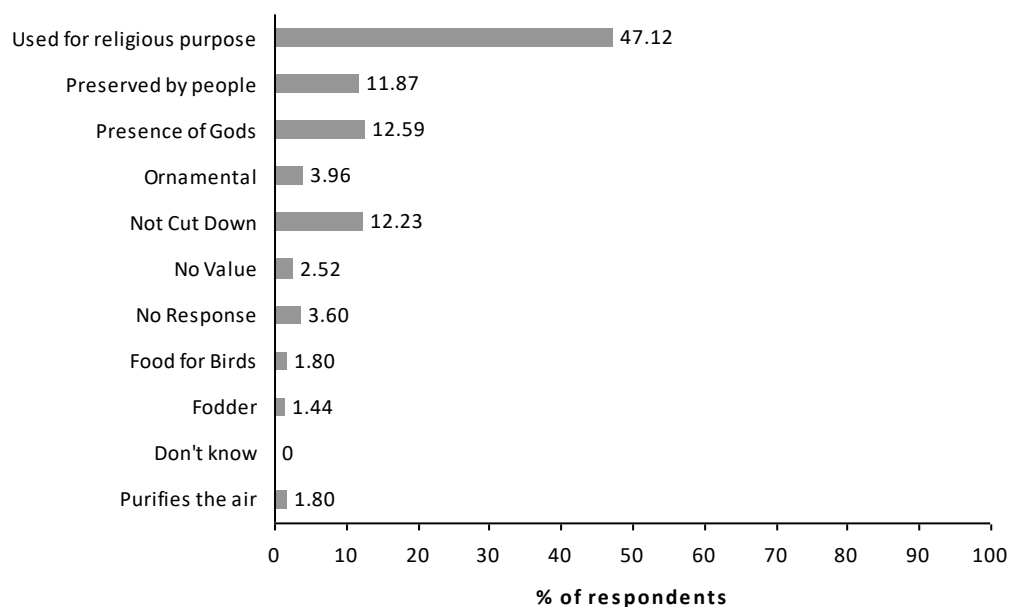
More people attributed religious values to *F.religiosa* (91%; n=253) (Fig. 3). This was followed by *F.bengalensis* (87%; n=241) and *F.retusa* (83%; n=231). Religious attributes were lowest for *F. glomerata* (67%; n=185). Differences in religious values for different species was significant (Cochran’s Q=1.03, DF=3,  $p=0.000$ ). Similarly, *F.glomerata* scored low for social / community values (18%; n=51), when compared to other *Ficus* species. Social values ascribed to different *Ficus* species was also significant (Cochran’s Q=1.07, DF=3,  $p=0.000$ ). However, there were no differences amongst *Ficus* species in terms of their use as cattle fodder (Cochran’s Q=0.00, DF=3,  $p=1.00$ ).



**Fig. 3: Values and uses associated attributed to four different *Ficus* species.**

### Perceived threats to *Ficus* in the landscape

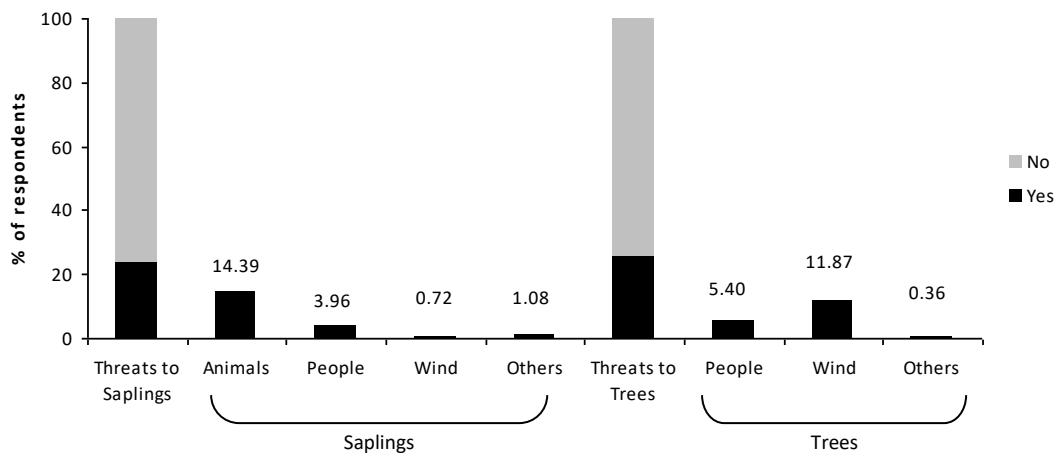
People were asked why *Ficus* trees remained in the landscape and a range of explanations were given (Fig. 4). Their use in religious ceremonies was the most frequent response, followed by statements such as “Preserved by people” and “Presence of gods or spirits in *Ficus* trees”. Other explanations were more simplistic, e.g. 12% of the respondents said *Ficus* remained in the landscape simply because people didn’t cut them down. However, the number of people attributing religious reasons is significant.



**Fig. 4: Why does *Ficus* remain in the landscape?**

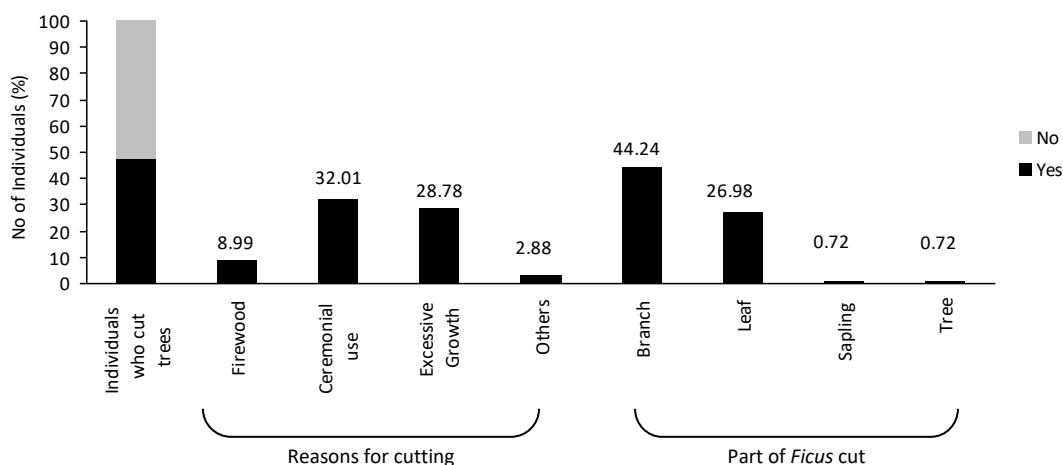
Most people felt that there were no major threats to *Ficus* saplings (76%; n=205) or to mature trees (74%; n=201). Those who did say there were threats identified animals (mainly goats or cattle) as the major threat to saplings, and wind or storms

as a threat to mature trees. Some individuals did mention cutting of trees or weeding out of saplings as reasons, but these were few in comparison.



**Fig. 5: Are there any threats to *Ficus* in your landscape? If so, what are they?**

When asked whether people cut down *Ficus* trees, 53% said they did cut trees, whilst 47% said they didn't (Fig. 6). Most people said they either cut branches or plucked leaves from the tree. Less than 1% said they cut the whole tree down or removed saplings. The main reason for plucking leaves was for use in religious ceremonies, whilst branches were cut either to obtain firewood or when there was excessive growth and it interfered with peoples' activities. The large number of people who said that they did not cut down the tree suggests that religious values attached to *Ficus* are potentially important in their conservation in the landscape.



**Fig. 6: Do people cut *Ficus* trees? Why? What part of the tree do they cut?**

### Perceptions of Conserving *Ficus* in the Landscape

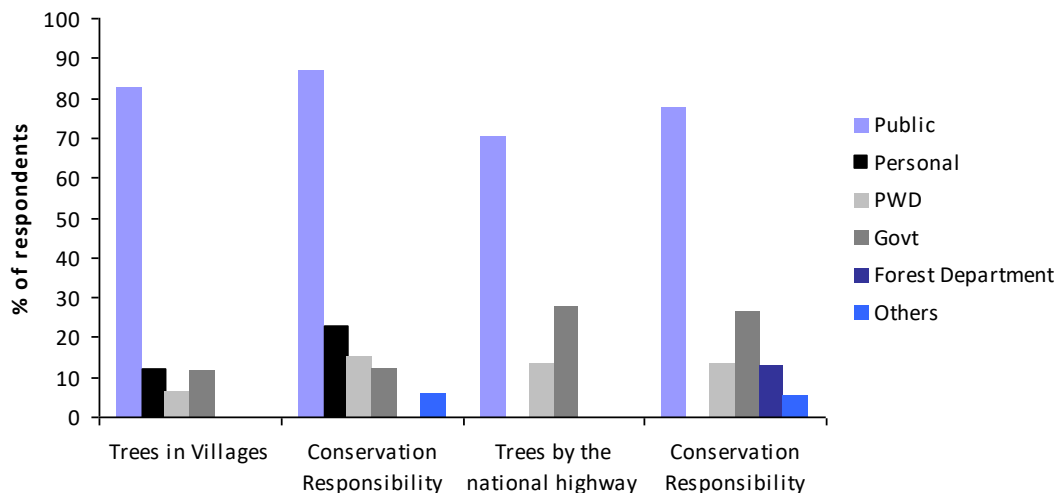
Responses to the question "Do *Ficus* trees have religious value?" showed that 96% (n=269) thought they did. Most respondents said this was valid for all *Ficus* trees (71.58%; n=199). Others mentioned specific localities: *Ficus* associated with temples

(245; n=67), those in villages (5.40%; n=15) and trees by the roadside (5.04%; n=14). Differences in the choice of localities were significant (Cochran's Q=78.77, DF=2, p=0.000), with temple trees scoring higher. This suggests that structures associated with *Ficus* perhaps lends to their religious value.



**Fig. 7: Do *Ficus* trees have religious value? If so, which trees?**

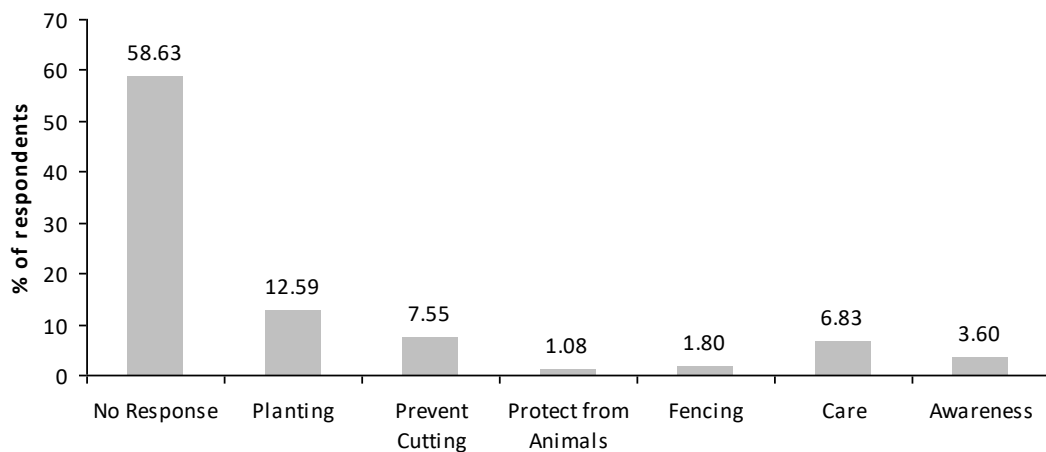
Most people felt that *Ficus* in village spaces or near the national highway (where a lot of *Ficus* were distributed) was public property (Fig. 8). Respondents also said that the onus of conserving these trees was on the public. However, there were differences in opinion as to whether trees in villages and those by the highway were public property (villages  $\chi^2 [1] = 121.78$ ,  $p < 0.0001$ , national highway  $\chi^2 [1] = 50.82$ ,  $p < 0.0001$ ). Similarly, more people thought that trees by the highway was the government's property as opposed to those in village spaces (villages  $\chi^2 [1] = 160.95$ ,  $p < 0.001$ , national highway  $\chi^2 [1] = 53.24$ ,  $p < 0.0001$ ). More respondents said it was their property to conserve *Ficus* trees in villages (22.06%), as opposed to those by the highway (no respondents; 0%).





**Fig. 8: Whose property and conservation responsibility are *Ficus* in villages (first two sets); whose property and conservation responsibility are *Ficus* near the national highway (third and fourth sets).**

When asked “What measures should be taken to conserve *Ficus* trees?” a majority of the respondents (58%) said they didn’t know or didn’t respond to the question (Fig. 9). A range of other measures were mentioned, including planting saplings, prevention of cutting down trees, taking care of saplings and protection from animals (cattle, goats). A few respondents said that people should be made more aware of *Ficus* and its conservation values.



**Fig. 9: What measures should be taken to conserve *Ficus* trees?**

However, only 47% of the respondents were willing to plant trees. There was a local belief that one should not plant trees unless for some religious purpose, and this may have been a contributing factor to the low rate of responses in willingness to plant *Ficus*. Moreover, the fact that very few people had them in their gardens, and when present these grew by chance, suggest that planting might not work unless initiated by third-party actors. More people (30.58%; n=85) thought *Ficus* should be planted by the roadside, as opposed to other village spaces (26.62%; n=74) or in their own homes (8.63%; n=24) (Cochran’s Q=52.86, DF=2, p=0.000). Whilst a few people (7.55%; n=21) said that prevention of cutting of *Ficus* was one way of conserving them, fewer people were willing to prevent cutting of *Ficus* that belonged to other individuals (58.63%; n=163) as opposed to those standing by the roadside (79.1%; n=220) and those in temples (81.29%; n=226) (Cochran’s Q=1.09, df=2, p=0.000).