# Print mass media coverage of wildlife in the developing world

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*Wildlife news is assumed to be a less commonly reported item in the media. We studied wildlife related news coverage by the Indian print news agencies and quantified its patterns by reviewing 766 news items across 50 national, regional and business newspapers in the year 2011. We found a considerable size bias towards large bodied species (1 : 8 times) in portrayal of wildlife news items. The Indian print media was also more likely to report large, endangered, terrestrial mammals when they reported about wildlife. Nearly half of the wildlife reports by dailies were on tigers (>250) and other endangered large felids (>150). A tendency towards controversial portrayals with respect to species such as leopards and elephants was observed. We found similar pattern of reporting between national, regional and business newspapers with respect to species and themes covered. Business dailies rarely carried wildlife related news (5 items). It is suggested that a balanced and ecological approach to sensitize the masses by various agencies can be adopted to reduce misconceptions and increase acceptance.*

**Keywords:** Development, endangered, felids, indigenous people, human wildlife conflict, large mammals, print news.

PRINT media content analysis is a reliable source of determining trends in public perceptions and plays a powerful role in presenting wildlife as either to further its conservation, or leave it as a neglected element of our natural heritage[1]. The mass media can aid in achieving biodiversity conservation goals by encouraging awareness and encouraging acceptance through public discourse which are key factors in recovery of populations of various species[2,3]. Print media such as newspapers can also inform on local constituencies, reflect urban and rural, as well as regional differences; they can track, in a relatively undistorted way, historical changes and can reflect the experiences and concerns of a large fraction of the general public[4].

India is the world's second most populous country with 1.21 billion people. With population growth rate of 1.2%, the pressure on the country's natural resources especially its natural parks and protected areas is tremendous. India's forest cover is about 21.34% within which a protected area coverage (PA) is approximately 5% of the nation's geographical area. The country has plans of high economic growth (GDP 7.4%) amidst enormous poverty gap due to which biodiversity conservation is often challenging. In the recent past, India has recovered from serious ecological crisis; tigers, rhinos and Kudremukh movement are some examples of conservation success stories[5–7]. It is gradually being recognized that mainstreaming biodiversity conservation into everyday decisions of business and public sectors especially the media is vital for such programmes to succeed[8,9].

According to the United Nations, India falls under the list of developing countries[10]. The Indian print media, i.e. newspaper circulation is close to 300 million; however, environmental coverage in Indian dailies is less than 3% (ref. 11). Few studies have documented media coverage of environmental news[12–15]. In the current study we attempt to understand particularly wildlife-related news coverage by the Indian print news agencies and quantify patterns. As print media is reliable and well documented, they can reflect popular views[16]. We examine: (a) Wildlife news items reported with respect to species and issues; (b) content analysis of news reported; and (c) nature of news reported with respect to regions and coverage type. We expect that large bodied, charismatic and animals receiving management interventions will get more news coverage than other species or types of animals. We also expect that national and regional dailies will have difference in importance to wildlife themes or topics that they report compared with dailies that have a pan nation coverage.

## Methodology

We collected news articles on wildlife issues from professional news clipping services and data from Green

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Book[17] from January to December 2011. Various newspaper articles were obtained from widely available 49 different newspapers (see supplementary sheet). We followed standard content analysis procedures similar to those used by Jacobson *et al.*[2,18]. We discarded collated data from green book as it was only textual and it would not be able to extract covariate information such as presence of picture and colour. Hence, the 766 news items that were in English from national and regional dailies pertaining to January through May 11 were used. The news articles were sorted according to date, region, paper type (major, regional, business), protected area type (tiger reserve, national park, wildlife sanctuary, zoo), species type (large, i.e. >25 kg of body weight, small-medium, mammal, terrestrial, aquatic, charismatic, marine, birds, reptiles, amphibian), picture presence, IUCN status of the species reported, person quoted, headline type (catchy, misleading and plain), pattern of reporting (event or non-event based), and content analysis (psychological, scientific impact and linguistic). The news items were sorted and content was noted according to predefined themes related to wildlife, viz. if any news was pertaining to (i) conflict, (ii) tourism, (iii) crime, (iv) conservation, (v) education, (vi) indigenous peoples, (vii) forest produce and (viii) policy or management related and was the depiction negative or positive with respect to the species or conservation. News were divided into zones of circulation, i.e. (a) North zone (Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Punjab, (b) West zone (Rajasthan, Gujarat, Maharashtra), (c) South zone (Karnataka, Tamil Nadu, Andhra Pradesh, Kerala), (d) East Zone (Odisha, West Bengal and North East states) and (e) Central zone (Madhya Pradesh, Chhattisgarh and Uttar Pradesh). We analysed data to explore descriptive characteristics of news reported with respect to species, type of taxa, size of taxa, conservation value and source of news. We delineated top five species reported zone-wise and country-wise. Data was also grouped on the basis of newspaper coverage that the item got, i.e. national daily, regional daily or business daily. We used *t*-test to assess any differences in pattern of reporting between such papers with respect to species and thematic representation of the content.

To analyse content portrayal of news we used general linear binary additive models in R (R Development Core Team, 2015), R commander[19] using only top five species reported as the response variable and content of news of reported, i.e. conflict, tourism, crime, conservation, education, indigenous peoples, forest produce, policy or management related. Model selection was done using akaike information criteria (AIC) from a stepwise regression model[20]. We also assessed news diversity using Shannon-Wiener diversity index among various zones[21]. To test for differences between thematic coverage across and between species we used 2-way ANOVA (MS Excel 2016 Add in).

## Results

766 news item across 50 newspapers during 2011 (January–May) were reviewed. We found 45 items (species/subjects) being reported by newspapers across the nation (Figure 1). Tigers (>250) were the most reported subject while red panda (<5) and swamp deer (<5) were least reported. News items contained 76% relevant pictures, while 20% of the time contained not relevant pictures, remaining items contained no picture. It was found that the main sources quoted in a news item were unknown sources (375), federal officials (297), nonfederal officials (78) and both federal and nonfederal officials (16).

In terms of news reports with respect to different classes of taxa, viz. size, charisma and taxa type, large (458) terrestrial (502) mammals with charismatic value (406) were most reported. Small sized species (58), aquatic (2), marine (10), avian-fauna (29) and reptile-amphibian (15) were least reported. News items were concentrated mostly on endangered species (481) and least on least concern species (9, Figure 1 and 1 *a*).

Species that were reported most were of the endangered category. On excluding tiger, we found that news items still reported >90% on endangered species followed by near threatened species, critically endangered, vulnerable and least concerned respectively. The most reported critically endangered species were vultures, near threatened – were leopards, vulnerable were – bird species, least concerned were – non species specific but group of taxa. The most reported large animal was tiger, birds, leopard, elephant and reptiles respectively. Among small-medium sized animals, the most reported were birds, vultures, amphibians and pygmy hog respectively (Figure 1).

The top five species/subjects in relation to wildlife were tiger, issue/policy news, birds, leopard and elephant. In terms of themes with which these top species/subjects were reported, there was tremendous difference among groups with respect to themes of an article (Figure 2) while among species/subjects there was no significant variance. For example, though all the news articles were in a broader sense related to conservation, articles related to leopards (40.22%) and elephants (25.33%) also mostly reported conflict issues.

### *Content analysis*

General linear models (GLM) showed varying significance with respect to explanatory variables (Table 1). News items that reported on birds tended to report it from an educational ($p < 0.01$) and tourism perspective significantly ($p < 0.01$). For tigers, the content was a mix of educational ($p < 0.001$), scientific ($p < 0.001$) as well as conservation ($p < 0.001$) oriented. News on elephant did not significantly show any particular content type. If the news was about leopards, it was mostly related to policy

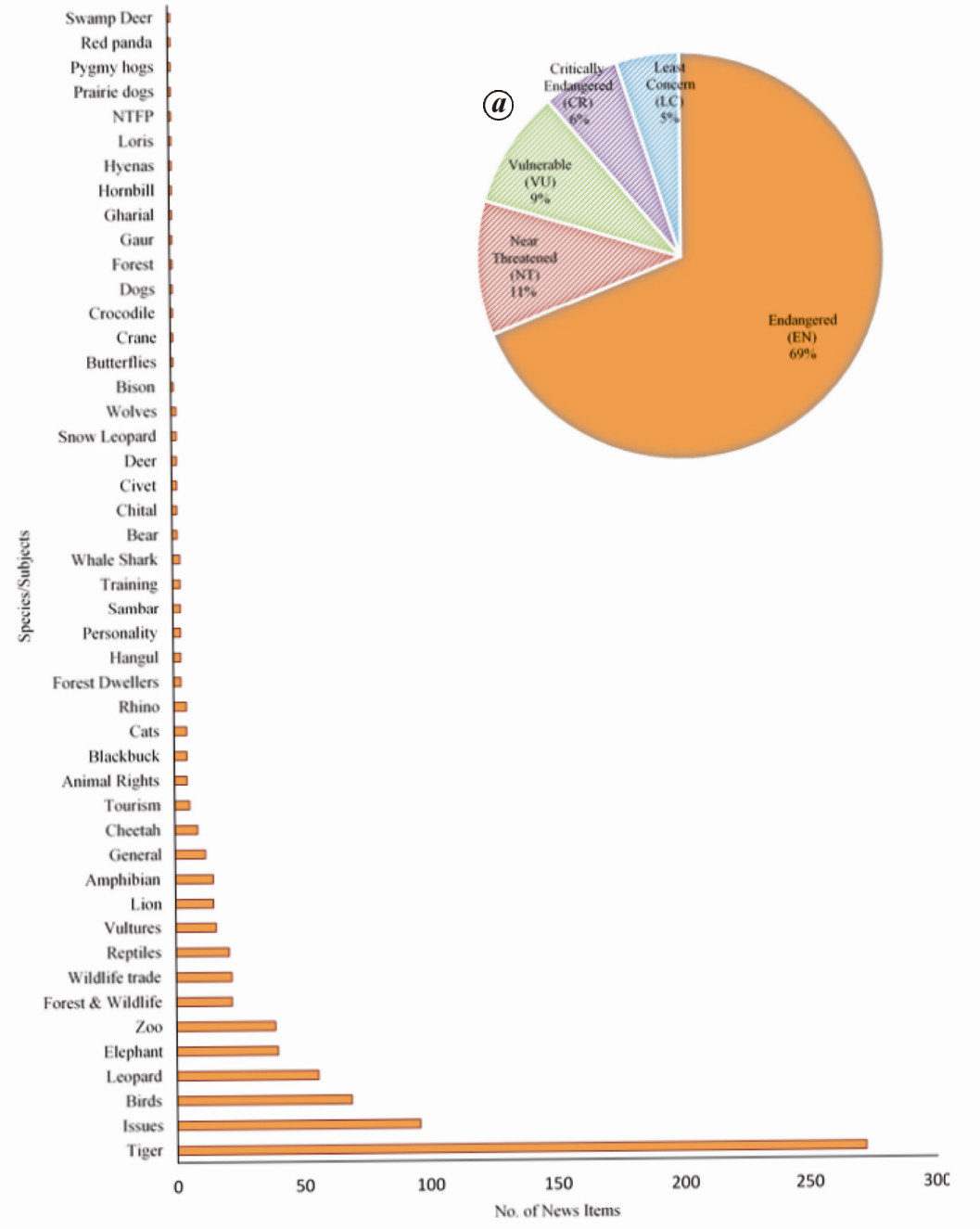


**Figure 1.** News report coverage of broad themes/species related to wildlife in India from major and regional Indian dailies. (***a***) Pie chart of species reported with respect to IUCN category.

or managerial issues in dealing with leopards. Similarly, non-specific issues reported were mostly with respect to forest dwellers/rights ($p < 0.001$), conservation ($p < 0.001$) and policy ($p < 0.001$).

Among the five zones that were divided with respect to newspaper circulation, we found tiger always dominated wildlife news with highest reports from the Northern zones of India (Figure 3 and Table 3). Elephant and rhino also figured among the popular news items reported in the east and southern zones. The Shannon Weiner diversity of news among all the four zones was highest for North Zone (2.44) > South Zone (2.41) > East Zone (2.36) > West Zone (2.22) > Central Zone (1.88).

Newspapers that had national coverage reported 459 news items compared to 302 and 5 news items by regional and business newspapers. We found no significance in terms of pattern of news reporting with respect to species being reported between national and regional newspapers ($p = 0.09$, $T_{crit} = 1.85$, $T_{stat} = -1.45$). We also found that similar importance to theme of content was

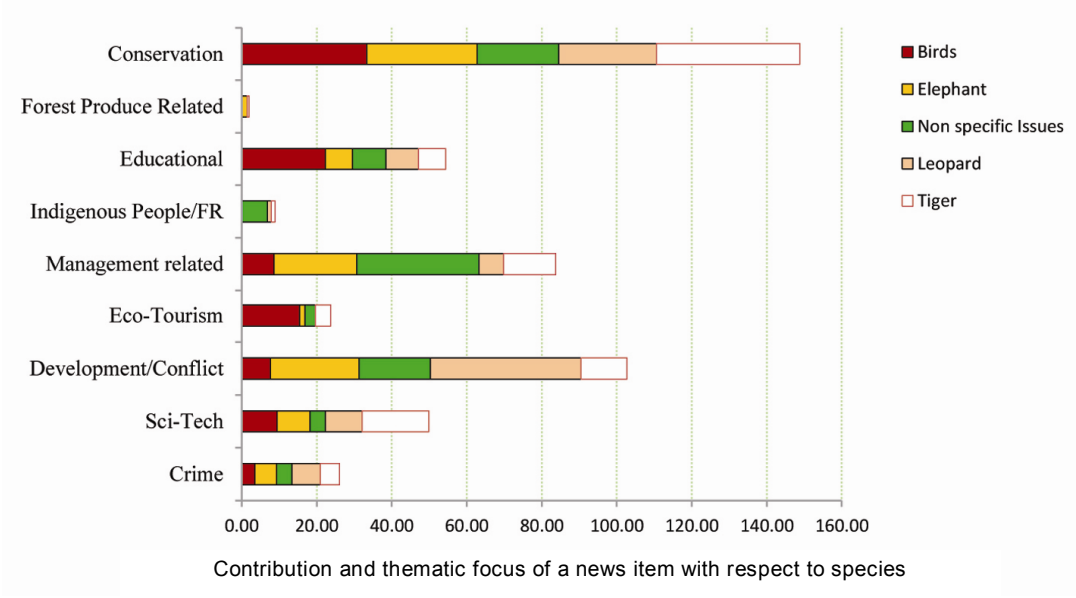


**Figure 2.** Thematic focus and species/subjects across top five reported species/subject in wildlife.

**Table 1.** Binary logistic regression. Birds news mostly reflected articles with a significant educational, tourism and picturesque depiction in papers. Conservation and educational wildlife perspectives were significantly focused on tigers. Non-specific wildlife issues were themed mostly with forest dwelling people and conservation. Leopard-related articles significantly contained managerial policy issues that were highlighted

| Model (Binary Logit Models) | Null Deviance | Res Deviance | Res df | AIC |
|---|---|---|---|---|
| Birds ~ conflict + conservation + crime + Educational *** + forest_dwellers + forest_products + policy + picture_rel* + science & tech^ + Tourism & business*** | 410.78 | 340.88 | 532 | 362.88 |
| Birds ~ Tourism & business*** + Educational***, family = binomial(logit), data = Media) | | 356.10 | 530 | 362.1 |
| Tiger ~ conflict + conservation** + crime + forest_dwellers + forest_products + picture_rel + policy^ + science-tech*** + tourism & business + Educational*** | 738.67 | 682.58 | 522 | 704.58 |
| Tiger ~ science-tech + Educational + conservation | | 689.90 | 529 | 697.9 |
| Tiger ~ conservation*** + policy + science-tech*** + Tourism & business + Educational*** | | 686.18 | 527 | 698.18 |
| Tiger ~ conservation *** + policy^ + science-tech *** + Educational *** | | 686.56 | 528 | 696.56 |
| Elephant ~ conflict + conservation + crime + Educational + forest_dwellers + forest_products + policy + picture_rel + science-tech + Tourism & business | 284.09 | 270.46 | 522 | 292.46 |
| Issues ~ conflict + conservation*** + crime + Educational^ + forest_dwellers*** + forest_products + policy*** + picrel + science-tech* + Tourism & business | 502.69 | 426.79 | 522 | 448.79 |
| Issues ~ policy*** + forestppl*** + conservation*** | | 440.9 | 529 | 448.90 |
| Leopard ~ conflict + conservation + crime + Educational + forest_dwellers + forest_products + policy** + picture_rel + science-tech + Tourism & business | 358.25 | 332.19 | 522 | 354.10 |
| Leopard ~ Tourism & business + policy** | | 339.84 | 530 | 345.84 |

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '^' 0.1'.

**Table 2.** Zone-wise breakup of news items and their relative importance with respect to number of items covered. News diversity is reflected with respect to number of news article in various zones. North India zonal papers were most diverse in terms of wildlife topics covered

| Rank | Items | North Zone | Items | South Zone | Items | East Zone | Items | West Zone | Items | Central Zone |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Tiger | 148 | Tiger | 27 | Tiger | 18 | Tiger | 66 | Tiger | 11 |
| 2 | Issues | 60 | Leopard | 9 | Elephant | 7 | Issues | 25 | Birds | 4 |
| 3 | Birds | 33 | Issues | 7 | Birds | 6 | Birds | 20 | Elephant | 2 |
| 4 | Leopard | 22 | Birds | 6 | Leopard | 4 | Leopard | 20 | Forest & Wildlife | 1 |
| 5 | Zoo | 20 | Elephant | 6 | Rhino | 4 | Zoo | 9 | Gaur | 1 |
| Total | | 408 | | 86 | | 184 | | 58 | | 25 |
| NEWS diversity | | 2.44 | | 2.41 | | 2.36 | | 2.22 | | 1.88 |

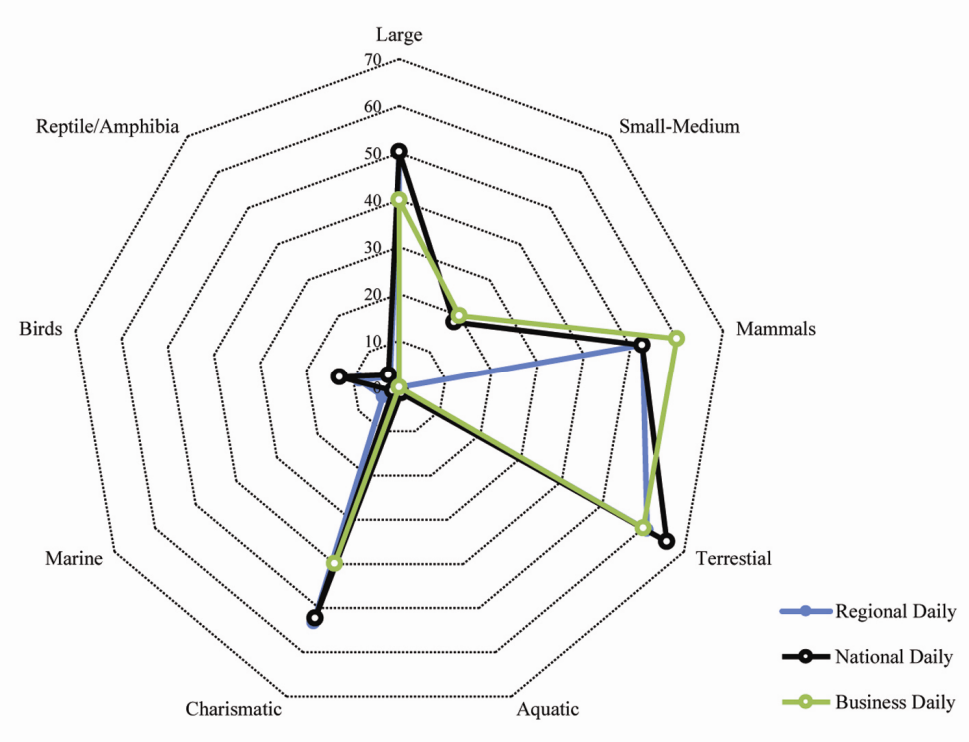


**Figure 3.** News reporting with respect to species and geographical coverage of newspaper. Newspapers mostly focused on large, mammal and terrestrial aspects of wildlife.

**Table 3.** Top ten news items/species that were reported in relation to crime or conflict in Wildlife

| Rank | Items/species | Crime reports | Conflict reports | Total items | Proportion (crime) % | Proportion (conflict) % |
|---|---|---|---|---|---|---|
| 1 | Tiger | 21 | 57 | 272 | 7.72 | 20.96 |
| 2 | Issues | 12 | 17 | 96 | 12.50 | 17.71 |
| 3 | Birds | 8 | 17 | 71 | 11.27 | **23.94** |
| 4 | Elephant | 5 | 9 | 40 | 12.50 | **22.50** |
| 5 | Wildlife trade | 5 | NA | 22 | 22.73 | NA |
| 6 | Leopard | 4 | 13 | 56 | 7.14 | **23.21** |
| 7 | Lion | 4 | 5 | 15 | **26.67** | **33.33** |
| 8 | Personality | 2 | 1 | 3 | **66.67** | **33.33** |
| 9 | Zoo | 2 | 7 | 39 | 5.13 | 17.95 |
| 10 | Animal Rights | 1 | | 5 | **20.00** | NA |
| | Grand Total | 73 | 162 | 619 | 11.79 | 26.17 |

given across regional and national dailies ($p = 0.09$, $T_{crit} = 1.85$, $T_{stat} = -1.43$). We found that human wildlife conflict and crime reports were highest for tiger in terms of absolute number of reports (Table 3). However, in terms of fraction of news items that reported about conflict and crime with respect to total news items about a species, it was seen that lions, personalities and wildlife trade issues contained more than 20% of content about crime. With respect to conflict, personalities, leopard, lions, elephant and bird news items contained more than that 20% content related to human wildlife conflict. Overall it was seen that nearly 26.17% of the total number of wildlife news examined was about human wildlife conflict and 11.79% was about wildlife crime.

## Discussion

There is considerable size bias towards large bodied species such as tigers and leopards (1 : 8 times) in portrayal of wildlife news items. We feel that large-bodied species receive more news coverage. There is also a tendency towards controversial portrayals with respect to some species that are often in the news. The Indian print media is more likely to report large, endangered, terrestrial mammals when they report about wildlife. We found that nearly half of the wildlife reports by dailies were on tigers, and endangered large felid. Discounting such articles, there were just 20% of articles that talked about other endangered animals. This may suggest that conservation status

of a species alone may not make news. Pictures almost always accompanied an article but 1 out 3–4 pictures would be irrelevant with respect to the article covered. The print media often ignored small and non-charismatic species, for example, the least reported species such as red panda, swamp deer, loris, gharial, snow leopard, rhino and amphibians as well as marine animals. Some content was on habitat and landscape level conservation or awareness and only one article that was directly about plant life 'Boost for bamboo, bust for tiger' (*The Times of India*, April 2011).

Content treatment by wildlife news to certain species directed the discourse often from neutral to negative most of the time. For example, 'Leopard population up, Shirur in grip of fear' (*Indian Express*, January 2011) or, 'Irked people kill leopard cub in Chanda' (*Hitavada*, April 2011) was almost the journalistic style and content that was depicted in reporting about leopard. Leopards in India face a similar perception to the Florida panther in some aspects[2]. Tiger on the other hand received a far less fear mongering or supportive pro-conservation treatment by newspapers, for example 'Tigers should be best left alone in jungles' (*Pioneer*, March 2011) or 'A bright moment for the tiger' (*The Times of India*, February 2011) was what most article headline would read. GLM results were similar with respect to these observations, birds were also seen in a positive light with respect to tourism and educative content coverage (Figure 2, Table 1). In most cases the portrayal of leopards, elephants and other non-specific issues was related to conflict management of wildlife, development versus conservation or the people versus parks controversy. The effects of such portrayal need to be considered as it has been found to increase risk perception among the public who were initially less likely to feel threatened[22].

From a geographical origin perspective, we find that north Indian print media dominates in terms of tiger news coverage. The country's tiger densities are ranked highest in central India and southern India. However, only 11 articles about tigers from central zone papers were found as opposed to 148 and 24 articles about tigers in north and south zone newspapers which may be due to journalistic interest among zonal offices of the various newspaper houses. Tigers also figure in most news reports that dealt with human wildlife conflict issues, but were rarely depicted in a negative light relatively to leopards, elephants, reptiles and birds. In terms of the newspaper's appeal, i.e. national, regional or business, we found no significant differences in the pattern of reporting between papers. We found size and charismatic species bias throughout all three types of dailies. However, business dailies concentrated significantly less in terms of wildlife coverage in general. If we assume business news is 'developmental news' then certainly environmental or wildlife coverage is important for generating awareness among business leaders as well.

The development versus conservation debate is often mixed with people versus park agenda in India[23,24]. We found 19 articles that directly had content relating to forest dwellers or communities indigenous or otherwise dependent on forest. In most cases the news content treated such subjects to be in conflict with the stewardship concept of the urban population. Perhaps this reflects the colonial concept of states to maintain sovereignty over natural resources. For example, some articles treated ethnic communities to be in conflict with conservation; 'Tribal hunting ritual or brazen poaching?' (*Pioneer*, February 2011), 'Baorias to get lessons in ecology conservation' (*Hindustan Times*, April 2011) and 'Tribal poaching nexus robbing Uttarakhand's forests of riches' (*Pioneer*, April 2011). However, support for indigenous rights was also evident from certain articles 'Scientist sacked for supporting tribal rights' (*The Times of India*, May 2011) and 'No forest rights act cover for dwindling Totos' (*The Statesman*, April 2011).

Media portrayals of wildlife can be diverse, informative, controversial, over-exaggerated and crucial[1,25]. Our study is limited to only content type and its portrayal, it does not address sociological aspects of readership as well as reader opinion. Future studies with larger and detailed analysis on such data especially from biodiversity rich countries, will help make sensible generalizations if possible to help further strategize the conservation agenda. In the Indian context, the wildlife news reports by most dailies has affinities with a market-driven approach, as the priorities of reporting are generally from a urban stewardship point of view and almost sometimes mistaken for adventure or leisure segment. In terms of wildlife/environment coverage, it cannot be said if newspapers demand as much accountability and government explanations as in the level of reporting intensity with respect to political or crime news[11].

Wildlife conservation has greatly evolved into a specialized field; the general public are usually unaware of wildlife or issues with it[2]. Most of the information that is sought in this domain is usually taken at face value also from television media and often shapes public opinion. Therefore, the media's rightful place is in raising the right kind of awareness about wildlife from an ecological, humanistic or even a moral perspective in daily lives of the public. While field conservation programmes can be left to experts, the challenge probably lies not in conserving wildlife but people's relations with wildlife which is where the media can actively catalyse change towards a pro-environmental attitude.

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